

MANAGEMENT OF ACCESS TO ELECTRONIC INFORMATION  
SOURCES AVAILABLE IN THE ENGINEERING COLLEGES OF WEST  
BENGAL : AN ANALYTICAL STUDY FROM USERS' PERSPECTIVES

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**“Management of Access to Electronic Information Sources Available in the Engineering Colleges of West Bengal : An Analytical Study from Users’ Perspectives”** submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the Supervision of Prof. Subarna Kumar Das And that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere / elsewhere.

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## EXECUTIVE ABSTRACT

Engineering Education plays an important role in the development of skilled manpower, enhancing industrial productivity and also makes notable improvement in the quality of life. Basically it offers courses and programmes in engineering, technology and its allied disciplines. Engineering college libraries like other academic libraries are expected to maintain quality and standards both in teaching and research. The libraries in engineering institutions play a crucial role in meeting the information requirements of users of professional disciplines.

In the digital age, libraries acquiring more and more electronic resources ( e-resources) because of its perceived benefits, such as easy access to digital information and its comprehensiveness. Due to dramatic increase of e-resources in libraries, the collection, acquisition and proper management for better access to these resources always puts a high demand to the library professionals. This forces the libraries to devise strategies to manage and deliver e-resources conveniently related to engineering and its allied disciplines. In order to make the teaching and learning more effective , the academic community need right information sources to consult that are expected to available in the libraries .Thus library acts as the facilitator and provider of need based information to highly academicians and intellectuals.

The use of latest form of e-resources in libraries began with the development of the machine readable catalogue format in the 1960s. E-resources have been increasingly accepted in Indian libraries and libraries around the world. Their popularity has been increased due to its accessibility, portability and storage. Last decade has witnessed a phenomenal increase in the use of e-resource such as e-journals, e-books, and full-text / aggregated databases, digitized and born-digital documents, digital images, streaming video, sound, audio books and internet/web resources in Indian libraries because of its merits over print resources. As a result, it has a significant impact on libraries and its users in both operational and organizational aspects besides changes in library usage pattern and budgets.

The increasing acquisition of e-collections and providing seamless online access to users have posed major challenges, which includes changes in libraries workflow such as selection,

acquisition, copyright, license agreement, negotiation, cataloguing, development of access interfaces, etc. In addition to the above, how to acquire and manage these collections in most efficient ways to ensure optimal access to users (students and faculty members) is become an issue before the library professionals. Consequently, methods, norms and standards are being developed for the management of e-resources in libraries through continuous research and innovation.

Due to influx of e-resources coupled with recent technological innovations like e-books, e-journals, e-databases etc. the library users often compare these services with services of libraries and expect similar simple and convenient access of e-resources from libraries. Corollary, these developments became a challenge for librarians to manage the collection development of e-resources. Many librarians found management of e-resource as critical because existing integrated library management systems (ILMS) are not capable enough to support the management of e-resources. The development of ERMS either through in-house expertise or commercial/proprietary product is a path breaking innovation in the line of library management which meets these challenges. It is a one-stop solution for managing and accessing e-resources which develop with specific standards and compatibility.

The publications of books and journals have largely moved out from the print world to electronic publications. Maintenance of both form of resources brought fundamental change to libraries system. The other factor such as cost benefit analysis should also be considered when libraries begin to invest in e-resources which can help in strengthen the value of its subscriptions-resources give attention to a range of legal issue including licensing. 'Licensing' in case of subscription of e-journals must be negotiated with content provider and executed as contracts. While negotiating on licensing, librarians should look into 'authorized users and sites', 'archiving policy and perpetual access', 'copyright and fair user', 'usage statistics', 'liability for unauthorized use', 'privacy and confidentiality', 'cost', 'technical considerations', 'indemnification', 'terms of payment and termination', 'governing law' etc.

E-resources play an important role in higher education in India. 'Library', 'Resources' and 'Education' are three indissoluble and indivisible concepts. These three are being vitally and concomitantly related to; and co-existent with each other. Currently libraries provide 'one-stop solution' for print and e-resources, including titles from commercial aggregated databases and free titles. The e-resources have placed more demands for research and

academic purpose. It becomes more popular because of their incredible benefits to organizations, students, faculties and research scholars.

Thus the advent of IT has made a great impact on library services by including materials accessible through electronic means and by providing the assistance of library professionals in navigating and thoroughly analyzing the tremendous amount of knowledge – its explosion with a variety of digital tools and techniques. As a result of this changing environment, there is a strong demand and increase in the use of electronic information sources. This situation further made a great impact on the management of electronic information in the higher learning institutes including engineering and technical institutes in the country. Hence there is every need to study the existing situation as well as to identify the areas to be improved. At the same time there is an urgent need also to study the procedures followed for the management of access to electronic information sources as the future of library science and library profession tremendously depend on the knowledge and attitude of the users in accepting the changing nature of information sources in pursuing their study and research at fullest extent.

In view of the drastic growth in the number of engineering colleges as well as increase in the amount and use of electronic resources, the present studies is important and also demand a further investigation to comprehend their proper management for better access to these resources. Various criteria for management of electronic resources related to financial provisions are highly concerned in this regard. This will help to identify the best possible practices so that engineering college libraries can adopt effective and meaningful management procedures applicable to both government and private engineering colleges in the state.

Keeping in view the above factors, it is thought fit to investigate the problem entitled “Management of Access to Electronic Information Sources in the Engineering Colleges of West Bengal: An Analytical Study from Users Perspective”. A few studies on electronic resources are available in literature; mostly they are restricted to few aspects and presented in the form of research papers. There is no comprehensive and systematic study on this topic undertaken so far.

This study is only confined to 36 Engineering College libraries approved by the All Indian Council of Technical Education( AICTE) , affiliated to Maulana Abul Kalam Azad

University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT), established up to 2012 . The present study encompasses various aspects of the management of access to e-resources in the engineering college libraries such as Information Technology (IT) infrastructure, selection, acquisition, evaluation, license agreement, and mode of access to e-resources.

As the present study is an analytical study, it merely examines the nuances of management of access to e-resources in libraries. Moreover, this study is conducted only in thirty six engineering college libraries in West Bengal approved by the All Indian Council of Technical Education (AICTE) , affiliated to Maulana Abul Kalam Azad University of Technology ( MAKAUT)

It has been understood from the review of literature that the growth of electronic resources and their use in engineering college libraries is increasing day by day in a cost effective manner and their compatibility to the available infrastructure in libraries. Moreover, the electronic information can be accessed at anytime and any where , and this has made the library professionals thought of selecting , acquiring and properly managing so as to satisfy the information requirements in a comprehensive manner. Most of the libraries are moving towards acquiring electronic resources. The importance of collection development policy and the factors related to that have been highlighted by many authors. The managerial aspects of such resources for better access have been investigated. In view of the above the present study demands further investigation to comprehend there proper management for enhancement of access to these resources for better use is highly concerned in this regard. Therefore it is thought fit to explore the problem in a systematic manner.

In the present study, data were collected from both primary and secondary sources. Structured questionnaire method is being used in the collection of primary data. The present study is based on both Primary and Secondary Data. Primary data are collected through questionnaire and secondary data in certain places are collected through various sources of publications such as institute Brochure, Know your library, Magazines and also from the websites of selected engineering colleges. In addition to that, data were also collected on critical points through observations such as attitude of library staff, physical condition of library etc. These are used defining the state of art of the engineering college libraries undertaken for the study.

The data processing and analysis is mainly focussed on bringing out the number of criteria considered relating to different aspects on management of e-resources by the 36 libraries covered under study. The notable observations are supplemented by bar diagram, pie-chart, and graphical presentations wherever possible for a better understanding of the observations made. The observations are tabulated systematically and presented sequentially maintaining the logical flow of analysis.

A holistic approach of sample 36 libraries of engineering colleges both in government & private sector is presented in this section for a general understanding of the procedures followed by these engineering colleges for the management of access to electronic information for its better utilization and access. In this connection it is thought fit to present a brief account on the colleges, network infrastructure facilities prevailing in these libraries, availability of different electronic resources particularly those prescribed by the AICTE along with various aspects of management of these resources namely awareness and knowledge regarding selection, acquisition, evaluation, license agreement, mode of access to these resources.

Attention has also been given to the major impact of electronic information sources on library as a whole particularly on the users, their satisfaction level, preferred methods of searching are also highlighted. The budgetary provisions for management of electronic information sources in these libraries are also discussed in this regard

In the concluding part the present study have intended that the concept of library management has been changing significantly with the growing demands of electronic resources into library collections. Today e-resources management has been considered as one of the important components of library development. After automation and digitisation of library resources, there is a strong challenge for library professionals to manage this vast amount of e-resources. Today, the library users are open to multiple sources of information and expect quality material within shortest possible time irrespective of the format of information. Proper understanding of customer's perceptions along with service quality dimensions is essential for library professionals to recognize the users' expectations.

The original model of integrated library system was designed primarily for print materials but it lacks the functionality needed for managing subscription to electronic resources. It has been observed that electronic resources in the last few decades have been growing with its volume

variety and nature to dominate library collections. As a result a new genre of software called the Electronic Resource Management System (ERMS) has been emerged. This type of comprehensive system approach has the ability to manage all types of library resources, including print, electronic and digital materials with support for the metadata formats and collection development policy needed to acquire and describe all formats, rather than, managing e-resources as a separate activity

## **PREFACE**

The primary objective of any library is to collect organize and cater a useful combination of both print and electronic information sources based services to the users to meet their information requirement in a successful manner. It is an important activity of libraries to educate the people with the systematic utilization of information sources from time to time. Out of all, the electronic information sources are immensely gaining importance in library collection and playing a crucial role in information dissemination in contemporary librarianship. Therefore, there is an urgent need to develop effective electronic resources management techniques and provide access to these resources to the users to satisfy their information requirement pin pointedly, exhaustively and expeditiously. Considering the multifold nature of growth of these resources, this would help the library professionals to select and procure such resources that would be easily accessible to the users without any hindrance.

The electronic resources are available in different formats and each format entails different infrastructure to tap the required information from them. The management of these resources encompasses adequate infrastructure, procurement guidelines, budgeting, staffing etc. In electronic resources, the librarians need to go for setting up trails, license negotiations, authentication, trouble shooting, evaluation and renewal. The work flow of electronic resources starts from making those resources available to the users for information requirement to renewal or cancellation of the resources. To make use of the electronic resources thoroughly and successfully, the appropriate communication technology is required accordingly. Therefore library professionals need to aware about the latest communication technologies.

In view of the drastic growth in the number of engineering colleges as well as increase in the amount and use of electronic resources, the present studies is important and also demand a further investigation to comprehend their proper management for better access to these resources. Various criteria for management of electronic resources related to financial provisions are highly concerned in this regard. This will help to identify the best possible practices so that engineering college libraries can adopt effective and meaningful management procedures applicable to both government and private engineering colleges in the state.



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## ABBREVIATIONS

AICTE	:	All India Council of Technical Education
CD-ROM	:	Compact Disc Read Only Memory
COUNTER	:	Counting Online Usage of Network Electronic Resources
DVD	:	Digital Video Display
E-BOOK	:	Electronic Book
E-JOURNAL	:	Electronic Journal
ERM	:	Electronic Resource Management
ERMS	:	Electronic Resource Management System
FTP	:	File Transfer Protocol
ICT	:	Information and Communication Technology
ILL	:	Inter Library Loan
IR	:	Institutional Repository
LMS	:	Library Management Software
MAKAUT	:	Maulana Abul Kalam Azad University of Technology
MARC	:	Machine Readable Cataloguing
NBA	:	National Board of Accreditation
OCLC	:	Ohio College Library Centre
ODLIS	:	Online Dictionary for Library and Information Science
OPAC	:	Online Public Access Catalogue
RRRLF	:	Raja Rammohan Roy Library Foundation
RSS	:	Rich Site Summary
UGC	:	University Grants Commission
UNESCO	:	United Nations Educational Scientific and Cultural Organisation
WBUT	:	West Bengal University of Technology



## **Chapter 1**

### **INTRODUCTION**

#### **1.1 History of Engineering Education**

##### **1.1.1 Early Centuries**

In India the Buddhists developed University institutions several hundred years before similar institutions of higher learning appeared in the 12<sup>th</sup> Century in Europe. The Buddhist Viharas in India developed into bigger institutions such as Nalanda, Vallabhi, Vikramshila, Odantapuri, Jagaddala, Mithila, Ranchi, etc. However, these Universities disappeared due to decline of Buddhism in India.

The excellence of manufactured articles in medieval India, e.g., fabrics of cotton and silk, embroideries, painted and enamelled wares, steel guns, swords, knives and scissors, gold and silver ornaments and white paper, is well known. This excellence was achieved and maintained for centuries with dependable technical education practices comprising hereditary learning, pupil age training and training schools attached to workshops. The manufacturing establishments called Karkhanas, imparted technical education in their areas of specialization. The early Sultans and Mughals supported such Karkhanas and their technical/vocational education. Both Hindus and Muslims took great interest in vocational education as a result of which trained workers of every trade were available in abundance.

##### **1.1.2 Engineering Education in British India**

In 1794, the British Government in India established the first Survey School in Madras with eight students from English schools. The Madras Survey School then trained only English boys. The British policy at that time was against teaching surveying to native Indians because of military and political implications of survey work, as a precaution against reliable maps falling into the hands of the French, the Dutch and the Portuguese. The Court of Directors of the East India Company insisted on the secrecy of survey maps and restricted the art and science of surveying to English boys. However, civil surveying for revenue purposes remained outside the ambit of the restrictions of the East India Company because it was an ancient branch of knowledge in India and a class of people, the 'Amins' or 'Mirdhas', specialized in preparing land revenue maps. The Madras Survey School went through several ups and downs, was on the brink of closure in 1810 but was revived in 1819, admitting some

apprentices directly called from England in addition to boys from the local English schools. The Survey School was later expanded in 1857 and renamed as the Civil Engineering School.

### **1.1.3 Developments in Bengal**

The General Committee of Public Instruction, comprising mostly English officers, constituted in Bengal in 1823, remained for about twenty years the only agency of Bengal Government concerned with education, until it was replaced by a Council of Education in 1842. Apart from reading, writing, and arithmetic, surveying was recommended for Indians required in judicial and revenue departments and by courts. At that time surveying was taught in Bengal in two colleges, the Mohammedan College which was established in 1781 and the Hindu College that was established in 1817.

The opinion that crystallized in Bengal was that drawing and surveying should be taught colleges and not in schools. From the need to teach these subjects in colleges, the desirability of having colleges of civil engineering was a big step. Engineering was not classified into several subdivisions and it meant engineering for civil purposes as distinct from military. The importance of civil engineering, as a branch of instruction for Indians, began to attract attention of authorities in about 1843. Construction of roads and canals was in progress or being projected and it was realized that men trained in engineering would be required and surveying skills alone would not be enough. At this time the idea for having a University was gaining ground. The Council in its report in 1844-45 suggested the establishment of a central university for “granting degrees in arts, science, law, medicine and civil engineering”. However, the Bengal Government took no action until after ten years.

### **1.1.4 Fluid State in Bengal**

In 1854, the Council of Education Bengal recommended the establishment of a separate engineering department in the proposed Presidency College, which was to function in the following year by incorporating the Hindu College. In November 1856, the Civil Engineering College Calcutta started functioning with 10 students and two teachers. The College was affiliated to Calcutta University when it was established in 1857 and the course was raised to three years with one year training at the end of which the candidates got ‘the degree of Licentiate in Civil Engineering (LCE).

In 1865 the Engineering College was merged as a department of Civil Engineering with the Presidency College, which impeded the progress of engineering education in Bengal for the

next about fifteen years. After a gloomy existence, the prospects improved in 1878 when a practical training institute around a newly established PWD Workshop was established and it was decided that the civil and mechanical engineering students should receive theoretical training in a college and practical training in a workshop. In April 1880 the engineering department in the Presidency College was again given a separate identity as a college and was moved to Sibpur. It was given the name Government Engineering College Howrah. Later in May 1887 it got another name Civil Engineering College Sibpur. In 1920 it was named as Bengal Engineering College Sibpur and remained so until after independence.

### **1.1.5 Status of Technical Education (1884-85)**

Sir MacDonnell's Memorandum prepared in 1886 on the existing state and future prospects of technical education had nothing much to notice except the four engineering colleges, three schools of industrial art and about forty five lower grade industrial schools. Sir MacDonnell reported that a few more Survey Schools were functioning during the period in Hyderabad (Sind). The total enrollment in the four engineering colleges during 1884-85 was reported to be 608, that in Survey Schools 465 and in industrial schools, 1379.

### **1.1.6 At the End of 19<sup>th</sup> Century**

The facilities of technical education at the end of 19<sup>th</sup> Century consisted of 4 engineering colleges at degree level, about 20 survey and technical institutions and some 50 industrial schools. The standard of education was good except that in the industrial schools. Government support for the development of technical education had come to a standstill by 1875. In the next quarter of the century, the Engineering Colleges barely continued to exist. The attitude of the Government was at variance with the need of the public. An elaborate system of technical education was being demanded to improve the employability of youth and to reduce the poverty of the people, whereas the Government opinion was that the development of industry was a pre-requisite to the expansion of technical education. The resulting debate helped in creating public awareness of private efforts.

### **1.1.7 Post World-War I**

After the World War I, the Government became a little more responsive to public demand of technical education. The situation, which was stagnant during the war period, began to improve. Several institutions were established during the war and in the decades thereafter. They include Banaras Hindu University (1916), Harcourt Butler Technology Institute,

Kanpur (1920), Calcutta University College of Science and Technology (1920), Bihar Engineering College, Patna (1924), Indian School of Mines, Dhanbad (1926), Maclagan College of Engineering, Lahore (1930) Andhra University, Vizag (1933), University Department of Chemical Technology, Bombay (1934), and Aligargh Muslim University (1935). Some Colleges were started in the Princely States of India in 1937. Many other colleges in the four regions of the country were started in subsequent years.

Later for coordination and standardization of courses, the All India Association of Principals of Technical Institution was formed in 1941. Several technical institutions were established in different parts of the country during this period. As recommended by the Abbot- Wood Committee, a Polytechnic was established in Delhi in 1941.

### **1.1.8 Pre – Independence Initiatives**

The number of engineering colleges during the years before the independence was 46 with a total intake capacity of 2500 students. These colleges catered predominantly to the needs of the various Government departments such as public works, railways, electricity, telecommunications, etc. A very small proportion of engineers found opportunities in private sector companies engaged in engineering operations and productions.

In 1944, the Central Advisory Board of Education was asked by the Reconstruction Committee of Viceroy's Executive Council to give a Report on the post-war education development in India. In the light of the Report, the Council appointed a committee in 1945 under the chairmanship of N.R. Sarkar to consider the development of higher technical institutions in India. In its interim report submitted in 1945, the Sarkar Committee recommended the establishment of not less than four Higher Technical Institutions one each in the North, East, South and the West. The objectives of these institutions were expected to be similar to those pursued by the Massachusetts Institute of Technology in the USA.

On the recommendations of the Sarkar Committee, a national agency, All India Council for Technical Education was established in 1945 for planned and coordinated growth of technical education in India. In 1947 at the time of Independence, Polytechnic education was lacking severely in respect of eligibility, duration, standard and management. At that time, only 53 institutions conducted Diploma courses in the country with an intake capacity of 3670 students. The major task of AICTE was therefore, coordination, standardization and improvement of Polytechnic education.

The visionary report of the Sarkar Committee led to the birth of the first Indian Institute of Technology at Kharagpur in 1951 followed by four other IITs at Bombay in 1958, at Madras in 1959, at Kanpur in 1959 and IIT Delhi in 1963. IIT Guwahati hosts the sixth IIT which was established in 1994 and University of Roorkee acquired the status of IIT in 2001.

**Table 1.1 : Major committees and recommendations**

Committee	Title	Year	Recommendations
Sarkar committee	“Higher Technical Institutions for the post-war Industrial Development”	1945	Setting up of Indian Institutes of Technology
Thacker committee	“Postgraduate Engineering Education and Research”	1959 -1961	Funding for 100 PhDs annually
Nayudamma committee	“Postgraduate Education in Engineering & Technology”	1979-1980	Post graduate minimum qualification for industry, Research & Development etc.
Nayudamma committee	“IIT Review”	1986	Greater liveness in Academic programs, Focus on engineering research, Faculty mobility.
P.rama Rao committee	“Reshaping Postgraduate Education in Engineering & Technology”	1995	21 months Master of technology. improved scholarship amount, Assured employment for Master of technology National Doctoral Programs
R.A. Mashelkar committee	“Strategic Road Map for Academic Excellence of Future RECs”	1998	Conversion of RECs into NITs with the status of a Deemed to be University and structural changes in

			governance
U.R. Rao committee	“Revitalizing the Technical Education”	2003	Regional imbalance to be removed, Faculty shortage to be addressed, Need for planning and manage in the working of AICTE
P.rama Rao committee	“IIT Review”	2004	Increase under graduate output of IITs Fund infrastructure improve, Add new IITs but maintain quality

The above table explains about role of several committee after independence that engineering and technological education found a great improve in the development of technical education has been one of the main achievement of the freedom period

### 1.1.9 Growth of Technical Institutions in India

The growth of Technical Education before independence in the Country has been very slow. The number of engineering institutes was only fifty during 1950.

**Table 1.2 : Growth of degree level engineering institutions in India ( 1950 to 1990)**

Year	No. of Institutions	Students Intake	Intake per Institution
1950	50	3700	74
1960	110	16000	145
1970	145	18200	125
1980	158	28500	180
1990	337	66600	198

Due to efforts and initiatives taken during successive Five Year Plans and particularly due to policy changes in the eighties to allow participation of Private and Voluntary Organizations in the setting up of Technical Institutions on self-financing basis, the growth of Technical Education has been phenomenal.

**Table 1.3 : Growth of Degree Level Engineering Institutions in India  
(2003 onwards)**

<b>Year</b>	<b>No. of Institutions</b>	<b>Students Intake</b>	<b>Intake per Institution</b>
2003 - 2004	1208	359721	298
2004-2005	1265	404800	320
2005-2006	1346	452260	336
2006 -2007	1511	550986	364
2007-2008	1668	653290	392
2008-2009	2388	841018	352
2009-2010	2972	1071896	361
2010-2011	3222	1314594	408
2011-2012	3393	1485894	438
2012-2013	3495	1761976	504
2013-2014	3887	1804353	464
2014-2015	4276	1903722	445

The above table clearly indicates that India has experienced a steady growth of engineering institutions for the promotion of engineering education in the country.

## **1.2 Background of the study**

The primary objective of any library is to collect organize and cater a useful combination of both print and electronic information sources based services to the users to meet their information requirement in a successful manner. It is an important activity of libraries to educate the people with the systematic utilization of information sources from time to time. Out of all, the electronic information sources are immensely gaining importance in library collection and playing a crucial role in information dissemination in contemporary librarianship. Therefore, there is an urgent need to develop effective electronic resources management techniques and provide access to these resources to the users to satisfy their information requirement pin pointedly, exhaustively and expeditiously. Considering the multifold nature of growth of these resources, this would help the library professionals to select and procure such resources that would be easily accessible to the users without any hindrance.

After the advent of Dialog in 1960s, the amplification of computer based bibliographic resources are being increased and influenced the collection of libraries. Subsequently the development of CD-ROM and online databases came into the picture in 1980s. The World Wide Web appeared in the early 1990's and created a radical change in the nature and access of information, later online databases including e-Journals, e-Books, open URL links and standards have emerged. These developments paved the librarians shift from print based to electronic resources in order to meet highly the information expectations of users. Consequently, the acquisition of electronic resources is increasing and created new challenges in workflow management and planning, selection criteria, acquisition parameters and procedures, copyright and licensing, access interfaces and usage statistics. It became imperative to libraries to evaluate, acquire, store and manage the wealth of electronic resources. Therefore, management of access to electronic resources became an important aspect in contemporary libraries.

The electronic resources are available in different formats and each format entails different infrastructure to tap the required information from them. The management of these resources encompasses adequate infrastructure, procurement guidelines, budgeting, staffing etc. In electronic resources, the librarians need to go for setting up trails, license negotiations, authentication, trouble shooting, evaluation and renewal. The work flow of electronic resources starts from making those resources available to the users for information requirement to renewal or cancellation of the resources. To make use of the electronic resources thoroughly and successfully, the appropriate communication technology is required accordingly. Therefore library professionals need to aware about the latest communication technologies.

Engineering education in India has witnessed remarkable growth over the past decade in many ways. The notable growth in Indian engineering education has been overwhelming due to establishment of privately funded engineering colleges rather than the public funded ones. Engineering education in India was started during the British era. The first engineering college was established at Roorkee known as Thompson Engineering College in 1847. The emphasis was given on civil engineering in early times.

There are large numbers of engineering colleges managed privately in India. More than 90% of the private engineering colleges are affiliated to universities. A few of them have also achieved autonomous status. The existing administrative set up and nature of private



engineering colleges' outcomes in very little financial autonomy with regulated fees and salaries accounting for almost 80% of the budget. An evaluation of the Indian engineering colleges with some of the world reputed institutions shows that it is possible for institutions to maintain student to faculty ratio of 15:1 or more and yet to maintain a significant research output. Most of the Indian institutions are trying their level best to improve their research output but still not upto the mark attained by some of the best international institutions. The ultimate challenge for our engineering education system is to make the conversion from primarily teaching institutions to teaching and research institutions.

The growth of engineering colleges in West Bengal is quiet significant and ahead of many states of India. In order to attract students to engineering courses and compete at global level, the engineering colleges need to maintain standards. Therefore, in the recent past considerable efforts have been put forth to develop acceptable and maintainable standards for engineering education. In this context the role played by the All India Council of Technical Education ( AICTE) is remarkable. The AICTE has constituted a body at national level known as National Board of Accreditation (NBA) to provide norms and guidelines for engineering colleges to maintain standards in engineering education.

### **1.3 Engineering Education in West Bengal**

Engineering education in West Bengal is provided by both the public sector as well as the private sector. The growth and development of private Engineering & Technology institutions in the state of West Bengal has been accelerated throughout the 9th, 10th and the 11th Five years Plan Period and the beginning of the 12th Plan period. The demand for techno-savvy manpower is high to fulfil the void and much stress has been given on expansion, modernization and reorientation of engineering education in the state. To attain the purpose, new private engineering colleges and institutes are being opened up.

The historical judgment of Supreme Court of India in 1993 paved the way for the growth of the capitation fee colleges, under the names of self-financing colleges. Elaborate mechanisms were developed by the Government to help the proliferation of self-financing colleges in the country. Today such colleges in engineering and management education outnumber public institutions, by several times. Until the late 1990s, the main of growth of private institutions was through establishing colleges affiliated to the existing universities or new universities carved out from the existing ones.

The changing structure of the Indian economy saw a need for the development of more professional programmes, leading to the rise of financially independent private professional colleges to meet the demand and people were willing to pay for professional colleges to meet the demand and people were willing to pay for professional education provided in the privatization institutions. As a result, Technical Education saw the biggest expansion

Maulana Abul Kalam Azad University of Technology, West Bengal (MAKAUT, WB), previously Known as the West Bengal University of Technology ( WBUT has been Founded in 2000 and funded initially by the Government of West Bengal, MAKAUT provides facilities for the pursuit of degree and advanced-level courses in engineering ,management and other professional areas through affiliated institutions and in-house departments. The university has been accorded affiliating university status and is functioning through an Advisory Committee constituted by the chancellor under the advice of the Government of West Bengal, as required by the West Bengal University of Technology Act 2000.

The University is steadfast in its twin objectives i.e. to serve as a Centre of Excellence in teaching and research in technology and management area and to provide framework of industrialization based on knowledge economy.

The basic objective of the University shall be to organize undergraduate courses of study in Engineering and Technology, especially in emerging areas. The university now affiliates 160 institutions spread over 15 districts of the state of West Bengal. Postgraduate study is being carried out in 30 of them and research is being carried out for the grooming of scientists, engineers and technologists.

The basic objective of the University shall be to organize undergraduate courses of study in engineering and technology, especially in emerging areas, post graduate programmes in sciences, engineering, technology and management education with a view to producing scientists, technologists and managers of high caliber, capable of contributing towards the development of industries. The University is also to develop Centre of Excellence for higher studies and research in the above areas.

## **1.4 Engineering College Libraries**

The library is regarded as the 'nerve centre of knowledge', the centre of intellectual life and the heart and soul of the academic institution. This means that discoveries and developments are actually made in the library and subsequently tested in the laboratory. It occupies an important place in the modern education system and maintains the expensive educational resources of the academic institutions. The libraries are primarily responsible for the selection and collection of material suitable for libraries, preservation and organization of the collection and dissemination of the material or the information, which it contains. Libraries as learning resources centre are playing an important role in sustaining and satisfying the information requirements of parent institutions. For the efficient, effective and scientific development of information resources and services, the libraries need to be designed and developed systematically. It is the responsibility of the staff of engineering and technical libraries to provide right information to right user at the right time to save the time of the user.

Engineering college libraries like any other college libraries are affiliated to the institutions that contribute primarily to the teaching and learning process by providing various kinds of information and learning resources to the clientele for their successful persuasion of the course programs offered by the institution. AICTE has framed elaborate norms for libraries of the engineering colleges offering different technical courses. For an institution, offering P.G.courses, the position of librarian is placed under the technical support staff. It further prescribes that the library should be provided with necessary supporting staff to provide services to staff and students for at least 12 hours in a day. It also suggests that the library should consist of one librarian, one assistant librarian and four library assistants for minimum strength of 240 intake. AICTE has also recommended that the central library of the institution for admission of 240 students per year should have a carpet area of 400 sqm. There shall be a seating capacity for 25% of the total students admitted in the institute. At the time of establishing an engineering institute with three branches, there should be a minimum of 4000 volumes in library, i.e. each branch should have 250 titles with four multiple copies. It further requires that in subjects like Mathematics, Humanities, Physics and Chemistry etc., there should be total of 1000 volumes.

The library should have facility of at least two computers offering digital contents with networking and multimedia facilities. Apart from this, there should be a minimum of 6 national technical journals for each branch of engineering.

#### **1.4.1 Objectives of Engineering College Libraries**

The important activities of engineering college libraries include the collection development, reference service, circulation, career guidance service, user education, access to electronic resources, etc. Engineering college libraries are expected to provide cost effective and reliable access to information using the state-of-the art information technology tools. The basic objective of the engineering college library is to be a dynamic instrument for explaining the escalating horizons of knowledge. The library endeavours to make the legitimate needs and demands of the patrons, from the senior academics engaged in advance learning to the fresh entrant motivate and encourage students to develop the lifelong habits of good reading, study and research and to be the centre of engineering college for educational and scholarly pursuit. The engineering college libraries are established with the following objectives:

- Conservation of knowledge amassed from times immemorial,
- Dissemination of this knowledge through teaching and publication.
- Extension of the bounds of knowledge through technological work by students and teachers, and
- Helping the students to achieve their academic excellence.

An Engineering college library is no longer a part of an ivory tower. The fundamental role of the library is to support the education to which it is attached. It should not be operated as a mere storehouse of books attached to a reading room, but as a dynamic instrument of education.

#### **1.4.2 Functions of the Engineering College Library**

- To acquire, process, organize and make available varied types of reading materials for meeting the needs of different levels of user;
- To guide students and provide them the resources useful for enhancement of technical projects;
- To keep the faculty members informed of the latest information resources in their fields of specialization;

- To establish library as an information centre and render reader advisory services as to enable them to make use of library resources;
- To adopt new technology, e.g. computerization in certain areas with a view to provide purposeful service in minimizing possible time; and
- To keep the authorities informed of the achievement and literary output of the institute, while to seek support and financial assistance.

Information technology has revolutionized the information handling activities in the engineering college libraries during the past few years. The information society demands that all the relevant technologies, that are involved in information processing, consolidation, repackaging and retrieval be merged so as to evolve an integrated system and capable of providing diversified services. In this direction, the automation of individual engineering college libraries is a first step rather a pre-requisite for the development of such an integrated engineering college library and information system. The promising trend in the development of information services with effective networking of these libraries will facilitate the optimum utilization of information resources.

### **1.4.3 Resources in Engineering College Libraries**

The resources in any engineering college library can be broadly grouped into two i.e. print and electronic formats. Among the print resources the important ones are, books, printed journals & magazines, back volumes of journals, question papers, reports, directories, project reports, news papers, newsletters, etc.

For various reasons, the engineering college libraries are acquiring and subscribing electronic resources besides print versions. Due the availability of information and communication technology, the librarians could think for electronic resources to satisfy the information requirements of users. Now the concept of information provision to users is shifted from information availability to information access. Therefore, there is no option left to library professionals except going for electronic resources. The electronic resources have a variety of advantages which motivated the library professionals to incorporate them in library collections. The following are the some of the resources in electronic format; e-journals, e-books, e-databases, e-magazines-lectures, e-newsletter, e-conference proceedings, e-reports etc.

#### **1.4.4 Role of Engineering College Library**

The major role of engineering college library is to gather information, arrange document information in engineering subjects get together for requirement of users and students. An engineering college library aim and objective is to help professionals of engineering education in updating their ability and knowledge to give information about new outlook, concept and study of new innovations in engineering education. Today engineering college libraries that is ICT are progressively more used to gather, stock, get back and spread a vast amount of information to communicate the users and engineering professionals.

Fulfilling user needs is an important aspect of library management, regular evaluation of user needs against existing library collection and services is a necessary management technique for the continuous upgrading any kind of services providing to the library. The library staff should be aware of the future and latest requirements of users and the information needs of the users vary from one library to another library as well as it also vary from time to time.<sup>12</sup>

When the learning and study process have started thorough using information communication technology in engineering college libraries play a main character in the teaching and educating process. When the teaching, learning process gradually becomes started learner is the center of different modes in informal education as well as libraries begins to play a part and addition as the job of teachers. It is necessary for engineering college libraries have to use of stylish information systems and new web technologies.

The usefulness of service institutions like libraries is measured by the services rendered by them to the users. This in turn depends on the personnel who are responsible for the efficient and effective delivery of service. Therefore library professionals have to be properly and adequately motivated, developed, maintained and utilized to provide efficient services. Librarians, therefore, occupy a prominent and decisive place in engineering colleges, for proper management and functioning of a library. The importance of a librarian cannot be ignored libraries can play vital role only under the guidance of professionally qualified and well satisfied librarians.

At the last two decades biggest technological event of the invention of digital media that is digital audio/video images libraries have stocked with multimedia documents and also entire range of everyday activities. Today digital libraries network based with distributed systems digital data can be transmitted in a fast way and inexpensive manner through the communication networks with individual servers for maintaining local collection of digital documents. As well as electronic libraries help to establish new ways to expand access with increase effectiveness and usability for the individuals interact with current digital information.

The development of new technology for the storage of Information, challenge of the future for libraries is not supporting a new electronic literacy, but supporting “The multi- literacy” that will be required in future years. The fundamental criteria for selection is that library relevancy, quality, technical and aesthetic aspects in the electronic library selection of material and information cost remain the same. It is proper that the selection of an art is go through modify with that regards many librarians believe that they will almost reduce variety of material is still crucial for libraries.

Collection Management can also be defined as the organization and maintenance of library resources, starting from collection development principle. A collection of new general materials identify a subject, serve data and introduce to specify the category of information available anywhere.

Library services help in using the collection in the best possible way. The modern library services have broken the traditional boundaries of place and started delivering services outside the confines of four walls.

In the engineering college libraries have to provide Internet has become the most widely used information source the average person to get the most recent information because today’s users can no longer depend on traditional information source in their respective fields. Teachers and students can carry an forward their work in the conventional ways that they are

learn, study and teach in classrooms, laboratories, libraries, conferences, seminars etc. but in the largest universal digital information library provides the fastest access to any kind of information in few seconds of time to users at any place at any time in the world.

At last the engineering college libraries play an important role in engineering colleges for developing countries to retrieve information at a very low cost by using new digital and technical information resources through the latest global internet network and collect pinpointed information in their respective fields.

### **1.5 Role of Library Associations and Organizations**

In India Library associations also play an important character in the advancement and progress in the library movement. Andhra Pradesh Library Association, founded in 1914 is the first of its kind in India. It started the first fully fledged professional periodical in 1925 under the title “Indian Library Journal” All Indian Library Association was also set up in 1920, but it could not do anything for libraries and their development. By Dr. S. R. Ranganathan’s effort Indian Library Association was set up in 1933 in its present form with its head quarter in Calcutta (Kolkata). The association published a quarterly periodical named ABGILA Raja ram Mohan Roy Library Foundation (RRRLF) was set up in 1972 on the occasion of the bicentenary of Raja ram Mohan Roy who raised the banner of revolt against obscurantism in the society and devoted his life to fight against injustice. Raja ram Mohan Roy library foundation is an independent organization of department of culture and government of India it supply several types of fund to various libraries such as Bengal Library Association in 1925, Madras Library Association in 1928, Punjab Library Association in 1929, Assam Library Association that is Sadau Assam Puthibharal Sanga in 1938 etc. played vital roles of library association and organization to development of public libraries in the respective states of origin.

### **1.6 Role of State and Central Government:**

- i) First Five Year Plan (1951-1956):- In this plan government of India played role of educational development includes the scheme of “Improvement of Library Service”. It scheme envisaged library network spread all over the India. At New Delhi was also made proposal of setting up a National central library under the first five year plan also



in this period nine state governments that is Assam, Madhya Pradesh, Punjab, etc. determined to set up state central libraries.

- ii) Second Five Year Plan (1956-1961):- Under this plan the government of India allocated about Rs. 140 lakhs for setting up a country wide network of libraries in 320 districts. Under this plan, the “Institute of Library Science” at University of Delhi was also established. The refresher course on “The public library and national development” on March 2, 1959 also started.
- iii) Third Five Year Plan (1962 — 1967):-During the third plan period besides the Institute of Library science, University of Delhi other universities also upgraded the facilities for training library personnel and enhanced the facilities for research in library science.
- iv) Fourth Five Year Plan (1969 — 1974):- The government of India announced on July 16, 1964, appointment of a 16 member education commission to make a compressive review of the entire field of education and advice the government on evolving a national pattern at all stages of education. The commission has formed various sub committees to prepare report on various aspect or education including the libraries, which plays a great role towards the betterment of libraries in India. During the fourth five year plan, the Government of India set up the Raja ram Mohan Roy library foundation in 1972 to make the bicentenary of the birth of Raja ram Mohan Roy, the father of modern India.
- v) Fifth Five Year Plan (1974 - 1979):- In 1972 Raja ram Mohan Roy library foundation the states were assisted. The government adopted the national adult program for an adult education of this fifth five year plan. In this plan was to be hold up by a network of libraries at the various centers. In 1979 the ministry of education in the department of culture and also view by the draft national policy on education (NPE) it means that it promote development of libraries in India and also launch a library section under the charge of an undersecretary.
- vi) Sixth Five Year Plan (1980 — 1985) -: In the sixth plan focus on smallest amount of all adults education efforts were support rural libraries by conducting network through communication. In the national policy library services seventh plan was selected in 1983 by the planning commission also in 1984 report other committees’ support of similar recommendation.
- vii) Seventh Five Year Plan (1985 — 1990) -: In this plan discuss on the educational national policy with special attention given development of facilities at the national level institution. In this period of plan improvement of existing libraries nationwide

will be taken up and also status of librarians improved. Many states passed library act in this period that is Kerala, Haryana, Assam and Manipur etc.

- viii) Eighth Five Year Plan (1992 — 1997) -: In this period Government of India discuss on the National Cultural policy in 1993 it is the new policy was created by Ministry of Human Resource Development ,culture department to designed or merging about library and information science with national book policy. It was also focus on vocational education in relation to emerging needs the major feature of the plan. In the formal and non formal education with books translation that is the important books translate in to various Indian language.
- ix) Ninth Five Year Plan (1997 — 2002) -: During the ninth plan new modern technology upgrade with major activities that is automation of the lending and the circulation section setting up users services improved through LAN. In this period computerized of the central reference library at Kolkata in the library got a major and advance progressive apparatus to keep uncommon books and other new material.
- x) Tenth Five Year Plan (2002 — 2007) -: In the tenth plan focused on upgrading and developed into modem library that is central and public libraries were improve. In this period national bibliographic database would be advanced networking, resource sharing and to better services for readers. The national library is expected to referral centre for different subjects and more effective, comprehensive services to the users.
- xi) Eleventh Five Year Plan (2007—20 12) -: In this period focused on effectiveness of education quality and standards of elementary school and by regular testing. In this five year plan also emphasis on higher education increase percentage of development for minimum standards of education going from the present percentage at the end of the plan.
- xii) Twelfth Five Year Plan (2012—2017) -:  
India's higher education system faces challenges on three fronts i.e. Expansion, Excellence, Equity and the play an instrumental role in the creation of knowledge networks. In the development of private sector that is research centers, institutions and also support faculty development and next steps go ahead that is financing for merit based students, international education, research environment high quality faculty and improved education technology.

## **1.7 Role of UGC**

The University Grants Commission undertook many steps and introduced many programs for building a system of accountability and assurance of quality in higher education. For

example, UGC introduced Faculty Improvement Programs (FIP), University Leadership Programs (ULP), National Eligibility Testing (NET), Academic staff colleges, Autonomous colleges etc. UGC also formed an Autonomous body namely national assessment and accreditation council to rank the excellence education imparted by the institutions on easily identifiable scales. These ratings ultimately will help India signing the Washington Accord to obtain recognition to the programs at international level.<sup>25</sup> The UGC gave a new life to the university and college libraries. It gave librarian a status, prestige and a better life.

### **1.8 Role of UNESCO**

The above lines are from the work of UNESCO's international commission on the expansion of education chief by "Edgar Faure" previous prime minister and education minister of France. These words are so tellingly true of the state of affairs in our country that we could usefully adopt them as a motto to govern our attempts to reform Indian education. Over the years higher education in the country has become increasingly irrelevant and superfluous. Our universities have become large, amorphous and impersonal entities that may be described more as examining bodies and diploma mill rather than live centers of learning and training and of service and use to our society.

The great contribution of UNESCO towards the library profession in India is that it gave it an international status. UNESCO for the first time started the first pilot project by establishing the Delhi Public Library in October 1951. The main aim of this project was to provide information of public library services for the parts of India in particular and for Asia in general. The INSDOC was set up in 1952 by the Government of India with technical support from UNESCO. In 1964, UNESCO assisted INSDOC again in setting up its regional centre in Bangalore. The second eminent step that the UNESCO took in this direction was the holding of a discussion group on the enhancement of libraries in Asia in Delhi from October 6-26, 1955. It was the first international meeting on this subject to be organized in an Asian country. On the whole, the seminar was a great success for the library profession in India. Another UNESCO seminar which had far reaching effect on library profession in India was the "Regional seminar on library development in South Asia" it was held in the University of Delhi library from October 3-14, 1960. The most significant achievement of this seminar was the "grading of staff", "salary scales" and "status of librarian" Besides these, the UNESCO honored the Indian librarians by inviting them to advise on various library projects meant for the member country. The prominent among those are Dr. S. R. Ranganathan, B. S. Kesavan,

S. S. Saith and a few others. Indian National Commission is the official agency of UNESCO, NIS SAT in Department of scientific and industrial research is the focal point for UNISIST (PGI) and is also the coordinating centre for ASTINFO programs NASSDOC of ICSSR is the focal point for UNESCO supporting APINESS programme.

### **1.9 All India Council for Technical Education (AICTE)**

The quality of engineering education was supervised by the Board of the All India Council for Technical Education (AICTE) which was established in November 1945 as a national level apex advisory body to conduct survey on the facilities on technical education and to encourage developments in the country in a synchronized and integrated manner by Government of India. It prescribes standards to be maintained, acts as an authority for planning, formulation and maintenance of norms and standards, quality assurance through accreditation, funding in priority areas, monitoring and evaluation, maintaining parity of certification and awards and ensuring coordinated and integrated development and management of technical education in the country. It has the responsibility for the approval of courses and takes appropriate steps to promote engineering and management education.

The AICTE Bill was introduced in both the Houses of Parliament and passed as the AICTE Act No. 52 of 1987. The Act came into force with effect from March 28, 1988. The statutory All India Council for Technical Education was established on May 12, 1988 with a view to proper planning and coordinated development of technical education system throughout the country, the promotion of qualitative improvement of such education in relation to planned quantitative growth and the regulation. Proper maintenance of norms and standards in the technical education system and for matters connected therewith.

The purview of AICTE covers program of technical education including training and research in Engineering, Technology, Architecture, Town Planning, Management, Pharmacy, Applied Arts and Crafts, Hotel Management and Catering Technology, etc. at different levels. It approves new courses, new institutions and regularly monitors their operations. To meet the objectives of engineering education the AICTE formed a body known as National Board of Accreditation.

#### **1.9.1 The AICTE Act, 1987**

This act based on technical education system for proper planning and coordinated development all over the country, recovery of quality of such education system. It was passed

by the parliament as the ACT, 1987 to provide to the AICTE norms for standards technical education system and matter include with proper manner.

### **1.9.2 Objectives, Responsibilities and Major Functions of AICTE:**

#### **1.9.2.1 Objectives –**

- 1) Regulations and maintenance of Norms and Standards.
- 2) Backing of excellence in technical education.
- 3) Setting up and co-ordinate development of technical education system.

#### **1.9.2.2 Responsibilities -**

- 1) Appraisal of norms and standards.
- 2) Evaluation of manpower obligation.
- 3) Policy Directions.
- 4) Others as provided in the Act.
- 5) Connection with State Governments, Universities and other legal bodies.

#### **1.9.2.3 Major Functions -**

- 1) Steps for prevent commercialization of technical education.
- 2) Correspondence of several technical Programs
- 3) Promotion of Autonomy in Technical Institutions.
- 4) Sanction of diploma level institutions and under graduate technical Institutions.
- 5) Sanction of variation! increase in intake, extra programs in technical institutions.
- 6) Networking of technical institutions.
- 7) Connecting technical institutions via EDUSAT Network- live transmission of M.E. / M. Tech programs.
- 8) Post Graduate Grants and GATE Scholarship.
- 9) Assessment of national technical manpower through national technical manpower information system (NTMIS).
- 10) Faculty Development Programs in Technical Institutions.
- 11) Promotion of Industry- Institute Interaction.
- 12) Authorization of post graduate programs.
- 13) Excellence declaration through official recognition.
- 14) Involvement in the procedure for funding deemed University status by MHRD.
- 15) Approval under foreign regulations.

- 16) Development of Model program of study through All India board of studies.
- 17) Research and institutional development through Modernization and removal of obsolescence (MODROBS)/ Research Promotion Schemes (RPS).
- 18) Decision on Equivalence of programs

### 1.9.3 AICTE Norms for Establishment of New Engineering Colleges

When new engineering colleges are establishments following rules and norms have required. Minimum capacity of first year to start under Graduate degree level courses in engineering technology maximum permissible annual intakes 240 for the new institution and with maximum number of four courses are to start. Requirements for built up area for engineering technology colleges are instructional carpet area 2770 square meters, administrative carpet area 535, circulation area and other area 99.5 square meters and all total area 2770 square meters ‘

### 1.9.4 AICTE Norms for Engineering College Libraries

Mainly library area requirement are 400 square meters. Book and Journals requirement in library for engineering and technology number of titles 250 per course, number of volumes 1000 per course and 6 national journals per course other essential requirements for engineering and technology colleges, four computers with multimedia facilities duly networked for library digitization. Library administrative faculty and wings members should b provided computing facilities along with LAN and Internet requirement for student’s utilization of open source software should encouraged.

**Table 1.4 : AICTE norms for mandatory e-resources**

S. No	Publisher	Subject Areas	E-Content
1.	IEEE	Computer Engineering + Computer Science + Electrical and Electronics Engineering + Telecommunications and related disciplines	145 e-Journals)(2011) (Backfile Access – since 2000)
2.	Springer	Electrical and Electronics and Computer Science Engineering	[(134 e-Journals) ( 2011 ) (Backfile Access – since 1997)

		OR	
	Wiley-Blackwell	Computer Science + Data System+ Telecommunication and related Discipline	30 Journals (Backfile Access – since 2000)
3.	ASME	Mechanical Engineering	ASME's Transaction Journals from 1960 to the present.ASME's Conference Proceedings from 2002 to the present.ASME Press eBooks selected from 1993 to the present.
		OR	
	Springer	Mechanical Engineering	[(46 e-Journals) ( 2011 ) (Back file Access – since 1997
		OR	
	Wiley-Blackwell	Mechanical, Electrical and Electronics Engineering	14 Journals (back file access since-2000)
4.	ASCE	Civil Engineering	(33 e-Journals) (2011 ) (Back file Access – since 1983 )
		OR	
	Wiley-Blackwell	Civil Engineering	18 journals (Back file Access – since 2000)
5.	McGraw Hill	General Engineering and Reference	Covers Renowned engineering handbooks, Faculty-made, instructional videos, Downloadable calculators, Time-saving curriculum maps, Powerful search tools, Interactive tables and graphs, Student study guides, Global engineering news
6.	J-GATE	J-GATE Engineering and Technology (JET)	Covers around 12000 indexed with 5000 free full text
7.	ELSEVIER Science	Engineering + Computer Science (Electrical + Electronics + Mechanical + Civil and Structural + Aerospace +	275 Journals (Back File Access from 2000 onwards

	Direct	Biomedical + Industrial and Manufacturing + Ocean Engineering + Computational Mechanics and Safety Risk, Reliability and Quality + Computer Network and Communications, Artificial Intelligence, Computer Science, Computational Theory and Mathematics, Computer Graphics and Computer – Aided Design, Information Systems, Control and System Engineering and Software	
8.	ASTM DIGITAL LIBRARY (DL) ONLINE VERSION	Online dictionary of Engineering Science and Technology Electrical & Electronics Engineering Mechanical Engineering, Civil, Metallurgical, Petroleum, Instrumentation	Covers 1700 e-books and 13000 journal articles

### 1.9.5 Norms for Library Staff

The library staffs are categorized as follows: (i) Librarian, (ii) Assistant Librarian, (iii) Library Assistant, (iv), and Library Attendants. There should be a minimum of one librarian, two assistant librarians, four library assistants and two library attendants for each college.

### 1.10 National Board of Accreditation (NBA)

The engineering education in India is developing at considerable speed in order to develop manpower in engineering and technology areas. Subsequently, a number of engineering institutions are established to meet their endeavours. Along with the development of engineering institutions, there is a need to maintain minimum and acceptable standards in order to offer a qualitative engineering education. Unless these steps are taken, the developed engineering product would not get due recognition at National and International level. Subsequently, the AICTE, a body responsible for development of engineering and technical education in India, thought of developing guidelines and norms for qualitative engineering



education. This idea gave birth to establishment of National Board Accreditation. The accreditation is a finishing touch of the quality assurance system in meeting high quality standards, implementing a continuous process and ensuing in quality assurance to reviewers. Accreditation helps the institution to attract the student at National and International level.

According to NBA the accreditation means “a process of quality assurance, giving credit where it is due for some clearly visible and demonstrable strategies of academic activities and objectives of the institutions, known to be honestly pursued and efficiently achieved by the resources currently available with a potential for continuous improvement in quality for effective growth”.

#### **1.10.1 The objectives of National Board of Accreditation**

- To assist all the stakeholders in technical education (like parents, students ,teachers, educational institutions, professional societies, potential employers, government agencies) in identifying those institutions and their specific programmes which meet the norms, standards and other quality indicators specified from time to time.
- To provide guidelines to the technical institutions for the desirable up- gradation of existing programmes and for the development of new programmes.
- To encourage the maintenance of a standard of excellence and to stimulate the process of continual improvements in technical education in the country. NBA aims to recognize and acknowledge the value addition in transforming the admitted raw student into a capable engineer having sound knowledge of fundamentals and acceptable level of professional and personal competence for ready employability in responsible engineering assignments.

The NBA is playing a very vital role in development of engineering college libraries too. Due to NBA norms, the engineering college libraries can provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the lifelong learning needed for successful professional career.

#### **1.11 Definition of Technical Education and Technical Institution:-**

**1.11.1 Technical Education** - “Technical Education means Programs of Education”, like that Research and training in engineering and technology, architecture, town planning management, hotel management & catering technology, pharmacy, applied arts & crafts and such other Programs or areas as the central government may in discussion with the council by notification in the official gazette declare.

**1.11.2 Technical Institution:** - In these rules except the circumstance or else requires.

- a) “Act” means the All India Council for Technical Education act 1987 (52 of 1987) b) “Technical Institution” means the institution of government, government aided and private (self financing) institutions. In the field of technical education conducting the courses / programs such as training and research in Engineering and Technology including Pharmacy, MCA, Town Planning, Architecture, Management, Hotel Management & Catering Technology, Applied Arts & Crafts and such other programs and areas as notified by the Council from time to time.
- b) In other words and expressions used and not defined but refer to in the All India Council for Technical Education Act 1987 (52 of 1987), shall have convey respectively consign to them in the Act. 81

## **1.2 Need of the Study**

Modern libraries are recognized as extending its resources and services beyond the physical walls of a building. The Information Technology (IT) application in each and every area of library day to day functioning has brought a decisive effect in the performance of information collection, organization, processing and dissemination for ease access to its resources.

The advent of IT has made a great impact on library services by including materials accessible through electronic means and by providing the assistance of library professionals in navigating and thoroughly analyzing the tremendous amount of knowledge – its explosion with a variety of digital tools and techniques. As a result of this changing environment, there is a strong demand and increase in the use of electronic information sources. This situation further made a great impact on the management of electronic information in the higher learning institutes including engineering and technical institutes in the country. Hence there is every need to study the existing situation as well as to identify the areas to be improved. At the same time there is an urgent need also to study the procedures followed for the

management of access to electronic information sources as the future of library science and library profession tremendously depend on the knowledge and attitude of the users in accepting the changing nature of information sources in pursuing their study and research at fullest extent.

In view of the drastic growth in the number of engineering colleges as well as increase in the amount and use of electronic resources, the present studies is important and also demand a further investigation to comprehend their proper management for better access to these resources. Various criteria for management of electronic resources related to financial provisions are highly concerned in this regard. This will help to identify the best possible practices so that engineering college libraries can adopt effective and meaningful management procedures applicable to both government and private engineering colleges in the state.

### **1.3 Statement of the problem**

Keeping in view the above factors, it is thought fit to investigate the problem entitled “Management of Access to Electronic Information Sources in the Engineering Colleges of West Bengal: An Analytical Study from Users Perspective”. A few studies on electronic resources are available in literature; mostly they are restricted to few aspects and presented in the form of research papers. There is no comprehensive and systematic study on this topic undertaken so far. It is hoped that this study will fill the gap and give the state of the art on the management of electronic resources in the engineering college libraries. It is expected that the results of the study will definitely provide the possible preparedness to be undertaken by the engineering college libraries of West Bengal as well as by the libraries and information centres in India .

### **1.4 Objectives of the Study**

1. To reveal the present status of e-resources available in the engineering college libraries
2. To explore the infrastructural facilities available for managing e-resources
3. To explore the current practices for selecting, acquiring and evaluation of e-resources
4. To ascertain the users attitude while accessing e-resources
5. To analyze the budgetary provisions for sustainable collection development of e-resources

6. To explore the major impact of electronic information sources in the emerging new information environment related to various management issues addressed by engineering college libraries
7. To offer suitable suggestions, recommendations and best possible practices for efficient and meaningful management procedure applicable to engineering college libraries

### **1.5 Hypotheses**

1. Electronic information sources have been influencing the Engineering college libraries to satisfy the user information requirements with its nature, volume and variety like other libraries
2. Access and use of electronic information sources from users perspective are gaining importance day by day
3. Electronic resources have become an integral part of any modern engineering college library. It is well recognized that improved e-resource collections enhance the users for academic growth and institutional research output. In this context, Management of electronic information sources needs proper attention in engineering college libraries

### **1.6 Scope of the study:**

This study is only confined to 36 Engineering College libraries approved by the All Indian Council of Technical Education( AICTE) , affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT), established up to 2012 . The present study encompasses various aspects of the management of access to e-resources in the engineering college libraries such as Information Technology (IT) infrastructure, selection, acquisition, evaluation, license agreement, and mode of access to e-resources.

### **1.7 Limitations of the study:**

The present study is an analytical study. Utmost care has been taken to minimize the errors, however limitations are there. There may be limitations in the study in terms of the theme as well as coverage is concerned. Few important limitations are enlisted below:

1. As the present study is an analytical study, it merely examines the nuances of management of access to e-resources in libraries
2. Besides , this study is conducted only in engineering college libraries in West Bengal approved by the All Indian Council of Technical Education( AICTE) , affiliated to Maulana Abul Kalam Azad University of Technology ( MAKAUT), formerly West Bengal University of Technology(WBUT)
3. Further, this study is only confined only to 36 libraries of engineering colleges of West Bengal and therefore, the other engineering institutions are not included in the sample.
4. The responses from librarians / library in-charge of the sampled libraries of these colleges therefore, this study includes their views only and the study does not cover the user's survey.

## **1.8 Methodology**

Perhaps there is no other aspect of management of information products or services catered by the libraries of engineering colleges in the recent times have received as much attention as the concept of management of e-resources achieved. There is a wide gap that has been observed in understanding the very delicate differences of management of e-resources in the engineering institutions in particular. Thus the present study titled “Management of Access to Electronic Information Sources available in the Engineering College Libraries of West Bengal: An analytical study from users perspective” is an attempt to address such gap.

### **1.8.1 Research Design**

A research design is a plan according to which, observations are to be made and this provides the empirical and logical basis for drawing conclusions and gaining knowledge. There is a variety of research designs used in accordance with the type of problem. This study uses sampling method as the engineering institutes are many and scattered in West Bengal. This study is conducted in 36 sample libraries of top 50 engineering colleges of West Bengal offering under graduate & post graduate studies in engineering discipline.

A suitable designed questionnaire has been sent to the libraries of above 50 engineering colleges in West Bengal. With all sincere efforts and constant pursuance 36 filled in questionnaire were received from librarians, library in-charge and other responsible staff.

### **1.8.2 Data Collection**

In the present study, data were collected from both primary and secondary sources. Structured questionnaire method is being used in the collection of primary data. Fifty (50) questionnaire were distributed to the librarians / library in-charge of top 50 engineering colleges in Maulana Abul Kalam Azad University of Technology (MAKAUT) formerly West Bengal University of Technology (WBUT). Out of that 50, after constant request, reminders and even with personal visit, the researcher could be able to collect 36 filled questionnaires. A few of them were received through e-mails and rest were through postal and in some cases it was collected personally. Besides primary source, secondary source like website of engineering colleges were consulted for collection of data.

Questions on general information such as year of establishment and accreditation, questions on the awareness and knowledge of the librarians regarding the electronic resources and network infrastructure facilities available in the library were included in the initial sections of the questionnaire. This is followed by questions related to the different aspects of management of e-resources in libraries.

### **1.8.3 Data processing & Analysis**

The data processing and analysis is mainly focussed on bringing out the number of criteria considered relating to different aspects on management of e-resources by the 36 libraries covered under study. The notable observations are supplemented by bar diagram, pie-chart, and graphical presentations wherever possible for a better understanding of the observations made. The observations are tabulated systematically and presented sequentially maintaining the logical flow of analysis.

### **Chapterisation**

Chapter -1: Introductory part of research work contains , History of Engineering Education in India and West Bengal , Emergence of Engineering College Libraries, Objectives, Functions and Role of Engineering College Libraries. It also includes the brief information about the Role of Library Associations and Organizations, Role of State and Central Government, Role of UGC, Role of UNESCO, All India Council for Technical Education (AICTE).It's Act,

Objectives Functions and major Responsibilities. AICTE Norms for Establishment of New Engineering Colleges, AICTE Norms for Engineering College Libraries and their Library Staff. National Board of Accreditation (NBA), its objectives and Functions. It also contains Need and Objectives of the Study, Scope , Coverage and Limitations of the study, Hyptheses and Methodology .

Chapter – 2: Discussed about the Historical Background and Growth of Electronic Information Sources , Its Meaning , Types , Advantages and Special Features. It also includes elaborate idea about the Management of Electronic Resources in Libraries.

Chapter - 3 : It reviews the relevant literature published on the management of electronic information sources in engineering college libraries. It also reviews the literature related to the users 'perceptions on the access to these resources in libraries. The emphasis has been laid on the review of the literature that is directly related to the present study

Chapter-4 : This chapter contains the information about the methodology used for research work and methods of data collection, through questionnaires, personal interviews, visits and personal observation in the 36 Engineering College Libraries in West Bengal

Chapter -5: This chapter provides brief information about the profile of 36 Engineering College Libraries of West Bengal

Chapter- 6: This chapter contains the presentation of data and analysis, the statistical analysis of the data for the present study was done by applying simple percentage. The notable observations are supplemented by bar diagram, pie-chart, and graphical presentations wherever possible for a better understanding of the observations made. The observations are tabulated systematically and presented sequentially maintaining the logical flow of analysis. Microsoft office 2007 software has been used to analyze the data. The analyzed data was used for the conclusion of the present study.

Chapter- 7 : This chapter deals with the findings & suggestions

Chapter - 8 : This chapter deals with the conclusions.

At the end of the thesis bibliography and appendices have been given.

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## Chapter 2

### ELECTRONIC INFORMATION SOURCES

#### 2.1 Introduction

The array of electronic information resources or electronic resources available in libraries today is an outgrowth of the changes in information delivery made possible through advances in both computer and telecommunication technologies such as powerful personal desktop workstations, and information storage and delivery mechanism such as CD-ROMs, online and web. These advances accelerate the ongoing efforts to replace other traditional sources and services. In many libraries, library information systems (OPAC or online public access catalogue) have almost completely replaced card catalogues, offering enhanced search capabilities for accessing the local collection as well as other libraries' collection. Many libraries are now providing a web interface to their library information system, which includes direct links to electronic journals, electronic books and Internet resources.

#### 2.2 Meaning

An electronic information source refers to the information stored in a medium, which requires an electronic device to read/access its contents. Information stored in different electronic media such as CD-ROM, Floppies, Magnetic Tape, Video, hard disk itself can be retrieved with the help of personal computer. E-information sources can also be defined as any of several different categories of databases and machine-readable files, including, but not limited to electronic journals, online databases, World Wide Web sites, and CD-ROM databases.

According to Online Dictionary for Library and Information Science (ODLIS), the e-information sources consist of data and/or computer programmes encoded for reading and manipulation by a computer by the use of a peripheral device directly connected to the computer, such as a CD-ROM drive, or remotely via a network, such as the Internet. The category includes software applications, electronic texts, bibliographic databases, etc.

#### 2.3 History and Developments

It is recognized that librarians are an early adopter of new technology and subsequently to access the library resources they have implemented computer in their library in the early stage. In the mid-1960s the MARC (Machine Readable Cataloguing) format developed and then the use of e-resources in the libraries started Early 1970's, libraries provides access to

data sets and during 1980's of microcomputer revolution, libraries started to get software and data on diskettes and offered database on CD-ROM which contain full text with search interfaces. In 1990 Tim Berners-Lee created the World Wide Web (WWW). Then the concept of online library public catalogs (OPAC) began in the libraries through WWW. The subsequent development of the Mosaic browser in 1992 led to extensive use of the Web beginning in 1993. In the mid - 1990's web based e-resources became available as a result of the development of web search engines such as Google, Yahoo, etc. Eventually library started offering web-based catalogue, bibliographic and full-text databases, e-books and e-journals through the web.

There is range of e-resources available to libraries from 1960's to the early 2000's which are described below.

### **2.3.1 Online Catalogue**

In the mid-1960's, e-resources began to access the library resources through machine-readable cataloguing (MARC). MARC was used for automation and it supports the data standard in the technology development. It takes necessary steps for the process and accesses the library resources.

### **2.3.2 Machine-Readable Cataloguing (MARC)**

During 1960s, the Library of Congress, USA developed the MARC format. It is a standard digital format used for the bibliographic description of to aid the creation and exchange of catalogues between libraries. MARC formats become the national standard for dissemination of bibliographic data in 1971 and the international standard in 1973. The MARC - I was created and codes were designed by the computer software for the bibliographic elements such as place of publication, name of the publishers and language and procedures were developed and documented. The Library of Congress decided to work on MARC II format in March 1967 to serve as a communication or exchange medium. Thus, the development of MARC format laid the foundation for libraries to share bibliographic data. MARC has several versions and the most popular is MARC 21. MARC 21 was formed in 1999 as a result of the synchronization of U.S. and Canadian MARC formats, and UNIMARC. The MARC 21 includes the format for bibliographic records as well as the formats for classification schedules, authority records and holdings records.

### **2.3.3 Shared Cataloguing**

Frederick G. Kilgour in 1967 established the Ohio College Library Centre (OCLC), which was the world's first computerized library network. In 1971 OCLC created the shared cataloguing database which is now known as WorldCat. It supports 54 academic libraries in Ohio. This online cataloging system shares bibliographic records between libraries and thus saves lots of cost of the libraries to develop their own library catalogue .

### **2.3.4 Online Public Access Catalogue (OPAC)**

OPAC stands for Online Public Access Catalogue. Ohio State University Libraries, in 1975, installed computers to search the library catalogue by various access points such as title, author, call number, key-word and Library of Congress subject headings.

The online catalogues developed to replace exiting library card catalogues during the 1980's. Online catalogues gave more advantages to the users than simply enhanced searching capabilities. These systems were also integrated with circulation and acquisitions processing. This added information about the status about on-order, inprocess, and up-to-date circulation was available to the users very effectively (Horny, subject terms, call numbers).

### **2.3.5 CD-ROM Databases**

CDROM stands for 'Compact Disc-Read-Only Memory'. This is a type of optical disk having the capacity to store large amounts of data up to 1GB. The most common storage capacity is 650 MB. Databases store on CD-ROM is defined as CD-ROM databases, where users search their queries through different search features. Library Corporation's Biblio File produced the first commercial CD-ROM product which was designed for libraries.

### **2.3.6 Online Databases**

In 1980's online databases were widely used. During the middle of the decade, full- text articles are added to online bibliographic databases. Then these databases became more useful. Online searches were made during this time via the TELNET protocol and private for profit networks. Internet was not used for online search that time (Hawthorne, 2008).

### **2.3.7. Web-Based Databases**

Web based databases (WBDBs) are structured list of web pages. WBDBs are collections of organized information which are used all the time.

### **2.3.8 Web-Based Catalogue**

Web-based catalogue defined the electronic representations of information about the products and/or services of an organization. Web-based catalogue are offered through graphical user interface with Boolean search facility

### **2.3.9 Databases**

A database is a set of organized data for some purposes which are available in digital format. The database provides searching facilities to the users by titles, authors, key words and subjects with Boolean operators. The database consists of products such as 4irectories, abstracts and indexes, encyclopaedias, dictionaries and other references works.

In the words a database is a collection of data that is organized for easy storage and access. These include paper-based tools like dictionaries and libraries of print materials. Some of the databases are discussed below:

#### **2.3.9.1 Bibliographic Databases**

A bibliographic database contains bibliographic records. It is an organized collection of references to published digital literature, which includes conference proceedings, journal and newspaper articles, government and legal publications, patents, standards, reports, books, periodicals etc. A large proportion of the bibliographic records in bibliographic databases describes articles, conference papers, etc. rather than complete monographs. These contain rich subject descriptions such as keywords.

### **2.3.10 E-Journal**

An electronic journal is also known as online journal, e-journal, and electronic serial, available full text in electronic form. Electronic journals are accessed via electronic transmission, usually published on the web.

E-journals appeared during 1970s but became popularized in 1996s. E-journals, which are available in electronic media such as Floppy, CD-ROM, DVD or the entire information, can be access Online. E-journal could be accessed through Gopher, FTP, Telnet, E-mail or discussion lists, but are mainly accessed through web. Generally, electronic journal published in two different ways on the web, such as commercial and open source. Journals which are paid by customer for accessing the same is called commercial journal whereas open sources journals are freely accessible to all. Now a day most electronic journals are born digital, ie, online only where as some are online editions of print journals. PDF is the most popular format of electronic journals but some electronic journals are published in HTML also. The other formats may include Doc., image and MP3-audio. Ejournals are available through aggregator database or directly publisher site such as EBSCOHOST, PROQUEST, Lexis-Nexis, JSTOR, Project Mouse, Science Direct, Emerald etc.

### **2.3.11 E-Books**

Electronic books are generally known as e-books. These are text and image based publications in digital form readable on computers or other digital devices. In 1971, ebook was created as a first steps of Project Gutenberg; a digital library for books from public domain. It is nearly 40 years old, already. But this is a short life compared to the 5-century old print book.

The Oxford Dictionary of English defines the e-book as “an electronic version of a printed book, but e-books can and do exist without any printed equivalent”. Commercially produced e-books are read on dedicated e-book readers. Computers, mobile phones, smart phones and other sophisticated electronic devices can also be used to read e-books. Kindle versions are also available on the Amazon and some other online book store platform to read the e-books.. Most e-books can be read as PDF files and hence specific reader application or devices are required to read an e-book. The PDF version of e-book is popular because it has similar options like a paper book. The users can make notes, bookmark the pages, highlight the texts,

and copy, paste, save and print the selected texts. In addition to these, some e-book reader also includes dictionaries, and alterable font styles and sizes.

### **2.3.12 Institutional Repository (IR)**

An Institutional Repository is the intellectual output of the University or Institution in the form of digital collections. The scholarly materials published by the faculty members and research staff are made accessible and available to users through web- based searchable databases through intranet and internet as well.

The institutional repositories improve scholarly communication and disseminate the research outputs of organizations to the community. IR could be student's thesis and project reports; faculty's publications, lecture notes and presentation etc. Taking into consideration both privacy and intellectual property issues, content could include e-prints, preprints, technical reports, course outlines, data sets and symposia proceedings.

A numbers of software have been developed for the management of IR on the web, amongst them is: DSpace, Greenstone, ePrints, Fedora, etc.

### **2.3.13 Emerging Types**

Following are the emerging types of e-resources which offer innovative approaches to information handling and have considerable potential for libraries too. These are:

#### **2.3.13.1 BLOGS**

Blogs are personal diaries where the entries and events are listed in reverse chronological orders. These have revolutionized the web publishing because of its simplicity in publishing the contents. Other readers can also record their comments and concerns on the blogs.

### **2.3.13.2 WIKIS — Editable Websites**

WIKIS have been with us for a few years as well, and are probably best known for the Wikipedia project. It seems likely that they, alongside blogs and RSS, will have a significant impact on libraries in the next decade. Wikis are a useful tool for facilitating online education, or for the creation and delivery of user-generated documentation; work groups and teams can use blogs and wikis to report progress to each other.

### **2.3.13.3 RSS FEEDS**

Really-Simple-Syndication or Rich Site Summary (RSS) is an “XML text-based data format containing a list of items, each typically with a title, summary, URL link, and date”. It can be used to make the users alert about changes to the source of the feed. Library can use RSS feeds as an easy means of, publicizing activities and library news. RSS feeds give us the ability to subscribe to services and link to other users. RSS can be used to disseminate news, events or summary information on a particular topic. Goggle Docs & Spreadsheets, Blogs & wikis are capable of generating an RSS feed.

### **2.3.13.4 Shared Bookmarking or ‘Social Classification’ or ‘Folksonomies’**

It offers libraries a new tool, although, almost by definition, they are possibly of more use to personal users. It allows users to store bookmarks online.

## **2.4 Advantages of Electronic Resources**

The following are the added advantages of e-resources over the print media.

- **Multi-access:** A networked product can provide multiple points of access (in the campus) at multiple points in time (24X7X365) and to multiple simultaneous users.
- **Speedy retrieval:** An e-resource is lot quicker to browse, to extract, and to integrate the information into other material and to cross refer between various publications.
- **Functional aspects:** E-resources will allow the users to approach the publication in order to analyze its content in various new ways and techniques by click of the mouse on search button.
- **Content analysis:** The E-resources contain a vast amount of information, but more importantly in a mixed format mode i.e. images, video, audio and animation which could not be replicated in print.



- Inexpensive: Electronic resources are cheaper than printed materials as regards to printing and distribution costs. Electronic format alleviate the staff and facility costs associated with material shelving and storage, both in current stack areas and in storage facility.
- Interactivity: Articles/issues/chapters can be read, commented by the readers, amended quickly and greater feedback can be given through the web
- Hypertext: format can be used and links to related articles, or other web sites, & URLs for individual articles and email alerts when latest issue/edition is uploaded can be got
- Virtual reality: Advantages taken on the web is to add value by using animation, virtual reality and interactive physical & mathematical charts.
- Flexibility: resources an evolved quickly i.e. they are not bound to any format, printer, and distribution network

## **2.5 Special Features of e-resources**

E-resources have some distinct features which differentiate them from traditional resources. E-resources on the Internet are further distinct by the nature of the information on the net itself. The features of 21st century information and media are:

- High compact storage
- Ease of reproduction, multiplication and manipulation and transmutation;
- Contents can be very easily detached from its media or container;
- Ease of migration of contents from one medium to another;
- Ease of transmission, communication and storage;
- Hypertext and multimedia;
- Seamless integration of print and electronic resources;
- Sophisticated and multipronged searches through keywords, free text, Boolean operators, lass numbers and natural languages processing;
- Convergence of technology, which is getting more powerful each day

## **2.6 Disadvantages of Electronic Resources**

- Discomfort in reading from the screen or poor graphic quality.
- Access to c-resources requires knowledge of computer and internet skills.
- The rate of information download depends on the availability of internet speed.

- Perishable citation: once online, if website changes URLs citation disappears.
- Authenticity: Authors concerned about establishing the source, authority of material in general, convinced reader for their credibility.
- While searching the electronic resources, the search result represents with vast amount information and gets confused the users which to be used which are not.
- It is tough to decide when one should stop searching the required information and start writing. It provides a lot of time for procrastination. It keeps looking and looking for stuff, without getting to the writing.
- There is the potential for the quality of work to go down because you need to be able to sort through what is legitimate and what is not.

## **2.7 Electronic Resource Management**

The objectives and functions of engineering college libraries demand the acquisition of information in different formats along with time. It is known fact that information is being published in electronic form besides print version. As stated earlier, the growth of electronic Information sources or e-resources and their use in engineering college libraries is increasing and also the electronic resources are available economically and their compatibility to available infrastructure in libraries. Beside these factors, the electronic information can be accessed at anytime and anywhere, this made the professionals in engineering colleges thought of selecting and acquiring E- Resources in their libraries, so as to satisfy the information requirements of users. Therefore, there is a need to understand the growth and development of electronic resources in order to develop the collections systematically.

Electronic Resources plays an emerging role in libraries on many levels. The incessant intensification of e-resources available in variety viz, full-text databases, bibliographic databases, e-books, e-journals, e-theses, digitized and born-digital documents, digital images, streaming video sound, and audio books becoiaes more decisive to manage effectively. These resources pose huge challenges for information professionals to adequately manage and access the diverse e-resources. With these growing challenges there is a need to have a mechanism “one-stop solution” i.e. Electronic Resource Management System (ERMS) for the evaluation, selection, acquisition, renewal / cancellation, license agreement, access rights, usage statistics, single access point, copyright, implementation and administration of e-

resources. ERM software assists the library to manage the details access and manages the eresources.

According to Breeding, there are two aspects of managing electronic resources. They are as follows:

- 1) The front-end details of delivering the content to library users; and
- 2) Managing the business details of back-end staff functions related to acquisition, payment, and licensing

The process involve in the managing e-resources i.e. life cycle of e-resources start from evaluation, trail, selection, license agreement, acquisition, access, administration, support service and evolution monitor, renewal!cancellation. The tool use to manage life cycle of c-resources is called ERMS which is basically for library professional, but its impact relates to end-users.

## **2.8 Electronic Resources in Engineering College Libraries**

The information explosion that has revolutionized the globe in the last four decades. But the advent of Information and Communication Technologies, the Internet and particularly the World Wide Web has changed dramatically everything on the earth. The Libraries and Information enters have gained a lot with the help of Information and Communication Technology. A job that used to take hours together earlier is now just a mouse click away. The publishers did not remain behind; they took advantage of these applications to a considerable extent and tapped a treasure house of electronic and web resources. This has created a thought on actual possession of resources to actual access of the same, thus creating a change in the collection development in an electronic environment. The engineering college libraries acquire electronic resources to support the various activities of the students & staff and their research.

The information scenario is changing at a faster rate. The reasons for this change are many. Library users increasingly demand resources in Electronic format, because of its associated advantages (such as their simultaneous presence, faster search ability, easy manipulability and accessibility). More and more library staff are now at ease with ICT and ready to explore the functionalities of the software! hardware to the maximum extent, starting from the lower level. Librarians are also becoming active and creating alliances with the academics to design environments to integrate ICT into the new teaching and learning methods. The library and computing services are going hand-in-hand to support users. There are remote users who want to access E- resources from their home, work place and while on move is on rise.

Libraries and other places of higher learning are slowly developing institutional repositories where the information generated by its members is archived, using appropriate software and made freely available worldwide, as far as possible. Publishers, vendors and agents are aware in the developing market for electronic resources and are eager to supply electronic resources I services along with print based materials. Further, the World Wide Web (www) is an important versatile platform for the delivery of needed information and provides a basis for the shift from ownership of physical collections to access on demand. Web being a real time information delivery channel, has made CD-ROM based delivery a reality. The shift is not only taking place within the knowledge centre but throughout the various facets of academics in an engineering college library. This is because of the changes in syllabus structure, distance education provision and delivery of teaching through virtual classrooms, using the Internet platform. However, current Library Management Systems (LMS) adopted by our engineering college knowledge centers are not very helpful in the management of electronic collections as they were primarily designed for print based resources and lack of the capability to manage the vastly changing electronic resources.

Dedicated Electronic Resources Access & Management Systems are now making their appearance in the market and some old LMS are also adding Electronic Resources Management modules to their systems for up gradation. These new generation systems will also help in the shift from printed to electronic resources. Hence to meet the demands of users, libraries are shifting towards new media - namely electronic resources for their collection development. As the managements of engineering colleges are ready to spend huge amount of money on electronic resources, it seems justified that the library managers have to examine the process for selecting such resources. Collection development policies and ordering processes for print collections have found a place in many, if not all, engineering

college libraries. As the transfer from paper to electronic resources occurs, especially in the acquisition of serial titles, it is necessary to examine the various processes in engineering colleges libraries in particular and other academic libraries in general to select various electronic resources.

The following types of electronic resources are mostly using in engineering college libraries:

- E-Journals,
- E-Books
- E-Databases,
- E-Magazines,
- E-Newsletter,
- OPAC (Online Public Access Catalogue),
- E-Images,
- E-Subject Guides,
- E-Conference Proceedings,
- CD-ROM's

### **2.8.1 Electronic Journals (E-Journals)**

E-Journals are a vital source of information for academic, research and development. An e-journal refers to be a serial whose creation and distribution to the public is entirely in electronic format. It may or may not have the print counterpart. All aspects of its preparation, refereeing, assembly and distribution are carried out electronically. There are three types of electronic journals: online (which are available through a host such as DIALOG), CD-ROM, and networked, (which are available on the Internet or WWW).

#### **2.8.1.1 Source for E-Journals**

Traditional aggregated full-text databases

- H.W. Willson
- Proquest
- EBSCO

Bibliographical databases

- Web of Science
- Compendex

- INSPEC
- SciFinder Scholar (Chemical Abstract)
- MathSciNet

Journal gateways and journal aggregators

- OCLC's Electronic Collections online (ECO)
- Ingenta
- J-gate

Other aggregators of academic journals

- JSTOR

Publisher packages

- Elsevier Science Direct
- IEL (IEEE & IEE Electronic Library)
- Springer Link
- ACM Digital Library

Other journal packagers

Free-with print combination

Free journals

Institutional Repositories

### **2.8.2 Electronic Books (E-Books)**

Electronic book has been defined as "...form of book whose pages were composed not of static printer's ink but from dynamic electronic information." Barker (1993) amended that definition to state that electronic books are a "collection of reactive and dynamic pages of multimedia information." Thus one definition of electronic books is a collection of pages that are read with a reading device, which can be a computer or a dedicated electronic book reader, as defined below.

Sometimes electronic books are referred to as hypermedia, hypertext systems, or simply books. Electronic books, hypermedia, and hypertext systems, share similar characteristic such as hypertext links, a definition of hypermedia is needed to distinguish hypermedia from electronic books. Hypermedia is defined as "a concept that encourages authors to structure information as an associative network of nodes and interrelating links".

The term 'e-book' includes the hardware, a suitable device to read electronic media, perhaps better called 'e-book reader'. The hardware is important as it provides what readers may need to exploit with the software available and link this to specific requirements. E-Books could be viewed and listened to, synchronously and asynchronously after storage and retrieved from anywhere.

### **2.8.3 E-Databases**

E-Databases (Electronic Databases) include periodical indexes & abstracts for example Library and Information Science Abstract (LISA), SCOPUS (Abstracting, Indexing and Citation data in Science, Engineering and Technology), ASTM standards, ASTM Journals, Life Science Review Journals, Communication & Mass Media, Magillion Literature Plus, Taylor & Francis (List), Directories, Encyclopedias, Dictionaries and related reference works.

### **2.8.4 Electronic Magazines (E-Magazines)**

Magazines can now be in zinio format instead of the hard copy for a price, which is equivalent of the print version.

### **2.8.5 Online Public Access Catalogue (OPAC)**

The OPAC is a database describing documents via bibliographic entries composed of fields, some which may be queried. It provides access to bibliographic records for the entire collection of books, back volumes, video and film of the library. The OPAC can be searched in many ways as detailed below.

- Accession number search
- Author search
- Title search
- Title keyword search
- Author/Title search
- Serial number search.
- Subject search

### **2.8.6 E-Images**

Digital images are electronic representations of images that are stored on a computer. The most important thing to understand about digital images is that you can't see them and they don't have any physical size until they are displayed on a screen or printed on paper. Until that point, they are just a collection of numbers on the computer's hard drive that describe the individual elements of a picture and how they are arranged. These elements are called pixels (short for picture elements), and they are arranged in a grid format with each pixel containing information about its colour or intensity.

### **2.8.7 E-Subject Guides**

The subject librarians maintain online subject guides that direct you to the best resources in your research area including databases, books, and journals. For example, if you have a business question, the business subject guide will provide database recommendations and ways to get started on business topics.

### **2.8.8 E-Conference Proceedings**

A collection of academic papers presented at a professional association meeting or conference. However, many of the words, like meeting and conference, which make up that definition are interchangeable with other terms...and often are. If you're not an academic or an engineer, you will benefit from the following expanded explanation.

### **2.8.9 CD-ROM**

CD-ROM (Compact Disc, read-only-memory) is an adaptation of the CD that is designed to store computer data in the form of text and graphics, as well as hi-fi stereo sound. The original data format standard was defined by Philips and Sony in the 1983 Yellow Book.

## **2.9 Selection of Electronic Resources**

Selection of electronic resources is the core collection development function and the primary objective of the selection decision for any format is fundamentally the same as college library objectives like satisfying the user needs. With the advent of e-resources, job responsibilities of selectors have changed drastically. In the past, selectors recommended new titles on an individual basis using traditional selection criteria such as quality, relevance, use and cost. Selectors analyzed faculty and user requests for new titles and made requests to add to the



collection. But in the cyber world, the roles of selectors have changed remarkably as E-Resources have expanded and developed. Selectors must now address new issues as part of the selection and management processes, issues such as easy and quick accessibility for users, continuous content, evaluation and technological and legal concerns.

Electronic resources are revolutionizing engineering college libraries. Many librarians believe that these resources have changed the principles of selection radically; some believe that they will virtually eliminate selection. Although it is true that the art of selection is undergoing profound change, the selection of materials is still crucial for libraries. The basic criteria for selection of E-Resources are quality, relevancy, aesthetic and technical aspects and cost.

### **2.9.1 Selection Tools**

- Publisher Catalogues through vendors.
- Reviews in Electronic periodicals or Journals.
- Vendor websites like GIST.
- Observation of other college library resources.
- Publishers' demos in seminars! Conferences.
- Opinion from faculty.
- Enquiry with existing vendors.
- Trail offered by publishers.
- Trail offered by vendors and
- Consortiums.

### **2.9.2 Selection Issues**

The following are the important issues should be taken into consideration while selecting an e-resource:

#### **2.9.2.1 Technical Feasibility**

It includes, but not limited to:

- a) Availability, e.g., remote access, stand-alone access.
- b) Authentication, e.g., IP [Internet Protocol] filtering or login password.
- c) Hardware and software compatibility and capability.
- d) Storage and maintenance, e.g., remote hosting v. local hosting.
- e) Platforms which facilitate access to e-resources.

### **2.9.2.2 Functionality and Reliability**

It includes but not limited to:

- a) Search and retrieval functionality, e.g. browsing, search history, transliteration.
- b) Exporting and downloading, e.g., printing, e-mail, downloading to a machine, and downloading to an electronic device.
- c) Sorting and ranking abilities for database results. For example: author, title, date, relevancy, etc.
- d) Interface
- e) Integration.
- f) Reliability and availability, e.g., response times, 24/7 access.

### **2.9.2.3 Vendor Support**

It includes but not limited to:

- a) User training and support.
- b) Trials and product demonstrations.
- c) Technical support and system notification process.
- d) Statistical reporting.
- e) Customization, e.g., branding.
- f) Data security and archiving policies.

#### **2.9.2.4 Supply**

It includes but not limited to:

- a) Purchase model, e.g., purchase, subscribe, pay per view, rental.
- b) Pricing models, e.g., selective v. big deal.
- c) Access options, i.e. single user, multiple users.
- d) Archiving and post termination rights.
- e) Maintenance fees.
- f) Cancellation rights.

#### **2.9.2.5 Licensing**

It includes but not limited to:

- a) Model/Standard license.
- b) Governing laws.
- c) Liability for unauthorized use.
- d) Definition of authorized users.
- e) Definition of authorized sites.
- f) Fair use provision.
- g) Termination.
- h) Refunds.
- i) Period of agreement.
- j) Compliance with the governing laws of the library's or consortium's legal jurisdiction (province, state, country).

#### **2.9.2.6 Currency**

Resources should not lag behind with their print counterparts.

### **2.9.2.7 Value for Money**

The electronic resource should provide sufficient added value over the print equivalent of other formats (e.g., increased functionality, increased accessibility).

### **2.9.2.8 Accuracy and Completeness**

The electronic resource should reflect the same or increased content as compared with the print equivalent.

### **2.9.2.9 Duplication**

Duplication may be considered if the electronic publication is not archived and retention is expected. If the cost of duplication is minimal and multiple formats be acquired.

## **2.10 Collection Development Policy**

Due to proliferation of electronic information resources, library activities like provision of E-resources, organization, digital based services and user education have undergone drastic changes. The emergence of E-Resources have brought with them 'access model' in place of ownership model for information resources. The E-Resources are available in different forms and formats both for procurement and for free of cost. The E-Resources have posed new challenges for the librarians, particularly in collection development.

Collection development was understood to cover several activities including the determination and co-ordination of selection policy, assessment of the need of users, collection analysis, selection, budget management and planning for resource sharing. Collection development has been influenced by the spread of digital technology as a means of information creation, communication, access and dissemination. The collection development of EResources have seen several trends, namely macro level selection instead of micro level selection; trail access instead complimentary copies; co-existence of print and E-Resources; co-ordinate and collaborative collection development and outsourcing of collection development.

There are several challenges in collection development of E-Resources such as complicated procurement and preservation system, technological obsolescence, non-compatibility of organizational culture, security in library environment, resistance to change, etc., in addition to licensing, copy right issues and provision of access to E-Resources.

Collection development policy is essential to develop a need based, balanced and up-to-date collection of print and digital resources. Without a collection development policy there will be a great confusion in collection building. The collection development policy describes the collection as it is now and as it will be. It is a systematic document, both comprehensive and detailed, that serves multiple purposes like planning, allocation, information administration and training.

## **2.11 Evaluation of Electronic Resources**

Evaluation of electronic resources in libraries is an important and a crucial activity. Evaluation helps the selectors to determine the cost and the reliability of the content provider. A selection tool such as a trial or demonstration of the product by the provider, as well as reviews in print and electronic sources, helps in evaluating the product and leads to sound decisions. For print resources, the selectors consider the credentials of the author, currency, intended audience, accuracy, ease of use, reputation of the publisher, the subject, cost and the curriculum or research needs of students/faculty/patrons. They also use methods such as citation analysis, user surveys, and so forth. However, with e-resources the selector must consider additional elements such as easy access to the content, coverage, search capability and functionality of the interface, quality of technical support, method of pricing, and provisions of licensing agreements. Thus, the typical evaluation process for e-resources has many facets, and following the various selection criteria is vital for selectors.

### **2.11.1 Content**

For content evaluation, the selector reviews the content of the electronic format and compares it with the print counterpart, if available, to find out about coverage in full text, availability of retrospective material, authoritativeness to determine the accuracy of the content, and completeness of content such as access to graphs, tables, illustrations, and advertisements. Also, it is important to check for duplication of the content in other e-resources, especially in the case of electronic journal packages.

### **2.11.2 Technical Requirements**

Electronic resources also present a number of technical issues that need to be considered to ensure resources are compatible with existing library hardware and software and that the library has the capability to provide and effectively maintain access to resources on an

ongoing and cost effective basis. Evaluation should be in consultation with the appropriate technical staff and should include consideration of the following:

### **2.11. 2.1 Method of Access**

There are many methods like stand-alone, remote via Web, local Web mount or hosting are available for access to e-resources. Access to remote hosts via Web is often preferable, because it provides additional benefits such as faster updating, optimum access, reduced burden in terms of storage, preservation and maintenance.

### **2.11. 2.2 Authentication**

In order to satisfy the contract terms with electronic resource vendors, libraries need to make sure that only authorized users i.e., faculty, staff, and students in an academic setting have access to these resources. To accomplish this, a form of access control is necessary. Access control is normally a two-step process: authentication and authorization. Authentication is the process of validating the identity of someone. It uses information provided by the authentication source to determine whether the user is really claims to be.

Authentication is normally performed by checking against identity credentials that are usually based on unique factors that only the user would know (e.g., student/employee ID number, barcode number, user name, password etc.)

Access via IP filtering is usually preferable because it typically provides simultaneous access for multiple users. IP-address recognition also provides access to users via a proxy server allowing authorized library users to access content from outside the physical confines of the library.

It should however be noted that access via proxy server must be predetermined in the license agreement. Access via login and a password is less preferred as it presents a number of challenges around dissemination and control of passwords, particularly when a library serves a large user base. If a vendor insists on password-based access, a disclaimer in the license agreement must be made about the library's inability to control distribution of this password to non-affiliates.

### **2.11. 2.3 Compatibility**

The resource should be compatible across a range of platforms and t-c local installation and maintenance are required, should be compatible with existing hardware and software available in the library, The selector should also determine, if the electronic resource requires any special hardware, software, multimedia or audio capabilities.

### **2.11.3 Functionality and Reliability**

In assessing the suitability of a resource in terms of functionality and reliability issues, the library may find t useful to evaluate the following:

#### **2.11.3.1 Interface**

The electronic resource interface should be user-friendly, easy to navigate and intuitive. User-friendly resources often include such features as online tutorials, introductory screens, navigation aids and context-sensitive help and personalization options such as subscribing to feeds/e-mail alerts, save search history etc.

The screen design should be easy to read and follow and consideration should be given to the similarity of the resource interface to others already in use and with which users are already familiar.

#### **2.11.3.2 Search and Retrieval**

The resource should offer a powerful, flexible and user-friendly search engine. Consideration needs to be given to how the search engine —works and how issues such as transliteration and diacritics are managed.

#### **2.11.3. 3 Exporting and Downloading**

A range of export options such as e-mail, printing and downloading (to a machine or a Personal Digital Assistant) should be supported. Provision of citation downloads to citation management software should be available. Considerations should be given to the ease of printing or downloading and to any restrictions suitable fee be imposed.

#### **2.11.3.4 Response, Reliability and Availability**

The system should be available 24/7. It should be stable with limited evidence of unscheduled downtime. The system should be technologically up-to-date and have the appropriate capacity and network infrastructure to support multiple users and optimum response times.

#### **2.11.3.5 Integration**

The system should support integration with other resources via reference and full-text linking.

#### **2.11.3.6 Vendor Support**

Consideration needs to be given to how well establish and reliable an electronic resource vendor is and to the range of technical and user support services they are able to provide. It is useful to determine the range of vendor support services available.

##### **2.11.3.6.1 Trial Evaluation and Product Demonstration**

It is preferable for the resource to be available for trial and for the vendor to provide, if required, product demonstrations. Trials are particularly useful in supporting the evaluation process of a product in terms of technical issues and functionality and reliability.

##### **2.11.3.6.2 User Training and Support**

The vendor should be willing to provide initial and ongoing training, including the provision of documentation or online manuals, in the use of the product. This will help to reduce the burden of training and development of documentation that might otherwise, fall on library staff and ensure that products are used effectively.

##### **2.11.3.6.3 Technical/Customer Support and System Notification Processes**

The vendor should be willing to agree to service levels in terms of system availability and response times for resolution of technical issues. The vendor should also have an advance system notification process in place to effectively manage and communicate planned downtime and content and platform changes.



#### **2.11.3.6.4 Customization**

Consideration needs to be given to the options available from the vendor for customization and branding of the product. This is often helpful in giving products used within the library a similar look and feel.

#### **2.11.3.6.5 Data security and archiving**

Consideration should be given to how frequently system data is backed up and what will happen to the resource and library patrons' ability to access it, if the provider declares bankruptcy or decides to liquidate. If backup data is offered in CD-ROM or DVD format, consideration needs to be given to the library's capacity to manage archiving and access in this format and to the features that might be lost compared to the original resource. It is important to understand the resource provider's archiving policy. Unlike print publications, electronic publications may not be maintained on a permanent basis.

Consideration should be given to the reliability of any third party archival solution in place. It is important to understand the content and form of any archive and any associated fees and possible restrictions on copying and archiving of files. Provision for migrating files to new formats/platforms to keep up with technological advances is also worth considering. It is also important to understand the impact cancellation or termination will have on perpetual access to previously subscribed content.

#### **2.11.3.6.6 Bibliographic Data Provision**

The vendor should be able to provide URLs or bibliographic data in the library's preferred file format which adhere to appropriate quality standards. This again reduces the burden on the library in setting up links or creating catalogue records for access.

#### **2.11.4 Supply**

Unlike print subscriptions, there is no standard model for the packaging and pricing of electronic publications. It is important to consider the range of purchase/pricing models available and determine which one best meets the needs of the library in terms of access and archival rights and value for money.

#### **2.11.4.1 Purchase Models and Pricing**

Selectors should carefully review the pricing models available for the resource under consideration as there is no standard pricing model for electronic resources. Pricing models are often based on a number of criteria and variables such as the size of the user population and the number of simultaneous users. One important pricing model for subscription based electronic journals, packages of e-books, databases, and other similar resources is one based on FTE (fulltime equivalent). It is recommended that where print copies are available, libraries should confirm that the cost of the electronic copy does not exceed that of the print version. If the price of the electronic version is higher than the print version, then this should be reflected in additional value added features such as functionality and improved access. The selectors should ensure that such features are worth any additional costs incurred over purchase of the print version.

#### **2.11.4.2 Number of Users and Sites**

The number of users and sites is likely to have an impact on pricing. The number of users required in a multi-user license should be based on anticipated demand. Where numbers are based on FTE, it should be based on the size of the actual user group and not the total user population, this is particularly important in selecting specialized resources with a specific and limited target audience.

#### **2.11.4.3 Back Files, Archiving and Post Termination Rights**

The purchasing or leasing of electronic data should include provision for perpetual access to that data. Following any termination of the license agreement, the institution's perpetual electronic access to the previously subscribed content should be guaranteed. In such cases, information needs to be obtained to understand likely ongoing access and maintenance costs of content acquired and archived to date.

#### **2.11.4.4 Cancellation Rights**

Due consideration be given to the terms and conditions around cancellation. This might be cancelling a bundled deal and moving to selected content or moving to outright cancellation or cancellation of linked print products. Models that impose 'no print cancellation' clauses or impose limits on the number of titles or financial penalties should be avoided.

#### **2.11.4.5 Invoicing**

Separate invoicing for individual members should be available where purchase is as part of consortia. Pricing should be transparent with content and access fees clearly indicated as separate costs.

#### **2.11.4.6 Renewals**

The vendor should notify the library at least two months in advance prior to the subscription renewal date. Where the renewal is as part of a consortia subscription, the vendor should seek confirmation from the individual library prior to renewal. Regardless of the pricing model, consideration needs to be given to the handling of back-files, the duration of the agreement or subscription, the size and type of institution and the number of simultaneous user and authorised sites as each of these are likely to have an impact on the price of the resource. Selectors should be prepared to negotiate with suppliers on pricing. Where a number of resources are acquired from the same vendor, this should be used as leverage to secure improved rates.

### **2.12 Licensing Considerations for Electronic Resources**

Librarians cannot afford to ignore the implications of license agreements when making a purchase decision. As long as electronic resources are available for lease rights only, examining license agreements will be an integral part of the selection process. The selector has to determine if a license exists, what impact the license will have on the selection and acquisition process and if the rights assigned by the license are adequate for the library's purposes. In particular, the selector must examine issues of user definition, use rights and restrictions and contractual obligations and penalties. An acceptable license agreement is required before the selection decision is finalized

#### **2.12.1 Access Concerns**

It is recommended practice that the following points governing access by a library's patrons be covered by any licensing agreement which a library, its governing institution or its consortia signs.

### **2.12.1.1 Authorized users**

These are all persons with a current, authenticated affiliation with the subscribing institution(s). This could include full- and part-time students and employees (faculty, staff, affiliated and visiting researchers and independent contractors). Visitors who have permission to use the institution's publicly available computers should have access to the licensed resource. This is commonly known as 'walk-in use'.

### **2.12.1.2 Authorized Sites**

These sites should include satellite facilities in different geographical locations. Authorized users should also have access to the licensed resource from home, offices or any other remote location, through the use of a proxy server or other IP-authenticated protocol as provided by the subscribing institution. This is commonly referred to as 'remote use'.

### **2.12.1.3 Method of Access**

Access should be permitted via IP authentication for the entire institution(s), including simultaneous access for multiple users, in different geographic locations, sites. Such access should be provided without requiring the use of a password or other code.

### **2.12.1.4 Archiving Policy and Perpetual Access**

The resource provider should provide a clearly articulated archiving policy for the information being licensed. The provider shall grant access to the licensed content of the resource for the mutually agreed time period. The purchasing or leasing of electronic data should include provision for perpetual access to that data. Following any termination of the license agreement, the institution's perpetual electronic access to the previously subscribed content should be guaranteed.

### **2.12.1.5 Institutional Archives/Self Archiving**

The resource provider should allow an individual institution or author to upload its faculty's work to its Institutional Repository either in pre, or post-print format. Preferably, the resource provider should provide the post-print version of the work which appears in the resource provider's publications.

## **2.12.2 Use of Electronic Information Resource**

The license should permit fair use of all information for educational, instructional non-commercial and research purposes. The following considerations regarding fair use, user statistics and liability for unauthorized use should be addressed in any licensing agreement which a library, its governing institution, or its consortium signs:

### **2.12.2.1 Pay-Per-View — Service**

Access articles which are not available in the library's print or online collections. It should be possible for the library to purchase the article and send it to the patron via E-mail. Pay-per-view is not a replacement for Inter Library Loan( ILL)

### **2.12.2. 3 Viewing, Downloading and Printing**

Authorized users should be allowed to view and print copies and to download electronic copies of single articles from the electronic resource for private use, in line with 'fair use' provision in the applicable governing copyright law.

### **2.12.2.4 User Statistics**

The information provider should provide statistics for each library's use directly to the library whether participating individually or as a member of consortia. In case of a consortium, aggregated statistics for the consortia should be delivered to the consortia administration.

### **2.12.2. 5 Liability for Unauthorized Use**

The license should reflect realistic expectations regarding the library's ability to monitor and trace unauthorized use.

## **2.12.3 Vendor Support and Technical Considerations**

The following vendor support and technical considerations should be addressed in any licensing agreement which a library, its governing institution, or its consortia signs:

### **2.12.3.1 Linking Service**

The resource provider should inform the library, if the content in the resource is available via a link server or link resolver. Information should also be provided on how the standard Open URL is supported. This applies to both linking to the content in the resource via the Open

URL and linking from the resource content to a link server. The following considerations apply to resources not covered by linking services or when this approach is preferred by the library.

#### **2.12.3.2 Content Consistency**

The resource provider should be obliged to inform, if the information content of the offer in question differs from what is available via the linking service.

#### **2.12.3.3 Bibliographic Data**

The resource provider should provide an electronic file with bibliographic information for input to the library's OPAC. This file shall describe the content of the resource (cataloguing data) and shall be delivered in a correct format. The library defines the demanded data quality of the bibliographic description and the required file format.

#### **2.12.3.4 Commencement Date**

The license period should not commence before the resource provider has provided catalogue data, as specified by the library, in correct format. Unacceptable data quality may entitle the library to a reduced price for the information content.

#### **2.12.3.5 System Integration**

The resource provider should inform the library as to what extent it is possible to link to holdings information and ordering functionality in the library's online information system.

#### **2.12.3.6 Technical Support**

The resource provider should provide contact information which the library can use for technical support.

#### **2.12.3.7 Notifications Process**

The resource provider should, at suitable intervals, inform the library of significant changes in content of the resource. Significant content changes include notification of new, ceased or changed titles or changes in the number of volumes available.

### **2.12.3.8 Customer Support**

The resource provider should provide sufficient customer support (in accordance with the institution's or consortium's specification) to the library or to each participating member library, if in a consortia agreement.

### **2.12.3.9 Web Browser Accessibility**

The information resource should be accessible via use of a standard web browser (e.g., Mozilla, MS Internet Explorer) and with capabilities for standard document formats such as HTML or PDF. The resource provider should provide online help screens and/or online user documentation manuals.

### **2.12.4 Flexibility and Enhancements**

The following considerations should be addressed in any licensing agreement which a library, its governing institution or its consortia signs:

#### **2.12.4.1 Cancellations**

The selector needs to ensure that there is no non-cancellation clause and must be clear about the period of notice that must be given to cancel or terminate a subscription or agreement and any restrictions around how many payments must be made before cancellation or termination can be undertaken.

#### **2.12.4.2 Value for Money**

The price of the electronic version should be the same or less than the print equivalent. Any increase in price should be reflected in an increase in functionality and accessibility.

#### **2.12.4.3 Consistency with Print Equivalent**

The electronic version of an information resource should have the same or better visual quality as the print original, including graphs, charts and illustrations. 2.5.4.4 Availability

The electronic version of a serial electronic resource should be available no later than the printed version.

#### **2.12.4.5 Drop-Out Clause**

It should be explicitly acknowledged that withdrawal from the license agreement is possible at the start of each calendar year or of the library's or consortium's fiscal year. The library or consortium should provide sufficient advance notice, as defined in the license agreement, of any intended withdrawal or cancellation.

#### **2.12.5 Legal Issues**

The following legal issues should be addressed in any licensing agreement which a library, its governing institution, or its consortium signs. It is generally advisable that the library or consortium consult with its legal counsel before any major license agreements are signed, if such review is not already legally or procedurally mandated at the institutional level.

##### **2.12.5.1 Terms of Payment**

The library's or the consortium's payment liability should commence from the date that the access is agreed upon by the library and the resource provider and the provider has actually provided access to the information resource content in the specified format.

##### **2.12.5.2 Grace Period**

The resource provider shall maintain access to the library or consortium for a grace period of at least one month at the start of each license year, if the renewal payment has not been received.

##### **2.12.5.3 Governing Laws**

The license agreement between the resource provider and the library or consortium should not restrict any legal rights of the library or consortium according to the governing laws of the library's or consortium's legal jurisdiction (province, state, country). Disputes arising from a license agreement should be arbitrated in the library's or the consortium's legal jurisdiction (province, state, country).

##### **2.12.5.4 Resource Provider's Authority to Provide Access**

The licensor should guarantee that it has all necessary rights to license the resource for the purposes outlined in the agreement.



### **2.12.6 Review and Renewal Process**

Due to the rapid changes in technology, the emergence of new offerings from information providers in terms of the pricing and packaging of content and continued pressure on library budgets made the renewal process still complicated. Workloads in managing and coordinating the annual renewals process for continuing electronic resources (i.e. those resources to which the library has a subscription or lease arrangement, as opposed to those it has purchased as a one off outright) should not be underestimated. Like other continuing resources, E-resources will not always have a uniform renewal date, as subscriptions or leases may run for one or more years from any particular date on the calendar.

#### **2.12.6.1 Review of Usage Data**

The library should review available usage statistics in order to justify their retention and renewal. As important as e-resource usage statistics are, they alone are insufficient in all instances for making significant selection decisions. Coordination and interpretation of the usage data should always be done within the broader context of the library's collection development policy and practices.

### **2.13 Acquisition of Electronic Resources**

Similarly, due to the overwhelming growth and availability of a variety of electronic products, the workflow of acquisitions has changed significantly, becoming more complex. Though the acquisition process is closely connected to collection development in any type of library, it has distinct functions. The primary objective of acquisition is getting the materials needed by the library's users in the most desired format and in the most efficient and economical manner. Thus, acquisition is defined as the technical process of ordering, receiving, and paying for an item after the intellectual decision to purchase an item has been made. Even though the process of identifying, ordering, and paying for materials such as books, serials, and media is very similar to that of electronic formats, the life cycle of e-resources is more convoluted than that of print resources. It requires additional levels of details including tracking, recording, and reviewing the license and business terms, and Selection policy investigating variable pricing ranges. Acquiring information for an electronic product is often much more time-consuming than for print resources. It requires more time for decision making at every step as well as higher levels of skills and knowledge among staff. Also, it can require additional budget allocations due to higher subscription

costs than for print collections. Due to the increase in the number of electronic formats, acquisition librarians are no longer just an expert in acquiring materials, having knowledge about publishers and book vendors, and identifying incomplete citations as well as finding out-of-print materials. Now they are also responsible for solving more creative problems in the areas of collection development, licensing, cataloguing, technology and other issues related to e-resources. Finally, the renewal and cancellation of serial subscriptions are a systematic recurring process in any type of engineering college library. Due to high inflation rates for serial subscriptions in all formats, shrinkage of budgets or buying power, and the emergence of new products, selectors are required to assess their collections for potential cancellations during the renewal process. Several traditional criteria are considered for reviewing serial subscriptions, such as low usage data, significant inflation rates, cost per issue, type of publication, relevancy, quality, duplication in other formats, and coverage in index and abstracting services.

The acquisition is a four-step process that begins after the selector discovers a new product. It includes verifying the bibliographic information for the product, identifying various pricing options, reviewing the license and business agreements, and finally, ordering and acquiring the product for the library collection.

### **2.13.1 Verification of Bibliographic Information**

The verification of bibliographic information for an electronic product requires finding out various details such as the content provider of the product, coverage, frequency of updates, and cost. Sometimes the same product may be available on multiple platforms or in more than one package. It is vital to understand various content providers' platforms and provide details to the selectors because they may have different content coverage; pricing; interface, search or retrieval capabilities; and user functions. Although acquisition librarians find various details from the publisher's Website, most of the time they have to work with a representative of content provider for clarification on various aspects of the product and for pricing and business negotiations. There are other tools that can be used for verification of bibliographic information, such as World Cat, Ulrich's Periodicals Directory, and Serials Directory.

### **2.13.2 Identification of Various Pricing Options**

Content providers offer various pricing models. They may be based on the size of the library, the number of users, or the nature of the product.

Unfortunately, there are no consistent standards for pricing, and acquisitions! ER librarians need to negotiate a final price or pricing model. Some common pricing models are as follows:

#### **2.13.2.1 Product Type**

There are various types of products, for example, electronic journal packages, aggregator databases, and full text databases. The pricing model may depend on the type of product, which may also be available through various options, such as yearly subscription or one-time purchase for archival products.

#### **2.13.2.2 Institution Size**

The size of the institution is another variable. The content provider may charge more when selling to large universities with multiple branches, locations, or sites compared to small sized universities or community colleges.

#### **2.13.2.3 Number of Users**

Price also varies with the number of potential users. Some content providers offer price based on full-time equivalents of students, while others include the total number of students, staff, and faculty members as potential users. Price may also be based on the number of simultaneous users or unlimited access including remote access, and so forth.

#### **2.13.2.3 Consortia**

Often content providers offer special pricing for consortia. In consortia deals, expensive electronic products can become affordable for small libraries because several libraries work together and share costs.

### **2.13.3 Journal Package Deals**

Some providers offer bundled sets of titles in an electronic journal package. The library or consortium must acquire the entire list of journals without any individual selection. In such a deal, libraries may get relevant content at a lower price but may have to pay for titles with less or no relevance for the users; whereas, some providers of electronic journals packages

offer pay-per-view options. In this option, libraries are not required to have subscriptions to all journal titles in the package, allowing users access to articles by paying the cost of an article from journals that are not subscribed to by the library. Sometimes, Pricing models are based on a combination of print and electronic subscriptions. In such cases, publishers offer free electronic access or provide deep discounts for print plus electronic subscriptions.

### **2.13.3.1 Content Access**

Sometimes pricing is based on the type of access to content. Some content providers require libraries to pay a large initial fee and then smaller annual fees for electronic packages where the annual fee is generally for continued access, which may or may not include additional content. Moreover, pricing depends upon the level of the content. Databases with full-text articles have higher prices compared to abstract and indexing databases. Thus, each pricing model is unique and variations seemingly limitless.

Most electronic journal packages are available directly from the publishers, while individual journal titles may be available directly from the publisher or through a subscription agent or another content provider. Electronic books can now often be purchased through a major book jobber as well as from the publisher or as a package deal through a third party, which may or may not be a consortium. Some expensive electronic databases or packages can be obtained directly from the publishers or by joining a larger consortium. Due to the high cost of e-resources, many libraries prefer a consortia approach in acquiring those resources. As a result, consortia play major roles in acquiring expensive e-resources. Purchasing through a consortium results in significant financial savings to individual libraries, which allows for wider access to materials for users.

Reviewing the License and Business Agreements Once the source of acquiring the product is determined the license agreement becomes the key part of the acquisition process. The license agreement includes description of the product, responsible parties that is, licensor and licensee who are signing the agreement, authorized users of the product, use of the product, and rights of the licensee and the licensor. Inquiring about the license agreement with a representative of the content provider before ordering the product is recommended. Many content providers make available their licensing agreements and terms of use on their Websites, while some licenses can be obtained through their representatives. Sometimes, publishers have “click-on” or “click through” licenses on their Websites, where a user is required to click on a box to agree to the terms and agreements of the products. It is a normal

tendency of the user to simply agree without reading the terms. In such scenarios, the librarians must review the agreement. If certain terms are not acceptable, then they should be negotiated with the publishers. It is most critical to get the contract reviewed and signed by both parties before the invoice of the product is paid.

Licensing is becoming a day-to-day responsibility of an librarian and is the most important issue these days since it concerns a legally binding contract made on behalf of the institution. The challenges associated with the licensing agreement include understanding the content, determining the standard wording required by the institution, and identifying terms, which requires negotiation. Librarians who deal with licensing agreements should have negotiating skills and be required to work collaboratively with the institution's legal counsel. They should be familiar with the policies of their institution. Librarians responsible for licenses should review each term and condition in the agreement very carefully. While reviewing the agreement, one should assure that each provision is clear. Librarians must work closely with content providers while reviewing the agreement and should make necessary changes to conform to the institution's policies. Almost all licenses are negotiable but require considerable time. The license agreement contains various clauses that define the rights of the libraries, users, and content providers. The following are some of the important clauses included in the license that can act as a checklist for the librarian who reviews the license agreement:

### **2.13.3.2 Content of Licensed Materials**

The license should clearly include the name of the product or the list of the titles that can be accessed.

### **2.13.3.3 Site**

It is important to include names of the sites/premises that have authorized access to the product. Sometimes access to the product is limited to a particular building or campus, and it is necessary to name them in this clause.

### **2.13.3.4 Authorized Users**

Definition of authorized users is an important clause in any license agreement. This clause defines authorized users such as students, faculty, and staff of an academic institution. Many public institution libraries require authorized access for public walk-in users who

occasionally visit the library. This clause should be reviewed carefully and negotiated if necessary.

#### **2.13.3.5 Copyright and Fair Use**

Copyright and fair use laws of the United States allow libraries to make copies of some portions of the material and send them to other libraries for educational, research, and teaching purposes. The license agreement should allow users to view, download, or print a copy of the material. Some providers support library services such as interlibrary loan, electronic course reserve, and distance education. Librarians should carefully review this clause, identify the institutional needs, and include them in the agreement.

#### **2.13.3.6 Confidentiality**

Some agreements require libraries to keep the cost of the resource confidential. It is not possible for public institutions to accept such a clause. On the other end, libraries should protect the confidentiality of the users. Thus, this clause should be reviewed carefully.

#### **2.13.3.7 Cost**

This clause should clearly include the cost of the subscription.

#### **2.13.3.8 Governing Law**

Most of the time a publisher stipulates in the terms that the contract will be governed by the laws of the provider's particular state or country. Librarians should be very careful in reviewing this clause and should be aware of their institution's policy. It is important to negotiate this clause and change the governing law to the geographical location of the institution.

#### **2.13.3.9 Perpetual Access**

This clause allows library to retain access to the materials for which payment has been made after cancellation of the product. Libraries should ask for archival access if it is not included in the contract.

#### **2.13.3.10 Terms of Payment and Termination**

This clause includes payment of invoices within certain time frames as well as requirements for the renewal of the contract. It is important to review this clause and make necessary

changes before signing the agreement. Termination includes reason and time of termination and notification from the provider.

#### **2.13.3.11 Indemnification**

This clause states that one or both parties will not be financially responsible for any monetary loss. This clause should be carefully reviewed and needs to have equal indemnification for both parties. Generally, the contract term also includes the phrase “hold harmless,” which means that legal action will not be taken against the other party.

#### **2.13.3.12 Usage Statistics**

Under this clause, the content providers agree to provide usage statistics for e-resources. The data should be compliant with Counting Online Usage of Network Electronic Resources (COUNTER), which helps libraries to compare usage statistics and make informed decisions for renewal or cancellation of e-resources. Though librarians are becoming savvy in negotiating the terms and conditions of licenses and the content providers are becoming more familiar with libraries’ needs, it is important to have consistent and transparent clauses. As of the time of this writing, there is no standard. Clarity and standardization in agreements would be beneficial for librarians as well as content providers.

The workflow of the licensing review process varies according to the type and size of a library. Some libraries have a team approach for license negotiation, while in some libraries legal counsel reviews the licenses. In some libraries, once the acquisitions / ER librarian reviews the license and negotiates the terms, it is sent to the institution’s attorney for final review. Lately large subscription vendors have also started participating actively in the licensing process. They have started providing a new service for the library by interpreting the terms of a contract and negotiating on the library’s behalf. It is also very important to keep copies of the signed agreement in the acquisitions department for future reference.

Ordering and Acquiring the Product After the license is reviewed and signed, ordering and acquisition of the product begins. Acquisitions personnel communicate with the content provider about the resource that is being requested and provide technical information, such as Internet protocol (IP) addresses. The acquisitions department gets phone or e-mail notification from the provider’s technical support staff once the access is set up based on the institution’s request. The content provider also provides a stable URL for the product through which the resource can be accessed. Acquisitions or technology personnel verify access of the

product and inform the rest of the organization of the availability of the new resource. The acquisitions department must notify other library departments such as cataloging, technology, collection development, and public services once access to an e-resource is activated. It is essential to communicate with the cataloging department regarding access to the resource because they maintain the online public access catalog (OPAC). They also need all the details such as license restrictions, if any, content availability, mode of access, simultaneous use access, and so forth. The acquisitions department informs the technology or systems department because they maintain the technical access and local tracking of the database. The acquisitions department also informs the selector who requested the product and the public services staff who publicize the new resource to users. It is important to share details about contractual and legal terms such as acceptable and prohibited use of the resource and the number of authorized users. Timely communication between the acquisitions department and various library departments is vital to ensure rapid access to the product for the user. Sometimes content providers offer training in the use of the resource once it is acquired by the library. In such a case, the acquisitions staff follows

up with the provider's representative regarding training for public services staff. Periodically they also provide refresher training for the e-resource purchased by the library. The acquisitions librarian should take advantage of such offers to set up training for staff members. After access is confirmed, the provider sends an invoice to the acquisitions department for payment. Acquisitions personnel review the invoice to make sure that the charges are as per the agreement and then process the payment. The responsibility of the acquisitions department is not over as soon as the item is paid for maintaining access to the resource also becomes a part of this department's task. Sometimes, access is disrupted due to a delay in the renewal of the resource. In such a case, acquisitions personnel need to contact the provider immediately to resolve the issue. Frequently access is affected due to technical problems such as a change in the URL. Under such circumstances, acquisitions or systems personnel should follow up. It is important for acquisitions personnel to communicate with the provider whenever there is a change in the IP address so records can be amended and access provided to additional buildings or sites. Another ongoing responsibility of acquisitions personnel is to receive usage statistics from the provider and provide data to selectors so that they can review the usage and make informed decisions about renewing or cancelling the resource.



### **2.13.3.13 Renewal / Cancellation of Electronic Resources**

Unlike most serial renewal subscriptions, which are based on a calendar year, the renewal for electronic subscriptions depends on the individual contracts. The majority of them are renewed every year, but sometimes contracts are signed for two or three years and are renewed accordingly. Usually, content providers send a reminder to the library's acquisitions department for renewal ahead of time with pricing and a copy of the contract. The core e-resources are most of the time automatically renewed unless there is a significant increase in the price or a change in the licensing terms. But noncore electronic subscriptions are reviewed by selectors based on various evaluation criteria before the renewal is processed by acquisitions. Once the invoice is paid, generally refunds are not available. Thus, evaluation of resources before the renewal process is critical. During the evaluation process for renewing e-resources, selectors consider various criteria such as ranking based on quality and usage, access, cost-effectiveness, breadth, audience, and uniqueness of the resource:

### **2.13.3.14 Access**

Access criteria are based on the technical reliability of the content provider, ease of use, remote access by users, and perpetual access. However, when the perpetual access/archive is not available or if a title is cancelled, the library loses access to current as well as retrospective material.

### **2.13.3.15 Cost-Effectiveness**

Cost-effectiveness is based on the number of searches per year, cost per search, and so forth. Usage data and especially cost per use helps in assigning the title for renewal or cancellation. The pricing for e-resources is very different compared to print resources. The price per title and the cost per use are extremely difficult to evaluate. Assessment of usage data from providers is extremely valuable for selectors during the renewal process, especially for evaluating expensive resources. Some content providers provide useful statistics such as number of queries per specific database, number of sessions, number of full text articles or citations retrieved, and the number of times users were denied access. Such data can help selectors to increase the number of simultaneous users during the renewal process.

### **2.13.3. 16 Uniqueness**

Uniqueness of the resource can be evaluated by comparing duplication in various formats or overlap in full-text resources. Individual titles in a publisher package generally cannot be cancelled. Sometimes, the titles are duplicated in aggregator databases, which do not provide stable access and hence require renewal of the subscription.

### **2.13.3. 17 Budget**

Finally, inadequate budget adds challenges for selectors in making decisions for renewal of e-resources. Once a decision has been made, the acquisitions department is notified to renew or cancel the subscription. They process the invoice for payment or communicate with the provider for cancellation.

## **2.14 Management of Electronic Resources**

The development of information technology and the Web environments have a dramatic effect on the user behaviors in information usage. The work flows from acquisitions to user services and the life cycle of electronic resources is quite different from that of print resources, since it is characterized by access without holding the physical objects. Also, the functional responsibilities for managing electronic resources are often distributed over departments such as serials, acquisitions and library systems. As licensing electronic resources has greatly increased in recent years, libraries have struggled to control this information in paper files, integrated library systems, separate databases stored on local computers or network. Under these circumstances, the need to get a better handle on these resources has grown.

The Electronic Resource Management System (ERMS) should offer an integrated environment that supports both management and access, without maintaining duplicate systems. The system should offer a capacity for global updating and flexible addition of fields. It should offer the ability to hide fields and records from public view and have a single point of maintenance for each data element. It should support inter-operation and dynamic data sharing with existing OPACs, Web portals, library-management systems and link resolution services. It should offer to user, consistent information regardless of the path they take in seeking it. Finally, the ERMS should, over time, support the ability to store, access, search and generate reports of the information that it contains.

### **2.14.1 Access-Management Requirements**

All libraries rely on authentication and access-management systems that are external to the systems and tools. These external systems may be as straight forward as reliance on the remote-authorization mechanism of an online provider (via IP addresses or user names and passwords) or as complex as a locally developed access-management service . The ERMS should accommodate both simple and complex environments with a disparate range of needs.

### **2.15 Preservation of Electronic Resources**

In the recent past, the libraries, worldwide, have increased their expenditure on e-resources phenomenally. An Electronic resource is defined as any work encoded and made available for access through the use of a computer. It includes electronic data available by remote access and direct access (fixed media). Remote access (e-resources) refers to the use of e-résources via computer networks. Direct access refers to the use of electronic resources via carriers) e.g. discs, cassettes, cartridges) designed to be inserted in to a computerized device or its auxiliary equipment. The trend to procure and maintain e-resources has grown exponentially among the libraries. This is due to the changes in the information seeking behaviour of users. They are showing greater interest and reliance upon E-resources and libraries & publishers to meet their potential information requirements by providing the same. This has been substantiated by many survey findings. At present, most of the E- journals have their print counterpart.

It is an issue of concern when print resources, which are 100 years or more old are to be stored and maintained for posterity. But in digital environment, the scene is completely different. Therefore, preserving digital information resources is a continuous problem.

#### **2.15.1 Digital Preservation: Meaning and Purpose**

Digitization is being carried on large scale, worldwide to facilitate and ensure wider dissemination and access of information. Universities, worldwide spend huge amounts of money on digitization for long-term gains ensuring access for long duration. So, preservation should be considered an inherent part of digitization activities.

#### **2.15.2 Archiving—Print Journals vs E-journals**

A printed journal is a physical object; whereas an e-journal is not a physical but a logical object stored on a physical medium. A printed journal presents the information so that it is

immediately accessible to the human eye and can be read directly. To view an e-journal specific software and hardware is required. The digital publication deteriorates much faster than paper. The format of the digital object may be damaged or lost and thus become irretrievable. But even before that happens, the technology used to store the publication is likely to become obsolete. Another threat is the loss of the functionality needed to interpret, display and use information contained in the digital object; without this functionality—the provision of specific hardware/software, the information will not be available even if the bit stream of the digital object has been preserved. It is a very complicated process and requires lot of innovations in institutional and business models, technology infrastructure, social and legal frameworks. Preservation of e-journals is particularly challenging due to extensive diversity and complexity of data structures in use over time and across the publishing community.

### **2.16 De-Selection of Electronic Resources**

Over period of time, the acquired E-Resources be reviewed particularly standalone floppy diskette/CD-ROM/DVD-ROM and other media formats and be removed based on their use. Particularly the E-Resources available in physical format like floppy diskette/CD-ROM/DVD-ROM, Pen Drive etc., are prone for damage. Therefore, the damaged electronic formats be De-Selected following a well established procedure.

It is understood that various resources using in engineering college libraries and, Various steps to be taken in Selection of E-Resources , Evaluation of E-Resources, Licensing aspects, Acquisition of E-Resources, Management of E-Resources, Preservation of E-Resources and De-Selection of E-Resources.

### **2.17 Benefits of Implementing Electronic Resource Management System**

ERMS proves its usefulness for both the librarian and users. Some of the benefits of implementing ERMS are as follows:

- Effectively and efficiently manage digital collections workflow i.e. from evaluation, selection, and acquisition, renewal cancellation, access to troubleshooting.
- To keep track licenses agreement, and manage online subscription, coverage data
- Analyze the cost per use, usage statistics, and licensing information. It can also examine cost benefit analysis of the Library.

- Allows users to search the multiple databases simultaneously and get the combined results in a uniform format.
- A central system of monitoring the management of link resolution with vendor, negotiation license with content provider, evaluation of trial subscriptions, subscription management, centralized acquisition, budgeting and ordering etc.
- Evaluation and monitoring module provides usage statistics, users' feedback, and downtime analysis which support for renewal /cancellation of eresources.
- Information alerts through e-mail, login popup windows remind the librarian for renewal resources before termination of license agreement. Notification from content provider to librarian and vice versa if there is a change of eresources Through this alert service different kind of notification have also been made to users like new addition of resources to the library, downtime notification, if any etc.
- Enable search of A-to-Z list available in the library. Search by title, author and subject etc direct the full text article via OpeURL resolving standard. This makes a single interface for all of the different units of information of e-resources life cycle. For example, Librarians, will be able to know the purchase details such as coverage, cost, subscription period and usage statistics of e-resources. With the available of contact information, librarian could contact the content provider/technical support for any technical problems and users for any information alerting service. Thus, ERMS streamline workflows and disseminate the information, hence eradicate the necessity of reentering data once more.
- ERMS administration control and restrict the library staff for read, update, create or delete the authorization of e-resources workflow. Staff cannot do anything beyond security restriction as defined by administrator.
- Library staff will get opportunity to learn new tools, technology and standards by implementing ERMS in the library.
- Implementing ERMS require staffs from different department to work together closely. Thus, the inter relationships between staff among various library departments improve. It provides opportunities for all to have all pieces related to e-resource management fit together.

## **2.18 Weakness of Electronic Resource Management System**

Though, the above mentioned benefits ERMS are beneficial to both the librarians and the users there are certain limitations those needs to be addressed in the ERMS .The important ones are: implementation of ERMS system leads to a huge additional cost as most of the proprietary ERMS are costly, a group of professionals with their technical skills/expertise is urgently required for implementing ERMS and most importantly, integration of electronic resources in ERMS is a mountainous job which takes longer time.

## **2.19 Training in Electronic Resource Management**

To manage the e-resources through ERMS, it is required to provide the training to the library staff as well as users. A training programme should be conducted by ERMS provider to all the librarians and librarians should give proper instructions to the users about the c-resources 'how to use it'. In the light of training, the resources can be used extensively and can justify the money being used in electronic resources. Users can be trained on variety of ways such as, through in person reference interactions with librarians, through e-mail, phone, or other contact with librarians, and through the numerous formal library instruction sessions conducted by librarians throughout the academic year.

## **2.20 Summary**

In this chapter an attempt has been made to give an overview of the major developments taken place in the library ranging from e-resources to e-resource management system. A common understanding of e-resources, e-resources management and its evolution, and e-resource management system has been made both for the librarian and users. It compares and evaluates the standards, features, functions use in ERM software designed especially for managing the c-resources. Based on this comparison, librarians can take this as a ready reference to match their needs, facilities offered by ERMS. This will be very handy tool in making right choice and decision for selecting ERMS for efficient management of c-resources. This chapter also mentioned general benefits, weakness of ERMS and also suggests for the training programme for librarians and users, and introduces ERMS programme for MLIS students.

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## Chapter - 3

### REVIEW OF LITERATURE

Review of literature is a set of output on a particular area of research and organized in a helpful sequence to strengthen the present technique. The main objective of review of literature is to understand the research activities that have been taken place in a particular area of research. The relevant literature available on this area is reviewed here. As this kind of research is new in the field of library & information science, an attempt has been made to present review of relevant literature published from 2004 to 2015.

The main purpose of the reviewing of literature is:

1. To identify gaps in the literature
2. To carry on from where others have already reached
3. To identify other people working in the same fields
4. To put the works into perspective
5. To provide intellectual context for own work
6. To identify ideas and method that could be relevant to the project

The articles have been presented chronologically in ascending order.

Pathak and Das (2000) carried out a survey – research on the role of electronic information in the institute of plasma research library. This study clearly stated the definition of electronic information and their advantages. The variety of electronic information sources available in the library such as CD-ROM , floppies were mentioned. The electronic information services based on such resources were also discussed. Information retrieval services, current awareness, e-mail, web access, home page etc were also mentioned. This study was concluded in this way that a variety of information services may be initiated by applying information and communication technology in libraries

Arora and Agarwal (2003) studied the role of INDEST consortium in engineering institutes of India. The genesis of such consortium needed for networking and the advantages were mentioned. The criteria for selection of electronic resources were stated like this: multi disciplinary resources with broad coverage were favoured over highly specialised sources needed for specialist and the electronic resources already on subscription were preferred over those which were not being used in any of the beneficiary institutions. Resources that are electronic only were favoured over print based collection .Costly important resources were preferred over less important low cost product. Selections of resources were made based on



their usage / suitable for institutions. The terms and conditions of license agreements include – authorized users, archival back up, electronic links, usage data, protection of increasing price, support for training etc. were also discussed. Various pricing models on subscription were also mentioned.

Breeding ( 2004) made an attempt on the fundamental aspects required for managing e-resources in libraries. Basically two aspects : back-end acquisitions and front –end content delivery were discussed in this regard.

It has been major challenge for finding ways to manage them efficiently. The number of electronic journals, citation databases, and full-text aggregations held by most libraries has grown rapidly. Managing these electronic resources involves providing the library's user with convenient ways to find and access them and providing library staff with the tools to keep track of them. Libraries subscribe to electronic content in a number of different ways. Some publishers offer packages that include many electronic journals, some products may include electronic journals from many different publishers, and libraries acquire some electronic journals individually. And since not everything is in electronic form, print resources cannot be neglected.

This study finally highlighted the fundamental aspects of managing electronic resources: 1) the front-end details of delivering the content to library users and 2) managing the business details of back-end staff functions related to acquisition, payment, and licensing. The researcher also realized that libraries should not have to maintain the same information in multiple ways. If the library catalogue, linking environment, electronic resource management system, cannot all share the same physical knowledgebase, then it should at least be possible to have a master copy of the data that is automatically distributed through these applications.

Fidel and Green ( 2004) tried to describe various factors influencing the engineers in selecting resources. This study described here the factors that engineers used for selecting information sources were complex as well. The study also showed that the concept of accessibility would be constructed in many different ways. To successfully enhance engineers' information seeking, one needs to examine the specific factors that would motivate an engineer to prefer one source over another. An in-depth understanding of engineers' thoughts and the context in which they work is likely to support interpretations of data that can be successfully employed in the design of information systems and services.

Kacherki (2004) worked on new paradigms and strategies that were ought to be considered from the perspectives of information technology and the critical information needs of engineering college library users. This study further revealed that in the digital age, technology is playing a vital role for generating and disseminating information in the network environment. Nowadays emphases in libraries have been shifted from collection to access. The increasing online environment resulting in users who are more technology savvy and are demanding and expecting their library on the internet able to meet their all information needs not only on demand but also in anticipation of demand.

Ventatesan and others (2004) proposed a strategic plan in a different way for collection development of electronic resources in JRD Tata memorial library. The scope of electronic resources and reasons for their subscription along with advantages of such resources such as multi-access, speed, functionality and content were discussed. Three level collection development policies were mentioned: The policy decisions were made at the highest level through senate library committee; selection of resources was the second level that ensure decision making and acquisition of materials. The divisions and department chairman was involved in the entire process and the third level was the process by which library acquires various materials and accordingly implementing the entire plan for collection development. Librarian was directly involved in the entire process. The various abstracting, indexing and bibliographic sources were also mentioned.

Avasia (2005) examined the movement towards digital library from traditional library. Emphasis had been given to the electronic management. This study also identified four basic criteria for selection of electronic resources i.e. quality, aesthetic aspects, technical aspects and finally library relevance. In the light of facilitating the management of electronic resources, the following aspects such as ease of use, vendor access, quick updating, cost savings etc were highlighted. The other factors includes quality of product, provisions for budget, technical obsolescence, access, copy right issues, data migration ownership and archiving of electronic resources were also covered. The author also observed that inspite of certain limitations, the printed journals would ensure more longevity.

Bist (2005) made an attempt to highlight the importance of management of electronic resources in the Library & Information Science profession and services. He also identified the changing role of library profession in the electronic environment. The basic differences between electronic services, online journals and electronic resources were also explained.

The major advantages of electronic journals like multiple access, easy to search, multiple format, etc. over the print versions were also discussed. Various issues related to management of electronic resources like selection, subscription, license agreement, backup and archival file format , access mode were also explained.

Doraswamy (2005) studied on the use and familiarity of electronic information resources by the students of V.R.Siddharthanath engineering college library, Vijaywada .This was a questionnaire based survey method. The final data analysis showed that more than 60percent students were familiar with electronic information sources, 27.50 percent of the students use the computer on regular basis, where 5.63 percent never used it. A less percentage of them, i.e.2.5 percent students used CD-ROM, 33.13 percent internet,38.13 percent e-mail, 36.87 percent search engines, and 21.25 percent used the college website respectively. This finding also indicated that almost 18.75 percent of students were reported to use online journals rarely but 42.50percent students used electronic information resources for communication purposes. Lack of proper training and time might be considered as the main problem while using the electronic information sources in the library.

Emery( 2005) explored the concepts from other disciplines. The rapid development of open source software, ubiquitous acceptance of sophisticated integrated library systems and emerging digital standards had opened floodgate for new models for workflow and processing of e-resources. Five components of e-resource management that libraries grapple while subscribing e-resources were discussed in this regard. These were acquisition, access provision, administration, service provision, and evaluation/monitoring. The author concluded (it could be wrong/right) that in order to develop three systematic processing approaches — transactional, knowledge management and decision support, the purchase and provision of e-resources are required. This comprehensive guide would help to develop better standardized management tools, thereby having more streamlined workflow as well as arrangement to process e-resources. More importantly, librarians might begin to realize the existence of these components of e-resource management and it arises while purchasing e-resource management, but they are not necessarily consistent from any one given resource to another and each of these components are not required to employ all the three systematic processing approaches outlined.

Hopkinson (2005) worked on the issues relating to management of electronic journals in the electronic age. He categorized electronic journals into three types: freely available, born digital without any hard copy & electronic journals with free access to subscribers of the hard copies. The issues relating to package subscription of electronic journals were mentioned. The publishers would play a crucial role for financial benefits in this electronic publishing environment. The difficulties in searching required information in print journals were well discussed. Access to electronic journals through IP address would be most convenient from users' point of view. The issues relating to internet protocol along with authorization & authentication were also discussed in detail.

Jaya Praksh (2005) in his study described the necessity of proliferation of information resources in electronic form to meet the current demands of academic libraries and institutions at reasonable price. The author also made an attempt to highlight the need and importance of e-journal consortium & resource sharing among libraries & information centres. Finally he further made an attempt to go through on various types of consortium available in India and mentioned their various attributes.

Sasirekha and others(2005) carried out a survey on the availability of electronic journals in engineering institutions in Tamilnadu. About twenty five engineering institutions were covered. According to the final report, 70% institutions were providing access to electronic access and private institutions had good collection of electronic resources. More than 58% engineering institutions participated in INDEST/AICTE consortium based subscriptions . This study also revealed that usage of electronic databases were not up to the level of expectation. Most of the engineering institutions were reported to prefer subscription of IEL online, ASME and ASCE journal packages.

Sridevi, Satrayana and Murthy (2005) made an attempt to study on the provisions of sustainability of electronic resources in the academic library community in Indian scenario. The advantages of electronic resources such as readily access, speed, linkage, cost and other matters were discussed. The other constrains or limitations of electronic resources such as financial, technical & social constraints were also discussed in this regard. The other matters like selection, acquisition, cataloguing, user access, training and support for the staff and users were also mentioned.

Hann (2006) examined the use of print and electronic resources among the undergraduates at Monash University Malaysia and the Victoria University Programme in Sunway University Campus. The objectives were to find out the print and electronic information resources available to the undergraduates, their perceptions of the use of information resources, the usage patterns, and factors influencing the use of print and information resources.

A total of 480 undergraduates from these two institutions participated in a questionnaire-based survey. The main findings indicated that undergraduates relied upon and used the Internet intensively. The undergraduates perceived electronic resources that are subscribed by their respective universities in Australia, and books to be more reliable and of higher quality than other resources.

One of the factors that prevented students from using the controlled resources such as books was inability to physically locate the materials even though it was shown to be available in the library catalogue. It was also found that less than half of the undergraduates surveyed had acquired the skills to search information resources. It was inferred that the undergraduates value the use of Internet because it would be easier to search than other resources. This is critical as uncontrolled resources, such as Internet, are used intensively than controlled resources such as subscribed electronic resources, books, journals and other resources available in the local library.

It was finally recommended that libraries and lecturers took initiatives to promote the use of more controlled and quality resources to the students to meet the standards of scholarly and academic requirements.

Gobbur and others (2006) made an attempt to study on the need of training facility in the digital environment. The influence of Information and Communication Technology (ICT) in libraries and their relative benefits were also realised. The skills required in this regard were discussed such as : professional & Information Technology( IT) related technical skills, teaching skills, team working skills, customer services skills, analytical & evaluative skills, subject skills, etc. This study also realised that the professionals should understand the functioning of computer networking. They have to improve knowledge on both hardware & software for better understanding. Several issues relating to implementation of library softwares were also discussed .The basic idea about digital library, information system,

networks, information collection , storage & retrieval , information management were also highlighted in this regard.

Kasprowski (2006) made an attempt to explain the steps required to manage e-resources. These were reported to be more complex than those required for print resources. Just as the workflow of print resources includes processes such as selecting, ordering, cataloguing, and binding, the workflow of e-resources also includes selecting, evaluating, approving, licensing, billing, and registering access and was also accompanied by a series of technical aspects, such as usability, performance, access technologies, public interfaces, troubleshooting, and usage statistics.

Arthur Sale ( 2007) carried out a study on the issues related to the budget in the various aspects of changes appearing in publishing media. This study also observed that, most of the printed journals used to move towards the electronic format. The concepts of open access journals and its implications were also stated well. It was also reported that more than 2500 open access journals would be accessible through the Directory of Open Access Journals(DOAJ). The limitations of open access journals were also stated.

Norziana ( 2007) in his study made an investigation to identify the use of e-journals among the academic staff in Monash University Malaysia. This study highlighted four main issues; awareness, potential use, characteristics perceived important and barriers faced in the use of e-journals. All the necessary data was gathered by a survey method using questionnaire. The respondents were 161 academic staff, which represents 10 different faculties in Monash University Malaysia.

The results mainly indicated that 100% of the respondents were aware of e-journals. Overall results of the data collected showed that e-journals were widely used by the respondents for their teaching purposes, research writing, professional development and preparing for teaching assignments for students. The findings of the study also revealed that majority of the respondents promoted the use of e-journals to their students and the teaching and research staff. Most of the respondents access e-journals through three main mediums; library database, specific URL and bookmark.

Among the barriers faced in using e journals are issues dealing with usability and unavailability of most recent or past issues. However, these barriers are not considered as 'Major Barriers'. The most important characteristics of e-journals are; availability of 24 hours

a day, and in using the e-journals academic staff do not have to go to the library or wait for document delivery. Library support by conducting workshops on information skills to retrieve relevant e-journals is perceived in order to provide an easier flow of knowledge from the right medium to the users to utilize for their own benefit.

Rani & Geetha ( 2007) tried to identify the importance and role of e-resources in modern libraries. The development of Information Technology has made great changes in all industries. Library is no more an exemption of this. The technological advancement in the use and delivery of information media has changed the role of library professionals. The library is no more a mere stack holders of books, now they became from owners to provide access to electronic information. The print media is getting digitized and through the advent of internet, the information is available to anybody from any corner of world. The use of e-journals, e-books has created a new source of information to the users. Their features attract the users to seek information from these media.

This study has also suggested that the open access publishing has enhanced the availability of information by breaking down the financial barriers. It is this technology which has made greater impact on libraries. The media of communication is developing and the format of information delivery and exchange is also undergoing rapid change. People require most up-to-date information from libraries. Hence, the technological developments have to be adopted in libraries to meet the needs of users. The invention of internet along with world wide web made the any part of the world is available to the user almost immediately. This has increased the responsibilities of the library to provide up-to-date and latest information to the users. Now libraries have also realized the importance of access to e-resources in its collection and their proper management.

Singh, Khan & Chauchan (2007) in their study made an attempt to explain that formally there were two types of electronic access resources available — direct and remote access resources. Direct access resources could be used at any time and it requires only a computer to access the resources. For example, direct access resources are databases available in CD form whereas remote access is server and client-based information resources. These are online resources where the location of the server is somewhere else, maybe in another country, and the clients are also in different geographical locations (or countries), for example, Science Online, Chemical Abstract Services (CAS), and others. This type of availability can be given to a specific range of IP within a campus, with access through

username and password where information can be downloaded from anywhere with the help of the Internet. Access through IP range, as well as through username and password is also there (in combination).

Achonna (2008) investigated students' awareness, access and usage of E – journal resources at the library of Yaba College of Technology, Yaba –Lagos Nigeria. This study also examined the level of awareness, access and usage of e – journals among the students; and the problems they encountered in their bid to use the resources. The study revealed that the level of usage of the e– journals were low, and that lack of skill to use the resources, power outage and inadequate computers were some of the problems encountered by the students. The study recommended a conscious effort to be made to provide information skills training appropriate to individual needs of the students; and information retrieval skills training to be embedded in the curriculum, undertaken at an appropriate time and supported by academic staff. Lecturers would take initiatives to emphasize and popularize information technology and its usage by talking about it and giving assignment that would motivate students to use electronic resources. It was also recommended that stable power supply and more computers should be provided to ensure constant, consistent and available services.

Bothmann & Holmberg(2008) made an investigation to define the various aspects of e-resource management, from pre-selection activities, such as trials and initial vendor inquiries to decisions for renewal/cancellation from the perspectives of planning, policy and workflow issues experienced by many libraries. The authors tried to describe the challenges, methods and impacts on e-resource management perceived by libraries. They also suggested some methods and ideas to address such challenges that might be helpful for libraries to create a sense about e-resource management.

Brown(2008), in his study discussed the e-resource license agreements with an overview of basic contract law as it would have relations with licensing of e-resources . The author elucidated e-resource license negotiation process as well as license agreement term & clauses. This study further indicated the basic understanding of licensing concepts and language to aid librarians in the processes of review and negotiation of their own license agreements. Further, the author mentioned that in order to protect a library's interests as well as those of a library's patrons, librarians must gain more knowledge about e-resource license agreements and the licensing language and terms included.



Davis & Feather (2008) in their study discussed about the license agreements requirement for e- resources that might be acceptable to publishers, vendors as well as librarians. In their study they reviewed and analyzed 35 licenses, that had been in effect prior to 2000, and their 2006 counter parts, to reveal how licenses were evolved according to the licensing principles set forth in recent years by the American Association of Law Libraries, the International Federation of Library Associations and the North East Research Libraries. In this study, 13 aspects of licenses were analyzed and discussed — authorized site, authorized users, breach cure period, confidentiality of business terms, dispute resolution and governing law, electronic reserves and course packs, indemnification, inter-library lending and scholarly sharing, licensee's responsibility for action of authorized users, modification of license terms, perpetual use/archival rights, remote access, and usage statistics. All the 13 aspects of license would encourage the library community to develop license agreement with vendors, that might have positive impact on the library.

Hults(2008) made an attempt to delineate the usage statistics of e-resources, including methods of defining, collecting and using data. He discussed about that usage statistics of e-resources that might be helpful to improve the processes of evaluation and decision-making throughout the life cycle of e-resources- new purchases, renewals and cancellation of packages.

Joshiyura (2008) had thoroughly discussed the workflow of e-resources, beginning from selection, trail, evaluation, license agreement, acquisition, to access system. The author addressed the major steps, processes, procedures and issues involved in the selection and acquisition of e-resources that would serve as teaching tools for librarians, who want to learn the best practices to manage the life cycle of e-resources.

This study further covered the various facets of the selection process, including tools, challenges and criteria, and provide a checklist for evaluating, verifying, ordering, and reviewing license agreement of e-resources. It also mentioned that a collaborative effort of both technical and service librarians are required to handle the work. These processes could be seen as a life cycle involving a specific workflow distributed among many library staff members. The processes involved in a typical workflow, to add an e-resource product to a library's collection, are as follows: 'consideration' — the e-resource librarian or a subject specialist should have some knowledge about the product, and he/she may or may not

consider the product worthy of further consideration; ‘trial’ — before committing to a license agreement, the product should be put under trial for a few weeks or a couple of months for its fair evaluation; ‘negotiation’ — this involves negotiation between the authorized library representative and the publisher regarding product options, pricing and other details; ‘license’ — after negotiation follows an agreement, which includes the provider requiring the library to sign a license agreement (legal document) specifying the terms of use, price restrictions and other details; ‘procurement’ — if there is successful completion of all the mentioned steps, then the library will issue a payment to the provider for the product; ‘active use and monitoring’ — after this, the library users should be able to access the associated content, and the library staff should be able to monitor the volume of the content being used and lastly, ‘renewal/deselection’ — the product might be renewed/deselected depending on the needs of the organization and other factors.

Ercegovac (2009) made an exploratory study reports on what engineering undergraduate students would like to learn about engineering information sources and access. Responses were obtained on selected performance measures within the framework of Information Literacy Standards for Science and Engineering/Technology This paper also discussed the implications of this study's findings in light of engineering education in general, and specifically with regard to instructing all engineering students in the proper use of a variety of pathways in accessing high quality engineering resources for numerous lifelong purposes.

Rao and Choudhury ( 2009 ) investigated on the availability of electronic resources at National Institute of Technology( NIT) libraries in India. As a repository of resources, library is an integral part of the educational system whose primary function is to serve users (students, faculty, researchers and staff). Electronic resources are the prime ingredients and they become a common part of the suite of most academic library resources today.

The investigators also mentioned the definition of electronic resources as mentioned in the AACR2.AACR2 rule 9.0A1 states “electronic resources consist of data (information representing numbers,text, graphics, images, maps, moving images, music, sounds, etc.), programs (instructions, etc., that process the data for use), or combinations of data and programs.”.

According to them In early 70s, most of the electronic sources were available on magnetic tapes and some of these were online. Various kinds of resources that are available and accessed today are intranet (locally produced e-resources), internet also called online (remotely stored e-resources) and physical media (stored data on CD-ROM, audio, video cassettes etc) based. The third one is much like the traditional paper based publications with the exception that they require computer hardware and software for their utilisation. Building electronic collections is largely influenced by a set of library policies and user (faculty and students) preferences in the academic environment. The proliferation of electronic resources has had a significant impact on the way the academic community uses, stores, and preserves information. These e-resources are added value to the academic libraries to offer better services to users. These e-resources are accessible from many different approaches. Users are able to access e-resources either by local or remote locations. The electronic resources empower and enrich the academic system. But, the increase in information generation at an estimated rate of 13 per cent per annum has made the task of collection, organization and retrieval of information very difficult. Alternatively, the academic libraries often prefer electronic resources to substitute print collections for optimum use.

Considering the reasons, the important ones including physical space, escalation in journals' prices, digital literacy, discovery system, and skilled manpower force the academic libraries to opt for electronic resources in meeting needs of the large community of users were also mentioned in this regard .

Electronic resources referred here are "information packages made available in digital format." These electronic resources consist of online journals databases, CD-ROM/DVD and audio/ video course materials. Mostly, the online journals databases cover full text journals databases such as ACM (Association for Computing Machinery) Digital Library, American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers, (ASME), ASTM (American Society for Testing and Materials) journals and standards, IEEE Online, Nature, Proquest, Springer link, ScienceDirect etc), and abstract databases (Engineering village2 (Compendex and INSPEC ) Web of sciences, Chemical Abstracts etc) and standards etc.

The investigators finally revealed that majority of libraries were reported to use 11 to 15 number of online journals databases, whereas 25 per cent libraries had the facility of more than 16 number of online journals databases. Very few libraries (20%) indicated that they had

less than 10 online journals databases at their end. Eighty five percent of libraries had the facilities eresources on CD-ROMs/DVDs form. About 90 per cent of libraries obtained audio/video course materials.

This study also mentioned the zone-wise performance among NIT libraries in India with respect to electronic resources availability. The South zone (75%) libraries were reported to have better-off in comparing to the other zone libraries.

Das ( 2010) carried out a study on the availability of electronic resources in the degree college libraries of Purulia district of West Bengal . The author here made an attempt to analyse the strategy for acquisition and promotion of electronic resources. The advantages of electronic resources were also stated. The scope of electronic resource management and the necessary attributes of the software like reliability, availability, security and portability were discussed. A three step strategy for acquisition of electronic resources were stated like this way : to subscribe open electronic resources available free in public domain. In this context the author mentioned websites of electronic journals, electronic books and free databases, the second one highlighted the strategy to become a part of existing library consortia & finally the third one discussed the selection criteria for electronic resources .Quality, relevance, currency, format, price, license agreement, archiving, mode of access, training for staff and users were reported to be necessary for management of electronic resources.

Sharma and Sharma ( 2010) made an attempt to highlight the concept of digital and virtual librarianship. According to them this had entirely overpowered the traditional librarianship. The old concept of librarianship in the present time of science and technology has almost been disappeared. In this fast growing generation, library users are also demanding for updated, nascent and quick information. To fulfill the information, knowledge and literature thrust of the end user, e-resources might play a very prominent role. Electronic information has gradually become a major resource in every university and research library. Electronic information has also diversified the ways of communication, storage and retrieval of information, demands of users and information management system in the libraries, information and research centres. The emergence, in particular, of the internet has opened up many fresh opportunities for dissemination of content to large and small consumer. Innovation in the field of information and communication technology is boosting research and development activities around the world. Earlier libraries were facing various problems for managing print documents rescued by the electronic resources .

Behera and Singh (2011) discussed the challenges faced by the Indian libraries for collection development in digital era . The developments of institutional repositories at institutions in the national level were discussed in this regard. The need for manpower development to manage these repositories and their proper functioning were also stated well. The major problems of collection development and their proper supervision in this connection such as problems of user friendly environment, digital device, user training etc. were also discussed. The major challenges in this regard were mentioned here as : challenge of management of digital resources, challenges of technological up gradation & financial constraints, challenges of providing web-based user services etc. The issues like perpetual access of electronic resources, online access facility etc. were given due importance. The pricing models for acquisition of electronic resources were also stated well.

Sasirekha , Gopalakrishnan and Balamurugan ( 2011) made an attempt to identify the availability of electronic resources in the engineering institutions in Tamilnadu. This study aimed to discuss about the preliminary findings of the present status of availability of electronic journals in engineering institutions in Tamil Nadu. This study was based on questionnaire method. The scope of the study was confined to the librarians of the private engineering colleges in Tamilnadu.

The academic libraries have a particular contribution to accomplish the goals of the institution. It serves more than repositories for materials and knowledge; they are of an access point to acquiring knowledge and skills. Technology provides better access to information; especially electronic resources play a vital role in supporting academic activities. In recent years, academic users have become more dependent on article databases and electronic journals to obtain information pertinent to their needs. In India, especially higher education has tremendous growth in providing quality education for past two decades, most of the universities and colleges are providing pin pointed electronic information to their users. It is right time to evaluate or assess the library electronic collections.

Finally this study concluded that majority of the non minority self financing institutions had been providing e-resources facility. All private universities tried to develop good collections of electronic resources in their library. Government aided colleges were reported to have all types of e-resources in their library collections. Private universities provided almost all popular e-journals in the field of engineering, technology and its allied studies.

Tucci (2011) also made a similar attempt to assess and provide for the information needs of the faculty of the schools of science and engineering at The College of New Jersey (TCNJ) in the digital age. The objectives of this study were to: 1) gain an in-depth understanding of how computer science and engineering faculty members currently obtain information and thus influence students, 2) determine changes needed in the collection/services of the library to facilitate this information flow and implement desired change and 3) share this experience so other librarians may question whether their faculty members also feel misunderstood and initiate a dialogue with faculty members to obtain their perspective and insight. Nine major information behaviors or issues were identified as needing to be addressed. From this feedback, collection/services changes were implemented to support the positive information behaviors and to overcome barriers to enhancing students' information literacy and life-long learning skills while assuring faculty members that their needs were heard and understood.

Das & Mohapatra( 2012) made an investigation on the state of e-collection development and management in the engineering college libraries of Bhubaneswar city. Emergences of electronic resources have made revolutionary changes in the library scenario. Many librarians believe that these resources have changed the principles of selection radically; some believe that they will virtually eliminate selection. Although it is true that the art of selection is undergoing profound change, the selection of material is still crucial for libraries. The four basic criteria for selection- quality, library relevancy, aesthetic and technical aspects, and cost remain the same in the electronic era of information. The development of new technology for the storage of Information, challenge of the future for libraries is not supporting a new electronic literacy, but supporting “The multi-literacy” that will be required in future year.

Johnson et al. (2012) have illustrated that before purchasing an e-resources, the license must be reviewed and negotiated, not only to inform and support the evaluation process, but also to ensure that it reflects the selector's expectation. It is preferable to obtain, wherever possible, a standard model license agreement that describes the rights of the library in an easy-to understand and explicit language. They have broadly described five areas that need to be reviewed and negotiated for a license agreement. These are: first, ‘access concerns’ includes methods of access, authorized users and sites, archiving policy and perpetual access, and institutional archives/self-archiving; second, ‘use of electronic information resources’ includes downloading and printing, course packages, course reserve, inter-library loan, pay-per-view, viewing, user statistics, liability of authorized use, and privacy and confidentiality

of user information; third, 'vendor support and technical consideration' includes bibliographic data, linking service, content consistency, system integration, technical support, web browser accessibility, documentation on help manual, commencement date, notification process, customer support, guaranteed up time, compatibility with library systems, and linking to the resources; fourth, 'flexibility and enhancement' includes cancellation, value for money, consistency with print equivalent, availability, and drop-out clause; and fifth, 'legal issues' includes terms of payment, grace period, governing laws, and resource providers' authority to give access to license agreements.

Mansur (2012) carried out an investigation on various facets in the collection development in the digital era. The various changes occurred in acquisition, retrieval and storage of information processes due to technological developments were thoroughly discussed. Limitations, issues, challenges restrictions and problems being faced by library managers and clientele due to the same had also been highlighted. The way these developments affected the academic environment in general and engineering college libraries in particular, and changed the role of librarian were also focused.

This study also revealed that the advent of ICTs, the Internet and particularly the World Wide Web (WWW) has changed dramatically everything on the earth. The Libraries and Information Centres have gained a lot. These technologies have been a boon. A job that before used to take hours together, is now just a mouse click away. The publishers did not remain behind; they took advantage of these applications to a considerable extent and tapped a treasure house of electronic and web resources. This has created a thought on actual possession of resources to actual access of the same, thus creating a change in; the collection development in the electronic environment.

The knowledge centers acquire electronic resources to support the various activities of the parent institution be it instruction and research. The information scenario is changing at a faster speed. The reasons for this change are many. Library users increasingly demand resources in electronic format because of its associated advantages (such as their simultaneous presence, faster search ability, easy manipulability and accessibility). More and more library staff is now at ease with ICT and is happy and are ready to explore the functionalities of the software/ hardware to the maximum extent starting from the lower level. Library managers are also becoming active and creating alliances with the academics to design environments to integrate ICT into the new teaching and learning.

Prabhakaran and Kurahatti (2012) made an attempt to make an indicative discussions on some contentious issues that might rise while negotiating the terms of the license agreement. Presently the libraries are incorporating more and more digital resources into its collection. Like print resources, the electronic resources pose different set of challenges to libraries. One such challenge is to ensure perpetual access to the electronic resources held remotely at the publisher's end. This raises the issue of ownership vs access and is a well debated point in the user and the librarians' communities. The fact is that, in case of online resources, the libraries are currently dependent totally on the publishers to access the subscribed content. Of course publishers too have their own concerns of protecting their content from misuse.

It is, therefore, a mutual interest of both the publishers and the end-user to enter into an agreement protecting each other's interest. A standard way to secure this is to enter into a license agreement with the concerned publisher, whereby the rights of end users are protected. This is a challenging task for libraries. The terms and conditions mentioned in the agreement are generally in favour of the publisher and the librarians need a lot of credible skills to alter the conditions to serve the interest of their organisation. The license agreement system that is currently in practice may itself undergo a change and eventually get standardised.

Velmurugan (2012) investigated the awareness and utilization of library electronic resources and related issues among faculty members of SKR Engineering College (SKREC) at Chennai. This is a matter of concern, as presently, electronic information sources and the Internet are considered extremely important tools for effective teaching and research. Accordingly, these resources have occupied a vital role in the collection and budget of almost all libraries. Faculty members are heavily dependent on e- resources for their teaching and research and keep them up-to date. The study revealed that the faculty members of SKREC were reported to use the available e- resources satisfactorily. Therefore, the SKREC library played an important role in extensive library promotion and user education programme.

Changes in technology in recent years have dramatically altered how information is accessed, stored and disseminated. Whereas information provision in academic libraries was previously based upon the collection of physical library materials, it is now increasingly the case that academic libraries are moving into the virtual arena. With advances in technology and e-



publishing, access to information on a local, regional, national and international basis, by overcoming the traditional barriers of time and space has become easy. Large amount of scholarly literature in the form of full-text journals, books, reports, etc., are published in electronic medium. Recognizing the fact that the use of ICT opens new avenues for better services in newly found digital environment, the libraries in higher education are adapting to new technologies for further value addition in to its products and services.

Through various search techniques, electronic resources provide extensive links to explore additional resources or related content. In addition, electronic resources are considered as important resources for teaching, research and training. Thus, most of the libraries as well as the universities of the present day prefers to subscribe electronic resources for higher education and research.

Emery & Stone ( 2013) in their study, listed the top 14 vital issues relating to licensing e-resources for academic institutions. First, definition of site does not encompass institution's geographical situation. Second, definition of users allows the utilization of resources by defined users, so that they can access and use the resources purchased. Third, remote access allows users to access the content with a remote authentication tool. Fourth, access should have an Internet Protocol (IP) authentication as opposed to username/password; in the case of e-books, digital rights management (DRM) should not preclude. Fifth, there should be provision for access and connectivity to other resources using a third-party link resolver at the article level, chapter level or dataset levels, and not just at title level. Sixth, indemnification should be mutual for both parties and not favour one or the other. Seven, privacy clause regarding price and details of the agreement needs to be avoided. Eighth, usage statistics should be readily available for the resources. Ninth, content transfer should be given within 60 days of the process, and if significant content is lost then the library should have the right to cancel upon notification. Tenth, they should be able to use the resource as well as resource records with third-party discovery tools and next generation library catalogue. Eleventh, the loss-of- funding out clause. Twelfth, it should be applicable to the institute's location and in line with its guidelines. Thirteenth, perpetual access should be maintained. Last, fourteenth, price cap allowance should be included, that is, the ability to cancel if the price increases above a certain amount.

The guidelines of Florida Virtual Campus (2013) have provided a structure to review and negotiate the license agreements for e-resources assigned by the FLVC on behalf of higher education institutions in Florida. It consists of three parts. The first part mentions the details and terms that typically constitute the main body of the contract, such as authentication, authorized users, sites & usages, licensor responsibilities, licensee responsibilities, mutual obligation, legal issues, and renewal and termination. Second part deals with various schedules and attachments used for laying out those terms that do not fit into the main body of the contract. And the third part is a standard addendum to be used with all contracts.

Sundareswari(2013) made an attempt to analyse the role of e-resources in the engineering college libraries. Library functions a very important role in this fast changing go green of publishing. Their role includes identification of selection of information, its organization of management, storage retrieval and dissemination to right users at the right time at right place at right price and in right format. The goal of any academic libraries is to meet the teaching, research and other information needs of the user. The proliferation of the literature on all the subjects, price of journals hike in currency conversion rate and the budget crunch made the libraries depend upon each other. This leads to library co-operation, resource sharing and networks etc. At present the online databases, E-resources facilitate formation of the colleges at resource sharing among the libraries. Engineering colleges prove to be one of the major solutions to the existing problems of budget crunches among the libraries and information canters. The advent of e-publishing has brought a revolution in journal publication, subscription and access delivery mechanism. This paper described various facets in collection development an E- resource in the engineering college libraries.

Library users increasingly demand resources in electronic format because of its associated advantages. More and more library staff is now at ease with ICT and is happy and is ready to explore the functionalities of the software/ hardware to the maximum extent starting from the lower level. Colleges and other places of higher learning are slowly developing institutional repositories where the information generated by its members, is archived, using appropriate software and made freely available worldwide DSpace, as far as possible. Publishers, vendors and agents are more aware of the developing market for electronic resources and are eager to supply electronic resources / services along with print based materials. Further, the World Wide Web (WWW) is an important versatile platform for the delivery of needed information and provides a basis for the shift from ownership of physical collections to access on demand.

Web being a real time information delivery channel has made CD-ROM based delivery a reality. The shift is not only taking place within the knowledge centre but throughout the various facets of academics in an engineering college. This is because of the changes in syllabus structure, distance education provision and delivery of teaching through virtual classrooms, using the internet platform.

Current Library Management Systems(LMS) adapted by engineering college knowledge centres are not very helpful in the management of engineering electronic collections as they were primarily designed for print based resources and lack the capability to manage the vastly changing electronic resources. Dedicated Electronic Resources Access & Management Systems are now making their appearance in the market and some Old library management system are also adding electronic resources management modules to their systems for up gradation. These new generation systems will also help in the shift from printed to electronic resources. Hence, to demands of users, libraries are shifting towards new media - namely electronic resources for their collection development. Collection development policies and ordering processes for print collections have found a place in many, if not all, engineering college libraries.

Tambe ( 2013 ) made an attempt to identify the strength and weakness of e-collection of different engineering college libraries affiliated to Pune University and suggested possible explanation for the improvement of e-resources in these libraries. With the rapid development of electronic publishing, libraries are not only acquiring reading materials such as printed books and journals but also arranging for providing access to various learning resources in electronic form. This paper discussed the definition of e-resources, advantage and management of e-resources the challenges, advantage and disadvantage of e-resources. Besides, it also discussed availability of electronic resources , users level of satisfaction while using e-resources ,quality of information retrieved through e-resources and participation in library consortium in various engineering institutions throughout the Maharashtra.The Engineering colleges libraries in India are facing challenges due to budget cut, reduced staff ,devaluation of rupee, and escalation in cost of publication. However, in order to meet the ever increasing demand of the user community in a digital environment, libraries have to develop ways to manage access to materials available in electronic format effectively and efficiently .

Saini & Others ( 2014) made an attempt to describe the user satisfaction of engineering colleges of the city of Jaipur. A well structured questionnaire was designed to elicit the opinions of the engineering college students. The response was gathered from 220 students. The result of the study provided the information about the satisfaction of the users with library collections. On the basis of the findings, some suggestions were put forth for maximising satisfaction of engineering college students in libraries.

Abdul& Gunjal(2015) made an investigation on the awareness, access and usage of electronic journals among the research scholars of NIT Rourkela. They have tried to analyze the different aspects such as awareness, access and usage of E-journals among the research scholar's at National Institute of Technology Rourkela, Odisha ,along with the problems they encountered during the usage of the same. Based on the study, it was recommended that users' education programme, stable high-speed internet supply, and adequate number of computers should be provided to ensure consistent access to available e-journals services. This study finally explained the detailed analysis of survey on these different aspects; findings and solutions. And it also recommended a probable solution for improving the usage of e-journals.

Agagond and Wadekar ( 2015 ) tried to investigate on the impact of Internet in the modern libraries to make it more useful for the researchers and also highlighted the essential information skills required for successful implementation. This study was conducted in some selected NAAC accredited colleges in Mumbai. Drastic changes are taking place in the academic libraries as a result of Information Communication Technology (ICT) revolution. The dawn of the Internet has impacted the library and information services enormously and made the present libraries more than the centre of learning resources and multimedia centre. With the continuous expansion of ICT and internet resources, libraries have been greatly benefited and also activated in democratizing information. Day by day, the content and coverage of the e-resources are expanding. The generation of the present day has been greatly influenced by tremendous amount of academic information available in the format of e-resources for the effective teaching and learning program. It had also been observed during investigation that using the e-resources for the purpose of accessing the required information is not an easy task. In order to evaluate the information available in the form of e-resources that requires some well-defined search strategies.

Dash(2015) made an attempt to highlight the need and importance for managing electronic resources in libraries. The number of electronic journals, e-books, citation databases and full-text aggregations held by most libraries has been grown rapidly. Managing these electronic resources involves providing library users with convenient ways to find and access them and providing library patron the most reliable scholarly resources published in electronic media. Libraries need to implement an ERM system to manage the information flow better and to administer their electronic resources in a better way. The terms and conditions for using these resources are set out in electronic resource licensing agreement between publisher and libraries. Several issues relating to licensing agreement between the publisher and libraries were briefly discussed in this paper.

Ghosh ( 2015) investigated the various issues related to the implementation of electronic resource management systems. This includes exponential growth in electronic resources, involvement of huge amount of budgets, continuous changing subscription/acquisition models, life-cycle of e-resources, license & access information, cost analysis, usage statistics, involvement of various stakeholders like publishers, interface providers, subscription agencies, and so on are the different issues concerned in managing e-resources in a library or consortium of libraries. The author also highlighted the major challenges faced by the libraries in this regard. The major challenges were the lack of efficient automated tools to deal with the complex nature of e-resources for effective use and its management. Traditional library management software was not capable enough to play with the multifaceted activities of electronic resource management. Therefore there is no doubt that in present scenario the libraries require an efficient integrated ERM system for managing electronic resources as well as analysing various decision making factors. Efficient ERM systems are not yet as tested widely as library management software. Moreover an ERM system should be a tool for librarians and interface to the end users.

Mukherjee & Das ( 2015) carried out a a survey of collection development and services of private engineering college libraries of Howrah district. This study further demonstrated the various aspects of use of collections and services, purpose to visit the library; adequacy of library hours, infrastructure facilities, use and collection of documents that is, internet information resources. It also identified the levels of use of various services provided, access of online databases services, database search techniques, and users' awareness about different

types of library network. This study further highlighted the users satisfaction with overall functions of the library. Suggestions were given to make the collections and services more beneficial for the academic community of the mentioned engineering college libraries.

Patra (2015) also made a similar attempt to identify the challenging issues related to the management of access to electronic resources in libraries. A paradigm shift from Electronic Resources (e-resources) to Electronic Resource Management (ERM) has witnessed a great change in the recent year both for the libraries and their users. Today's the important function of libraries which increase very rapidly is to provide information in electronic formats. Libraries provide access to these e-resources in a wide variety such as edatabases, e-books, e-theses and dissertations, e-journals, digitized & born-digital documents, digital images, streaming video, sound, audio books and Internet/Web resources. To manage this diversity of e-resources is a challenge before library professionals. Therefore, the concept 'electronic resource management (ERM)' emerges. To manage the entire process of e-resources starting from acquisition, access and administration, renewal/cancellation is called life cycle of e-resources. Following figure represent the life cycle of electronic resource management. The author also highlighted the Major components of the life cycle of e-resources. This includes (1) acquisition management, (2) access management, (3) administration management, (4) support management, and (5) evaluation monitor management. Tool to manage and access e-resources starting from evaluation, selection, acquisition, renewal/cancellation, license agreement, open access and institutional archives, access rights, usage statistics, single access point, implementation and administration were also discussed.

Pratap (2015) made an attempt to describe the present status of engineering college libraries in Dehradun region of Uttarakhand. This was a questionnaire based survey aiming to know about the various aspects of engineering college libraries such as physical infrastructure, collection development policy, status of automation software, library services etc. This study revealed that most of the libraries did not have sufficient collection to satisfy their users' requirements but interestingly almost all the libraries took subscription to e-journals because these are made mandatory by All India Council of Technical Education (AICTE) for all the engineering colleges. The libraries were mainly offering minimum services to the users and keep their collections in open access. The ICT infrastructure was reported poor and only nine libraries would use software packages. However, the fact that an overwhelming number of libraries are of recent origin and develop small collections, leaves one to hope that this

situation can be soon changed with the proper implementation of ICT to make these libraries into well structured service libraries

Shivraj (2015) had made an attempt to investigate on the usage of the electronic information sources by the students and faculty members for work-related purposes. From the study it might predict that the use of electronic information sources are expected to increase in future. The students and faculty members are aware of electronic information sources and majority of them used these sources in support of their study and research. It is also clear that users rely more on electronic information sources. In this regard library has a crucial role to play to create awareness about the electronic information sources and should acquire more electronic databases that are very useful to the users. This further implies the proper management of EIS also in the library. As electronic information is easier to locate, identify and accessing information as compared to print sources. So more priority should be given to acquire electronic information sources. Although respondents in this study were increasingly aware of using EIS, a few of them were not quite familiar in using them. They also faced some problems in accessing them. Thus the proper infrastructure for organisation and management of these resources were reported to take into high concern in this regard.

Prabhakaran (2016) made an attempt to analyse the use of e-resources by faculty members of engineering colleges from Virudhunagar District and to find out the problems and constraints faced by the users in accessing the e-resources with some purposeful suggestions for their development.

This study also showed that e-resources put radical impact on the changing higher education environment. It has been broadly used for teaching and research purposes. The author also opined that the use of electronic information sources for study and research purposes must be encouraged and proper training should be organised from time to time.

According to author libraries use information technology (IT) for better services and satisfying diverse users' needs. Libraries have transformed into digital and virtual libraries where books, journals, and magazines have changed into e-books, e-journals, and e-zines. This has increased the global dissemination of information. Electronic resources (e-resources) are easily accessible in the remote areas. The e-resources solve storage problems and thus control the flood of information. Over the last decade, electronic resources have become increasingly substantial components of academic library collection. This is due to the continuous development of IT and its impact on library collection development policies due to changing demand of users for the pin-pointed and exhaustive information within a short time. With the growing popularity of e-resources, the traditional libraries are gradually

migrating from print documents to e-resources where providing access to information is considered more important than owning it. This has compelled libraries to rethink about their collection development policies.

Further applications of information communication technology (ICT) in libraries have provided enough opportunities for e-resource development and disseminate it in the manner that their users preferred. Among e-resources, the e-journals and e-books are more in demand by the users. The e-resources are the best means of getting current and up-to-date information. The proliferation of e-resources has had a significant impact on the way the academic community uses, stores, and preserves information.

The advantages of e-resources have drawn attention of the library users to a great extent. Accordingly, these resources have occupied a significant place in the collection and budget of almost all libraries. Research scholars' attitude seems to be very positive towards e resources for their study and research and the role of libraries as gateways to provide assistance in accessing these resources.

### **Observations Based on the Review of the Literature**

It is understood from the review of literature that the growth of electronic resources and their use in engineering college libraries is increasing day by day in a cost effective manner and their compatibility to the available infrastructure in libraries. Moreover, the electronic information can be accessed at any time and any where , and this made the library professionals thought of selecting , acquiring and properly managing so as to satisfy the information requirements in a comprehensive manner. Most of the libraries are moving towards acquiring electronic resources. The importance of collection development policy and the factors related to that have been highlighted by many authors. The managerial aspects of such resources for better access have been investigated. In view of the above the present study demands further investigation to comprehend there proper management for enhancement of access to these resources for better use is highly concerned in this regard. Therefore it is thought fit to explore the problem in a systematic manner.



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## Chapter 4

### METHODOLOGY

#### 4.1 Introduction

Research is a systematic inquiry to describe, explain, predict and control the observed phenomenon. It involves both inductive and deductive methods. In other words, research is an art of “scientific and systematic search for pertinent information on a specific topic investigation”. The Advanced Learner’s Dictionary of Current English defines research as a “careful investigation or inquiry specially through search for new facts in any branch of knowledge”. Research can also be defined as the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in constructions of theory or in the practice of an art.

The basic types of research are as follows:

- **Descriptive vs. Analytical:** Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening. The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlational methods. In analytical research, on the other hand, the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.
- **Applied vs. Fundamental:** Research can either be applied (or action) research or fundamental (to basic or pure) research. Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas fundamental research is mainly concerned with generalisations and with the formulation of a theory. “Gathering knowledge for knowledge’s sake is termed ‘pure’ or ‘basic’ research. The central aim of applied research is to discover a solution for some pressing practical problem, whereas basic research is directed towards finding information that has a broad base of applications and thus, adds to the already existing organized body of scientific knowledge.

- **Quantitative vs. Qualitative:** Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. This type of research aims at discovering the underlying motives and desires, using in depth interviews for the purpose.
- **Conceptual vs. Empirical:** Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. On the other hand, empirical research relies on experience or observation alone, often without due regard for system and theory. It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment.
- **Evaluation Research:** Evaluation research effort aimed at solving processes and results of the study. There are two types of it - summative and formative. The purpose of the activities such as formative research, time, and specific groups of people, is to improve the human intervention; summative evaluation of a program, policy, or to judge the effectiveness of the product.

## **4.2 Research Design**

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, the research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. Research design is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money. Research design, in fact, has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work

A research design is a plan according to which, observations are to be made and this provides the empirical and logical basis for drawing conclusions and gaining knowledge. There are variety of research designs used in accordance with the type of problem. This includes the following:



- Interview method
- Questionnaire method for library survey
- Interpretation of statistics over a period of time
- Comparison with other libraries
- Observations method, and
- Applying standards based on averages

Each of the above method has its own advantages and disadvantages. Questionnaire method is a traditional method to collect and record data. A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms. It is handy and can be administered in different ways depending upon the convenience of the researcher and the respondent.

This present study uses sampling method as the engineering institutes are many and scattered in West Bengal. This study is conducted in 36 sample libraries of top 50 engineering colleges of West Bengal offering under graduate & post graduate studies in engineering discipline.

A suitable designed questionnaire has been sent to the libraries of above 50 engineering colleges in West Bengal. With all sincere efforts and constant pursuance 36 filled in questionnaire were received from librarians, library in-charge and other responsible staff.

### **4.3 Data Collection**

The collection of data and information is an extremely important part of library science research because the conclusion of the study is based on what the data reveals. So the methods of data collection are very important.

There are many tools available and used by the researchers suitable to their purpose. As the final result of research, the solution to the research problem depends on analysis of this data collected, so the data collection in the research is the very crucial stage. If the source is reliable then the results are more correct.

#### **4.3.1 Methods of data Collection**

In order to gather the data on the problem for the research and to test the validity of the hypothesis

The following methods are used-

1. Questionnaire.
2. Interview
3. Personal observation

#### **4.3.2 Construction of Final Questionnaire**

To get the response, the questionnaire was not too long. To understand the questions correctly and for getting the correct information the questionnaire is prepared in English language. So that the persons are encouraged to answer the questions and give relevant information; the questionnaire is so constructed that it reflects the objectives of the study and to get the answers in writing.

For the data analyses following sections are divided to collect the expected data and its systematic study, analysis and interpretation. The questionnaire covers the relevant areas related to the research problem under study such as:

- General Information of college
- Information on Library
- Library Staff Structure
- Status of Library Automation
- Collection and Organization & Management of Electronic Information Sources
- Use of Electronic Information Sources
- Major Impact of Electronic Information Sources

In brief the questionnaire is so prepared to cover all aspects necessary to fulfil the objectives of the research problem.

In the present study, data were collected from both primary and secondary sources. Structured questionnaire method is being used in the collection of primary data. The present study is based on both Primary and Secondary Data. Primary data are collected through questionnaire and secondary data in certain places are collected through various sources of publications such as institute Brochure, Know your library, Magazines and also from the websites of selected engineering colleges. In addition to that, data were also collected on critical points through observations such as attitude of library staff, physical condition of library etc. These are used defining the state of art of the engineering college libraries undertaken for the study.

Fifty (50) questionnaire were distributed to the librarians / library in-charge of top 50 engineering colleges in Maulana Abul Kalam Azad University of Technology ( MAKAUT) formerly West Bengal University of Technology (WBUT). Out of that 50, after constant request, reminders and even with personal visit, the researcher could be able to collect 36 filled questionnaires. A few of them were received through e-mails and rest were through postal and in some cases it was collected personally. Besides primary source, secondary source like website of engineering colleges were consulted for collection of data. Questions on general information such as year of establishment and accreditation, questions on the awareness and knowledge of the librarians regarding the electronic resources and network infrastructure facilities available in the library were included in the initial sections of the questionnaire. This is followed by questions related to the different aspects of management of e-resources in libraries.

#### **4.4 Data Processing & Analysis**

The data processing and analysis is mainly focussed on bringing out the number of criteria considered relating to different aspects on management of e-resources by the 36 libraries covered under study. The notable observations are supplemented by bar diagram, pie-chart, and graphical presentations wherever possible for a better understanding of the observations made. The observations are tabulated systematically and presented sequentially maintaining the logical flow of analysis.

The data collected by the various methods used is consolidated and analyzed which is used for the conclusion of the study. The data collected through the questionnaire were analyzed with the help of the computer. The advancement of electronic tools especially the computers have given added motion to this activity.

Microsoft office 2007 software has been used to analyze the data. MS office 2007 is a product developed for managing information or data stored on the computer in an efficient and optimum manner. MS Office is one of the most widely used data base managing system software with programming facility. The analyzed data was used for the conclusion of the present study.

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## Chapter 5

### BRIEF PROFILE OF SELECTED ENGINEERING COLLEGES

#### 5.1 Abacus Institute of Engineering & Management

The vision of the institute is to become a pioneer Engineering Institute of modern society. The objective is going to be fulfilled positively since presently this works now under an umbrella of JIS Group & Techno Group which have already established and considered as strong organizations both in terms of wide range of experience and strong financial back- up.



**Fig.5.1: Abacus Institute of Engineering & Management**

The mission of the institute is to meet the growing need for supply of technology knowledge based human resources both within the country and abroad, it has become imperative and immediate task to teach, educate and train a large number of fresh young people who will be emerging as the new generation of Engineers and Technologists.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Civil Engineering, Electronics & Communication Engineering ,Electrical Engineering and Mechanical Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT) formerly West Bengal University of

Technology .

The Institute has a library with 22000 volumes including 17 printed journals. The library is also endowed with audio cassettes in its collection. The library services are provided manually. The library has future plan to automate the entire operations of the library.

## **5.2 Academy of Technology**

Established in 2003, Academy of Technology is one of the most acclaimed self-financed engineering colleges in West Bengal. It has been established by Ananda Educational Development & Charitable Organisation (AEDCO), a trust consisting of the trustees who have a deep sense of social commitment and are dedicated to the promotion of education by inculcating appropriate ethics and attitude.



**Fig.5.2: Academy of Technology**

In a metamorphosis of over 13 years, Academy of Technology has been reinventing itself constantly to explore the infinite possibilities of engineering and technology - an academy that inspires everyone to think differently. It is now the preferred career destination for meritorious students due to its academic integrity and standard as well as its attractive campus placement.

The institute aspires to be a pre-eminent deemed university of national standing in education and innovation.

Four years programmes leading to the Bachelor of Technology ( B.Tech) are offered in the following areas: Computer Science & Engineering, Civil Engineering, Electronics & Communication Engineering ,Electrical Engineering and Mechanical Engineering, Electronics and Instrumentation Engineering,Information Technology.

This college also offers two years Master of Technology ( M.Tech) in the following areas : Computer Science & Engineering & Electrical Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

The lush green campus of Academy of Technology, spread over an area of 10.66 acres, has been developed as a modern piece of architecture blended with the environment. Campus is Wi-fi enabled with 40 Mbps internet connectivity supported by OFC for uninterrupted accessibility. In order to sustain and maintain standard in teaching, the following state-of-the art infrastructure, measuring a built up area 3.01 lac sq. ft., has been developed to serve the curricular requirements.

There are a total number of 81 high end IT and Core engineering laboratories adhering to the requirements of university curriculum under the following eight academic departments. Many higher semester core and computer laboratories are equipped with industry compatible experimental setup and software based simulation platform beyond university curriculum to provide the students a cutting edge in campus placement and professional career.

A well-designed building with covered area of 6800 sq. ft., the Central Library of the institute presently consists of 45292 volumes of text books and reference books and more than 4240 titles on all relevant subjects.290 national and international journals and proceedings from IEEE magazines, back volumes of periodicals and national dailies are available in the Central Library.

The collection is growing both in quality and quantity with regular addition of new books, journals and reading materials from time to time. Book Bank facilities are also available to every student.

Library is fully equipped with Libsys, Web OPAC and also ensures availability of Audio-Visual & Reprographic facilities. The Library remains open on all working days, on academic weekends and vacations.



**Fig. 5.3 : Library view of Academy of Technology**

Digital Library of Academy of Technology is accessible from everywhere in the campus and is resourced with:

- Online subscribed Journals.
- 400 open access e-journals.
- E-books.
- Tutorial CD/DVD Service.
- Question Bank.
- Online Assessment Software.
- Video Lectures.
- DELNET.
- GATE study materials.
- All NPTEL web/video courses.





**Fig. 5.4 : Library circulation counter**

Digital Library is equipped with IBM X3400M3 Intel Xeon 5506 (Quadra Core) Series, 10 P-IV Workstations, internet connectivity and other relevant hardware and software.

### **5. 3 Adamas Institute of Technology**

The Adamas Institute of Technology, Barasat, India, was established in 2008. It is an affiliate institute of the West Bengal University of Technology and AICTE Approved. The college was established in 2008.



**Fig. 5.5 : Adamas Institute of Technology**

Inspired by the noble cause of imparting education and promoting excellence, Adamas Institute of Technology was founded in 2008-2009 under Sachis Kiron Roy Memorial Trust. The Institute is approved by All India Council for Technical Education and is affiliated to West Bengal University of Technology. The Institute imparts Bachelor of Technology courses in the streams of Civil Engineering, Electronics & Communication Engineering,

Computer Science & Engineering, Information Technology, Mechanical engineering and Electrical Engineering. In 2013-14, with an aim of nurturing serious academicians of the future the post graduate courses in Electronics & Communication Engineering and Civil Engineering was added to the existing array of streams

The teaching faculty is a mix of senior teachers with high academic and industrial experience and the promising young academicians brimming with energy, enthusiasm and confidence. The institute's primary aim is to create an atmosphere where teaching and education will be totally integrated with the serious research endeavor.

The Institute is set up with an elaborate infrastructure within the vast precincts of a new age ecofriendly campus of Adamas Knowledge City, Barasat. It comprises of the Administrative Block, five Academic Blocks, a central Workshop and Hostel for Boys & Girls. The Administrative Block harbors within itself Language Laboratory (designed by CACM-ISIL, IIT-KGP), a Conference Room, a Seminar Room with Video Conferencing Facilities and a large meeting Hall. The Academic Blocks consist of classrooms, laboratories and other facilities. The central Workshop is spread over an area of about 12000 square feet. Nestled among a background of lush greenery, it provides an aesthetic and serene atmosphere on one hand and an intellectually stimulating environment on the other.

Adamas Institute of Technology is planned to be an institution of unique distinction. In order to meet the needs of rapid industrial growth and consequent demand for the number of technocrats it aims to : Turn out professionals of high academic calibre, Induct distinguished professors and competent engineers, Maximize industry–institute interaction in the long run, Strengthen the nation's human resources, Mould a new generation of technologists of high order.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Civil Engineering, Electronics & Communication Engineering ,Electrical Engineering and Mechanical Engineering & Information Technology.

The Central Library has been built to cater to the daily academic needs of both students and faculty members. It has specialized collections of Books, Journals & Non-book materials are available in Basic Sciences, Engineering and Technology, Humanities and Management Sciences.The Collection replete with a good many volumes of books, large number of

valuable titles, magazines and printed journals both International and National. Different sections of Central Library includes reference section , Reading room with news papers and periodical sections, circulation section , e-library etc.

The following facilities are being provided in the central library : Text books for Home issue to both Students & Faculty members, Books issued for project & interview purposes, Questions papers, OPAC facility , Digital Library, Reprography service etc.

#### **5.4 Aryabhata Institute of Engineering and Management**

Aryabhata Institute of Engineering and Management was established in 2003 with the objective of creating highly trained professional manpower in various disciplines of Engineering keeping in mind the rapid industrial growth in West Bengal as well as different parts of India in the context of globalization and competition . The Institute is approved by AICTE and courses are affiliated to WBUT.



**Fig. 5.6 : Aryabhata Institute of Engineering and Management**

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Civil Engineering, Information Technology, Electronics & Communication Engineering ,Electrical & Electronics Engineering and Mechanical Engineering & Electrical Engineering.

The institute also offers two years Master of Technology ( M.Tech) in the Electronics & Communication Engineering.

All academic programmes are approved by AICTE, recognized by Department of Higher

Education, Government of West Bengal and affiliated to affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

AIEMD, by virtue of its cutting edge quality of education, the uniqueness of its teaching-learning process and the continuous emphasis on the allround development of the students, has created a niche for itself. A harmonious integration of valued traditions with modern outlook is the guiding principle behind the development of academic environment of the Institute.

Besides required curricular activities, students are exposed to a number of other programmes like group discussions, interactive seminars, brain storming sessions etc. all designed to expand and bring about qualitative growth. Through such programmes, students are constantly motivated and encouraged to develop their leadership qualities and improve their communication abilities.



**Fig. 5.7 : Library view of Aryabhata Institute of Engineering and Management**

There is a constant endeavour on the part of the members of faculty and staff of this Institute to help the students in this grooming process. Although the assessment of the students' performance is generally guided by the prevalent regulations of the University, the respective course teacher also adopts a continuous evaluation system independently in the Institute.

The Institute has a well equipped library with 45000 volumes including 8 leading printed journals. The library is automated with LibSys software with barcode facility. The library also subscribes to DELNET online resources. Among the library services the important ones are circulation, reference, photocopy, internet etc.

### **5.5 Dr.B.C. Roy Engineering College**



**Fig. 5.8 : Dr. B.C. Roy Engineering College**

Dr. B.C. Roy Engineering College, Durgapur, popularly known as BCREC, was set up on 21st August, 2000, under the over all management of Dr. B.C. Roy Engineering College Society. Born of a vision of a group of Durgapur based philanthropic entrepreneurs, the institute is dedicated to the memory of Dr. Bidhan Chandra Roy, the architect of modern West Bengal and BCREC management is deeply committed to gradually build the college as one of the best seats of Engineering and Management Education in Eastern India with domestic and global requirements in view.

Dr. B.C. Roy Engineering College, Durgapur was affiliated to the University of Burdwan for the students admitted in 2000-01 session. But from 2001-2002 session onwards the college was affiliated to the Maulana Abul Kalam Azad University of Technology( MAKAUT) formerly West Bengal University of Technology (WBUT).. The college is approved by both All India Council for Technical Education (AICTE), Directorate of Technical Education (DTE) and Department of Higher Education, Govt. of West Bengal. All the courses offered conform to the latest requirements and syllabus is structured by Maulana Abul Kalam Azad University of Technology( MAKAUT). The team at the helm of affairs believes in the best and the latest towards grooming the students and transforming them as dynamic leaders of

tomorrow. Generating top quality Engineering Managers and Professionals year after year is, indeed, a true service to the nation and respectful salutation to the great visionary, Dr. Bidhan Chandra Roy. The management is on toes to take all pains to make BCREC, one of the premier institutes in Engineering and Management Sciences and in regard to standards, always benchmarks with the best in education.

The eco-friendly wifi learning environment is prevailing within the campus . The Central library is located in an aesthetically designed three-storied separate building is endowed with over 70,592 volumes. All the books are bar coded and computer supported. The electronic library is well equipped with internet connectivity. IEL online facility with 150 IEEE/IEE peer reviewed full text journals are being provided in the library. The library also subscribes to DELNET online databases. The library is also endowed with over 3242 CD-ROMs.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Applied Electronics & Instrumentation Engineering, Computer Science & Engineering, Information Technology, Electronics & Communication Engineering , Mechanical Engineering , Electrical Engineering & Civil Engineering.

The institute also offers two years Master of Technology ( M.Tech) in the following areas : Modern Communication Engineering, Power System Engineering, Computer System & Technology & Mechanical Engineering.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

Dr B C Roy Engineering College, Durgapur, has a well equipped composite library system The Central Library is housed in a sprawling three storied separate building. The total area of the library is around 1300 sq.m. The library has a Rich collection of Books and Journals. In addition to that the library has a large number of semester books those are provided during each semester. A substantial collection of CD-ROMs / DVDs relating to books are also available in the library. The library functions twelve hours a day. The library is endowed with 6381 titles and 76667 volumes. It also subscribes to 72 print journals including 482 bound volumes. The library has more than 3585 CD ROMs / DVDs.

Subscription to a good number of current journals, both Indian and international are also being reported in the library. Indian ones are mostly in print version with some in combo version (print + online version combined). International ones are mostly in online version accessible through below mentioned online bibliographical databases:

i) IEEE (ASPP) : 169 journals / transactions with back files access since 2005 in the fields of Computer Science & Engineering, Electrical, Electronics + Telecom & related disciplines.

ii) Science Direct : 275 journals with back files access since 2000 (Elsevier) in the fields of Electrical, Electronics, Mechanical Engineering, Civil / Structure Engineering, Computer Science & Engineering.

To facilitate campus wide usage including hostels of these databases, they are accessible on internet enabled PCs/ Laptops under the two static IP addresses of the College . The Library also subscribes to DELNET . This is an important library network which provides online access, inter alia, to a select list of online full text foreign journals, full text US patent literature, union catalogue of books, journals, theses, dissertations, etc. Its Document Delivery Service (DDS), which provides xerox copies of required journal articles, chapter of books etc, is extremely useful. All these online databases provide access to a wealth of information to keep a user abreast of the current wave front of knowledge as well as for retrospective literature search.

Departmental libraries attached to teaching departments serve to meet the requirements for quick reference to books by the faculty members and the students. Availability of special collection of books, journals, required for the competitive examinations (GATE, GRE, CAT, MAT, XAT, GMAT, SAT, TOEFL, etc.) to help the prospective aspirants hone their skills to face these examinations confidently.

Availability of a host of Reference Books: Enclopaedia Britannica (31 vols), McGraw-Hill Encyclopaedia of Science & Technology (20 vols), World of Science (20 vols), Modern Power Station Practice (12 vols), Instrument Engineers Handbook (3 vols), Welding Handbook (4 vols), ASM Handbook (relevant volumes of the 27 volume set), Industrial Electronics Handbook (5 vols), VLSI Handbook, etc, etc.

Accessibility to the book-collection of the Library by author, title, subject, etc through OPAC (Online Public Access Catalogue) on several computer terminals spread over the college buildings. Holdings of the library books are computerized and barcoded. Uninterrupted internet connectivity.

Provision of all these facilities taken together enables a discerning user to broaden and

sharpen his/her knowledge base.

## **5.6 B.P.Poddar Institute of Management and Technology**

B.P.Poddar Institute of Management and Technology (BPPIMT) was established in the year 1999, under the aegis of B.P.Poddar Foundation for Education, a Trust dedicated to enriching the quality of technical education in the country. The Institute was set up as a tribute to the memory of Late Badri Prasad Poddar, philanthropist and educationist and the founder of the B P Poddar Group.

The B.P. Poddar Institute of Management & Technology was initially affiliated to the University of Kalyani (in the year 1999) and later on in the year 2001 as per the instruction of Govt. of West Bengal, the Institute was affiliated to the West Bengal University of Technology, Kolkata. The courses offered are structured according to prevailing international standards. The Institute blends a dynamic and progressive approach to education with high quality, innovative and result oriented programmes which has been approved by the All India Council for Technical Education (AICTE), New Delhi

The institute has a mission of creation of conducive learning atmosphere to inculcate Value based education, development of state of the art technology and making education responsive to changes, creation of effective interface with Industry and strengthening Industry-Institutional interaction and Entrepreneurship Development, promoting research activities and establishing linkage with National and International Institutes of repute & creating awareness for transfer of technology to rural mass.

The objectives of the institute is to develop an institution of excellence for advancement of Science & Technology and for creation of professionals with high sense of ethical values and commitment to the Society, capable of functioning unfettered by the shackles of caste, creed, political dogmas and religious parochialism and to effectively contribute to and lead in the shaping of the nation.

The Institute has two state of the art campuses, one for Engineering discipline and other for Management courses

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the



following areas: Computer Science & Engineering, Information Technology, Leather Technology, Electronics & Communication Engineering and Electrical Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology (MAKAUT) formerly West Bengal University of Technology (WBUT).

The library plays a key role in the academic activities of the Institute. It is conveniently located in a spacious accommodation with computer aided reading room facility for providing support to large number of students. The library has a large collection of books, journals and periodicals.

The Central Library is mainly for the use of faculty members, student, technical staff, administrative staff of the institute. The library is endowed with more than 39200 volumes and 5036 titles including around 1685 CD / DVDs. Among the e-journals the important ones are IEEE, Springer & Elsevier

Stock of books is regularly updated with the latest editions. The Institute has an e-library facility. It is enriched with E-Learning Facilities, comprising of EDUSAT, Electronics study materials and access to online journals and conference proceedings of IEEE and Springer Link. The reference tools available in the library include. Dictionary, Encyclopedia, Year Book, Handbook of Engineering, Technical Data (Mechanical), and Entrance Examination guidebooks for GATE, GMAT, GRE, TOFEL, MAT, etc

The other services available in the library are : Book Bank, Circulation Services, Reference Services, CAS Services, and photo copying Services.

The Library provides its services from Tuesday to Saturday , twelve hours a day.

### **5.7 Batanagar Institute of Engineering**

Techno India Batanagar is an Institute under the vision of Techno India Group, One of the largest knowledge management groups in the eastern part of the country having 4 Universities, 20 Engineering Colleges & 10 B-Schools, 15 Schools, Hospital, Press and many more.

Established in the year 2012, the Institute has already made its presence felt by its vibrant campus in the Maheshtala – Taratala region of The City of joy- The Industrial Hub of the City.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Mechanical Engineering, Electrical Engineering , Civil Engineering & Electronics & Communication Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

The library plays a key role in the academic activities of the Institute. It is conveniently located in a spacious accommodation with computer aided reading room facility for providing support to large number of students. The library has a large collection of books, journals and periodicals.

The Institute also runs Diploma courses in Civil & Mechanical Engineering, which is approved by AICTE & affiliated to West Bengal State Council of Technical & Vocational Education and Skill Development with an intake of 60 students in each branch.

The institute was developed with a vision to build it as a Centre of Excellence for technical education. The Institute has been giving maximum stress on modern teaching methodologies, Faculty development, promotion of research activities so that the students graduating from the institute are industry-ready professionals with leadership values and high degree of professional skills.

The closed access library is located at the first floor of the main building with 409.35 sq. meters area as per AICTE requirements. The library is fully automated with ION Software of TCS. Till now the library houses a collection of more than three thousand titles and near about ten thousand volumes of books, thirty titles of National Journals, thirty five Technological and informative magazines and English newspapers.

The library has a book bank facility where every student is lent six books for the whole semester. Apart from this, each student is provided with four additional books on demand

according to their need. TI- Batanagar library has a comfortable and peaceful reading room where hundred students can sit and study at a time. The reference section contains books which students/faculties/staffs can refer.

The library also has reprographic facility as per AICTE norms. Students can take photocopy / printouts of topics from journals, magazines etc. The library has special facility for faculty members and students to concentrate on the study for research topic in separate cubicles. In each semester, the library, under the control of a library committee decides the books, journals, periodicals to purchase for the next session. Library committee meets regularly and decides on further improvement of the library from time to time. The library is connected to other libraries of the country by Del-Net facility. The library also displays new arrivals of books and periodicals separately.

### **5. 8 Bengal Institute of Technology**

Bengal Institute of technology was established in the year 2000 with 4 AICTE approved Courses. Currently it has 4 UG Courses and 1 PG course. The college is approved by AICTE and affiliated to West Bengal University of Technology (WBUT).

The Institute is situated on Basanti Highway a few kilometers off from downtown Kolkata in a lush green picturesque setting , away from madding crowd and din and bustle of a metro and yet having facilities of a city life. The location is quite well connected to different parts of Kolkata by government and private buses and is 10 minutes drive from Science City. Auto services are available from Sealdah Railway Station & the Institute also has its own bus service for the convenience of the students.

Dedicated and Quality Faculty members, adequate Infrastructure and other facilities with good academic environment have helped the college to earn a good reputation. The college is one of the few in West Bengal to offer an Engineering degree in Bio Technology.

All the departments of this institution work in tandem towards creating an enriching environment focused on the latest development and innovations taking place in the field of technology, workshops, industrial projects, national level symposium, seminars and add-on courses are a regular feature of this institution. The final year students are also motivated to design and fabricate prototype working models as part of their project work.



**Fig.5.9 : Bengal Institute of Technology**

The vision of the institute is to produce skilled Technical manpower of high quality with high degree of social commitment, to compete in the global market as a sequel, to the “irreversible process” of globalization and need for mobility of technical man power access & beyond the national boundaries.

The objectives of the institute is to create congenial ambience ,to apply and disseminate Information and Communication Technology in Teaching-Learning process, to provide both Hard & Soft skills to students , to organize regular Student Development Programme and to organize Education Development Progrmme

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Electronics & Communication Engineering, Biotechnology and Information Technology.

Since its inception in 2000 Bengal Institute of Technology library played pivotal role in disseminating information, promoting education, career guidance, &strengthening knowledge partnership that cross national, social & ethnic boundaries. It is the knowledge centre, information kiosk for the user community.

The library is increasingly being redefined as places to get unrestricted access to information in many formats and from many sources and extending services beyond the physical walls of a building, by providing material accessible by electronic means, and by providing the assistance of library staffs in navigating and analyzing very large amounts of information with a variety of digital tools. BIT library is divided into departments staffed by both Para professionals and professional Library staffs. In the era of information explosion with the

advancement of information and communication technology 4 skilled and 3 unskilled staffs rendering qualitative services including book bank, e-journals, magazines, etc satisfying the famous slogan as propounded by Dr S R Ranganathan (Father of Library Science in India) “ Right Information to Right User in Right Time”

BIT library rendering qualitative services to its clients including faculty members, students and support staffs. Among these the important ones are: reprographic facility, question bank magazines & news papers, display of publication, lending of books, book bank, promotion of communication skill, OPAC, user orientation program, display of new arrivals, book exhibition etc.

BIT Library is life member of Institute of Engineers Kolkata Chapter. Presently subscribed 29 hard copy journals including 12 from Institute of Engineers.

IEEE (ASPP) will be essential to the global technical community and to technical professionals everywhere, and be universally recognized for the contributions of technology and of technical professionals in improving global conditions. Package includes more than 169 IEEE online society-sponsored journals, transactions, and magazines;+ back files from 2005 onwards free for its member. included in IEEE ASPP;

### **5. 9 Bengal Institute of Technology & Management (BITM)**

Bengal Institute of Technology & Management (BITM), Shantiniketan has already put its mark in providing quality-engineering education in Eastern India during its eleven years of existence. This institute with its 60 acre wide campus, is continuously growing up to edge over other institutions of its kind in the country by the untiring and combined efforts of the distinguished and dedicated faculty members, a large number of young energetic students and efficient administrative and supporting staff members

The huge buildings, gardens, canteens, laboratories and playgrounds that dot the 60-acre campus. Although the main attraction of this place remains because of its association with Gurudev Rabindranath Tagore (1861-1941), one of Bengal's greatest figures, of course the natural charm of Santiniketan is a major draw in itself. Home at Santiniketan would surely call for peaceful Residential Neighbourhood at Santiniketan amidst the greenery all around. Thus here comes Upoban the new concept of housing complex launched as a joint venture of

Bengal Ambuja Housing Development Limited and Sriniketan Santiniketan Development Authority who enhances on materializing their vision of setting a well facilitated Residential neighbourhood at Santiniketan with utmost satisfaction of its residents. However since this is one of the most renowned and coveted tourist spot in Bengal one would surely like to gather information on Hotels at Santiniketan. Please note that there are tourist lodges and Tourist cottages run by the West Bengal Tourism Development Corporation apart from which Visva Bharati runs a guesthouse as well. One can also find youth hostels at Bolpur and Bakeswar along with quite a few private hotels at Bolpur. Weather in Santiniketan is usually a pleasant one although you will come across the normal weather changes during Summer, winter and Monsoon. Nonetheless Spring has its own charm in Santiniketan not only because of its natural beauty blooming to its fullest amidst the lush greenery but also due to the famous Vasanta Utsav held to mark the festival of Holi with the onset of Spring. Connectins to Santiniketan: From Calcutta Shantiniketan is 136 kms: By Rail: By train from Howrah to Bolpur. Shantiniketan is 2 kms from Bolpur by cycle rickshaw. By Road: By road it is 211 km from Calcutta. Direct bus service.The Institute is affiliated to West Bengal University Technology.



**Fig.5.10 : Bengal Institute of Technology & Management**

Emphasis has been given to students character building and discipline. Sports and Games have been compulsory for this purpose in the academic curricula. BITM encourages and welcomes students of different countries, who cutting across the boundary of geographical barriers shall enrich their countries culture, understand each other in a better way and pave the way to world peace in the long run.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electronics & Communication Engineering , Mechanical Engineering , Electrical Engineering & Civil

## Engineering and Applied Electronics & Instrumentation Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

An institute should be a storehouse of knowledge where enthusiastic students require a massive collection of books to quench their thirst of knowledge. Nothing can be better if the institute itself can provide that. At BITM, One comes across a library of mammoth dimensions



**Fig.5.11 : Library view**

It houses over 23,000 books, about 250 journals of national and international repute ,82 magazines having extreme relevance to engineering and management fields, major dailies, newsletter and a number of electronic on-line academic publications. The library has a software based networking system and will soon have the multimedia support which will enable it to perform in a more dynamic way. BITM has also established a separate book bank which has a collection of nearly 15000 books thereby rendering a back-up support to the students and faculty members. The journals for Engineering and technology are:AICTE Consortium Journals, IEEE Computer, IETE journal of Research,IEE-Technical Review pramana, IETE journal, Harvard business Review, MIT Sloan Management Review, Asia pacific Business, Decision(IIM, Kolkata),Journal of information Science and knowledge, of education.

## **5.10 Birbhum Institute of Technology**

often called "The land of red soil", Birbhum is noted for its topography and its cultural heritage which is unique. Birbhum is one of the most peaceful districts of West Bengal.

Suri is the district headquarters of Birbhum. The quite serenity of the place makes it a perfect place for pursuing educational endeavours. As an engineer our students consolidate their learning in the peaceful vicinity of Suri and unwind in tranquility for mind rejuvenation. The bauls of Birbhum, their philosophy and their songs form a notable representation of the folk culture of the district. Being close to Shantiniketan, Shri Rabindra Nath Tagore's abode of peace and learning, our students are exposed to some of the larger than life cultural festivals of Bolpur like the notable Poush Mela, to witness the East and West cultures meet. Birbhum can boast of some of the most sacred religious pilgrims like Tarapith, Bolpur and Bakreswar. Students can make a trip to these sacred places on weekends and get blessed for a bright career. This also keeps students moral and ethical individuals of strong character.

The mission of the institute is to impart quality professional / technical education to students inculcating in them national / global perspective ,leadership attitude , entrepreneurship , co-operative spirit, cultured outlook, ethical values , social responsibilities and healthy habits so as to contribute to the technological,economical and social development of the region, the state and the country and to create an ambience of excellence, inspiring value based education research and development

The main objective of the institute is to create an institution for higher technical education, dedicated to the cause of developing professionals with high sense of ethical values and commitment to the society , where students shall realise their potentials and learn to be future torch bearers of evolving technologies, through inculcation of proper attitude, appropriation of traditions and heritage and fostering of originality , so as to be capable of functioning without being influenced by malice of caste, creed, political and religious dogmas.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Civil Engineering, Electronics & Communication Engineering ,Electrical Engineering and Mechanical Engineering and Information Technology.



The institute also offers two years Master of Technology ( M.Tech) in Heat Power Engineering & Manufacturing Engineering.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

The Institute has a well equipped library with 4967 volumes and 4052 titles . Among the library services the important ones are circulation service with barcode technology , Book Bank service, Reprographic service, Lending service, Air conditioning facility of Reference section, Internet facility, Air conditioning facility of digital Library, Printing Service. The library also subscribes to 57 printed national and international journals.The E-library facility is also provided for users. Among the electronic resources the important ones are Sciencedirect,ASTM, Springer-Mechanical . The library also subscribes to MCGraw-Hill,Wiley,ASTM e-books. Apart from these the central library is also provides DELNET online databases and NPTEL video lectures for users.

### **5.11 Brainware Group of Institutions**

Brainware Group of Institutions is an educational institution of Information Technology, Management and Engineering courses located in Saltlake and Barasat in Kolkata which is affiliated to WBUT.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Mechanical Engineering, Electrical Engineering , Civil Engineering & Electronics & Communication Engineering.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

The library has a rich collection of text and reference books, journals, magazines, audio/videos, CDROMs, research reports, online journals and database analysis software in all programmes and areas of study. Web-based software is being used in the library which

will make issuing and depositing of books an automatic and easy way.

Every student, who is looking for books or other reference materials in the library, is provided all possible guidance and help. The library is equipped with a photocopy machine to help students with their reference works. The library also has a cloakroom where the students can keep their belongings safe while they are within the library premises. The library is completely Wi-Fi enabled to provide easy access to internet.

A number of alerts and updates would be sent out by the library team to keep students, researchers and faculty members up to date about the various facts of education, development and social science. These would include alerts from publishers on new contents from journals and new books published. The library team would also share weekly updates from various newspapers and magazines. WEB OPAC catalogue (online catalogue): Online OPAC software enables students and staff to search, request for, and reserve books and reference materials in the library . Under urgent, abnormal or unforeseen circumstances, the Library or any of its sections may be opened later or closed earlier than the scheduled hours at the discretion of Librarian or Principal or Executive Director, after proper intimation to all concerned.

All registered students of the institute are eligible to become members of the Central Library. To become a member of the Central Library, a student has to submit 3 copies of stamp size photograph, his/her address proof, Photocopy of College money receipt to the Library Assistant, who will further guide him/her regarding membership procedure. Readers shall always notify any change of his/her permanent address to the Librarian in writing. Membership to the library is not transferable.

Library membership cards or other identity cards are to be shown, if demanded, at the time of entering into the library or whenever asked for in the library.

## 5.12 Budge Budge Institute of Technology (BBIT)

Budge Budge Institute of Technology (BBIT) is a technical institute whose main objective is to produce result oriented and skilled professionals to meet the ever-growing demands of industries. The success story of an institution weaves around its pillars, which supports and facilitates the growth of individuals. These pillars are students, parents, teachers and administration. The Institute seeks to set up a supportive environment the essence of which is “care.”



**Fig.5.12 : Budge Budge Institute of Technology**

We care for each one who enters the portal of our institution for we know the power of a gentle touch, a friendly smile, a kind word, a listening ear, and an honest compliment – all of which embody parental care. With nurturing philosophy, it views each one of you as unique and are committed to grooming you into a strong individual, a global citizen with your feet firmly rooted in values and traditions that embody a true BBITians. In a larger context the BBIT intends to provide quality education on which the country can depend. The curriculum is up to date to effectively fulfill the technological requirement of India. It is tuned to the requirements of research institutes and industries, so that the benefits of your education can find application in improving the people’s quality of life



**Fig.5.13 : Library view**

The aims and objectives of the institute includes the followings: Latest technology to meet the demands of front-end industries, High teacher-student ratio to ensure better interface, impart personality traits in students to ensure bright career, expose the students to industrial climate and practical problems, improve communication skills, creativity and leadership qualities among students, encourage participation in co-curricular activities, develop social awareness and provide facilities for faculty up-gradation, encourage in subsequent publication of research papers in National and International Journals and finally establish a close bond between the teachers and the students

The Central Library of Budge Budge Institute of Technology plays a vital role in the academic activities of the Institute. The Library is located in the third floor of the Administrative Block. The central library is housed in a 5000 sq ft. hall with reading room facility for 180 students. The library collectively supports teaching, research and extension programmes of the Institute.

The library has been using Libsys (Library Management Software) for the library housekeeping operations. Activities being performed with the help of Libsys are as follows OPAC cataloguing, circulation etc.

It has a rich pool of text and reference books, etc. The books available in the library cover all the subjects according to academic course structure.

The books in the library are classified according to the 22nd edition of Dewey Decimal Classification. The total collections include 21,000 books and the titles are 2100. The e-library has repository of hundreds of e-books, e-journals (National and International) and

audio / video lecturers from IITs, subscription with National Programme on Technology Enhanced Learning (NPTEL). The purpose is to provide this opportunity among the students and faculties to enhance the quality of engineering education by developing curriculum based videos and e-books

### **5.13 College of Engineering & Management, Kolaghat**

The College of Engineering & Management, Kolaghat was set up in September, 1998, under the aegis of ‘Vidyasagar Society for Integrated Learning’, Kolkata to provide opportunity for technical education to the budding talents of the region in particular, and to the country as a whole.

The college from its very inception was fortunate to have renowned educationists to guide it in its search for academic excellence. Prof. S.K.Sen, former Vice-Chancellor of Jadavpur University, who was a doyen of Engineering education, and was an ex-minister in charge of Power, Science and Technology and Non-Conventional Energy Sources, Government of West Bengal was the guiding spirit behind the formation of the college. At the inaugural function of the college in September 1998 were present luminaries like Dr. A. R. Kidwai, the then governor of West Bengal, Prof. Yash Pal, the then Chairman of the University Grants Commission, Prof. A. R. Deb, the then Vice-Chancellor of Vidyasagar University. Prof. Yash Pal declared the college to be an ideal case of Public-Private Partnership.



**Fig.5.14 : College of Engineering & Management, Kolaghat**

The college is one of the recipients of the World Bank Aided Technical Education Quality Improvement Programme Phase II (TEQIP-II) assistance; out of the 54 colleges in the country

and one among the 13 colleges in the State to have got this honour. This assistance helps to upgrade the laboratory with state-of-art equipment and development of faculty and staff of the institute.

The College was established in the year of 1998 by the “Vidyasagar Society for Integrated Learning”, Kolkata with the assistance from West Bengal Power Development Corporation (WBPDC). Professor S.K. Sen, former Vice-Chancellor of Jadavpur University, a doyen of Engineering education and ex-Minister-in-Charge of Power, Science and Technology and Non-conventional Energy Sources, Government of West Bengal is associated with the college as its advisor. A well-represented Governing Body comprising renowned Educationists, top-level Managers from industries and Senior Educational Administrators manage the affairs of the college. Their love for education and research along with their constant monitoring of the status and progress has enabled the college to establish its reputation as one of the front ranking institutions of the country. The College is situated in the Kolaghat Thermal Power Project Township (KTPP) at Kolaghat in Purba Medinipur district of West Bengal.

The college has an excellent air-conditioned open-access library where the students can directly choose their books from racks. Sufficient number of text books and reference books about 32618 Volumes & 4905 Titles in different subjects/fields are available. There is a good collection of Foreign journals (11 numbers hard bound), Indian journals (49 numbers), 13 numbers Technical magazines, Newspapers, CDs, Project Papers of senior students etc. so that both the students and faculty members are able to keep themselves abreast with the latest knowledge.



**Fig.5.15 : Library view**

Our Library has subscribed to all IEEE & IEE Journals On-Line to facilitate our students to access all these journals. The library is fully automated with Bar-coding facility. Library software, LS-Ease (College edition of LIBSYS) with multi-user LAN version is in use. There are computers, having the Internet connection for use by the students only. The library remains open upto 8.30 pm. The students may fully utilize the library in a calm and peaceful environment.

The library is also the member of DELNET (Developing Library Network, New Delhi). Through this network students and faculty members can get any kind of information regarding books, journal articles, thesis, etc of AICTE approved institutions including the location where the particular document exists. DELNET also provides various services by sending journal articles, books etc. by Inter Library Loan.

#### **5.14 College of Ceramic Technology**

From its humble beginning as the Bengal Ceramic Institute in 1942, renamed as the College of Ceramic Technology in 1962, and further renamed as the Govt. College of Engineering & Ceramic Technology in 2005, the college is entering the 80th glorious year of its academic life. It is indeed a time to celebrate, to introspect, to consolidate and to plan for its future. The uniqueness of this institute is that, it is the oldest institute for imparting technical education in Ceramic Science and Engineering, in the Eastern Part of India and the only institute offering a full fledged Undergraduate and Postgraduate course in Ceramic Technology in the state of West Bengal. This college has seen the addition of two new B.Tech courses in Information Technology and Computer Science & Engineering which was initiated under the West Bengal University of Technology in the year 2000 and 2001 as well as the M.Tech course in Ceramic Technology which was introduced in the year 2006. The B.Tech and M.Tech courses of Ceramic Technology and the B.Tech course in Information Technology has already been accredited by the National Board of Accreditation (NBA).



**Fig.5.16 : College of Ceramic Technology**

The academic program of this institute presently comprises of the mentioned B.Tech courses which has an intake of 48 students each and M.Tech course with an intake of 18 students. The institute has recently gained approval from AICTE to begin the M. Tech. course in Information Technology with a sanctioned intake of 18 students. The institute can boast of well equipped workshop and laboratories, which is essential for the scheduled academic curriculum and research activities operational at the institute. Besides other departmental laboratories, special mention is needed for sophisticated and specialized labs developed such as the Thin Film lab, Nano-Materials and Sol-gel Lab of the Ceramic Department and VLSI, Image Processing, GIS and the Computer Vision Lab of the Information Technology department. Another feather in the cap is the addition of a most modern Language Lab for English Communication Skill & Personality Development as well as the EDUSAT lab with Virtual Learning capability of our students. It is worth mentioning that the entire campus is connected to the internet for 24 hours through NKN Leased Line (100 mbps) connectivity which is accessible from all computers in the institute.





**Fig.5.17 : College of Ceramic Technology**

Our College of Ceramic Technology was established in 1941 by Professor Sasadhar Ray who was an eminent and educationist and the first Principal of the college. At that time the college was named as Bengal Ceramic Institute Calcutta, which later on flowered into College of Ceramic Technology. Professor Ray was one of the pioneers in spreading ceramic education in India. He obtained his M.Sc. degree in Physics in 1930, as a student of Prof. Satyendranath Bose, from the University of Dacca having been placed first in Class. He was a research scholar under Prof. K. S. Krishnan-F. R.S. in the Indian Association for the Cultivation of Science and served as a supervisor in Peripatetic Demonstration for Scheme of the Govt. of Bengal to popularize the ceramic manufacturing processes in the villages. He also worked for a brief period in the Industrial Research Laboratory, Dept. of Industries, Government of West Bengal.

The college started with certificate and diploma courses in Ceramic Technology with six other different courses to train people for various ceramic industries in the eastern and other regions of India. Prof. Roy organized a commercial Training- cum- Production unit at the institute to provide employment through practical training to the students. He formulated many developmental schemes with their successful implementation and introduced the concept of self- employment in the institute to cope with the problem of growing unemployment in the country. He was the pioneer in India to manufacture bone chinawares using indigenous raw materials on commercial basis and glazed pottery, sanitary wares, tiles and low-tension insulators from Gangetic silt. His contribution to ceramic education and industry has gone far and near within India and round the globe.

In the year 1962, B. Sc (Tech.) degree course in Ceramic Technology under the University of Calcutta was introduced in the institute, which was then renamed as College of Ceramic Technology and was undertaken by the Govt. of West Bengal. At that time more emphasis was given on Traditional Ceramics. Traditional consists of pottery including materials, cement, etc. and traditional glasses for windows and containers/bottles including crystal glasses and of course the infamous optical glasses for our eyes and cameras.

This college has seen the addition of two new B.Tech courses in Information Technology and Computer Science & Engineering which was initiated under the West Bengal University of Technology in the year 2000 and 2001 as well as the M.Tech course in Ceramic Technology which was introduced in the year 2006. The B.Tech and M.Tech courses of Ceramic Technology and the B.Tech course in Information Technology has already been accredited by the National Board of Accreditation (NBA). The institute has also recently gained approval from AICTE to begin the M. Tech. course in Information Technology.

The vision of the institute is to cultivate excellence in various fields of engineering and technology by imparting core knowledge to the students and to transform the institution into a center of academic excellence and advanced research apart from producing skilled technologist.

The library of the institute is endowed with good number of text, reference & additional text books. It has a collection of more than 18600 books including special collection of 241 reference books, patents , standards etc. The library subscribes to about more than 50 print journals. The library also subscribes to about 8787 e-journals and 460 e-books through J-Gate & KNIMBUS online databases.



**Fig.5.18 : Library view**

The library has taken significant initiatives in the following areas: Subscription of E-Journals and E-Books, Modernization of reading room facility with special provisions for differently able students, Creation of e-corner within the library for online access of e-journals, e-books and other documents, Digitization of library with OPAC facility, Introduction of Book Bank facility for underprivileged and all female students, Installation of CCTV surveillance at the entry/exit point and reading room of the library for security of the resources, Organization of book exhibition once in a year.

Library gets feedback regularly from the faculties, research scholars and UG/PG students. The Library advisory committee frequently meets and the issues are discussed and appropriate measurements are taken to augment the library as a citadel of learning resources of the Institute. The library is fully automated with LibSys software.

### **5.15 Dinabandhu Andrews Institute of Technology and Management**

Dinabandhu Andrews Institute of Technology and Management is a self financed institute. The institute is affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal (formerly known as West Bengal University of Technology). The institute offers BBA, BCA, BBA(Hospital Management), AICTE approved PGDM and M.Sc in Computer Science. It provides suitable educational infrastructure to young brilliant students for their career development in their respective interest in Computer Application & Business Administration at reasonable and affordable price.



**Fig.5.19 : Dinabandhu Andrews Institute of Technology & Management**

Dinabandhu Andrews Institute of Technology & Management( DAITM) has been set up in the year 2002 affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal (formerly known as West Bengal University of Technology), with the objective to emanate the scope of technical and management education. Without diluting this basic objective of producing IT & Management professionals with core competence in respective field , DAITM also intend to further fertilize the sharp minds of its students with specialized trainings in cutting edge topics of management and technology so as to produce matured young Managers & Technocrats with sharp communication skills and profound knowledge on impacts of globalization - a truly global intellectual product.

The mission of the institute is endowed with the following areas: Creation of conducive learning atmosphere to inculcate Value based education, Development of state of the art infrastructure and making education responsive to changes, Creation of effective interface with Industry and strengthening Industry-Institutional interaction and Entrepreneurship Development as a whole, Promoting research activities and establishing linkage with National and International Institutes of repute, Developing the human resource towards the rapid progressive change towards industrialization of this state

The vision of the institute is to develop an Institution of Excellence for advancement of Management & Technology and for creation of professionals with high sense of ethical values and commitment to the Society.

The institute offers two years Master of Science in information technology, especially the information systems development process. The course of study is concentrated around the Information Systems discipline. The core courses are (typically) Systems analysis, Systems design, Data

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)



**Fig.5.20 : Library view**

The institute has spacious class rooms, central library, seminar room, laboratory, cheap store, cafeteria, etc. to meet the requirements of the students.

### **5.16 Future Institute of Engineering & Management**

The Engineering department at Future Institute of Engineering and Management is renowned as one of the top engineering colleges in Kolkata. Offering a plethora of courses in all the major branches of B.Tech, FIEM maintains the highest standards in academics and research. Equipped with world-class infrastructure and a stellar teaching staff, FIEM stands out among the B.Tech colleges in Kolkata, and provides an ideal ambience to stimulate the teaching-learning process, culminating in the creation of skilled and disciplined Engineers.

With a continuing dedication to the pursuit of excellence in teaching & providing knowledge, the Future Institute of Engineering & Management offers unmatched learning experience for students, across a broad spectrum of academics.

The Future Institute of Engineering and Management aims at creating highly trained technical manpower in different disciplines of Engineering and Technology, and professional managers in the fields of General Management.

Both Future Institute of Engineering & Management (FIEM) and its component Future Business School (FBS) are managed by Future Education and Research Trust, which have a common Board of Governors & an Academic Council. In addition, they have their respective Boards of Advisers.

The vision of the institute is to strive continuously in pursuit of excellence in Education,

Research and Entrepreneurship eventually to become a Global Hub, and offer scientific and technological services to the society.

The objectives of the institute implies to impart total quality education to develop innovative, entrepreneurial and ethical future professionals fit for globally competitive environment, to share with stake holders institutional experience in education and knowledge for mutual enrichment in the field of technical education, to create an ambience in which new ideas, research and scholarship flourish and from which leaders, innovators and entrepreneurs of tomorrow emerge and to contribute to the socio-economic development of the society through scientific and technological services.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electronics & Instrumentation Engineering ,Electrical and Mechanical Engineering and Electronics & Communication Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

The infrastructure boasts of state-of-the-art equipment that is regularly upgraded to keep pace with technological advancement.

With the establishment of institute, the Central Library started its journey as one of the prestigious departments. Since its inception, it has been playing a pivotal role in teaching and learning programmes of the institute.The aim of the Central Library is to serve the needs of our Faculty, Research Scholars, Students and Members of the Library. It acts as a center for the collection of literature predominantly related to science, technology and management and its allied subjects and develops a comprehensive collection of information that is useful for teaching and learning.

The Central Library fosters intellectual growth and advances the mission of Future Institute of Engineering and Management and affiliated communities by supporting excellence and innovation in education and research, managing and delivering information.

### **5.17 Government College of Engineering and Leather Technology**

Government College of Engineering and Leather Technology is one of the pioneering Engineering College of our Country established by British Raj in the on 11th Day of March in the year 1919, just after the World War-I. The historical perspective has been dealt in the History section of this web site. This Government Institute is under the administrative control of the Directorate of Technical education West Bengal and Department of Higher Education.

Since the inception its focus was on the teaching & research in Leather Technology & Footwear & Leather goods making, assistance to Industries and also to provide training and organize seminar/workshop to disseminate the knowledge to the stake holders. There was a gradual change in morphology of this college since 2000 when B. Tech course in Information Technology was offered by this Institute. In 2001 again another B. Tech Course in Computer Science & Engineering was offered. Keeping pace with horizontal expansion, in 2005 we looked into vertical expansion by introducing M. Tech programme in Leather Technology



**Fig.5.21 : The Government College of Engineering and Leather Technology**

The Government College of Engineering and Leather Technology (GCELT), pioneer in the field of education and research on Leather Technology was originally started under the name 'Calcutta Research Tannery' in the year 1919 on the recommendation of Munitions Board set up by the Government of India immediately after the first World War with the aim of exploring Indigenous resources of hides, skins and tanning materials for the purpose of production of leather and leather goods and development of leather industry in the country.

The college originally was situated on Canal South Road, Pagladanga, P.O. Tangra, Calcutta – 700 015. In August 1955 this college was affiliated to the University of Calcutta for imparting training in B. Sc. (Tech) course in Leather Technology and it has been recognized as a professional college under the University of Calcutta. The latest development and new schemes undertaken by the college has turned it into a big organization in the field of Leather Technology, the like of which was not found in any part of India. The main service provided by the college to the industry during 90 years of existence was supply of technical manpower and technical development.

The college undergoes paradigm shift in the start of 21st Century with the change in location from Pagladanga to the prime location of Salt Lake on E. M. By Pass next to the West Bengal University of Juridical Sciences in the year 1994. The mono disciplinary College dimensionally changes into a multi disciplinary one. Of late, two new disciplines in B. Tech. namely, Information Technology (IT) in 2000 and Computer Science and Engineering (CSE) in 2001 have been introduced. The affiliating University is now West Bengal University of Technology (WBUT) located in Salt Lake itself. A long awaited Two Years' Master degree course in Leather Technology under the same University got the affiliation of All India Council for Technical Education (AICTE) also to start and run from the year of 2005.



**Fig.5.22 : Library view**

Govt. College of Engineering and Leather Technology has a huge RFID facilitated library with more than 18,000 books, 16 National Journals and 12 International Journals. The books database can be searched digitally through a renowned library management software. Free photocopying facility is available for Faculty Members.



### **5.18 Govt. College of Engineering and Textile Technology, Serampore**

Govt. College of Engineering and Textile Technology, Serampore, is one of the pioneer institutions in India in the field of Engineering and Technology. The college was formerly known as College of Textile Technology, Serampore and it was established in 1908. The Institute started with a certificate course in Weaving. After that in the year 1926 Women's section started in separate premises. Institute started B.Sc(Tech) degree course in Textile Technology in the year 1957. Meanwhile, B.Sc degree turned into B.Tech in the year 1998 and started M.Tech in Mechanical Processing of Textiles. In the year 2000, It opened new stream Information Technology, Next year i.e. 2001 Computer Science & Engineering stream was opened successfully. After that, It added a brand new stream Apparel Production Management in 2007. Institute now has M.Tech courses on Mechanical Processing of Textiles & Chemical Processing of Textiles.

The mission of the institute signifies the followings: To maintain Standard and Academic Excellence in Textile education, To provide Education & Service for the development of Textile Industry, To fulfill commitment towards Excellence, Innovation, Customer Satisfaction through self & shared efforts, To achieve and maintain the Quality of its courses & their Teaching-Learning Process, To build strong interaction with the Industry through Industry-Institute cell, To undertake Research Project on a Globally competitive basis, To provide Continuing and Informal Education programme to render services to the Community and Economy

The Institute will be a leader in technology, whose students, faculty, staff and alumni define and expand the frontiers of knowledge and innovation self and shared efforts. The institute seeks to create and enrich more prosperous sustainable society for citizen of West Bengal, the nation and the world by providing innovative solutions through research, consultancy and continuing education for satisfying current and future institutional and R & D needs.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology and Textile Engineering.



**Fig.5.23 : Library reading room**

The Govt. College of Engineering and Textile Technology Library has a collection of 12,000 documents including books, journals, reports, proceedings, pamphlets and lab-manuals etc. covering the subject fields of Information Technology, Textile Technology and Computer Science and Engineering. The library has a floor area of 200 sqm. with a portion of sitting arrangement for 50 users. There is a separate reading room for the students. The library is providing following services- Issues four books at a time to each student for 14 days ,All time reading facility, Different types of reference service, Allowing more books during examination, Current awareness service, Gives XEROX facilities, LIBSYS facility for online Library management and administration, Close circuit camera are always capturing the activities

### **5.19 Greater Kolkata College of Engineering & Management**

The Institute has a sprawling campus of over 10 acres of land. The College also provides a sizeable instructional area of about 7735sqm. and administrative area of about 979sqm. and around 673 students (454 male & 219 female) pursuing various streams in engineering and technology.



**Fig.5.24 : Greater Kolkata College of Engineering & Management**

We have a team of experienced faculty members who are dedicated to impart quality education to the students. The campus has 25 class rooms, one seminar hall, 31 technical labs and 400 computers. The institute is furnished with automated library, separate reading parlour having more than 20,000 books and numerous national and international journals as academic research initiatives. The Library has implemented Libsys software and Barcode system. The institute also offers separate hostel facility for boys and girls, and a medical room attended by a qualified Medical Officer. All the computer Labs are connected through LAN and hi-speed internet facility is available with 10mbps bandwidth with Wi-Fi facility. We provide pick-up and drop facility to students to and from the Baruipur Railway Station to the campus.

The mission of the institute is to provide excellent educational infrastructure and academic ambiance conducive to higher learning by setting up centers of excellence and instilling a sense of ethics and value system among the students and to afford opportunities to the students to develop their full potential and professional growth and to spread the light of higher education.

The vision is to generate a stimulating academic environment for higher learning and to bring about a harmonious development of personality among the students by fostering leadership values and importing high degree of professional skills.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Civil Engineering, Electrical Engineering Mechanical Engineering and Electronics & Communication Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher

Education, Government of West Bengal and affiliated to affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)



**Fig.5.25 : Library view**

The infrastructure boasts of state-of-the-art equipment that is regularly upgraded to keep pace with technological advancement

GKCEM has a professionally managed well stocked Library with Book-Bank facility. Present status of books and journals are as follows: GKCEM has a professionally managed well stocked Library with Book-Bank facility. Book Bank facility envisages that one book for each theoretical subject is issued to students for the entire semester period. These books are to be returned for issue of books for the next semesters. In addition, students can get 2 nos. reference books against their library cards which are to be returned within 15 days. The library has 1485 titles and 22447 volumes . It also subscribes to IEEE e-journal. Library operation is automated using LIBSYS software.

## **5.20 Guru Nanak Institute of Technology**

Instituted with a vision to empower the aspiring professionals with the technological knowledge and professional expertise, Guru Nanak Institute of Technology was formed under the aegis of JIS Educational Initiatives in the year 2003. This technical campus offering undergraduate and post graduate courses under West Bengal University of Technology (WBUT), approved by AICTE is located in one of the prime locations in North Kolkata near Sodepur. The Institute offers cutting-edge technology, NBA accredited streams and gives

precedence to research initiatives undertaken by both the faculty members and the students to enrich and enhance the teaching learning process. This approach equips the students in keeping pace with the dynamic evolution of science and technology both in academics and industry. The trend-setting academic endeavours of GNIT have produced some of the finest scholars and ace industry professionals amongst our alumni who have brought fame and laurels for both the institute and themselves.

The mission of the institute is to meet the demands for skilled manpower on a global basis in the field of engineering, technology and management, to inculcate amongst the students and inspire them to take up higher studies and research, to impart high quality education by providing the ambience needed for developing requisite skill for excellence in education and industry, to ignite young minds with creativity and empowering lives, to train and educate students at both U.G and P.G levels to produce a galaxy of young professionals of outstanding ability who can become leaders in their profession and finally to develop responsible citizens who can meet the challenges faced by the society



**Fig. 5.26: Guru Nanak Institute of Technology**

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, Applied Electronics & Instrumentation Engineering and Food Technology.

The Institute also offers two years Master of Technology ( M.Tech) programmes in Mobile Communication & Network Technology , Computer Science & Engineering and Food Technology

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).



**Fig. 5.27 : Circulation counter of the library**

The Institute has a well stocked library with e-library facility. The library resources includes books, Reference books like encyclopaedia, e-journals including open courseware, patents, IEEE – online databases etc.



**Fig. 5.28 : Stacking area of library**

The key facilities of the library endowed with the followings: hard copy of books and e-books, hard copy of journals and e-journals, VCDs, multimedia CDs, NISCAIR journals, NPTEL videos, IEEE( ASPP) e- journals , membership of British Council Library, self-learning materials like CDs, project reports etc.

## **5. 21 Heritage Institute of Technology (HIT-K)**

inspired by the noble cause of education and philanthropic zeal, a group of twenty-two likeminded industrialists in Kolkata established in 1990 the Kalyan Bharti Trust (KBT), a public charitable foundation, to promote and provide higher education in the country and in State of West Bengal, in particular. To achieve KBT's objective, The Heritage School (THS) and Heritage Institute of Technology (HIT-K) were set up in 2001, while The Heritage Academy (THA) came up in 2007. Management Education Centre of HIT-K, which is accredited by NBA, has been accorded an independent status by AICTE as Heritage Business School (HBS) in 2013.

HIT-K was set up with a view to creating a Centre of Excellence in technical education in Eastern India. The aim is to be a leader in technical education in the country and to be at par with the best in the world. Since inception, HIT-K has been fortunate to attract the best possible faculty and has created one of the finest infrastructures available in West Bengal. All its eligible B.Tech Programmes are accredited by NBA and it has been granted autonomous status w.e.f. AY 2014-15. There are further expansion plans which are intended to be implemented in phases to elevate the status of this Institute to that of a Private University.

A harmonious integration of valued traditions with modern outlook is the guiding principle behind the development of academic environment that constitutes the basic philosophy of the Institute.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, Applied Electronics & Instrumentation Engineering , Civil Engineering, Mechanical Engineering , Biotechnology & Chemical Engineering.

The Institute also offers two years Master of Technology ( M.Tech) programmes Computer Science & Engineering, Information Technology, Electronics & Communication Engineering, Applied Electronics & Instrumentation Engineering, Biotechnology & Chemical Engineering.



**Fig. 5.29 : Heritage Institute of Technology**

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

Heritage Institute of Technology Library, which is one of the best college libraries in West Bengal, comprises the Central Library, MCA Library and Departmental Libraries under the Faculty of Engineering and Technology. The Central Library of Heritage Institute of Technology is one of the central facilities used by all types of members of this Institute.

The basic objectives of Heritage Institute of Technology Library are to serve the needs of the faculty, research scholars, students, officers and non-teaching staff with modern techniques.



**Fig. 5.30 : Spacious reading area of the library**



Central Library of the Heritage Institute of Technology, Kolkata (HITK), is the nerve center for all academic activities of the Institute. It is housed in a large air-conditioned hall of 20,000 sq. ft.(approx.) with sufficient seating space for reading. It is fully automated and is one of the modern technically equipped libraries in West Bengal with Barcode system and Anti-theft solution.

The library has a generous collection of Engineering & Management books, Reference books, Scientific Journals, Reports etc. In addition, it has books on Humanities, Social sciences and Career Guidance also.

The Technology library has 4443 titles and 41949 volumes including semester books. The library subscribes to 107 National (Print) journals and 71 International (Print) journals in order to support the study and teaching activities of the Institute including 14 news papers. In addition to the print journals , the faculty members and students have been accessing the huge number of online journals, which are available in LAN, in order to fulfill their requirements relating to research and project linked work

On-line subscription includes IEEE (ASPP), JET, JSMS, SAGE-online, HBR-online, DEL-NET & NPTEL including 3500 CD / DVDs. The library also has 1000 back volumes of At present , this collection includes about 1758 e- books. The students are showing their interest to have access to e- books related to their syllabi. The e-books, available in open access, are also highlighted to the users with the respective URLs.Through BCL, the users may have access to the databases of 90,000 e-books.



**Fig. 5.31 : E-library**

With the introduction of the digital library, facilities and services are being upgraded and expanded. Some of the current facilities include :- access to - IEEE-(ASPP) that includes around 255 e-journals with the back files since 2000 related to all major areas of engineering & technology.,- J-Gate Social & Management Sciences (JSMS) covers around 6700 indexed with 2000 free full text related to management & technology,- SAGE Online covers 9 journals, - EPW Online provides current & back issues since 1966, - HBR Online covers current & back issues, - DELNET –databases and NPTEL – video lectures that covers web & video courses, a joint initiative of IITs and IISc, Bangalore, funded by MHRD, Govt. of India. Organisation of CDs and DVDs is done for services to the users. The URLs of the open access journals & books are being highlighted to the users.

HITK has been developing the collection of online journals through both subscription and resource sharing. The content of e-journals collection covers 4136 ( approx.) full text journals and 100000 journal articles and 11,300 indexed matter related to engineering and technology.

Through the membership of DELNET, the library has access to i) periodical database of 20,235 records and ii) database of 9,12042 number of journal articles. The members of HITK may have access to 7,000 e-journals through institutional membership of British Council library , Kolkata.

It is a great pleasure to note that the usage statistics of the publishers of the different databases and online journals reveals the constantly increasing use of the online journals particularly IEEE (ASPP) in the HITK.

## **5.22 Hooghly Engineering & Technology College**

The institute thrives to be recognized as a centre of excellence in creating innovative, professionally competent and research oriented future engineers with compatible development of body, mind and spirit and to be able to pursue higher studies and successfully face the challenges of the cutting edge technologies while serving the stake holders at local, regional, national and international levels, eventually creating a vibrant, academic and R & D environment to bring in a prosperous sustainable global society.



**Fig. 5.32 : Hooghly Engineering & Technology College**

The mission of the institution is as follows :to impart student- centric innovative education in a research conducive environment, To bring intellectual growth by integrating the academic programmes with practical knowledge to fulfill the purpose of effectively meeting the needs of industry and society at large,To be capable of conducting all kinds of basic and applied research,To be able to provide effective and efficient consultancy,To develop the spirit of entrepreneurship imbued with the quality of moral, ethical and human values at all levels having honesty, integrity and dedication as the foundation and finally and To become wealth of the nation and the world at large in terms of valuable technical resource, ultimately leading to an autonomous institute of learning.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, Applied Electronics & Instrumentation Engineering , Civil Engineering, Mechanical Engineering

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering (CSE) , Electronics & Communication Engineering ,Electronics & Communication Engineering (Microelectronics & VLSI )

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

The Library has developed an excellent collection of Books, Journals & other non book materials. Total no. of books in the library have now gone upto 20,000 with 2000 no. of titles. There are different discipline books like Computer Science, Electronics, Electrical Engineering, Mechanical Science, and Civil , Mathematics, Physics, Chemistry & Environment Science, English Communication, and others are available in the library. Besides this, some reference books (Conventional & Non- Conventional) are available for ready reference.

Good number of technical journals are being provided for constant updating of the latest developments in the field of science and advanced engineering technology. There are some popular magazines and books to supplement the needs for competitive examinations. Library also subscribes two English Newspaper

### **5.23 Institute of Engineering & Management**

IEM opens up the doors of young minds who dare to dream. It encourages the spirit of free enquiry and imagination. Here dreams take Shape. The Institute tries to indicate the sense of human values and discipline to make students respectful towards human being, realise and demonstrate their best potential and be a winner in life. The Institute is affiliated to WBUT. B.Tech.& M.Tech., courses are under AICTE, Govt. of INDIA.

All round excellence in management and engineering discipline is attained only by close interaction with the allied industries. To facilitate close interaction of modern industries, as well as to draw upon the vast academic & professional resources of a vibrant industrial sector.

The vision of the institute is to be globally recognized as a leader in engineering education, research and enhance the application of knowledge to benefit the society. The objective of the institute is to provide the highest quality engineering graduates, cutting-edge researchers and innovative technologists by offering a congenial learning atmosphere to students with a target to create good citizens.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, and Mechanical Engineering

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer

Science & Engineering (CSE) , Electronics & Communication Engineering and Information Technology.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

A beautiful & modern library well updated books, journals & multimedia learning aids, provides the student an opportunities to keep themselves well versed with all engineering & management related information.

#### **5. 24 Jalpaiguri Goverment Engineering College**

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, and Mechanical Engineering

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering (CSE) , Electronics & Communication Engineering and Information Technology.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

The Central Library of Jalpaiguri Government Engineering College was established in the year 1961. From a humble start with a few books, it now has an enviable collection of 49,349 valuable books and subscribes to 22 journals and periodicals(as on 1st April, 2007). Almost 3000 back-volumes of the journals are available. The Library also currently subscribes online to 5 e-journal packages namely IEL(120 journals), ASCE(30), ASME(19), Springerlink(520), Del(about 4000 engineering articles), which includes journals of both technical and supporting departments through the INDEST-AICTE consortium.

An outsider may use the reference section of the Library with the prior permission of the authority concerned . Moreover any type of reference and referral services are available. Almost 6163 new volumes have been procured under the TEQIP grant from World Bank. The Library remains open from 10:30AM to 8:00PM . Currently, the library uses a library management software called LIBSYS and is under the efficient supervision of the below named librarians. The Central Library of Jalpaiguri Government Engineering College is a symbolism of the heritage called JGEC and holds a place of pride among its students.



**Fig. 5.33 : Library view**

Among the future plans the important ones are provision of a xerox machine in the library premises, digitalisation of the existing library facilities, extending library memberships to ex-students, online library catalogue to be provided on campus wide LAN to enable easy access, issue of books by bar coding to be provided immediately.

### **5. 25 JIS College of Engineering**

JIS College of Engineering was established in the millennium year 2000 by JIS Foundation and over the last decade grown in rapid strides to transform it into an Autonomous Institute. JIS Group is the largest educational conglomerate in the state of West Bengal and leading Private sector Educational Group dedicated to impart demand driven education in Science, Engineering, Technology, Management and Medical Science with highly laudable quality.



**Fig. 5.34 : JIS College of Engineering**

The Institution is declared Autonomous by the University Grant Commission in 2011. The autonomous status conferred with qualification of 2(f) and 12(b). The Institution is approved by All India Council for Technical Education (AICTE) and affiliated to West Bengal University of Technology (WBUT). The Institution was accredited by National Assessment and Accreditation Council (NAAC) in 2009 and all its eligible technological departments are accredited by National Board of Accreditation (NBA) or under re accreditation process. Further, the Institution has qualified for the World Bank Grant of Rs. 4 crore under Technical Education Quality Improvement Programme (TEQIP) Phase II in the Subcomponent 1.2, for PG and Demand driven Research & Development & Innovation, as the only private self financed institution from the State of West Bengal after three lead Universities JU, BESU and CU.

Located in its sprawling 17.5 acres lush 'Green Campus' at Satellite Township of Kalyani, 55 km north of Kolkata, the College has strength of 3000 + students pursuing various degree engineering courses along with computer application and management. The Campus is an ideal educational ambience with Classrooms, Laboratories, Smart Classrooms, Seminar Halls, Conference Halls, Computer Centre, Central Library, Gymnasium, Store and Canteen with campus WI Fi connectivity.

The vision of the institute is to generate a stimulating academic environment for higher learning and to bring about a harmonious development of personality among the students by fostering leadership values and importing high degree of professional skills.

The mission is to endow with excellent educational infrastructure and academic ambience

conducive to higher learning by setting up centers of excellence and install a sense of ethics and value system among the students. We are committed to provide opportunities to the students to develop their full potential and professional growth and to spread the light of higher education.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering, Civil Engineering, Applied Electronics & Instrumentation Engineering, Biomedical Engineering and Nano Science & Technology.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

There are many service centers in the campus to cater to the needs of our students such as Student Counseling Centre, Career Development Office, Gymnasium, Student Canteen, Reprography Centre, Stationery Store, Photocopy Center, Playground, Management Lab, and Audio visual room, Career Development Office, Computer Systems Laboratories, Language Lab, Boy's & Girl's Students Common Room, IIPC & EDC Centers, Smart Class Rooms, Project Presentation Lab. There is a television with a cable connection for the students to listen to the news in Hostels. Staffs are provided with pick & drop Transport facilities, medicals facilities, and canteen in extent to the state-of-the art working ambience with career development training under Faculty and Staff Development Programme. The Institution has all Weather Approach, Barrier free Environment, Potable Water Supply and Vehicle Parking, Power back up for Campus & Hostels.

The library has a collection of 78079 books, 641 ebooks via IEEE-Wiley, 108 print journal and 201 IEEE E- Journals in Central Library. The library is fully automated with LibSys software. The Library provides internet access to the students.

The library has commissioned a Digital Library System with separate space allocation. The Digital Library System runs on D Space software which is an integrated system of 25 terminals connected together through an independent LAN with a connectivity of 50 mbps.



1500 titles have been uploaded which include various Books, VIDEO Lectures, around 450 ebooks, University Questions Papers, Research Publications, NPTEL VIDEOS etc. A new block for provide **Book Bank** Facility Book bank Provide 5 books to the students for 6 months per semester and a whole new block as Study Center for IEEE E- Journals.

### **5.26 Kalyani Government Engineering College**

Kalyani Government Engineering College is one of the best college all over the West Bengal under Maulana Abul Kalam Azad University of Technology (formerly - West Bengal University of Technology).

The mission of Kalyani Government Engineering College is to impart quality technical education to the students at the undergraduate and at the postgraduate levels of engineering with the aim to make them complete human beings possessing depth of knowledge not only in their own discipline but also in the kindred areas, which shall necessarily be accompanied by a wide mental horizon making them capable of sifting the grain from the chaff, the honesty from the chicanery, the truth from the untruth.

The vision of Kalyani Government Engineering College is to produce high quality, globally competitive technical manpower and to become a centre of excellence in a few select areas of high-end technologies. It also envisages to act as an incubation cell for entrepreneurship activities in the region in association with the industry houses of the locality and outside. Keeping pace with the global technological developments through continuing education programmes is its another cherished ambition.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, and Mechanical Engineering

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering , Electronics & Communication Engineering, Information Technology & Production Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to affiliated to Maulana Abul Kalam

Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

### **5.27 Mallabhum Institute of Technology**

The term 'Technology', being essentially generic throughout the world acquires a new rationale in the context of Bishnupur; hence the motivation for the foundation of Mallabhum Institute of Technology envisaged by new engineers, doctors, professors and leading figures of the community around Bishnupur. As a part of conviction, they hope that the inception of Mallabhum Institute of Technology would keep on acquiring newer and newer dimensions in terms of global trends without being oblivious of the aspirations and realities of the community around.



**Fig. 5.35 : Mallabhum Institute of Technology**

The mission of the institute is to provide the students with the best and updated infrastructure and competent teaching faculty, to fulfill the needs of the employing organizations, thereby providing opportunities to bright Boys and Girls for respectable placement across the country and abroad, to have program and training methodology so as to mold the character of each student to be well disciplined and presentable, to offer value-added education to the students to inculcate in them the highest ethical standards and moral values of human life in the society.

The mission of the institute to create an educational institution that will be admired globally, to make engineers well equipped with current technical competencies and shall be able to face all future challenges.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Electronics & Communication Engineering , Mechanical Engineering , Electrical Engineering & Civil Engineering.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT)

The Central Library is designed to provide the services by means of various activities towards the satisfaction of potential users. Mallabhum Institute of Technology Central Library was established with an objective to cater the services to its users with their at most satisfaction for academic enrichment and governance. It has been established in 2002 consisting various categories of members (student, faculty, administrative and other staffs, Executive etc) and numerous types of resources to facilitate the academic and research activities.

In spite of rich collection, library materials have been organized using LIBSYS (LSEase 6.2) since 2009. Currently it has 23373 books in print forms, 450 CD ROMs, 300 Question papers, 60 Print Journals and online access to electronics journals. The Institution has also 10 departmental libraries.The library also took the institutional membership of Institutions of Engineers (India) Library ,Indian Institute of Technology, Central Library Kharagpur (IIT-KGP)



**Fig. 5.36 : Technical section of the library**

The patrons of the MIT Library can search the bibliographic databases and find specific information online. The search facility also appraises the user about the availability of each item for circulation, including current status of individual copies of a title and Reserve status. OPAC also shows titles on order displaying current status in acquisition.



**Fig. 5.37 : Stacking area of the library**

Library automation was first started in 2009 through LSEase 6.2 (LIBSYS). LIBSYS (Library management software) is running. The library also maintains a barcode based circulation system for creating quick services to the users and well connected the OPAC facility.



**Fig. 5.38 : E-library**

The library has a collection of 3446 titles and 24671 volumes. The library also subscribes to 42 national and 18 international journals including three news papers. Among the online resources the important ones are IEEE (ASPP), Springer ME & J-Gate and National Programme on Technology Enhanced Learning (NPTEL).

### **5. 28 MCKV Institute of Engineering**

MCKV Institute of Engineering is an engineering college founded in 1999, affiliated to West Bengal University of Technology. It ranks as one of the top engineering colleges in West Bengal and graded AA+ by Careers 360 in 2015.

For more than 15 years, MCKVIE has been known for its spirit of excellence that transforms students into intellectuals, where faculty work with the students to engineer solutions and encourage exploration across disciplines. Critical thinking and networking is the main focus – on campus, off campus and after graduation.



**Fig. 5.39 : MCKV Institute of Engineering**

The vision of the institute is to be a sustainable centre of academic excellence and advanced research at national level producing students recognized for their academic competence, attitudes and dedication. The mission of the institute is to create a vibrant learning environment in the Campus, to develop and enhance teaching – learning quality, to have highly qualified faculty and to support application oriented research and encourage entrepreneurship.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical

Engineering, Electronics & Communication Engineering, and Mechanical Engineering and Automobile Engineering.

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering, Electronics & Communication Engineering, Electronics & Communication Engineering – VLSI and Automobile Engineering.



**Fig. 5.40 : Library view**

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology (MAKAUT) formerly West Bengal University of Technology (WBUT).



**Fig. 5.41 : Reading area of the library**

The Central Library is housed in a sprawling hall with a sitting capacity for about one hundred and fifty members. It has a rich collection of more than 23,000 text books and

reference works on all relevant subjects. The institute subscribes to a large number of national and international periodicals and local and national dailies which are available for the benefit of the readers. Some of the facilities include Reprography, Internet, educational CDs. The library is fully automated with Online Public Access (OPAC) facility.

### **5. 29 Narula Institute of Technology**

Narula Institute of Technology is a leading Engineering & Management college, located at Agarpara in West Bengal. Approved by AICTE and affiliated to West Bengal University of Technology. The college offers NBA accredited degree programmes in engineering.



**Fig. 5.42 : Narula Institute of Technology**

The Institute is eligible for receiving Central assistance under the recognition of 2(f) & 12(B) under UGC Act. The institute is also accredited by National Assessment and Accreditation Council (NAAC). The college has also received the notable World Bank Assisted and MHRD approved TEQIP (Phase II) grant for the advancement of Technical Education. The institute boasts of a powerful R & D cell with immense contribution from the scholarly faculty members. There is an enormous repository of International and National Journal publications which have drawn nationwide attention. Dr. Jayanta Kumar Saha is one such bright star in the sky of NIT. He has done his Ph. D work in the Department of Physics, Narula Institute of Technology, Agarapara, Kolkata under the supervision of Dr. Tapan Kumar Mukherjee. On 2nd March, 2015, he has got the prestigious "Best Thesis Award" of Indian Society for Atomic and Molecular Physics (ISAMP). Further he has been appointed as the winner of the prestigious Sheldon Datz Prize 2015, a coveted international award of US\$1000. He will be

conferred this award in the ICPEAC Conference in Toledo (Spain). With the encouragement and support from the college, around ten projects funded by organizations like UGC, BRNS and AICTE are running successfully by the faculty members till date.

The college is in collaboration with Oracle, INFOSYS, TCS, NIT Sikkim, IIT-KGP, AIT Bangkok and other organizations of repute. The students get an opportunity to interact with foreign experts all across the globe through seminars, conferences and special teaching-learning sessions. The student chapter plays a crucial role in organizing informative technical events within the campus. At present there are five student chapters in our college: IETE student forum of Electronics & Communication Engineering Department, ICE & ASCE of Civil Engineering Department, CSI of Computer Science Engineering, Information Technology & MCA Department and Institute of Engineers of Electrical Engineering Department.

NIT is a one-stop venue for promoting a vibrant and sustainable atmosphere for teaching-learning. Besides academics, the students get an exposure to the world of co-curricular activities which help them in shaping their personality. The students made the college proud by winning laurels in some recent cultural events organized by Telegraph and Maruti Suzuki. To add a feather in our cap is Lakhi Singh of ECE, 2nd year who is selected in the national squad for the Women's "Under Nineteen World cup T20" cricket tournament to be played at Bangladesh.

Thus, the cornerstone of the successful evolution of Narula Institute of Technology lies in its meticulous tutoring and mentoring of the future professionals of the industry as well as of academia and citizens of the society where the Institute's success has always been directly proportional to the success of the students.

The mission of the institute is to impart high quality Engineering and Management education to the budding professionals and provide the ambience needed for developing requisite skills to make a mark of excellence in Education, Business and Industry.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering, Civil Engineering and Electronics & Instrumentation Engineering



The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering (CSE) , Electronics & Communication Engineering, Electrical Engineering, Electronics & Communication Engineering Microelectronics & VLSI and Civil Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).



**Fig. 5.43 : Stacking area of the library**

The library is stocked with the latest books in Basic Sciences, Telecommunication, Computer Instrumentation, Computer Management and general knowledge by national and International authors. A variety of journals and periodicals are available here to help the students up-date their knowledge. Moreover it is provided with computers with CDROM drives and Multimedia capabilities. A photocopier is also available for the use of the faculty and the students. The library is open for hours a day. New books to cover the requirements of semesters 7th & 8th are being added the faculty and the students are encouraged to recommend any book/ periodical they think would help them in their studies. Addition to the library is a continuous process..

The Central Library began its existence in 2001. Since then, it has grown in size and content along with the Narula Institute of Technology to take the present shape. All these years, it has been the lifeline for the academic activity of the institute. At present, it stands as a modern

library with a lot of automation and as the largest of the Fourteenth Library of JIS Group in terms of the number of books and journals.

NIT Library welcomes to all of its' members to use the library. In order to ensure a good library-environment and to enable the users to have as productive as possible in the library, we ask users to abide by the following rules. However, we expect, all members should exercise self-discipline, respect and consideration for others when using the Library.

Library is open on all working days of the Institute and from 8:00 am– 8:00 pm (Monday to Friday)& 9.30am – 1.30pm. (Saturday). However, the library remains open on request, as per convenience of the students and staffs of the Institute.

### **5.30 Netaji Subhas Engineering College**

The Netaji Subhas Engineering College (NSEC) has been set up, keeping in mind the ideals of Netaji Subhas Chandra Bose, whose contribution to the Indian Freedom Movement remains invaluable forever. Netaji had dreamt of vibrant, strong and powerful India, an India which would be independent and self reliant, not only politically, but also in the spheres of Education & Technology. He strongly believed that true independence can only stem from strong base in education and technology.



**Fig. 5.44 : Netaji Subhas Engineering College**

At NSEC, we give maximum importance to in-depth studies in IT and its related fields. Without diluting this basic goal and with an aim to produce professionals with sound knowledge in IT., we also intend to further sharpen our students by imparting specialized training in different advanced topics in management and technology so that our outgoing students can become not mere professionals knowledgeable in TI, but technically and managerially confident professionals with good communication skills - a more matured and better marketable product.

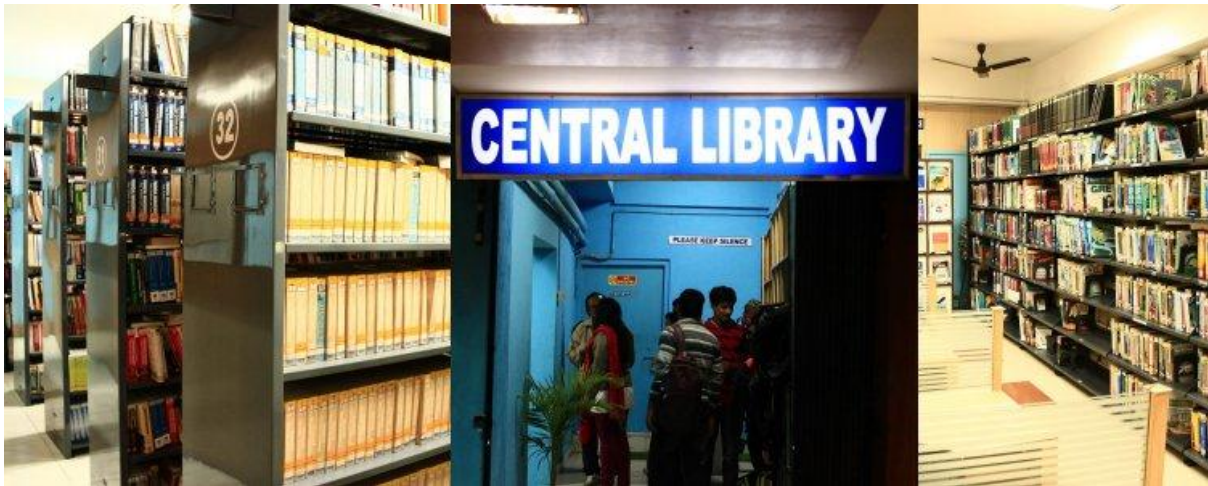
The mission of the institute is to strive continuously in pursuit of excellence in Education, Research and Entrepreneurship eventually to become a Global Hub,

The vision of the institute is to impart total quality education to develop innovative, entrepreneurial and ethical future professionals fit for globally competitive environment, to share with stake holders institutional experience in education and knowledge for mutual enrichment in the field of technical education, to create an ambience in which new ideas, research and scholarship flourish and from which leaders, innovators and entrepreneurs of tomorrow emerge, and to contribute to the socio-economic development of the society through scientific and technological services

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering , Civil Engineering, Electronics & Instrumentation Engineering and Biomedical Engineering.

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering ,Electronics & Communication Engineering,Control & Instrumentation and Power Systems.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).



**Fig. 5.45 : Library view**

Netaji Subhash Engineering College Garia Central Library will create and sustain an information environment that supports the educational and research needs and enables learning and advancement of knowledge of NSEC community. It will strive relentlessly to enhance the quality of its services to maximize user satisfaction.

The Central Library, NSEC Garia started its journey in a small room of the Institute Old Building in the year 2000 ( February), next in the Annex Building and then finally moved to its present premises in 2004. Since then, it has grown in size and content to take the present shape. With the developments in computers, microelectronics and communication technologies, the behavioral characteristics of the information seekers have been changing rapidly and the library is trying its best to adapt with the technological advancement. For the last five decades, the library has been the lifeline of the academic activities of the Institute.

The Library is well equipped with modern facilities and resources in the forms of online databases, books, journals, reports, etc. The Library has been using the LIBSYS, an integrated library management software package, with all the modules for automated library operations.

The Central Library NSEC Garia has two main divisions. One is for the collection of books and the other is meant for Reading Room collections and the periodicals ( current).

The Library is kept open on all the week days, except the Institute holidays. The opening hours are as follows Tuesday to Saturday 9.00 a.m. to 8.00 p.m.. The Library is having a collection of more than 95232 books, covering 4127 titles on it,

subscribing to 52 print National and International journals, and providing access online full-text IEEE journals to its users approx 3000. The Library uses Dewey Decimal Classification (DDC) system to classify its documents. DDC groups the Universe of Knowledge into ten broad Subjects: Generalities, Philosophy, Religion, Social Science, Languages, Pure Science, Technology, Fine Arts, Literature, and History & Geography. Each subject is assigned a classification number to classify a book. Books are arranged on the racks in the ascending order of books. Textbooks, Reserve books and Reference books, exclusively earmarked, are kept in the Stack area of the Main Building. General Books are kept in the stack area of the Main Building as detailed below:

Books are kept on the racks in the ascending order of the Classification Numbers assigned to them. They are kept in the various racks in the stack area of the Main Building. Reserve books are kept in locked almirahs. They can be lent out for reading in the basement only, on depositing Library Identity Cards with the person in the Section. Copies of the past Semester Examination papers of B.Tech/ M.Tech. Courses in bound forms are also kept in this section.

Reference collection of the library consists of Bibliographies, biographies, Dictionaries, Directories, Encyclopedias, Geographical Reference Tools, Guide books, Hand books, and Year books. These books are not to be issued out at any circumstances.

Presently the library subscribes to 36 National and 16 International print journals. The current issues of these periodicals are kept in the Reading Room adjacent to the Library. The issues of the periodicals are not issued out. Users are urged to read them inside the Room.

For Institute users, the photocopying charge is 0.60 paisa per exposure and for outside users, the photocopying charge is RS.2/- per exposure. Photocopying of the entire book/journal is not permitted. Users are responsible for complying with the Copyright Act. Property Counter The Property Counter is located near the Library Gate. Checkpoint The checkpoint at the entrance to the Library is usually manned by two persons from Institute Security Section and / or Library. Visitors and Library users are requested to declare their belongings whenever they pass by the checkpoint. Suggestion Box A suggestion box is placed near the Circulation Counters. Users are requested to drop their suggestions in the Box. The Library Management attaches great significance to these suggestions for providing improved Library services.

CCTV To ensure proper surveillance of various potential locations of this large library, we have recently installed CCTV camera heads and also at specific terminals located at security check point and Property Counter

Library The Digital library is housed in the reading room attached to the Central Library. The Digital Library collections consists of on-line electronic databases, CD-Rom databases and other

Now Central Library collects and preserves the research output (Ph.D thesis) of Faculty members of the institute, faculty publications in the Gallery installed newly attached to library foyer.

### **5.31 Pailan College of Management and Technology**

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical Engineering, Electronics & Communication Engineering, and Civil Engineering.



**Fig. 5.46 : Pailan College of Management and Technology**

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).



**Fig. 5.47 : Library view**

The library consists of a Central Library and 2 divisional libraries which collectively support the teaching, research and extension programme of the Institute. All students, faculty members and staff members of the Institute are entitled to make use of the Library facilities on taking library membership. The Library, besides having a huge collection of books on engineering, computer science, hospital management and optometry and visual science offers library services through its various Divisions. Initially setup in 2002. The library resources are endowed with 15926 books ,7 printed journals, 958 CD/DVDs , 7 News papers . Library also subscribes to IEEE and DELNET online databases.

The library facility is endowed with book bank circulation inter-library loan, users awareness programme, OPAC searching ,e-journal searching, reference service, previous Question paper referral service and reading room facility .The library also provides services through the intuitional membership of American Library and British Council Division Kolkata.

### **5.32 R.C.C Institute of Technology**

RCC Institute of Information Technology (RCCIIT) was established in the year 1999 as a collaborative venture of the Ministry of Information Technology, Govt. of India and the Department of Higher Education, Govt. of West Bengal through an Autonomous Society formed by the Department of Higher Education. The Institute also received grants from the World Bank under the TEQIP-II project since 2011.

RCCIIT is an ISO 9001-2008 & ISO 14001-2004 Certified Institute. All courses are approved by AICTE, New Delhi and affiliated to Maulana Abul Kalam Azad University of Technology West Bengal (MAKAUT, WB); erstwhile WBUT.



**Fig. 5.48: R.C.C Institute of Technology**

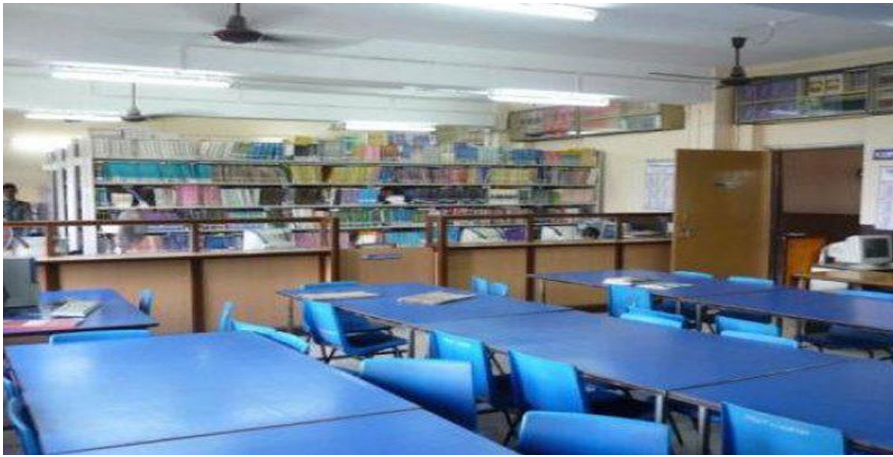
The vision of the institute is to impart knowledge and skill of the highest quality by applying technological innovations through the use of state-of-the-art technological tools for generating technical manpower as required in industries, research organizations and academia and to inculcate the importance of inter-disciplinary research and development that directly impacts the social needs of our country

The mission of the institute is to train technical professionals with cutting-edge technological knowledge and skill, good communication ability and interpersonal skills for meeting challenges with innovation and application, to produce quality engineers and good human beings who will be able to assess the need, design solutions and apply their innovation skills, to implement projects with clean and green technology for the benefit of mankind To select, groom and retain talented, qualified and committed faculty and staff and to develop relevant infrastructure and learning resources with conducive climate for pursuing planned research and learning practices by all the stake holders

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electrical



Engineering, Electronics & Communication Engineering, and Applied Electronics & Instrumentation Engineering.



**Fig. 5.49: Library reading area**

The Institute also offers two years Master of Technology ( M.Tech) programmes in Computer Science & Engineering, Information Technology and Telecommunication Engineering.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

Library is located in the third floor of the institute’s main building, Being far from the classes and labs the ambience is just conducive for learning The objective of the library is to help user community to become skilled, effective, responsible information users; i.e. how to find, retrieve, evaluate and use information efficiently, effectively and ethically.

The Library manages a reprographic centre to cater to the needs of the authorized users. Apart from Librarian and other Library staff working dedicatedly for extending best possible service to the users there is a 8-member Library committee comprising of the Librarian and faculty representatives of all department including Principal. Library being ‘the heart of the institute’ the management gives highest priority for its development and resource expansion  
brary Layout

The library is endowed with 30500 volumes and 4130 title of books, more than 500 CD/DVs, more than 5000 book bank books. The library also subscribes to online journals.



**Fig. 5.50: Stacking area of the library**

Books are basically organized according to the revised 21st edition of Dewey Decimal Classification Scheme (DDC21), and placed classification-wise on modular bookracks. New arrivals books are displayed in a separate almirah. User community of the Library constitutes mostly the students and teachers. The academic course structure of the Institute requires various sets of prescribed text books. Therefore, the Library maintains a separate collection of enough copies of such books for the user. Whenever the syllabus is modified by the University or new version of books are published or new courses are introduced new text books are added to the collection upon recommendation of the Library Committee.

Costly reference books are continuously added to the reference section upon requisition from faculty members. Currently major allocation of the Library budget is for reference procurement. Apart from reference books there is a collection of conventional reference materials like dictionary, encyclopedia, handbook, manual etc. for ready reference and general information.

The Library also has the facility of “Book Bank” by which student can avail two to four (depending on the year and semester) books for the entire semester in addition to three books through normal Library facility. Student’s feedback is collected once which is verified with the subject teachers and the most popular/essential/useful books are identified by the Library as book bank book .

Institute subscribes to around 65 national and international printed as well as on-line journals with facilities to download and take printout of any article of a member’s interest. The journals are kept in the reference section for access of students, research scholars and faculty.

members. The library also subscribes to Elsevier, Science Direct, IEEE, ACM Digital library and J-Gate online resources.

### **5.33 Siliguri Institute of Technology (SIT)**

Established in 1999, Siliguri Institute of Technology (SIT) is an IT based institution running under the vision of Techno India Group and is only one of its kinds in North Bengal. About 5 km away from Siliguri city, the Institute has a sprawling and picturesque campus surrounded by opulent lush green tea gardens, dense forests of Sukna with a backdrop of Sub-Himalayan ranges making it a premier abode of learning. The institute runs Six B.Tech programs, undergraduate and postgraduate courses in management and computer applications along with an undergraduate program in Hotel Management and Catering Technology involving more than 1500 students. SIT is situated right on NH55 which connects the “Queen of the hills” Darjeeling to the rest of the country and the Darjeeling Himalayan Railway (DHR) Toy Train, An UNESCO world heritage. This city has a very good climate, neither too hot nor too cold.

To be a recognized institution offering high quality technical educational opportunities to students to become employable engineers/professionals in 100 best ranked industries and research organizations of India in next five years.”

To impart quality technical education for holistic development of students who will fulfill the needs of the industry/society and be actively engaged in making a successful career in Industry/research/higher education in India and abroad.

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Electrical Engineering, Electronics and Communication Engineering, Computer Science and Engineering, Information Technology, Civil Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT).

The Central Library of SIT was established in the year 1999. In today’s high-tech learning environment the ‘Central Library’ as a learning resource is taking up increasingly more academic space and time in a life of a learner. Library is the heart of our academic institution.

With the advancement of information and communication technologies library is trying its best to adapt with the technological advancement. The quality of services and user interaction in the library is rich, vibrant and stimulus as it has a healthy mix of people with varied background. A journey towards the future with a careful coordination and planning is the hallmark of this library confronting the challenges of globalization. At present the library has more than fifty five thousand volumes. The library is also rich with non-print materials like CD & DVDs, e-projects etc. To provide the flavour of national and foreign publications to the students and faculty members, the library has organized book exhibitions time to time

The primary mission of the library is to support the educational and research programs of the institute by providing physical and intellectual access to information, consistent with the present and the anticipated educational and research functions of the institute. In accordance with the objectives of the institute, the library aims to develop a comprehensive collection of documents useful for the faculty and student community of the institute. The secondary mission is, to serve as a resource center for the students and faculty members of the institute

In addition to the general books, Book Bank facility is also available in the library. Student can borrow four book bank books in addition to four general books for lending purpose.

The Digital Library Archives has been started by the central library by using Greenstone Digital Library Software. It is situated in the 1st year Building within a 1500 Sq. ft. carpet area with 45 PC machines with well equipped modern facilities.

Library has a collection of more than 55000 books . The total area of the library is around 6000 sq.ft carpet area. It is an open access library. The library is automated with LibSys LSsease 5.0 software. Greenstone software has been used for the creation of digital library .

### **5.34 Supreme Knowledge Foundation Group of Institutions**

Supreme Knowledge Foundation Group of Institutions, a dream that was seen by many in the year 2009 has now emerged as one of the leading institutions for engineering as well as management education in the eastern part of the country. The oath that was taken by Mr. Bijoy Guha Mallick, a renowned social worker of the district, a successful entrepreneur, to spread professional education in the country was affirmed by few other respectable social workers and entrepreneurs like Mr. Dilip K. Mandal, Mr. Krishna C. Mandal, Mr. Chanchal K. Bhattacharya.



**Fig. 5.51: Supreme Knowledge Foundation Group of Institutions**

Professor B. N. Biswas, one of the most nationally and internationally acclaimed researchers and educationists, took the responsibility of sowing the seed. Professor Biswas not only gathered a few dynamic and vibrant young faculty members but was successful in bringing several experienced and acclaimed faculty members as well under the same umbrella.

A barrier free infrastructure started developing over a lush green sprawling campus spanning over a 10.408 acres of land at a handshaking distance from Mankundu Railway Station. In the year 2009, the institution started with B. Tech in 4 disciplines viz. Applied Electronics and Instrumentation Engineering, Computer Science and Engineering, Electronics and Communication Engineering and Electrical Engineering under Sir J. C. Bose School of Engineering and MBA with four specializations viz. Financial Management, Human Resource Management, Marketing Management and Systems Management under Dr. P. C. Mahalanobis School of Management. The intake capacity of each department was 60.

Within a span of only 7 years, the institution has undergone both horizontal and a vertical growth. Supreme Knowledge Foundation Group of Institutions i.e. SKFGI by which the institution is known colloquially is now offering B. Tech in 5 disciplines viz. Civil Engineering, Computer Science and Engineering, Electronics and Communication Engineering, Electrical Engineering and Mechanical Engineering and MBA with four specializations. The intake capacity of four departments viz. Computer Science and Engineering, Electronics and Communication Engineering, Electrical Engineering and Mechanical Engineering is 120 each.

Moreover, three departments namely Computer Science and Engineering Department, Electronics and Communication Engineering Department and Electrical Engineering Department have started M. Tech courses.

At SKFGI the different learning centers such as Sir J. C. Bose Creativity Centre, Centre for Renewable and Non-Conventional Energy Studies and Research, Texas Instruments C2000 Teaching Laboratory under Texas Instruments University Programme, Centre for Machine Learning and Intelligence, Finite Element Analysis and Design centre, Big Data Laboratory, Maclab are the incubation centers of the young researchers. The experienced faculty members are working as PhD Supervisors of different universities.

In the year 2014, SKFGI introduced Diploma in Engineering Courses in Civil Engineering and Mechanical Engineering with an intake capacity of 60 each.

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology (MAKAUT) formerly West Bengal University of Technology (WBUT).

The state-of-the-art Library of the Institute is a learning resource centre of the Institute that meets the requirements of the students and teachers with respect to the academic programmes and syllabi of WBUT. The Library provides them with modern and technologically advanced amenities with respect to books, journals, E-sources as well as live-coverage of special lectures and seminars.

The Library is situated in the heart of the academic complex of the Institute, in the Ground Floor of the main building. The Library has a collection of over 2000 titles and over 39,000 volumes. Besides the printed journals, the Library subscribes to several on-line IEEE, IET, WILEY and other journals and provides access to IEEE online database. The functions and services of the Library are fully computerised and the students are provided with digital library facility. Besides the general lending, the students are also entitled to accessing books from the Book Bank of the Library and retaining them for a defined semester. It has a well maintained stock of CD- ROMs, DVDs, Project Reports, Theses, and the like. The students are given access to fully automated circulation facilities through LIBSYS Software package (an integrated multi-user library system). The Library remains open even beyond the Institute

hours for the benefit of students and teachers. Further, in order to promote awareness about the Library among the users, the Library organises Exhibitions on various subjects at regular intervals.

### **5.35 Surendra Institute of Engineering Darjeeling**

Surendra Institute of Engineering and Management was established in the year 2009 under the aegis of a charitable society, Bidya Bharti Foundation. It is named in the memory of (Late) Mr. Surendra Agarwal, popularly known as the Iron King of Patna. An ace businessman, Mr. Agarwal, always valued the importance of education in a man's life. He cherished the dream of spreading education and providing skill acquisition and enhancement opportunities to the young generations of the society. Surendra Institute of Engineering and Management is the realization of his dream – the dream of bringing world class infrastructure and quality education to North Bengal and its adjoining areas. Surendra Institute of Engineering and Management has a sprawling campus with state – of – the art classrooms and laboratories. The students receive a comprehensive learning opportunity through experiential methods. Affiliated to West Bengal University of Technology and approved by All India Council for Technical Education, Surendra Institute of Engineering and Management lives true to its mission of providing world class education to its students



**Fig. 5.52: Surendra Institute of Engineering & Management**

Surendra Institute of Engineering & Management is a world class Engineering Institution providing B.Tech Course in Electronics & Communications Engineering, Computer Science & Engineering, Mechanical Engineering, Electrical Engineering, and Civil Engineering. Situated in Siliguri (West Bengal), the college has recognition by All India Council for Technical Education (AICTE) and affiliated to West Bengal Technical University

(WBUT). Under the aegis of a charitable society Bidya Bharti Foundation, SIEM started the journey in August 2009 and it is dedicated to the cause of quality education in the field of Engineering and Management in North Bengal.

SIEM is in the sixth years of operation and within this six year we have become an organization with the strength of 1500 young and energetic student along with dynamic, competent and qualified teaching and non-teaching work force working together towards a better future and higher academics and student development. Siem aims to be the Institution of higher learning providing each and all an equal and just access to quality education. An institution that actualizes each student inborn potential into the professional and technical capabilities of the highest order, awaking in each of them an indomitable spirit of enquiry a strong social commitment.

SIEM has a modern & state of the art Central Library. It started its function with a vision to serve the information needs of its users and it mainly holds books related to engineering and management established its library in the year 2009. The library has a collection of books about 18000 volumes which includes text books, reference books & international journals. The central library supports the teaching and research programmes of the Institute and provides facilities for general reading and disseminates information according to the requirement of the users. The services and operations in the central library are fully computerized. The database of entire library acquisition was created using “LIBSYS-4” software. The book database is accessible through OPAC (Online Public Access catalogue). Circulation services are executed through Barcode system

### **5. 36 Techno India Salt lake**

Techno India Group started in 1985 for the exclusive purpose of delivering quality education in science and engineering in the state of West Bengal, India. Today Techno India is the recognized leader among private education groups in India for its academic excellence and vast multitude of course offerings.

Techno India Group has strengthened its original emphasis on science and engineering and expanded into management, medicine, and other key areas like Information and Communication Technology, Nanotechnology, Genetics, Biotechnology, Food Technology, Construction Technology, Architecture, Biomedical Technology, Paramedical



Sciences, Management Sciences, Sports Technology and Media Science. In an effort to build a solid foundation for the state education system Techno India has also entered into the arena of primary and secondary education by establishing numerous model schools.



**Fig. 5.53: Techno India Salt Lake**

It has been successful in creating a positive learning experience by investing in superb infrastructural facilities, state of the art technologies in its engineering, science and computer labs, highly endowed library facilities and campus wide wifi enabled communication links.

In spite of its phenomenal growth, Techno India still remains a dedicated family of 2500 professionals including doctors, engineers, scientists, chartered accountants, lawyers and management professionals along with 40,000 students and a host of well wishers, dedicated to the same cause that inspired us in our inception.

It is an organization that believes in the future and the power of technology to deliver that future one student at a time. The vision of the institute is to be recognized nationally as a premier institution producing qualified engineers/professionals with research skills by the year 2025.



**Fig. 5.54: Reading area of the library**

The institute offers four years Bachelor of Technology ( B.Tech) programmes in the following areas: Computer Science & Engineering, Information Technology, Electronics & Communication Engineering , Mechanical Engineering , Electrical Engineering, Civil Engineering, Applied Electronics & Instrumentation Engineering. The institute also offers Master of Technology in Electrical Engineering

All academic programmes are approved by AICTE, recognized by Department of Higher Education, Government of West Bengal and affiliated to Maulana Abul Kalam Azad University of Technology( MAKAUT)formerly West Bengal University of Technology (WBUT



**Fig. 5.55: Technical section of the library**

The college has a Central Library of its own located in the ground floor of the building. The library has a total carpet area of about 3200 sq. ft. The library e in August, 2005 in order to serve the academic needs of the faculties, students, technical assistants, and other non-

teaching staff of the college. The library also has a Reading Room of about 1000 sq. ft. with an accommodation of 60 readers.



**Fig. 5.56: Librarian's chamber**

The library remains open from Monday to Saturday from 09:45 am to 05:15 pm and remains closed on Sundays and other University Holidays.

The library has a total collection of about 40,000 volumes and about 3000 titles at present. There are mainly two categories of books – texts and references. The total collection of the books is displayed in the reading room. Books on various competitive examinations and documents on current information, general knowledge, dictionaries, newsletters, CDs etc. are separately available for reading purpose only and cannot be taken outside the library. The following list shows the total number of titles and volumes of various disciplines available in the library.

The library also subscribes to about 11 eleven national and 12 international journals. The library also subscribes to some important magazines like Electronics for You, Digit, PC – Quest, India Today ,Outlook including nine news papers.

Provides technical journals and magazines of various interests which are to be used only in the periodicals section of the library. They are as follows:

The Library has subscribed to IEEE + POP online journal package which covers over 3,00,000 technical articles published on various IEEE journals on all engineering disciplines.  
Subscription of ASCE and ASME

The Cataloguing, Circulation and other house-keeping operations of the library are fully computerized. For this purpose the library has subscribed user-friendly software called

LIBSYS. All in-house operations of a library can be performed through this software. Users can search the library database through OPAC.

There is a provision of departmental library for the benefit of faculty members. Each department gets a copy of each title (subject wise) of the total library collection. Apart from circulation and reference service the library provides following facilities to its users: scanning, reprography, internet surfing, computer print-outs etc.

## Chapter - 6

### ANALYSIS AND INTERPRETATION

#### 6.1 Introduction

This chapter attempts to analyze the primary data collected through a structured questionnaire form the libraries of 36 engineering colleges offering undergraduate courses in engineering and its allied disciplines. A few of them are also offering post graduate courses. All engineering colleges covered under this study in West Bengal are approved by the All India Council of Technical Education (AICTE) and affiliated to Maulana Abul Kalam Azad University of Technology (MAKAUT), formerly known as West Bengal University of Technology(WBUT).

A holistic approach of sample 36 libraries of engineering colleges both in government & private sector is presented in this section for a general understanding of the procedures followed by these engineering colleges for the management of access to electronic information for its better utilization and access.

In this connection it is thought fit to pertinent to present a brief account on the colleges , network infrastructure facilities prevailing in these libraries, availability of different electronic resources particularly those prescribed by the AICTE along with various aspects of management of these resources namely awareness and knowledge regarding selection, acquisition, evaluation, license agreement , mode of access to these resources.

Attention has also been given to the major impact of electronic information sources on library as a whole particularly on the users, their satisfaction level, preferred methods of searching are also highlighted. The budgetary provisions for management of electronic information sources in these libraries are also discussed in this regard.

#### 6.2 General Information

Information on the year of establishment and number of undergraduate & post graduate courses are offered by these 36 colleges as reported by the librarians or library in-charge is shown in Table 6. 1

**Table 6.1 : List of Engineering Colleges with year of establishment**

Name	Year	UG Courses	PG Courses
1. Govt. College of Engineering & Textile Technology , Hooghly	1908	02	01
2. Govt. College of Engineering & Leather Technology, Kolkata	1919	03	01
3. Govt. College of Engineering & Ceramic Technology , Kolkata	1941	03	02
4. Jalpaiguri Govt. Engineering College , Jalpaiguri	1961	06	02
5. Kalyani Govt. College of Engineering , Nadia	1995	05	05
6. Institute of Engineering & Management , Kolkata	1996	05	03
7. Netaji Subhas Engineering College , Kolkata	1998	08	04
8. College of Engineering & Management , Kolaghat, East Midnapur	1998	06	NA
9. R.C.C Institute of Technology , Kolkata	1999	05	03
10. Birbhum Institute of Technology Birbhum	1999	06	02
11. Siliguri Institute of Technology , Darjeeling	1999	05	NA
12. B.P. Poddar Institute of Technology, 24PGS(N)	1999	04	NA
13. M.C.Kv Institute of Technology , Howrah	1999	06	04
14. JIS College of Engineering Kalyani , Nadia	2000	08	05
15. Bengal Inst. of Technology, Hadia , Kolkata	2000	04	NA
16. B.C. Roy Engineering College, Burdwan	2000	06	04
17. Narula Institute of Technology, 24PGS(N)	2001	08	06
18. Heritage Institute of Technology, Kolkata	2001	09	06
19. Techno India Saltlake	2001	08	03
20. Bengal Institute of Technology & Management , Santiniketan, Birbhum	2001	06	03
21. Mallabhum Inst. of Technology, Bankura	2002	05	NA
22. Pailan College of Management and Technology , Kolkata	2002	04	NA
23. Dinobandhu Andrews Institute of Technology & Management Kolkata	2002	N.A.	01
24. Future Institute of Engineering & management , 24PGS(N)	2002	08	02
25. Gurunanak Institute of Technology, 24PGS(N)	2003	06	04
26. Aryabhata Inst. of Eng.&Management , Burdwan	2003	07	01
27. Academy of Technology, Hooghly	2003	06	05

28. Hooghly College of Engineering, Hooghly	2004	05	NA
29. Abacus Inst.of Engineering & Management , Hooghly	2008	05	NA
30. Adamas Institute of Technology , 24PGS(N)	2008	07	02
31. Greater Kolkata College of Engineering & Management, 24pgs(s)	2008	05	NA
32. Budge Budge Institute of Technology , Kolkata	2009	05	NA
33. Supreme Knowledge Foundation group of Institutions, Hooghly	2009	05	03
34. Surendra Institute of Engineering Darjeeling	2009	05	NA
35. Brainware College of Engineering , 24PGS(N)	2010	06	02
36. Batanagar Institute of Engineering & management Science 24PGS(N)	2012	05	NA

The year of establishment of the libraries varies from more than 100 years old to newly established library (in the year 2012) . This provides an plenty opportunity to understand the dynamics of differences of management of access to electronic resources selected and practiced in an famous old and new engineering libraries in West Bengal to provide access to resources to users even in a digital environment. For better understanding the libraries are divided in two major groups: 1) Those were established on or before the year 2000 & 2) Those were established after the year 2000

**Table 6. 2 : Year of establishment & total number of colleges**

Year of establishment	Number of Colleges
Upto the year 2000	16
After the year 2000	20

Out of the 36 colleges covered under study , 16 colleges were established in the year 2000 or before while the remaining 20 colleges were established in the year 2001 or later. In fact the latest one is the Batanagar Institute of Engineering & management Science that was established in the year 2012 and the oldest one is the Govt. College of Engineering & Textile Technology, Hooghly in 1908.

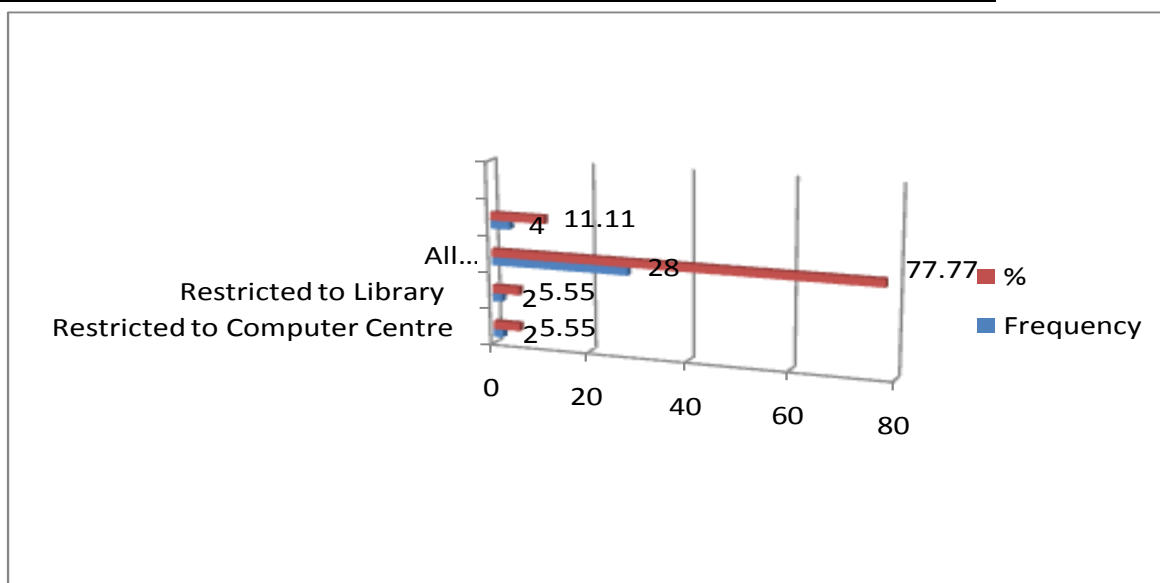
### **6.2.1 Infrastructure facility**

The growth and development of Information and Communication Technology (ICT) made it achievable for the libraries to acquire, organize and use electronic resources available in many platforms with its enormous volume and variety. To make it successful adequate infrastructure is highly concerned in this regard. Therefore, it is necessary to understand the network infrastructure and its availability in these engineering college libraries. Under this aspect, type of network

connection, LAN facility, facilities for use of e-resources, accessories etc. are covered under this study.

**Table 6. 3: Infrastructure facility**

Spread of LAN	Frequency	Percentage ( %)
Restricted to Library	2	5.55
Restricted to Computer Centre + Library	2	5.55
All Depts./Centers/Labs./Units/Library are well connected	28	77.77
Besides Institute the LAN reaches out to the hostels	4	11.11



**Fig.6. 1: Internet connection and availability of LAN facility**

Table 3 and figure 1 reveals that out of 36 engineering college libraries , a well established LAN facility is existing in twenty eight ( 77.77%) libraries where all the departments , Laboratories and other units of the colleges including the library is well connected through LAN. This make it possible for the users to get access over all kinds of electronic resources available in the library form any where within the campus. Even this facility has been extended to the students hostel also in four ( 11.11%) colleges . This enhances the access and use of electronic resources extended upto the residents also. The LAN facility is only restricted to Library and computer centre in two ( 5.55%) colleges repectively.



**Table 6. 4: Type of internet connection and rate of bandwidth**

	<b>Frequency</b>	<b>Percentage(%)</b>
<b>Nature of Internet connectivity</b>		
Dial-up	1	2.77
Leased Line	29	80.55
WIFI	3	8.33
Any other	3	8.33
	<b>Frequency</b>	<b>Percentage(%)</b>
<b>Bandwith Rate</b>		
Less than 1 mbps	2	5.55
1-10mbps	13	36.11
10-50 mbps	7	19.44
50-100 mbps	14	38.88

Table 4 indicates that among the thirty six libraries covered in the study , leased line internet connectivity have been reported in twenty nine ( 80.55%) libraries . In another three ( 8.33%) libraries, Wi-Fi type of network is available and out of the remaining four libraries three ( 8.33%) libraries have been using other type of internet connection.

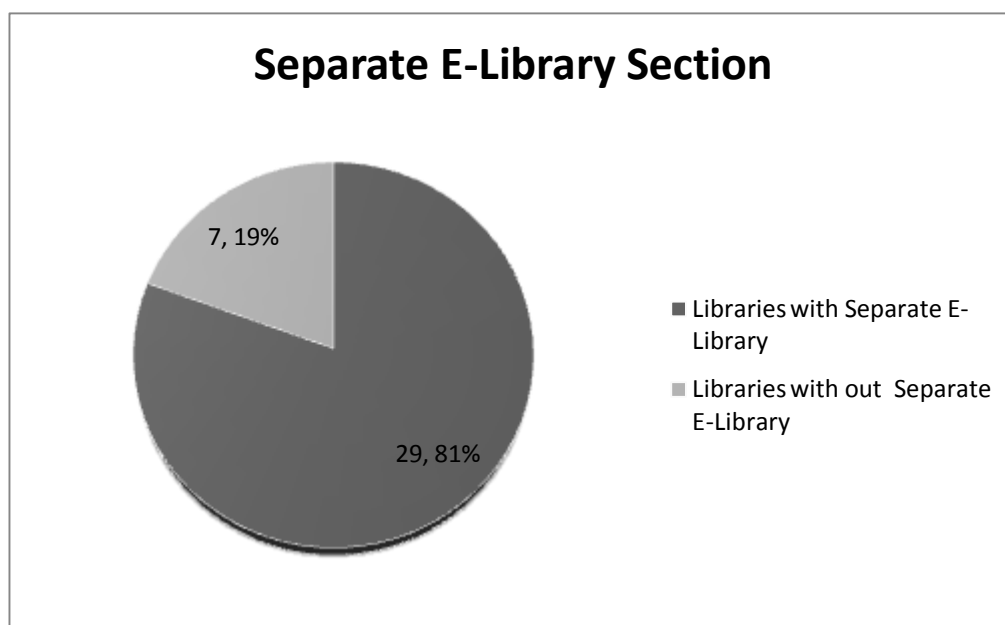
Only one ( 2.775) library has dial up connection. Table 4 also indicates that among the thirty six libraries , fourteen ( 38.88%) libraries have bandwidth rate ranges from 50-100mbps , followed by 10-50mbps in seven(19.44%) libraries, 1-10mbps in thirteen libraries ( 36.11%) .

Only two libraries (5.55%) have bandwidth rate of less than 1 mbps. It shows that majority of the libraries have excellent network facility, thus it would be possible for these libraries to provide better access to electronic resources to users.

**Table 6. 5: Facilities for use of e –resources**

<b>Separate section within the Library for Managing E-Resources</b>	<b>Frequency</b>	<b>Percentage(%)</b>
Yes	29	80.55
No	7	19.44

<b>Separate Server for Managing E-Resources</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Yes	28	77.77
No	8	22.22
<b>Number of computers available</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Below 5	2	5.55
5 -10 computers	15	41.66
10-15 computers	3	8.33
15-20 computers	4	11.11
Above 20 computers	5	13.88
NIL	7	19.44



**Fig.6.2 : Provision of separate e-library section**

Effective use of electronic resources necessitates availability of certain facilities such as adequate number of computers with suitable configuration, availability of a separate server for e-resources for easy and better access to e-resources. In the present context ,table 5 and figure 2 reveals that among the thirty six libraries , twenty nine ( 81%) have developed separate e-library section for searching electronic resources , only seven ( 19%) libraries are lacking in this regard. It is necessary to provide sufficient number of PCs with suitable configuration in order to enhance the access to e-resources to the users.

The above table indicates that a good majority of libraries ( 77.77%) have separate server for e-resources in their libraries and the remaining eight ( 22.22%) are lacking in this regard. These eight libraries should go for to have a separate server for electronic resources in their libraries.

The above table also reveals that among the thirty six libraries , fifteen ( 41.66%) libraries have computers ranges from 5 to 10 followed by five ( 13.88%) libraries having more than 20 computers , four ( 11.11%) college libraries have 15-20 computers , while three( 8.33%) libraries have 10-15 computers followed by two ( 5.55%) libraries have only computers less than 5. This study also significant in the sense that about seven ( 19.44%) are very much lacking in this regard. They should concentrate in this issue on urgent basis.

### 6.3 Accessory facilities for Use of E-Resources

**Table 6.6 : Adequate accessory facilities for use of e-resources**

<b>Printing Facility</b>	<b>Frequency</b>	<b>Percentage ( %)</b>
Yes	29	80.55
No	7	19.44
<b>Scanning facility</b>		
Yes	26	72.22
No	10	27.77
<b>CD/DVD Writers</b>		
Yes	27	75.00
No	9	25.00
<b>Web-camera</b>		
Yes	9	25.00
No	27	75.00
<b>Audio facility</b>		

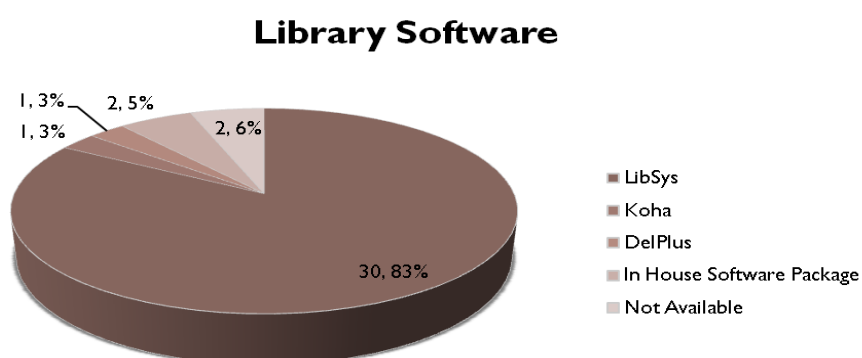
Yes	10	27.77
No	26	72.22

For making successful use of the available e-resources it is necessary for libraries to develop adequate accessory facilities like printers, scanners, CD/DVD writers. Almost twenty nine (80.55%) libraries out of thirty six libraries are having printing facility, only seven libraries ( 19.44%) are lacking in this regard. The Table 6 also reveals that almost twenty six ( 72.22%) libraries have scanning facility where only ten( 27.77) libraries are not able to generate such facility. Adequate CD/DVD facilities have been ensured by twenty seven ( 75%) libraries while nine ( 25%) are not in a position to provide such facility.

Web camera is available in only nine (25%) libraries and audio facility in ten( 27.77%) libraries . The last two areas needs to be taken care to generate further value addition in library services.

**Table 6.7: Availability of Library Automation Software**

Library software used	Frequency	Percentage (%)
LibSys	30	83.33
Koha	1	2.77
DelPlus	1	2.77
In-house package	2	5.55
Not available	2	5.55



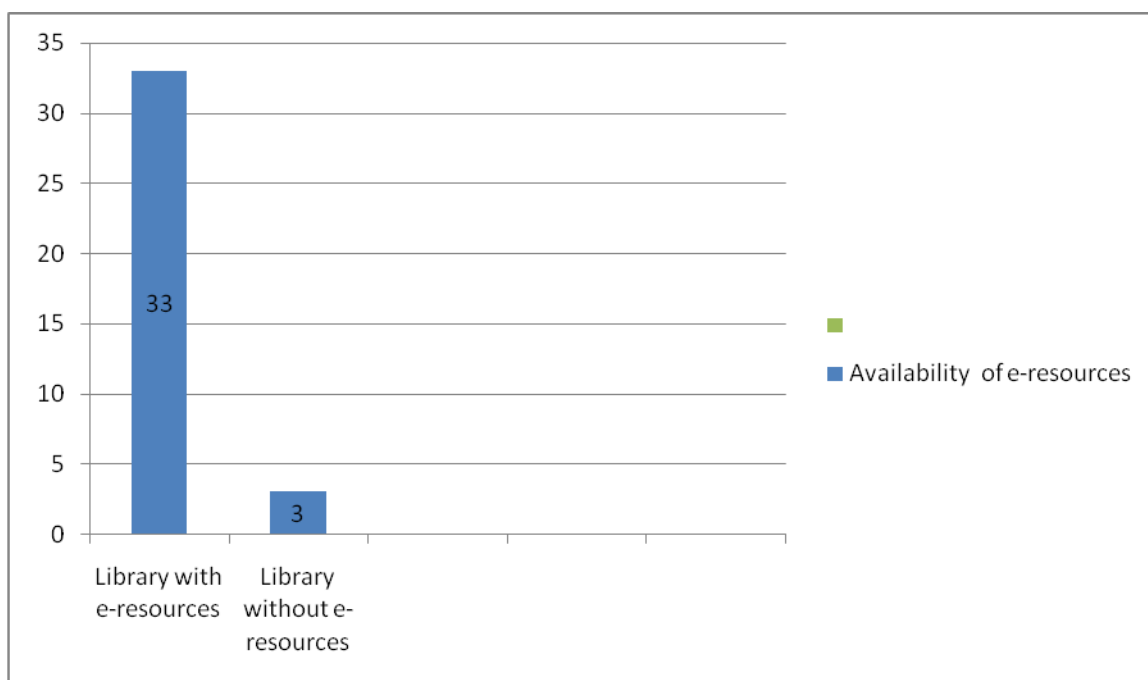
**Fig.6. 3: Availability of library automation software**

This study also reveals that most of the libraries have preferred LibSys software for their automation purpose. Among thirty six libraries, thirty libraries( 83%) are preferring this type of automated library management system .

Users of KOHA and DELPLUS (2.77%) software are single in number. Only two ( 5.55%) libraries have in-house package. This data analysis have established the popularity of Libsys in the engineering colleges libraries of West Bengal.

**Table 6. 8: Availability of e-resources**

Availability of E-Resources	Frequency	%
Yes	33	91.66
No	3	8.33

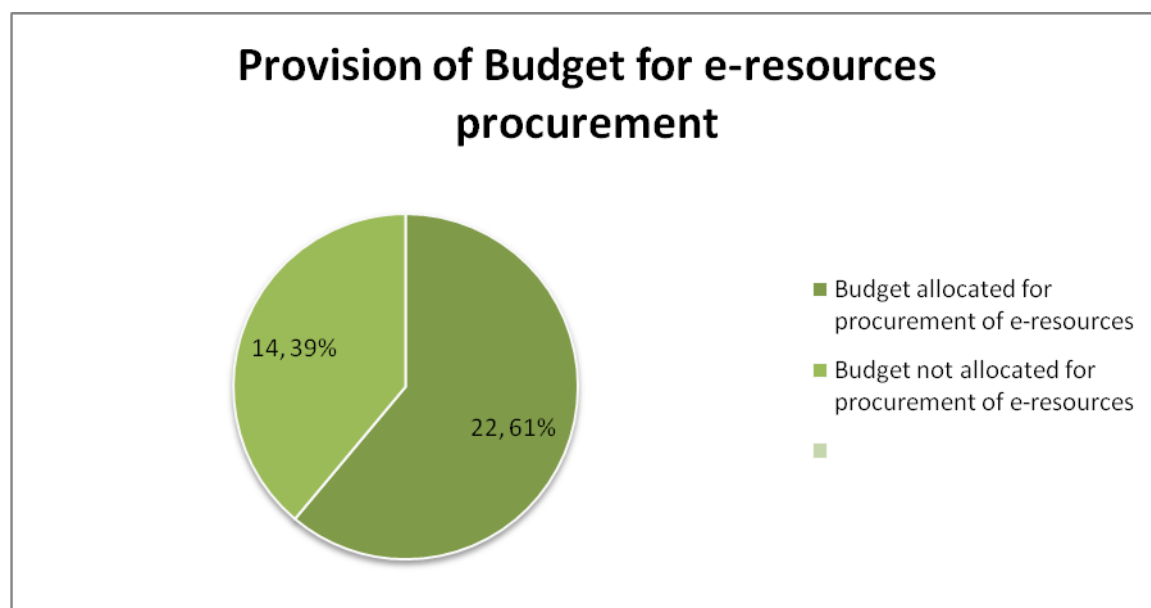


**Fig.6. 4 : Status of availability of e-resources**

Table 8 and figure 4 indicates that among the thirty six engineering college libraries, thirty three ( 91.66%) have ensured availability of e-resources into its collection, only three ( 8.33%) are lacking in this regard.

**Table 6.9: Provision of separate budget for e-resources**

Provision of separate budget for E-Resources	Frequency	%
Yes	22	61
No	14	39



**Fig.6. 5 : Budgetary provision for procurement of e-resources**

The above table and figure have established that among the thirty six engineering college libraries, a good majority of them i.e. twenty two (61%) have separate budgetary provisions apart from general library budget, for procurement of e-resources. This study has also noticed that fourteen (39%) libraries have no such separate budgetary provisions. Libraries having separate budgetary provisions would be able concentrate much more on e-resources as funding is readily available for procurement of e-resources

**Table 6. 10: Availability of e-resources**

SI No.	Name of the College	Available E-Resources
1.	Abacus Inst.of Engineering & Management , Hooghly	Not available
2.	Academy of Technology , Hooghly	IEEE, ASME, DELNET, NISCAIR

		Online Periodicals Repository (NOPR) , NPTEL & CD-DVDs
3.	Adamas Institute of Technology , 24PGS(N)	J-GATE ,IEEE & CD-DVDs
4.	Aryabhata Inst.of Eng.&Management , Burdwan	DELNET
5.	B.C. Roy Engineering College, Burdwan	DELNET, IEEE( ASPP), SCIENCE DIRECT, CD-DVDs
6.	B.P. Poddar Institute of Technology, 24PGS(N)	IEEE( ASPP) , SPRINGER, SCIENCE DIRECT& CD-DVDs
7.	Batanagar Institute of Engineering & management Science 24PGS(N)	DELNET
8.	Bengal Inst. Of Technology, Hadia , Kolkata	IEEE(ASPP), J-GATE & CD-DVDs
9.	Bengal Institute of Technology & Management , Santiniketan, Birbhum	SCIENCE DIRECT
10.	Birbhum Institute of Technology , Birbhum	E-journals:SCIENCE DIRECT,ASTM,SPRINGER(ME),DELN ET E-Books:SPRINGER, MC.GRAWHILL,WILLEY,ASTM &NPTEL , CD-DVDs
11.	Brainware College of Engineering , 24PGS(N)	CD-DVDs
12.	Budge Budge Institute of Technology , Kolkata	DELNET , CD-DVDs &E-Resources through USIS MEMBERSHIP
13.	College of Engineering & Management , Kolaghat East Midnapore	DELNET,IEEE(ASPP)+POP,ASME& CD-DVDs
14.	Dinobandhu Andrews Institute Of Technolgy, Kolkata	Not available
15.	Future Institute of Engineering & management , 24PGS(N)	IEEE(ASPP), J-GATE & CD-DVDs
16.	Govt. College of Emgineering & Ceramic Technology , Kolkata	IEEE( ASPP), SPRINGER, KNIMBUS, MC-GRAW-HILL & CD-DVDs
17.	Govt. College of Engineering & Textile Technology , Hooghly	IEEE CS,EBSCO,SAGE & CD-DVDs
18.	Greater Kolkata College of Engineering & Management, Baruipur 24pgs(s)	IEEE & CD-DVDs
19.	Gurunanak Institute of Technology, 24PGS(N)	IEEE(ASPP)+BCL & CD-DVDs

20.	Heritage Institute of Technology, Kolkata	DELNET, IEEE(ASPP), ASTM DIGITAL , JET, JSMS, RMIT,NPTEL, BCL –ONLINE & CD-DVDs
21.	Hooghly College of Engineering, Hooghly	J-GATE. & CD-DVDs
22.	Institute of Engineering & Management , Kolkata	IEEE, J-GATE & CD-DVDs
23.	Jalpaiguri Govt. Engineering College , Jalpaiguri	DELNET & CD-DVDs
24.	JIS College of Engineering Kalyani , Nadia	IEEE+POP E journals & Wiley – E-Books, CD-DVDs
25.	Kalyani Govt. College of Engineering , Nadia	DELNET,IEEE( ASPP),ASME,Science Direct ( Elsevier), Springer & CD-DVDs
26.	Govt. College of Engineering &b Leather Technology, Kolkata	AICTE Mandatory – NLIST packages
27.	M.C.Kv Institute of Technology , Howrah	J-GATE,SCIENCE DIRECT, NPTEL & CD-DVDs
28.	Mallabhum Inst. Of Technology,Bankura	IEEE(ASPP),SPRINGER,ASME,MC-GRAWHILL & CD-DVDs
29.	Narula Institute of Technology, 24PGS(N)	IEEE(ASPP)+POP , SCIENCE DIRECT
30.	Netaji Subhas Engineering College , Kolkata	IEEE+POP , CD-DVDs
31.	Pailan College of Management and Technology , Kolkata	IEEE, DELNET, BCL & AMERICAN LIBRARY
32.	R.C.C Institute of Technology , Kolkata	DELNET, IEEE, SCIENCE DIRECT , ACM & CD-DVDs
33.	Siliguri Institute of Technology , Darjeeling	IEEE(POP)
34.	Supreme Knowledge Foundation group of Institutions, Hooghly	IEEE(ASPP), DELNET
35.	Surendra Institute of Engineering Darjeeling	Not available
36.	Techno India Saltlake	J-GATE

**Table 6.11: Awareness & availability of AICTE prescribed mandatory e-resources**

Sl.No	Type of E-Resources	Subject Areas	Awareness		Availability	
			Number	%	Number	%
1.	IEEE( ASPP)	Computer Engineering + Computer Science + Electrical and Electronics Engineering +	31	86.11	25	69.44



		Telecommunications and related disciplines				
2.	Springer	Electrical and Electronics and Computer Science Engineering	27	75%	3	8.33
3.	ASME	Mechanical Engineering	24	66.66	4	11.11
4.	Springer	Mechanical Engineering	25	69.44	5	13.88
5.	Wiley-Blackwell	Mechanical, Electrical and Electronics Engineering	21	58.33	1	2.77
6.	Wiley-Blackwell	Civil Engineering	23	63.88	2	5.55
7.	McGraw Hill	General Engineering and Reference	21	58.33	3	8.33
8.	J-GATE	J-GATE Engineering and Technology (JET)	29	80.55	8	22.22
9.	ELSEVIER	Engineering + Computer Science	25	69.44	8	22.22
10.	ASTM DIGITAL LIBRARY (DL) ONLINE VERSION	Online dictionary of Engineering Science and Technology	22	61.11	3	8.33

Since electronic resources are gaining importance day by day and getting their way into libraries , in order to understand and manage them properly , library professionals need to aware about adequate knowledge of these resources along with their availability .In this context the mandatory resources prescribed by AICTE for engineering college libraries are covered and presented in Table 11 and figure 6 & 7. It has been observed that most of the libraries are aware about the AICTE prescribed e-resources and acquire & add them in to their collection.

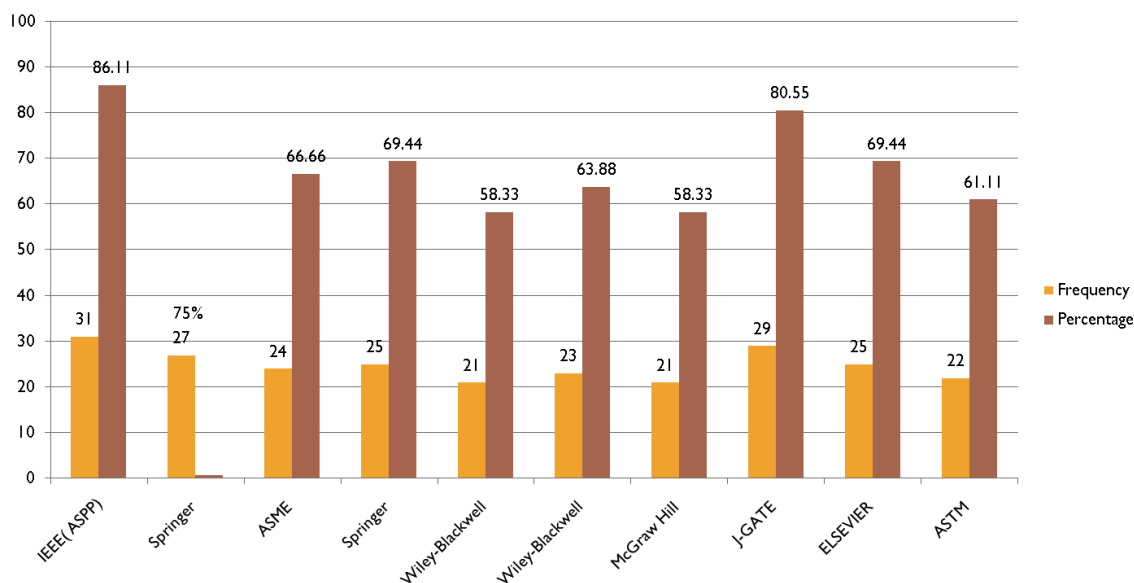
Among thirty six libraries , thirty one ( 86.11%) are aware about these resources and out of these thirty one libraries , twenty five ( 69.44 ) libraries have procured IEEE – online e-journals ,

followed by twenty nine ( 80.55%) libraries are aware about J-Gate engineering & technology and eight ( 22.22%) have been subscribing J-Gate engineering & technology.

This study further indicates that twenty seven (75%) libraries are aware about Springer – electrical and electronics & computer science engineering & three ( 8.33%) libraries have been subscribing the same.

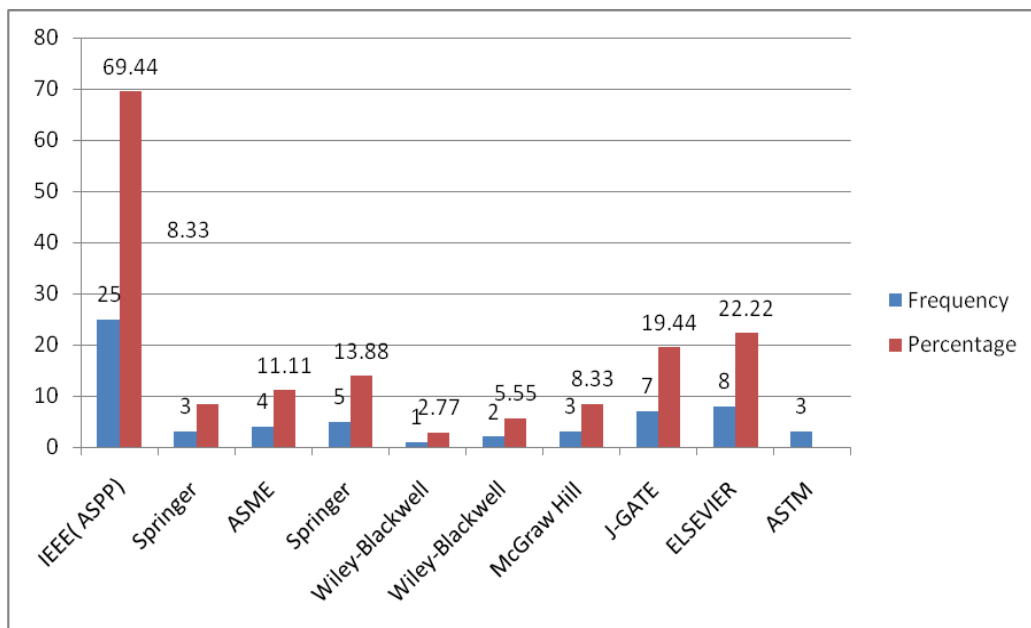
About twenty five (69.44%) libraries have ensured that they are aware about the Springer-mechanical & Elsevier engineering and computer science. Where five ( 13.88%) have been subscribing the Springer and eight ( 22.22%) libraries have been subscribing the Elsevier- computer science for their libraries.

Among the thirty six libraries , twenty four (66.66 ) libraries have also reported that they are aware about the ASME mechanical engineering followed by twenty three(63.88 ) libraries are aware about Wiley-Blackwell –civil engineering , twenty one (58.33 ) libraries on Wiley-Blackwell mechanical & McGraw Hill –general engineering and reference books respectively.



**Fig.6.6: Awareness of AICTE prescribed mandatory e-resources**

As far as the availabilities of e-resources are concerned, this study also indicates that four ( 11.11%) libraries have been subscribing ASME – mechanical engineering followed by three ( 8.33%) libraries McGraw- Hill general and reference sources & two( 5.55%) libraries have been subscribing Wiley–Blackwell – civil engineering . Only one (2.77%) has Wiley Blackwell mechanical , electrical & electronics engineering package



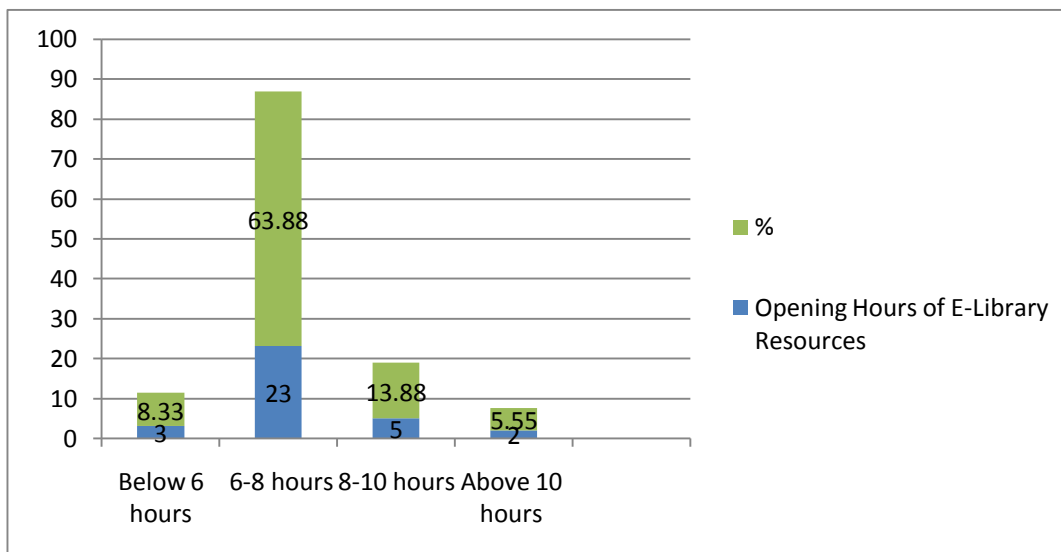
**Fig.6. 7: Availability of AICTE prescribed mandatory e-resources in Libraries**

**Table 6. 12: Factors that influence the use of e-library resources**

Opening Hours	FOLLOWED	
	Frequency	%
Below 6 hours	3	8.33
6-8 hours	23	63.88
8-10 hours	5	13.88
Above 10 hours	2	5.55
Modes of Access to E-Resources	FOLLOWED	
	Frequency	%
IP Based	20	55.55
User Id/ Password	8	22.22
Both	5	13.88
Staff Strength	Frequency	%
	Single Staff	22
Double staff	8	22.22
Multiple Staff	2	5.55
Not available	4	11.11

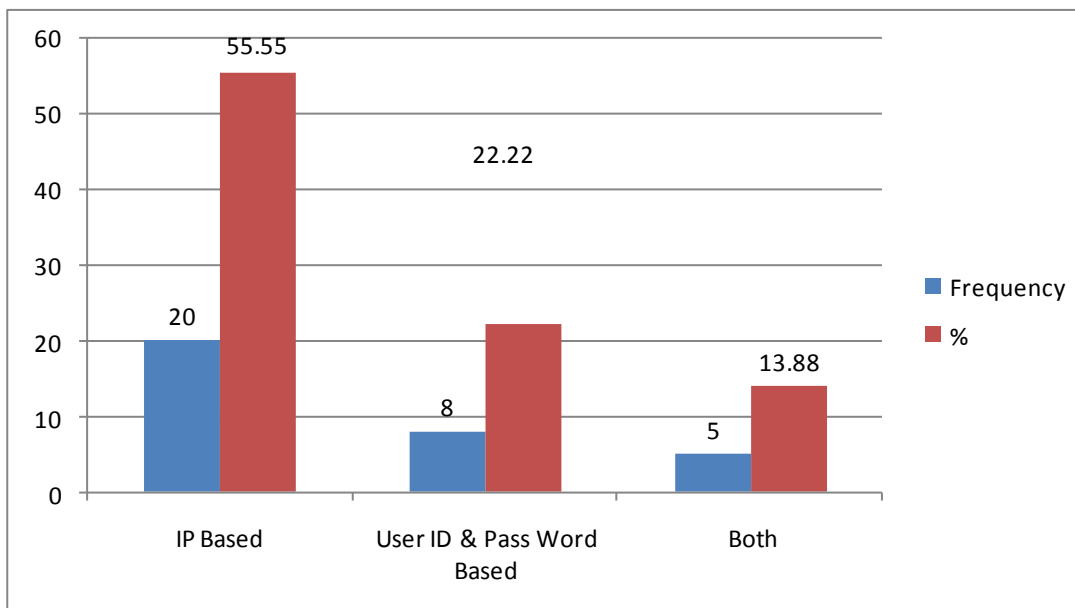
For maximum utilization of e-resources in libraries it is very urgently needed to keep it open minimum eight hours in a day .This facility definitely expedite the efficient access to these resources.

Table 12 and figure 8 have ensured that among the thirty six libraries , twenty ( 63.88) are kept open for six to eight hours for users followed by five ( 13.88%) libraries for more than eight hours a day . Only three ( 8.33%) are kept open below six hours .The most significant observation is that out of these thirty six libraries , two ( 5.55%) are also functioning more than ten hours in a day.



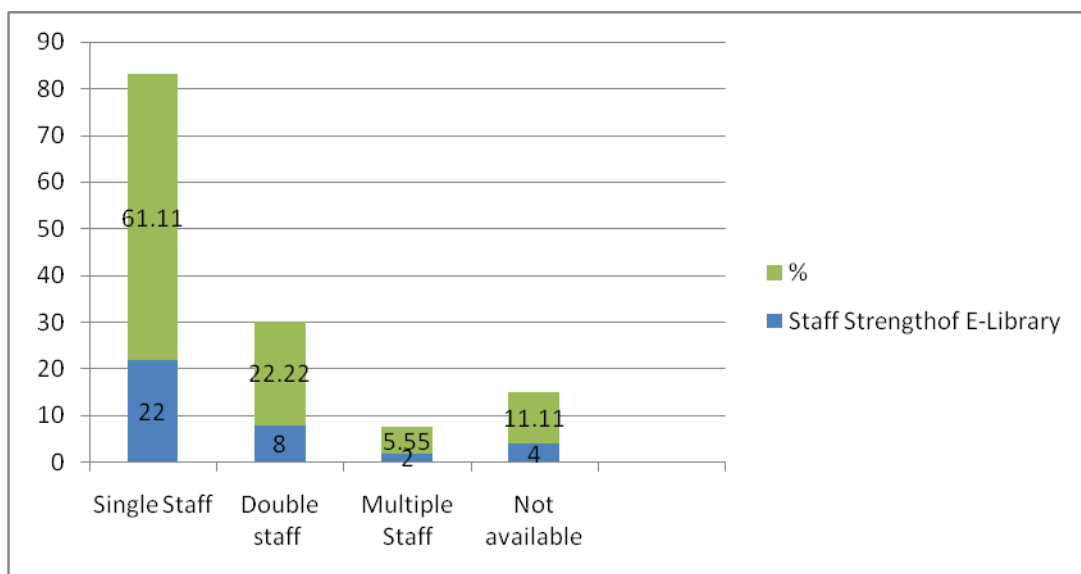
**Fig.6.8: Working hours of e-library**

This study further noticed that among the thirty six libraries , a good majority of them ( 55.55%) have preferred IP based access to e-resources , while eight( 22.22%) colleges have preferred user-ID & password based mode of access to these resources. Only five (13.88%) college libraries have opted both type of mode of access to e-resources.



**Fig.6.9 : Mode of access to e-resources**

This factor definitely influences the use of e-resources in the libraries covered under study. As a majority of them have been following IP based access, so it helps the users to get access over these e-resources at any time anywhere within the campus where internet facility is available. This facility obviously accelerates the access and use of these resources.



**Fig.6.10 : Staff strength in the e-library section**

The above table 12 and figure 10 also highlights the staff strength of e-library section of the colleges covered under study. This indicates that e-library section of twenty two ( 61.11%) colleges are managed by single staff followed by eight ( 22.22%) e-library section with double staff. More

than two staff have been reported in two ( 5.55%) college . The above matter is not applicable in four ( 11.11%) colleges . These colleges are lacking of e-resources.

**Table 6.13: Main users of e-resources**

User Type	Frequency	Percentage (%)
Undergraduate students	2	5.55
Postgraduate students	1	2.77
Both	1	2.77
Faculty	2	5.55
Udergraduate & Faculty	4	11.11
Under + Post + Faculty	12	33.33
Faculty+Research	1	2.77
Post+Faculty+Resear	2	5.55
All of the above	9	25.00

Table 13 has shown that among the thirty six colleges , in twelve ( 33.33%) college libraries both undergraduate , post graduate & faculty members have shown their interest in using the e-resources. This study also indicates that in nine ( 25%) libraries all types of users are using e-resources for academic purposes. Only in four ( 11.11%) colleges the main users are undergraduate and faculty members .

The above table also reveals that only in two ( 5.55%) colleges the main users of e-resources are Undergraduate students, faculty members and both post graduate students + faculty & research scholars respectively.

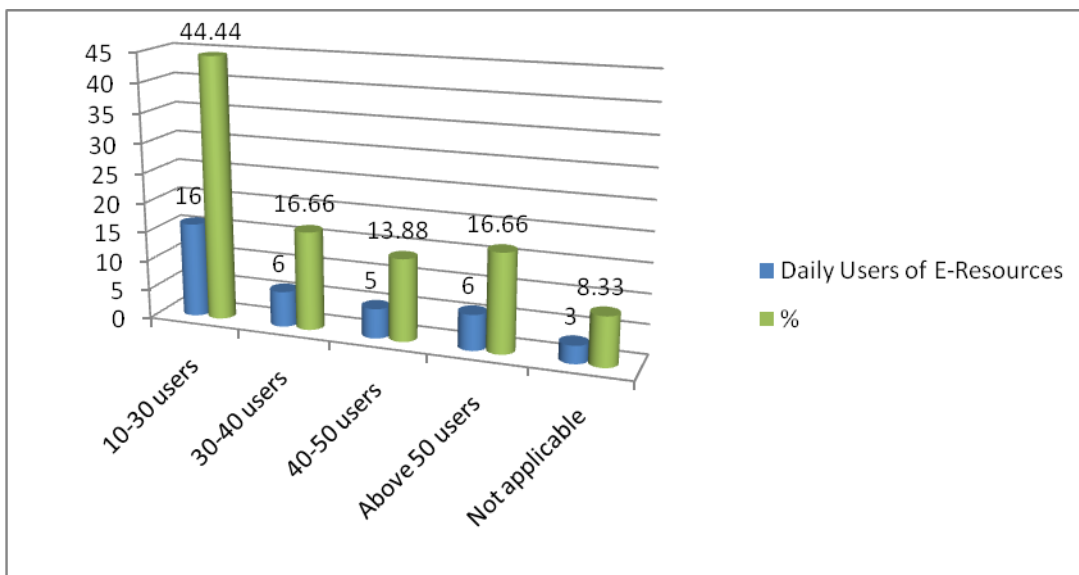
Only in one ( 2.77%) college library, where the main users of e-resources are postgraduate students , both undergraduate & postgraduate students and faculty & research scholars respectively.

**Table 6.14 : Daily average users of e-resources**

Daily Users of E-Resources	Frequency	Percentage(%)
10-30 users	16	44.44
30-40 users	6	16.66

40-50 users	5	13.88
Above 50 users	6	16.66
Not applicable	3	8.33

The above table 14 and figure 11 below describes the daily average users of e-resources. It has been observed that ten to thirty users have been reported to use e-resources in sixteen ( 44.44%) colleges followed by thirty to forty users in six ( 16.66%) college libraries.



**Fig. 6.11 : Daily users of e-resources in e-library**

Forty to fifty users of e-resources have been reported in five (13.88%) college libraries. Six ( 16.66%) college libraries have more than fifty users who are using e-resources on daily basis for their academic purposes. The above matter is not applicable to three (8.33%) college libraries

**Table 6.15 : Satisfaction level of users using e-resources**

Type	Satisfied	%	Highly Satisfied	%	Dissatisfied	%	Highly Dissatisfied	%	Neutral	%
E-Journals	22	61.11	4	11.11	1	2.77	1	2.77	0	0
E-Books	13	36.11	1	2.77	2	5.55	1	2.77	1	2.77

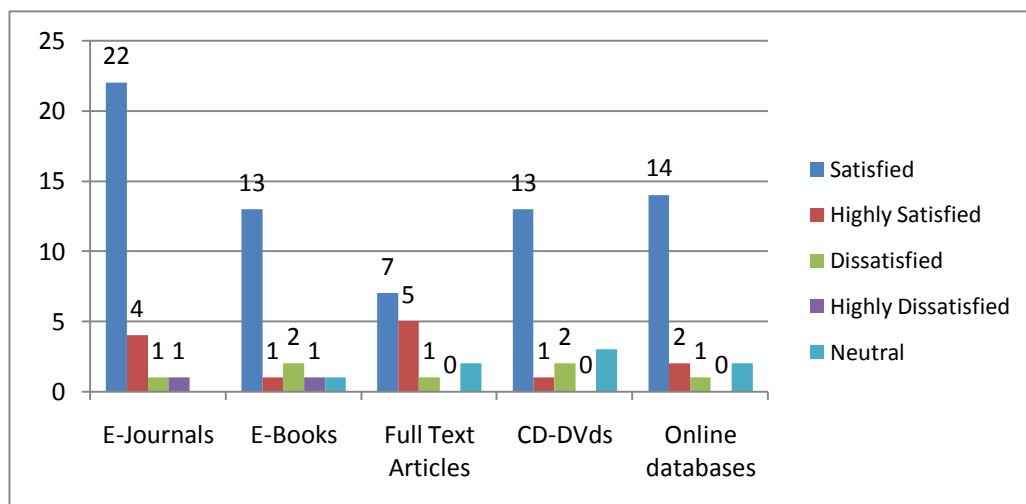
Full Text Articles	7	19.44	5	13.8	1	2.77	0	0	2	5.55
CD-DVDs	13	36.11	1	2.77	2	5.55	0	0	3	8.33
Online databases	14	38.88	2	5.55	1	2.77	0	0	2	5.55

Table 15 has noticed that users have shown their satisfaction in using the e-journals, e-books , full text articles , CD/DVDs & other online databases.

Among the thirty six colleges , twenty two(61.11%) library have ensured that their users are satisfied in using these resources, followed by four (11.11%) colleges, those are highly satisfied in this regard. Only one ( 2.77%) college library users have shown their dissatisfaction & highly dissatisfaction respectively in this regard.

For e-books , thirteen ( 36.11%) college library users are satisfied and one ( 2.77%) college library users are highly satisfied.

Only Two( 5.55%) library users have shown their discontent in this regard. Only One (2.77%) college library users are highly dissatisfied in this regard. . One library remains neutral in this regard.



**Fig.6.12: Users' satisfaction on using e-resources**

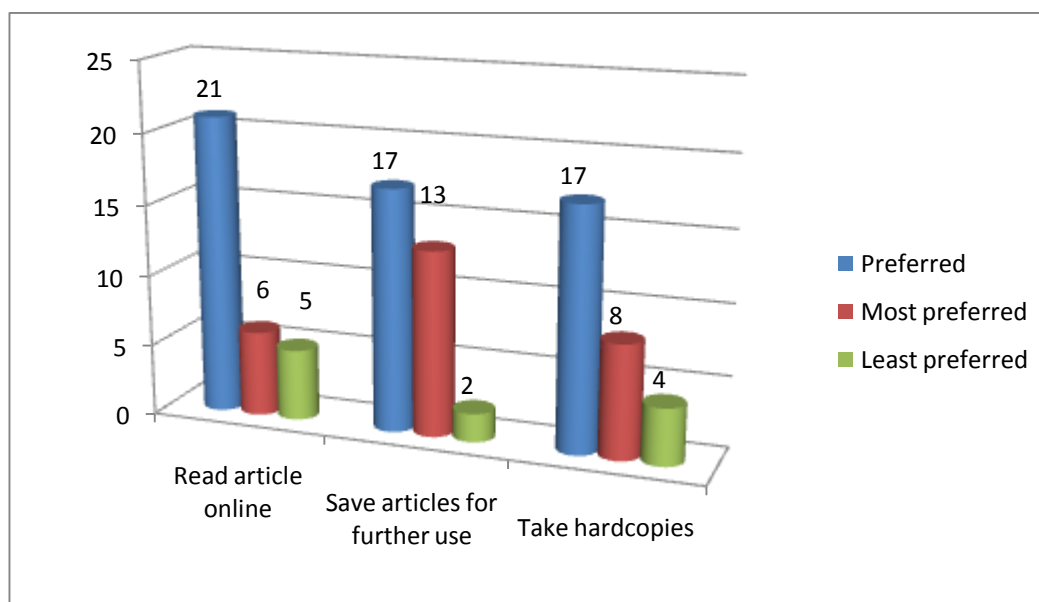
The above table also signifies that fourteen ( 38.88%) library users have shown their great interest in using on-line databases, while two( 5.55%) libraries are highly satisfied in this regard. Only one (2.77%) library has shown their dissatisfaction in this regard.



In case of CD/DVDs , a good number of libraries ( 13,36.11%) have shown their interest and satisfied in using this resources.Only two ( 5.55%) library users are dissatisfied in this regard. Three( 8.33%) libraries remain impartial on CD/DVd issue. The above table further reveals that about seven(19.44%) libraries out of thirty six libraries are satisfied on subscribed full text articles,where five ( 13.88%) library users are highly satisfied .Only one ( 2.77%) library has shown its displeasure and two ( 5.55%) library remain unbiased respectively.

**Table 6. 16: Methods preferred by users in using e-resources**

	Preferred	%	Most preferred	%	Least preferred	%
Read article online	21	58.33	6	16.66	5	13.88
Save articles for further use	17	47.22	13	36.11	2	5.55
Take hardcopies / printouts	17	47.22	8	22.22	4	11.11



**Fig.6.13 : Preferable methods of using e-resources**

The above table and fig Highlights that library users have strongly preferred online reading. Among the thirty six colleges, twenty one ( 58.33%) have shown their interest in online reading, while six( 16.66%) library are strongly preferring the same.

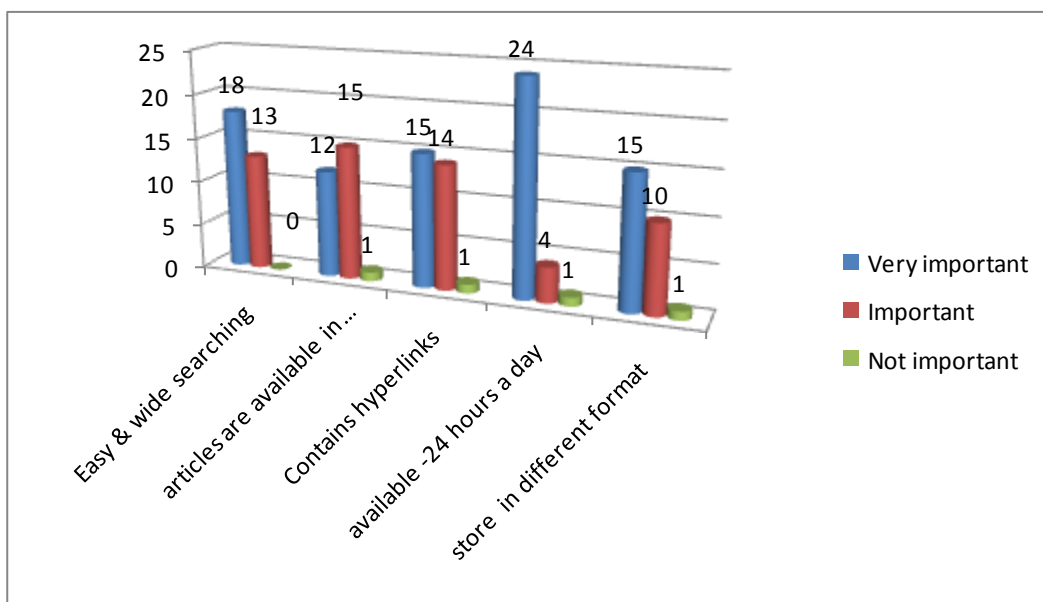
Only users of five (13.88%) libraries have least preferred this facility.

This study further reveals that a good majority of the users of seventeen libraries (47.22%) have favoured to save articles as per their choice for further use and also take printouts if required , while users of thirteen( 36.11%) libraries have strongly preferred the saving option for further use and eight (22.22%) libraries on print out issue. This facility definitely enhances and popularise the e-resources in the present networked environment.

Only Two ( 5.55%) libraries on former topic and four( 11.11%) in the later one have shown their displeasure in these regard.

**Table 6. 17: Advantages of electronic resources from users’ perspectives**

	Very important	%	Important	%	Not important	%
Easy & wide keyword searching is possible through internet	18	50.00	13	36.11	0	0
Articles are available in electronic form before they are published in print.	12	33.33	15	41.66	1	2.77
Contains hyperlinks to other articles and related information.	15	41.66	14	38.88	1	2.77
These are always available -24 hours a day, every day.	24	66.66	4	11.11	1	2.77
Can store information in different format for future use also.	15	41.66	10	27.77	1	2.77



**Fig. 6.14 : Merits of e-resources**

The advantages of e-resources from users' perspectives are manifold. The above table and figure have firmly noticed that a majority of the users of these libraries are preferring the advantages of electronic environment . Now it is possible to carry out easy and wide keyword searching through internet. The available online reference materials also provides hyperlinks to other necessary articles and related information. More over these are always available in twenty hours a day. The users can store the required information in usable format for future use also.

**Table 6.18 : General aspects / criteria for selection of e-resources**

Sl.No.	CRITERIA/ ASPECTS	FOLLOWED	
		Frequency	%
1.	Recommendation of Head of the Dept./ Faculty members	32	88.88
2.	Free Online Trial Access	23	63.88
3.	Consulting other libraries	13	36.11
4.	Short and Long Term Objectives	6	16.66
5.	Need Assessment & Users requirement	17	47.22
6.	Levels of Collections	2	5.55
7.	Acquisition Procedures	3	8.33
8.	Security / Authentication	10	27.77
9.	Balance Between Print & e-Collections	10	27.77

10.	Others (please specify )	00	00.00
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While selecting e-resources for in the college libraries , it becomes necessary to take into account a variety of aspects .These aspects are very important while selecting the e-resources in the library.

The above table reveals that almost thirty two( 88.88%) libraries take recommendations from the head of the departments for procurement of e-resources .In twenty three ( 63.88%) libraries , aspect such as free online trial access , in seventeen ( 47.22%) libraries aspect such as need assessment & user requirement and in thirteen ( 36.11) libraries aspect such as consulting with other libraries, are taken into consideration. Authentication and aspect like balance between print & electronic collections are considered in ten ( 27.77%) libraries.

Other aspects like short term and long term objectives , acquisition procedure and levels of collections are taken into consideration in six ( 16.66%) , three ( 8.33%) and two ( 5.55%) libraries respectively.

It is evident from the above table that most of the libraries are following a variety of criteria for selection of e-resources, a note worthy feature.

**Table 6.19 :Aspects /Criteria related to license agreement of e-resources**

Sl.No.	CRITERIA/ ASPECTS	FOLLOWED	
		Frequency	%
1.	Authorized users will use the resources	28	77.77
2.	Cost of Access	12	33.33
3.	Single User Access	4	11.11
4.	IP based / Multi User Access	26	72.22
5.	Beyond Campus Access	2	5.55
6.	Archival Backup	8	22.22
7.	Fair Use	10	27.77
8.	Confidentiality	7	19.44
9.	Multiple Format	10	27.77
10.	Negotiations	5	13.88
11.	Electronic Links	5	13.88
12.	Inter Library Loan	5	13.88
13.	Protection of Increase of Price	10	27.77

Table 19 highlights the various aspects relating to the license agreement of e-resources followed by the libraries under study. Twenty eight ( 77.77%) of thirty six libraries are agreed that only authorised users will get access to these resources , while twenty six( 72.22%) librarians are looking for licensing of IP based & multiuser based access. Twelve ( 33.33) of thirty six libraries are concerned about the cost of access to such resources.

Aspects like fair use , multiple format and protection of increased price are reported to be followed by ten ( 27.77%) libraries respectively. Archival back up is considered in eight ( 22.22%) libraries .

Other aspects like negotiations, electronic links and interlibrary loan are considered in five ( 13.88%) libraries in each case. Aspects like single user access and beyond campus access are followed in four ( 11.11%) and two( 5.55%) libraries respectively.

It shows from the table that librarians are giving due importance and following the various criteria for license agreement in selection of e-resources. It indicates that the awareness and application of licensing criteria of libraries is up to the mark .

It is necessary to evaluate the criteria relating to the evaluation of e-resources. It helps the librarians to develop the collection in a systematic way and satisfy both administrative issues and users needs. Aspects considered for pre-acquisition evaluation by the libraries covered in the study are shown in table 19 and figure 15.

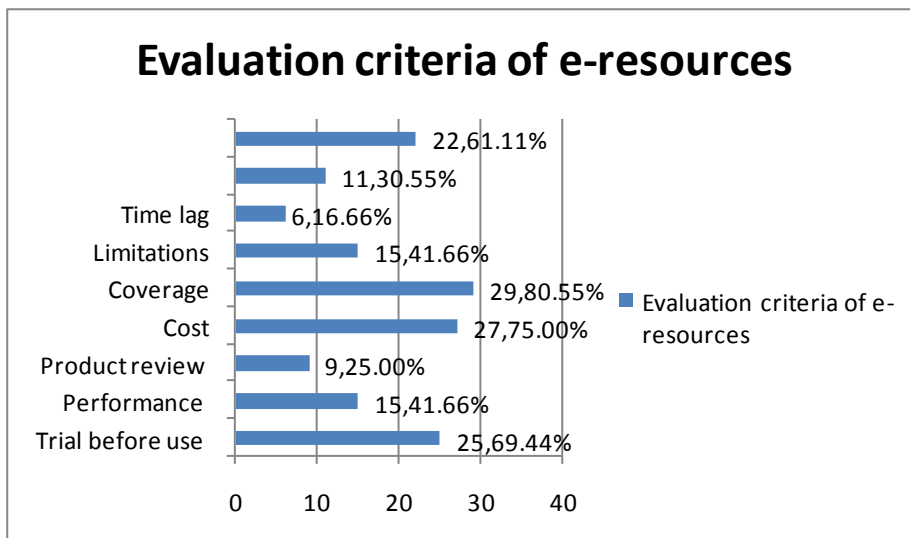
**Table 6.20 : Aspects /Criteria related to evaluation of e-resources**

Sl.No.	CRITERIA/ ASPECTS	FOLLOWED	
		Frequency	Percentage (%)
1.	Trial before use	25	69.44
2.	Performance	15	41.66
3.	Product review by expert	9	25.00
4.	Cost	27	75.00
5.	Coverage	29	80.55
6.	Limitations	15	41.66
7.	Time lag	6	16.66
8.	Perpetual Access facility	11	30.55
9.	Single/ Multi Users/Networking	22	61.11

Nine aspects relating to pre-acquisition evaluation have been covered in this study. Twenty nine ( 80.55%) of thirty six libraries have considered coverage of e-resources in this regard. Aspects like

trial before use is considered by twenty five ( 69.44%) libraries and and cost is considered by twenty seven( 75%) libraries .

Other aspects like single /multiuser and performance are reported to be followed by twenty two( 61.11) and fifteen ( 41.66%) libraries.Aspects like perpetual access, product review by expert and time lag are followed in eleven ( 30.55%) , nine ( 25%) and six ( 16.66%) libraries respectively.



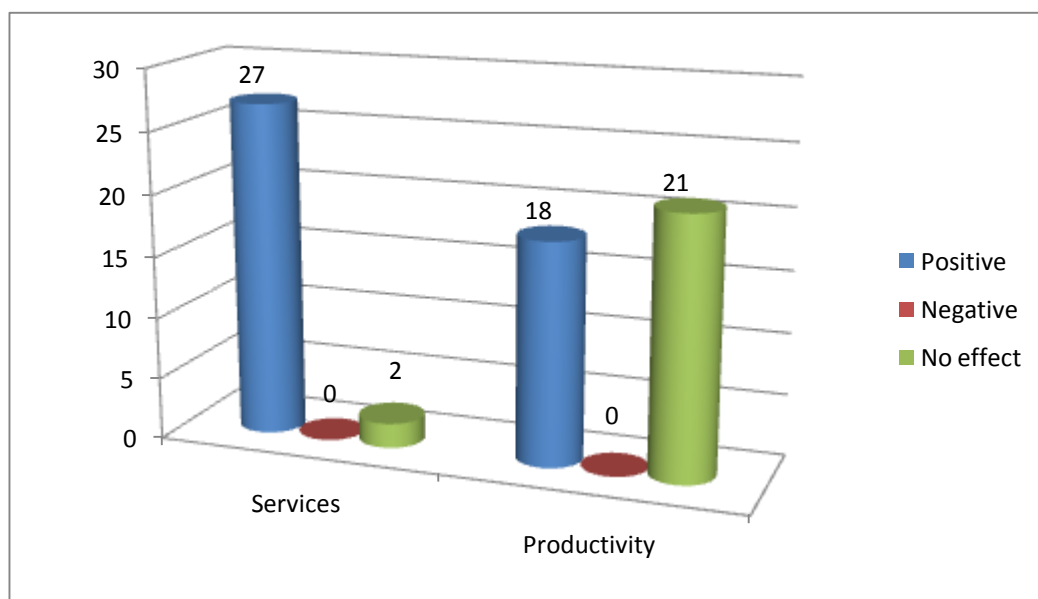
**Fig .6.15: Evaluation parameters of e-resources**

It shows from the above table and figure that librarians are giving due importance and following the various criteria for evaluation in selection of e-resources. This will definitely enrich the library to develop an effective collection development policy of e-resources.

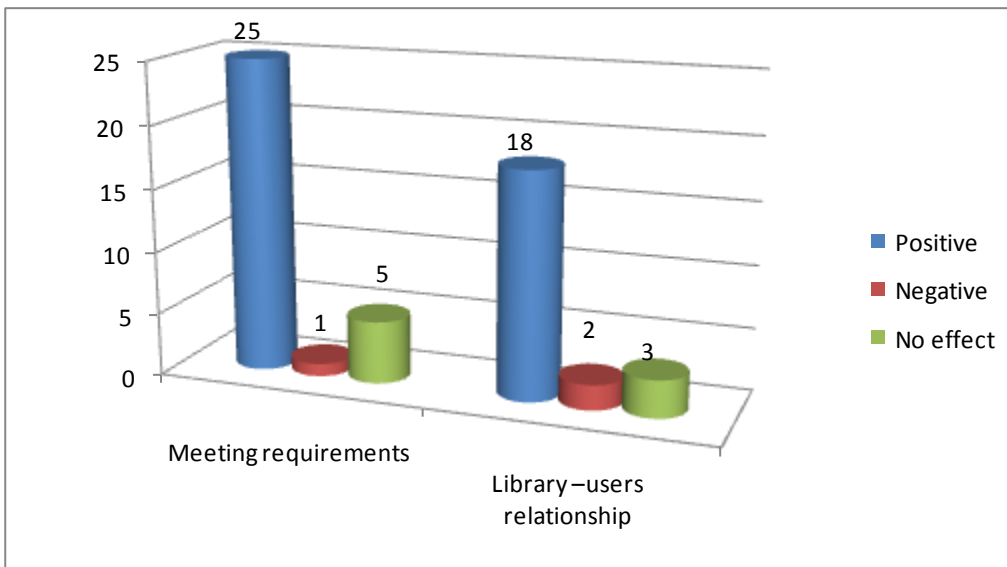
The table 21 and figures below have noticed that electronic information sources put a notable impact on library professionals, library users, information services and finally library as a whole. This table and figure suggests that e-resources ensure a positive impact on the services ( 75%) and 50% on the productivity of library .

**Table 6.21: Major impact of electronic information sources on:**

<b>Library Professionals</b>	<b>Positive</b>	<b>%</b>	<b>Negative</b>	<b>%</b>	<b>No effect</b>	<b>%</b>
a)Services	27	75.00	0	0	2	5.55
b)Productivity	18	50.00	0	0	21	58.33
<b>Library Users</b>						
a)Meeting requirements	25	69.44	1	2.77	5	13.88
b)Library –users relationship	18	50.00	2	5.55	3	8.33
<b>Information Services</b>						
a)Quality	30	83.33	1	2.77	1	2.77
b)Quantum of Information	16	44.44	0	0	2	5.55
<b>Library as a whole</b>						
a)Usage of library material	28	77.77	0	0	0	0
b) Image	17	47.22	2	5.55	1	2.77

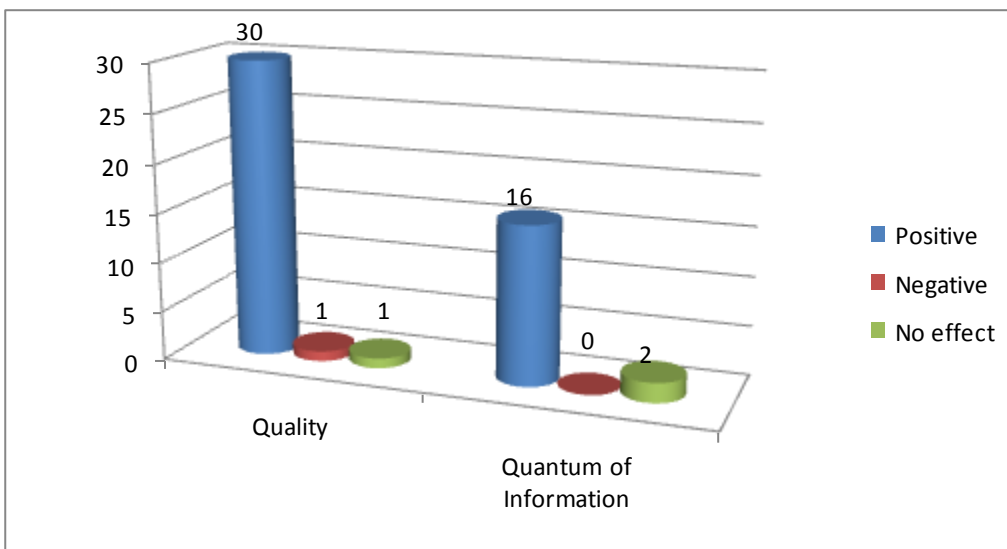


**Fig.6.16 : Impact of e-resources on library professionals**



**Fig.6.17 :Impact of e-resources on library users**

Almost twenty five ( 69.44 %) librarians have decided that e-resoucrs have been playing crucial role in meeting the requirements of user. Eighteen ( 50%) of thirty six libraries have agreed that e-resources put significant impact on the library –users relationship.



**Fig.6.18: Impact of e-resources on library services**

Other aspects like quality of library services, thirty( 83.33%) libraries have considered the positive impact of e-resources and sixteen ( 44.44%) libraries on the positive impact on the quantum of information relating to the information services.



Positive impact of e-resources on image and usage of library material are reported to be considered in twenty eight ( 77.77%) and seventeen ( 47.22%) libraries respectively.

**Table 6.22 : Problems faced by library professionals for better utilization of e-Resources**

<b>Nature of problem</b>	<b>Frequency</b>	<b>%</b>
Lack of infrastructure	<b>20</b>	<b>55.55</b>
No support from administration in training library professionals	<b>8</b>	<b>22.22</b>
Lack of support from authorities for implementing ICT applications in library	<b>11</b>	<b>30.55</b>
No initiative from professional associations to conduct specialized training programmes	<b>11</b>	<b>30.55</b>
Lack of co-ordination among library staff	<b>8</b>	<b>22.22</b>
Lack of scope for Library professionals due to ICT applications	<b>8</b>	<b>22.22</b>
Lack of interest on the part of users	<b>14</b>	<b>38.88</b>
Apathy of ICT applications	<b>5</b>	<b>13.88</b>

The table 22 have noticed that librarians are also facing some problems for proper management of e-resources in libraries .Eight areas have been considered in this regard. Twenty ( 55.55%) librarians have considered that the lack of infrastructure is one of the major problem.

Other problems like lack of interest on the part of users, lack of support from authorities and inactivity of professional associations to conduct specialized training programmes are reported to be considered in fourteen ( 38.88%) and eleven( 30.55%) libraries respectively.

Other aspects like lack of in service training and too much dependency on technology are also considered in eight ( 22.22) libraries.

The present study on the management of access to electronic information sources also indicates that apart from casualness of authorities, librarians need to keep themselves updated with the latest developments and happenings around them. For this purpose, they need to attend the relevant workshops and hands on training programmes both local and national level, take initiatives to organize in-house training programmes for library staff, make discussion of professional matters

with colleagues in the same field , keep learning from web resources ,searching Internet for relevant professional information, keep up to date with relevant professional literature and other relevant matters.

**Table 6.23: Methods for updating the knowledge / skills of library professionals**

<b>Actions for updating the knowledge / skills of library professionals</b>	<b>Frequency</b>	<b>Percentage(%)</b>
Regular attendance of relevant conferences/workshops	29	80.55
In-house training programmes for staff development	30	83.33
Going for higher studies/formal courses	21	58.33
Undertaking individual research work/publication	21	58.33
Discussion of professional matters with colleagues	27	75.00
Attending professional association meetings	17	47.22
Involvement in teaching	9	25.00
Searching Internet for relevant professional information	25	69.44
Regularly reading relevant professional literature	25	69.44
Learning from web resources	28	77.77

Other aspects like going for higher studies/formal courses, undertaking individual research work/publication & attending useful professional association meetings are also reported to be considered by many libraries for better understanding of the organisation and management of electronic resources in libraries. The table 23 have justified all the above matters in a comprehensive manner.

## Chapter - 7

### FINDINGS & SUGGESTIONS

#### 7.1 Findings:

1. From the present study on the management of access to electronic information sources in the engineering college libraries of West Bengal , it is found that among the thirty six engineering college libraries majority of colleges are managed privately. These are non aided colleges. The present study reveals that total number of non aided colleges covered under this study is thirty one. Only five engineering colleges are government aided.
2. Among the thirty six colleges, sixteen colleges were functioning on or before the year 2000 while the remaining twenty colleges were established after the year 2001. All the colleges covered under study are offering undergraduate courses in engineering & its allied fields except Dinobandhu Andrews Institute Of Technolgy& Management, KOLKATA , it offers M,Sc.in Computer Science . Twenty three of thirty six colleges are conducting post graduate courses in the same. All the colleges are approved by the All India Council of Technical Education ( AICTE) and affiliated to the Maulana Abul Kalam Azad University of Technology ( MAKAUT) ,formerly known as West Bengal University of Technology ( WBUT).

The basic purpose of library of the engineering college is to assist the professionals in enhancing and updating their knowledge and skills and also provide them necessary information regarding new ideas, theories , engineering education and research.

The aims and objectives of engineering college libraries comprises of collection , organization and dissemination of information in both digital and non digital format , thus helping the students and faculties to pursue their academic excellence, encourage reading habits particularly of students community and also make them aware about the importance of library in career building.

3. In the present study it is observed that out of 36 enginnering college libraries , a well established LAN facility is existing in twenty eight ( 77.77%) libraries where all the

departments , laboratories and other units of the colleges including the library is well connected through LAN. This makes it possible for the users to get access over all kinds of electronic resources available in the library form any where within the campus. Even this facility has been extended to the students hostel also in four ( 11.11%) colleges . This enhances the access and use of electronic resources extended upto the residents also. The LAN facility is only restricted to library and computer centre in two ( 5.55%) colleges repectively.

4. The present survey further reveals that among the thirty six libraries covered in the study , leased line internet connectivity have been reported in twenty nine ( 80.55%) libraries . In another three ( 8.33%) libraries, Wi-Fi type of network is available and out of the remaining four libraries three ( 8.33%) libraries have been using other type of internet connection. Only one ( 2.775) library has dial up connection. This study also indicates that among the thirty six libraries , fourteen ( 38.88%) libraries have bandwidth rate ranges from 50-100mbps , followed by 10-50mbps in seven(19.44%) libraries, 1-10mbps in thirteen libraries ( 36.11%) .

Only two libraries (5.55%) have bandwith rate of less than 1 mbps. It shows that majority of the libraries have excellent network facility, thus it would be possible for these libraries to provide better access to electronic resources to users.

5. As far as the infrastructure is concerned , the present study indicates that among the thirty six libraries , twenty nine ( 81%) have developed separate e-library section for searching electronic resources , only seven ( 19%) libraries are lacking in this regard. It is necessary to provide sufficient number of PCs with suitable configuration in order to enhance the access to e-resources to the users. The majority of libraries ( 77.77%) have separate server for e-resources in their libraries and the remaining eight ( 22.22%) are lacking in this regard. This study also reveals that among the thirty six libraries , fifteen ( 41.66%) libraries have computers ranges from 5 to 10 followed by five ( 13.88%) libraries having more than 20 computers , four ( 11.11%) college libraries have 15-20 computers , while three( 8.33%) libraries have 10-15 computers followed by two ( 5.55%) libraries have only computers less than 5. This study also

significant in the sense that about seven ( 19.44%) are very much lacking in this regard. They should concentrate in this issue on urgent basis.

6. Concerning adequate accessory facilities for use of e-Resources, it is found that out of that among the thirty six college libraries , twenty nine are having printing facility only seven libraries ( 19.44%) are lacking in this regard. This study also reveals that almost twenty six ( 72.22%) libraries have scanning facility where only ten( 27.77) libraries are not able to generate such facility. Adequate CD/DVD facilities have been ensured by twenty seven ( 75%) libraries while nine ( 25%) are not in a position to provide such facility. Web camera facility is available in only nine(25%) libraries and audio facility in ten( 27.77%) libraries . The last two areas needs to be taken care to generate further value addition in library services.

7. This study also reveals that most of the libraries have preferred LibSys software for their automation purpose. Among thirty six libraries, thirty libraries( 83%) are preferring this type of automated library management system .

Users of KOHA and DELPLUS (2.77%) software are single in number. Only two ( 5.55%) libraries have in-house package. This data analysis has established the popularity of Libsys in the engineering colleges libraries of West Bengal.

8. As the primary objective of any library is to ensure an effective combination of print and non print & electronic resources to meet the information requirements of users, it becomes imperative for a library to acquire, store, evaluate and manage the wealth of electronic resources .Out of all electronic resources are playing a vital role in information dissemination in contemporary librarianship. In engineering college libraries, the growth of electronic resources is quite significant for reasons like the availability of Information communication technology economically and user friendly. The present indicates that among the thirty six engineering college libraries ,thirty three ( 91.66%) have ensured the availability of e-resources into its collection, only three ( 8.33%) are lacking in this regard.This result further indicates the popularity and importance of e-resources in library.

9. The challenges of integrating e-resources and technologies into the process of collection development in an engineering college library are many, varied, and

multifaceted. The most common being shrinking budgets and increasing operating costs. Collection budgets are at special risk because they are not directly connected to the number of staff positions or level of user services. E-resources costs come under three varied categories: Equipment and network infrastructure costs, staffing, training & development & costs of subscriptions. E-resources are often costlier than their print equivalents because in some countries like UK, libraries also have to pay 17.5% VAT in excess of journal prices. The present study highlights that although most of engineering colleges are non aided and administered privately, but the results shows that among the thirty six engineering college libraries, a good majority of them i.e. twenty two (61%) have separate budgetary provisions apart from general library budget, for procurement of e-resources. This study has also noticed that fourteen (39%) libraries have no such separate budgetary provisions. Libraries having separate budgetary provisions would be able concentrate much more on e-resources as funding is readily available for procurement of e-resources.

10. Considering the growing demands of e-resources most of the libraries covered under study, apart from print collection have developed e-resources into its collection particularly those prescribed by the AICTE. This includes IEEE( ASPP) in Computer Engineering, Computer Engineering + Computer Science + Electrical and Electronics Engineering + Telecommunications and related disciplines, Springer - Electrical and Electronics and Computer Science Engineering, ,ASME - Mechanical Engineering , ,Springer - Mechanical Engineering , Wiley-Blackwell - Mechanical, Electrical and Electronics Engineering, ,Wiley-Blackwell- Civil Engineering, McGraw Hill - General Engineering and Reference material , J-GATE- Engineering and Technology (JET) ,ELSEVIER- (Engineering + Computer Science ), ,ASTM DIGITAL LIBRARY (DL) ONLINE VERSION - Online dictionary of Engineering Science and Technology.
11. Apart from AICTE prescribed mandatory e-resources , a good number of libraries are being reported to subscribe DELNET, Science Direct, e-resources through British Council and American library, video lectures through NPTEL.

12. It has also been observed that most of the libraries are aware about the AICTE prescribed e-resources and acquire & add them in to their collections. Among thirty six libraries , thirty one ( 86.11%) are aware about these resources and out of these thirty one libraries , twenty five ( 69.44 ) libraies have procured IEEE – online e-journals , followed by twenty nine ( 80.55%) libraries are aware about procured J-Gate engineering & technology and eight ( 22.22%) have subscribed J-Gate engineering & technology. This study further indicates that twenty seven (75%) libraries are aware about Springer – electrical and electronics & computer science engineering & four ( 11.11%) libraries have subscribed the same.
13. About twenty five ( 69.44%) libraries have ensured that they are aware about the springer-mechanical & Elsevier engineering and computer science. Where five ( 13.88%) have subscribed the springer and eight ( 22.22%) subscribed the Elsevier in their libraries. Twenty four (66.66 ) libraries have also reported that they are aware about the ASME mechanical engineering followed by twenty three(63.88 ) aware about wiley-blackwell –civil engineering , twenty one (58.33 ) libraries on wiley-blackwell mechanical & McGraw Hill –general engineering and reference books
14. For maximum utilization of e-resources in libraries it is very urgently needed to keep it open minimum eight hours in a day. The present study has ensured that among the thirty six libraries , twenty ( 63.88) are kept open for six to eight hours for users followed by five ( 13.88%) libraries for more than eight hours a day . Only three ( 8.33%) are kept open below six hours .The most significant observation is that out of these thirty six libraries , two ( 5.55%) are also functioning more than ten hours in a day.
15. As far as the mode of access to e-resources are concerned the present study indicates that twenty libraries ( 55.55%) have preferred IP based access to e-resources , while eight( 22.22%) have preferred user-ID & password based mode of access to these resources. Only five (13.88%) libraries have opted both type of mode of access to e-resources.

16. This study further indicates that e-library section of twenty two (61.11%) colleges are managed by single staff followed by eight colleges ( 22.22%) e-library section with double staff. More than two staff have been reported in two ( 5.55%) colleges. The above matter is not applicable in four ( 11.11%) colleges . These colleges are lacking of e-resources.
17. The present study has highlighted that among the thirty six colleges , in twelve ( 33.33%) college libraries both undergraduate , post graduate & faculty members have shown their interest in using the e-resources. This study also indicates that in nine ( 25%) libraries, all the student & the teaching community are using e-resources for academic purposes. Only in four ( 11.11%) colleges the main users are undergraduate and faculty members .
18. The above table also reveals that only in two ( 5.55%) colleges the main users of e-resources are Undergraduate students, faculty members and both post graduate students + faculty & research scholars respectively.
19. As far as the usage statistics are concerned it has been observed that ten to thirty users have been reported to use e-resources in sixteen ( 44.44%) colleges followed by thirty to forty users in six ( 16.66%) colleges. Forty to fifty users of e-resources have been reported in five ( 13.88%) college libraries . Six ( 16.66%) college libraries have more than fifty users who are using e-resources on daily basis for their academic purpose. The above matter is not applicable to three (8.33%) college libraries.
20. This study has noticed users satisfaction in using the e-journals, e-books , full text articles , CD/DVDs & other online databases. Among the thirty six colleges , twenty two(61.11%) library users have ensured that they are satisfied in using e-journals, followed by four (11.11%) colleges are highly satisfied in this regard. Only one ( 2.77%) college library users have shown their dissatisfaction & highly dissatisfaction in this regard respectively.



21. For e-books , thirteen ( 36.11%) college library users are satisfied and one ( 2.77%) college library users are highly satisfied.Only Two( 5.55%) library users have shown their discontent followed by One ( 2.77%) college in using e-books respectively. One library remains neutral in this regard.
22. This study also signifies that fourteen ( 38.88%) library users have shown their great interest in using on-line databases, while two( 5.55%) libraries are highly satisfied in this regard. Only one (2.77%) library has shown their dissatisfaction in this regard. In case of CD/DVDs , a good number of libraries ( 13,36.11%) have shown their interest and satisfied in using this resources. Only two ( 5.55%) library users are dissatisfied in this regard. Three( 8.33%) libraries remain impartial on CD/DVD issue. The present study further reveals that about seven(19.44%) libraries out of thirty six libraries are satisfied on subscribed full text articles, where five ( 13.88%) library users are highly satisfied .Only one ( 2.77%) library has shown its displeasure and two ( 5.55%) library remain unbiased respectively.
23. Present study also highlights that library users have strongly preferred online reading. Among the thirty six colleges, twenty one ( 58.33%) have shown their great interest in online searching & reading, while six( 16.66%) libraries are strongly preferring the same. Only users of five (13.88%) libraries have less preferred this facility. This study further reveals that a majority of the users of libraries (47.22%) have favoured to save articles as per their choice for further use and also take printouts if required , while users of thirteen( 36.11%) libraries have strongly preferred the saving option for further use and eight (22.22%) libraries on print out issue. This facility definitely enhances and popularise the e-resources in the present networked environment. Only Two ( 5.55%) libraries on former topic and four( 11.11%) in the later one have shown their displeasure in these regard.
24. The advantages of e-resources from users' perspectives are manifold. The present study have firmly noticed that a majority of the users of these libraries are preferring

the advantages of electronic environment . Now it is possible to carry out easy and wide keyword searching through internet. The available online reference materials also provides hyperlinks to other necessary articles and related information. More over these are always available in twenty hours a day. The users can store the required information in usable format for future use also.

25. For selection of e-resources, it is necessary to develop a need based selection procedure based on certain criteria those are considered to be very important for procurement of e-resources in libraries. The present study has noticed that librarians of almost thirty two( 88.88%) libraries take recommendations from the head of the departments for procurement of e-resources .In twenty three ( 63.88%) libraries , aspect such as free online trial access , in seventeen ( 47.22%) libraries aspect such as need assessment & user requirement and in thirteen ( 36.11) libraries aspect such as consulting with other libraries, have been taken into consideration. Authentication and aspect like balance between print & electronic collections have also been considered in ten ( 27.77%) libraries.
26. Other aspects like short term and long term objectives , acquisition procedure and levels of collections are taken into consideration in six ( 16.66%) , three ( 8.33%) and two ( 5.55%) libraries respectively. It is evident from the above table that most of the libraries are following a variety of criteria for selection of e-resources, a note worthy feature.
27. The present study further highlights the various aspects relating to the license agreement of e-resources followed by the libraries under study. Twenty eight ( 77.77%) of thirty six libraries are agreed that only authorised users will get access to these resources , while twenty six( 72.22%) librarians are looking for licensing of IP based & multiuser based access. Twelve ( 33.33) of thirty six libraries are concerned about the cost of access to such resources.
28. Aspects like fair use , multiple format and protection of increased price are being reported to be followed by ten ( 27.77%) libraries .Archival back up is considered in

eight ( 22.22%) libraries . Other aspects like negotiations, electronic links and interlibrary loan are considered in five ( 13.88%) libraries in each case. Aspects like single user access and beyond campus access are followed in four ( 11.11%) and two( 5.55%) libraries respectively.

29. It is indispensable to evaluate the criteria relating to the evaluation of e-resources. It helps the librarians to develop the collection in an efficient way and satisfy both administrative issues and users needs. Nine aspects relating to pre-acquisition evaluation have been tested. Twenty nine ( 80.55%) of thirty six libraries have considered the importance subject coverage of e-resources in this regard. Aspects like trial before use is considered by twenty five ( 69.44%) libraries and and cost is considered by twenty seven( 75%) libraries .
30. Other aspects like single /multiuser and performance of e-resources are being reported to be followed by twenty two( 61.11) and fifteen ( 41.66%) libraries respectively .Aspects like perpetual access, product review by expert and time lag are also followed in eleven ( 30.55%) , nine ( 25%) and six ( 16.66%) libraries respectively.
31. The present study has also investigated the major impact of e-resources in various areas libraries.The present investigation suggests that e-resources provides a positive impact on the library professionals in the services ( 75%) and productivity (50%) of the of libraries covered under study.Almost twenty five (69.44 %) librarians have decided that e-resources have been playing very crucial role in meeting the requirements of users of these libraries . Eighteen ( 50%) of thirty six libraries have strongly agreed that e-resources put significant impact on the library –users relationship in a positive manner.
32. For quality of library services, thirty( 83.33%) libraries have considered the positive impact of e-resources on quality of library services and sixteen ( 44.44%) libraries have considered positive impact on the quantum of information relating to the information services. Posivite impact of e-resources on image and usage of library material are also being reported to be considered in twenty eight( 77.77%) and seventeen ( 47.22%) libraries repectively.

33. The present studies have also noticed that librarians have been facing some problems for proper management of e-resources in libraries .Eight areas have been considered in this regard. Twenty ( 55.55%) college librarians have considered that the lack of infrastructure is one of the major problem. Other problems like lack of interest on the part of users, lack of support from authorities and inactive ness of professional associations to conduct specialized training programmes have also been reported in fourteen ( 38.88%) and eleven( 30.55%) libraries respectively.Other aspects like lack of service training and too much dependency on technology are also being reported in eight ( 22.22) libraries.
34. The present study on the management of access to electronic information sources also indicates that apart from casualness of authorities, librarians need to keep themselves updated with the latest developments and happenings around them. For this purpose , they need to attend the relevant workshops and hands on training programmes both local and national level, take initiatives to organize in-house training programmes for library staff, make discussions on professional matters with colleagues in the same field , keep learning from web resources ,searching Internet for relevant professional information, keep up to date with relevant professional literature and other relevant matters.

## **7.2 Suggestions**

1. Libraries should subscribe e-resources keeping in view the priorities and preferences of users.
2. Announcements should be done by the library about the availability of newly subscribed e-resources or additions of new databases for users of the library.
3. There is an urgent need to provide adequate facilities for the users to get well acquainted with e-resources subscribed by the library; this can be done by the presentations organized by the concerned publishers, vendors or aggregator.
4. Special training programmes may be organized for students and faculty members for maximum utilisation of e-resources so that users can adequately trace the required

information. There is an urgent need to organize orientation programmes for the new comers in every year

5. Implementation of ERM requires skilled professionals. Therefore training on ERM for the existing library professionals should be undertaken on a regular basis.
6. For improvement in access to e-resources, more computers with latest configuration and multimedia kit should be installed, so that users can avail useful services of the internet.
7. For futher assistance and guidance, technical staff or technically trained staff should be deployed to assist the users as and when required.
8. To enhance the access to e-resources, there should be complete campus networking. Moreover problems related to slow connectivity should be resolved by upgrading the bandwidth
9. Majority of the engineering college libraries in West Bengal are managed privately. These colleges are self financed and are facing challenges due to continuous increase in the cost of subscription of scholarly journals and online databases particularly those are prescribed by AICTE as mandatory for libraries. Considering the acute financial crunch , libraries are practically hard pressed to satisfy the requirements of AICTE which further affects the research and academic activity .Most of the engineering college libraries have realized the need and importance of e-resources in its collection in order to satisfy their users and among these e-journals are most important.
10. There is need to encouraged the library professionals to improve their knowledge further on e-resources for selection and use them thoroughly in libraries. If necessary, the professionals may be advised to visit other libraries to observe their practices, make discussions on professional matters with colleagues in the same field , keep

learning from web resources ,searching Internet for relevant professional information, keep up to date with relevant professional literature and other relevant matters.

11. Library should try to follow all the licensing aspects as far as possible to minimize and avoid management problem in future. Moreover, there is an urgent need to follow as many as possible aspects of review of license and business agreements to reduce problems with vendors.
12. All pricing options for procurement of e-resources should be considered in engineering college libraries while acquiring e-resources. Evaluations of e-resources based on certain criteria are highly concerned in this regard.
13. Discovery or federated tools may be implemented for single search of all e-resources for better and efficient management.
14. Dedicated dynamic website should be designed for easy retrieval of e-resources.
15. All libraries should have a de-selection policy or guidelines for termination of subscription of e-resources that would ensure the need based collection development and availability of better e-resources for user community

### **7.3 Validation of Hypotheses**

#### **Hypotheses 1**

Electronic information sources have been influencing the Engineering college libraries in West Bengal to satisfy the user information requirements with its nature, volume and variety like other libraries

Considering the usefulness of e-resources with its associated advantages such as their simultaneous presence, faster search ability, easy manipulability and accessibility,it has been reflected from the present study that engineering colleges have shown their strong interest for procurement of e-resources in libraries of West Bengal . Today libraries are undergoing transformation , on one side they are facing three major challenges namely

limited budget &, high users' demands ,shortage of space and rapid increasing in the cost of publications , and on the other side are the challenges posed by the advances in field of information and communication technology. The remarkable growth of electronic information in the last few decades has changed the scenario and solve many problems. The digital coherence allows all the objects in a digital environment – sounds, images, texts and every thing else –to be treated in essentially the same way.

The present study reveals that out of thirty six colleges , twenty nine ( 80.55%) engineering colleges have separate section for searching electronic information All most all of them have separate server. Thirty three ( 91.66%) have been influenced by electronic information and electronic information has ensured their place in these libraries.

The present study further reflects that most of the librarians are aware about the usefulness of e-resources required for their users particularly those prescribed by AICTE. All most all of them have tried their level best to develop such collections in their libraries. Among them IEEE ( ASPP) – All Society Periodical Package in Computer Science & Engineering has made an tremendous impact in the libraries. Twenty five ( 69.44%) libraries out of thirty six have been subscribing IEEE for their libraries.The other resources like Springer for Electrical and Electronics and Computer Science Engineering & Mechanical Engineering ASME for Mechanical Engineering,Wiley-Blackwell for Mechanical, Electrical and Electronics Engineering & Civil Engineering,McGraw Hill for General Engineering and Reference,J-GATE for Engineering and Technology (JET),ELSEVIER for Engineering + Computer Science,ASTM DIGITAL LIBRARY (DL) on Online dictionary of Engineering Science and Technology have also secured their place in the libraries.

The present study have further noticed that electronic information has made a great impact on four major areas of library - library professionals , library users , Information services and library as a whole. In twenty seven ( 75%) libraries out of thirty six libraries , electronic information has made positive impact on services provided by the library professionals , on productivity the positive impact has been reflected in eighteen ( 50%) libraries. In twenty five ( 69.44%) libraries out of thirty six college libraries , electronic

information put positive impact on meeting the information requirements of users, while in eighteen ( 50%) libraries it provides encouraging impact on library – user relation ships . About thirty ( 83.33%) libraries have observed that electronic information has made constructive impact on quality of information services. Sixteen libraries ( 44%) have observed that electronic information has good positive impact on quantum of information being provided to fulfil the requirements of users.

Hence it can be clearly concluded that like other libraries engineering college libraries in West Bengal have been greatly influenced by the electronic resources with its volume , nature and variety.

## **Hypotheses 2**

Access and use of electronic information sources from users' perspective are gaining importance day by day

Access to resources is now considered more important than collection building. The advent of information and communication technology, the internet has changed dramatically Further, the world wide web is an important versatile platform for the delivery of needed information and provides a basis for the shift from ownership of physical collections to access on demand. The Libraries and Information Centres have gained a lot . A job that before used to take hours together, is now just a mouse click away. The publishers did not remain behind; they took advantage of these applications to a considerable extent and tapped a treasure house of electronic resources. This has created a thought on actual possession of resources to actual access of the same,

The advantage of the electronic resources is ubiquity – many users can simultaneously access a single electronic copy from many locations. Copies can be delivered smoothly, and it would be possible to reformat the material as per the reader's preference.

The present study has also investigated on such issues as mentioned above. To enhance such facility, preferences have been given to IP based access in twenty ( 55.55%) college libraries so that users can access electronic resources anywhere within the college campus



where internet is available. Access to e-resources through user id & password are being provided in eight ( 22.22%) libraries , while five ( 13.88%) libraries have been reported to provide both type of access facility for users.

This study further indicates that in twenty three ( 63.88%) libraries , the access facilities of e-resources are being provided for six to eight hours. In five libraries this facilities are being extended upto ten or even above ten hours on daily basis also. Most of the colleges have better infrastructure facilities with sufficient number of computers and adequate additional facilities.

The present study further suggests that in majority of libraries, all undergraduate and post graduate students along with the faculty members & research scholars are the potential users of e-resources.

As far as the satisfaction levels are concerned,the present study suggests that in twenty two ( 61.11%) of libraries where users are satisfied on using e-journals. A good number of library users are also satisfied on using e-books, online databases and CD-DVDs. A few of them are highly satisfied in this regard. Fourteen ( 38.88%) have reported that their users are satisfied on using online databases, thirteen ( 36.11%) libraries have also reported that users are satisfied on using both e-books and CD-DVs respectively.

Sixteen ( 44.44%) libraries out of thirty six college libraries, where users of e-resources are near about thirty on daily basis. Six libraries have been reported in each case where daily users are on and above forty. More than fifty users of e-resources have also been reported in six libraries.

The present study further reveals that users of twenty one ( 58.33%) libraries have preferred the provision of online access , about seventeen ( 47.22%) libraries have reported that users have preferred to save articles as per their requirement and also showed their interest to take hardcopies of the same.

From users perspective, the present study further reveals the advantages of e-resources over print materials in many ways like easy key word searching, availability of articles in

electronic form before black & white form, provision of hyperlinks to other related information, archiving option in suitable format for future use and availability in twenty four hours a day. Thus the situation is encouraging. This analysis clearly justifies that e-resources are gaining importance day by day into library collection.

### **Hypotheses 3**

Electronic resources have become an integral part of any modern engineering college library. It is well recognized that improved e-resource collections enhance the users for academic growth and institutional research output. In this context, Management of electronic information sources needs proper attention in engineering college libraries

Electronic resources are creating a revolution in engineering college libraries To meet the objectives of engineering college libraries , it is essential to make use of electronic resources.

Librarians also believe that attention should be given to understand certain key areas like selection, evaluation, licensing, acquisition, management and preservation to maintain them properly in libraries. It is true that art of selection is undergoing profound change , the selection of materials is still crucial for libraries & knowledge centres. The four basic criteria for selection-quality, library relevancy, aesthetic and technical aspects, and cost are considered very crucial in this regard. The electronic resources require continuing management to a far greater degree than print resources do is an accepted fact.

The present study have identified that various criteria are being followed in the libraries while selecting e-resources. thirty two( 88.88%) libraries have taken recommendations from the head of the departments for procurement of e-resources .In twenty three ( 63.88%) libraries , aspect such as free online trial access , in seventeen ( 47.22%) libraries aspect such as need assessment & user requirement and in thirteen ( 36.11) libraries aspect such as consulting with other libraries, are taken into consideration in this regard.

Authentication and aspect like balance between print & electronic collections have been considered in ten (27.77%) libraries.

Other aspects like short term and long term objectives , acquisition procedure and levels of collections have been taken into consideration in six ( 16.66%) , three ( 8.33%) and two ( 5.55%) libraries respectively.

The various aspects relating to the license agreement of e-resources have also been followed by the libraries under present study. Twenty eight ( 77.77%) of thirty six libraries are agreed that only authorised users will get access to these resources , while twenty six( 72.22%) librarians are agreed with licensing , IP based & multiuser based access. Twelve ( 33.33) of thirty six libraries are concerned about the cost of access to such resources.

Aspects like fair use , multiple format and protection of increased price are reported to be followed by ten ( 27.77%) libraries respectively. Archival back up has been considered in eight ( 22.22%) libraries .

Other aspects like negotiations, electronic links and interlibrary loan have been considered in five ( 13.88%) libraries in each case. Aspects like single user access and beyond campus access have also been followed in four ( 11.11%) and two( 5.55%) libraries respectively.

It shows from the above librarians are giving due importance and following the various criteria for license agreement in selection of e-resources. It further indicates that the awareness and application of licensing criteria of libraries is up to the mark.

It is necessary to evaluate the criteria relating to the evaluation of e-resources. It helps the librarians to develop the collection in a systematic way and satisfy both administrative issues and users needs.

Nine aspects relating to pre-acquisition evaluation have been covered in this study. Twenty nine ( 80.55%) of thirty six libraries have considered coverage of e-resources in

this regard. Aspects like trial before use and cost have been considered by twenty five ( 69.44%) and twenty seven( 75%) libraries respectively..

Other aspects like single /multiuser access and performance of e-resources have been reported to be followed by twenty two( 61.11) and fifteen ( 41.66%) libraries respectively. .Aspects like perpetual access, product review by expert and time lag have also been followed in eleven ( 30.55%) , nine ( 25%) and six ( 16.66%) libraries respectively.

The present study thus indicates that librarians are giving due importance and following the various criteria for evaluation in selection of e-resources. This will definitely enrich the library to develop an effective collection development policy of e-resources.

Hence it can be said that considering proper understanding of users' perceptions along service quality, special attention has already been given for suitable management of e-resources in the engineering college libraries of West Bengal

## CHAPTER – 8

### CONCLUSIONS

Library is the heart of any academic institution. The engineering college library like any other library primarily contributes to the teaching and learning process by providing various information of learning resources both in digital and non digital formats for the successful persuasion of the course programmes offered by the institute.

The concept of library fulfilling users' needs is one of the important aspect of library. An engineering college library is to assist engineering professionals in enhancing and updating their knowledge skills .In these process engineering college libraries apart from print collections have concentrated on the collection, organisation and management of electronic resources. Thus electronic resources have got a permanent place in the library collections. It plays an emerging role in libraries on many levels. The incessant intensification of electronic resources with its volume, variety and nature becomes more decisive to manage effectively. These resources put huge challenges for library professionals to adequately manage and access the diverse electronic resources. With this growing challenge a better solution for the proper management of access to these resources still remains an area of further study and research.

The concept of library management has been changing significantly with the growing demands of electronic resources into library collections. Today e-resources management has been considered as one of the important components of library development. After automation and digitisation of library resources, there is a strong challenge for library professionals to manage this vast amount of e-resources. Today, the library users are open to multiple sources of information and expect quality material within shortest possible time irrespective of the format of information. Proper understanding of customer's perceptions along with service quality dimensions is essential for library professionals to recognize the users expectations.

The technological development provides an opportunity for easy and uninterrupted access to electronic resources. In engineering disciplines, a variety of electronic resources are available. In Indian context the AICTE, the highest authority at national level for engineering and technical education has already laid down certain guidelines for subscription of e-

resources. Consequently, the engineering college libraries are subscribing a variety of electronic resources to meet the information requirements of users in their colleges. It has been observed that most of the engineering college libraries are following management aspects to maintain e-resources in their libraries.

There is an urgent need to formulate a collection development policy for e-resources. Engineering e-resource collection development policy includes everything that implies acquiring materials including selection, ordering and payment. It is a chain of events that includes planning, administration and control. Besides this, importance should also been given to formulate a policy for De-selection of e-resources. Acting as an e-resource knowledge manager rather than collection manger, librarians should try to develop a suitable platform for the delivery of needed information and provide a basis for the shift from the ownership of physical collections to access on demand.

The present study has tried to thrown up few issues which need to be addressed for further development of management of e-resources in library. Lots of issues are still remaining unexplored and half spoken in this area. Following are some suggested areas for further study of research on e-resource management:

1. Factors affecting electronic resource management in engineering college libraries
2. Organisation and management of open learning resource in engineering college libraries
3. Designing of electronic resource management software for engineering college libraries
4. A comparative study on availability and accessibility of electronic resources in engineering college libraries
5. Similar kind of research may be initiated for other cluster of libraries such as social science, scientific etc.

Today, the library customers are open to multiple sources of information and expect quality material within shortest possible time irrespective of the format of information. The web technologies and commercial information service providers have encouraged libraries to be customer focused for their survival. Proper understanding of customers' perceptions along with service quality dimensions is essential for library professionals to recognize the customer expectations.

The original model of integrated library system was designed primarily for print materials but it lacks the functionality needed for managing subscription to electronic resources. It has been observed that electronic resources in the last few decades have been growing with its volume variety and nature to dominate library collections. As a result a new genre of software called the Electronic Resource Management System (ERMS) has been emerged. This type of comprehensive system approach has the ability to manage all types of library resources, including print, electronic and digital materials with support for the metadata formats and collection development policy needed to acquire and describe all formats, rather than, managing e-resources as a separate activity.

The ever changing nature of library collections will experience further changes in future, where the proportion of e-resources is expected to increase even further, but the print materials will carry on for the long term for its own attributes. This integrated approach of comprehensive resource management model is expected to hold greater assurance than the belief of separate applications dedicated to each format of material.

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**ANNEXURE - I**  
**QUESTIONNAIRE**

**Management of access to electronic information sources available in the Engineering Colleges of West Bengal: an analytical study from users' perspective**

Narendra Bhattacharya

E-mail: narendrabhattacharya415@yahoo.com

9830746816

**QUESTIONNAIRE**

**General Information**

1. Name of the College:
  
2. Status of the college ( Please tick (√) mark which is applicable)
  - a) Govt. Aided
  - b) Private Aided
  - c) Autonomous
  - d) Any others
  
3. Full Address :  
  
Phone No.: \_\_\_\_\_ E-mail: \_\_\_\_\_  
Fax: \_\_\_\_\_ Web site : \_\_\_\_\_
  
4. Establishment Year :
  
5. Is your College / Institution approved by AICTE affiliated to WBUT ? Yes/No
  
6. Is your College / Institution approved by NBA ? Yes / No
  
7. How many courses are offered and the Annual intake of no. of students? ( Please tick (√) mark those are applicable)
  - a) Undergraduate Level .....
  - b) Postgraduate Level .....
  - c) Integrated Level .....
  - d) Research Level .....
  - e) Any other

8. Annual Budget of the Library

- a) 2010-2011 :
- b) 2011-2012:
- c) 2012-2013:

9. Is there any provision for any separate budget for e-resources? Yes / No

If yes mention the total amount.....

10. What are the Financial Sources of your Library ( Please Tick (√) mark)

- a) Institutional Share
- b) Library Fee
- c) Grants from State Govt.
- d) Grants from Central Govt.
- e) Grants from AICTE
- f) Grants from UGC
- g) World Bank
- h) Donations
- i) Other sources :- (Please mention) -----

11. How adequate has the funding been in respect of requirements of library? Please Tick (√) mark

- a. Very adequate
- b. Adequate
- c. Inadequate
- d. Very Inadequate
- e. Fairly Inadequate

12. Specify the no. of registered Library Users ( Please tick (√) mark which is applicable)

- a. Undergraduate level.....
- b. Postgraduate level.....
- c. Faculty .....
- d. Research Scholar .....
- e. Admin staff .....

- f. Supporting Staff .....
- g. Others ( if any) .....

13. Library Holdings

Sr.No.	Items	No.
1.	Books	
2.	Journals(Printed)	
3.	Journals (bound vol.)	
4.	E-Journals	
5.	E-Books	
6.	Online Databases	
7.	Audio Cassettes	
8.	Microfilms/Microfiches/Slides	
9.	Magnetic Tape/ Films	
10.	Ph.D. Theses	
11.	Manuscripts	
12.	Rare Books '	
13.	Others (please specify)	

14. Library staff strength

Sr.No.	Staff	No.
1.	Librarian	
2.	Deputy Librarian	
3.	Assistant Librarian	
4.	Library Assistant	
5.	Library Sorter	



6.	Library Attendant	
7.	Others if any	

15. Do you have LAN Facilities? Yes/No

If Yes, How spread out your campus LAN is ? (Please tick (√) mark which is applicable)

- a) Restricted to Computer Centre
- b) Restricted to Computer Centre + Library
- c) Limited no. of Connections in Dept./Labs/Units.
- d) All Depts./Centers/Labs./Units/Library are well connected
- e) Besides Institute the LAN reaches out to the hostels

16. What is the bandwidth rate of your internal network ( Please tick (√) mark which is applicable)

- a) Less than 1 mbps
- b) 1-10mbps
- c) 10-50mbps
- d) 50-100mbps

17. Do you have internet connectivity? Yes / No

If Yes, (Please tick (√) mark which is applicable)

- a) Dial-up
- b) Leased Line
- c) VSAT
- d) Any other

18. Are you using any automation package for library ? Yes/No

If Yes ( Please tick (√) mark which is applicable)

- a) Name of the automation package:
- b) Date of implementation of automation package:
- c) Do you have any dedicated server to run the library automation package?

Yes/No

19. Is your library a member of a National / International library network? Yes/No

If Yes please Tick(√) the under mentioned

- a) INFLIBNET
- b) DELNET
- c) UGC-INFONET
- d) Other (please specify):

20. Are you a member of INDEST-AICTE Programme? Yes/No

If yes, please give the details:

- a) Date of Implementation:
- b) No. of E-Journals .....
- c) No. of E\_Books .....
- d) Full Text Database.....
- e) Articles .....
- f) Bibliographical Database .....
- g) Other (please specify).....

21. Is your library a member of any National / International network other than INDEST-AICTE ? Yes/No

If yes, please give the status of under mentioned:

- a) Name :
- b) Starting year of membership:
- c) Subscription cost:
- d) Major facilities:

### **Electronic Resource Section**

22. Is the management of E-Resources for providing access to users within the library undertaken in a separate section? Yes / No

If Yes then mention how many computers are available to access the E-Resources for users? .....

23. Please Tick (√) mark the Hardware devices which are available in e-resource section

- a) Printer

- b) Scanner
- c) Audio system
- d) Web Camera
- e) Other (please specify)

24. Please tick the Storage Medium which are the using by the users in E-Resource section:

- a) CD ROM
- b) PEN DRIVE
- c) DVD
- d) External Hard disk
- e) Others

25. Mention the staff strength in this section

No. of Professionals with Computer Knowledge.....

No. of Professionals without computer knowledge

.....

26. Do the staff have opportunity to take part any form of training / workshop to improve their skills and knowledge for handling E-Resources ? Yes/No

27. Does Library have special software for its E-Resources section ? Yes/No

If Yes, please mention the name of the software .....

**Available Electronic Information Resources , Its Collection and Organisation**

28. Which of these E-Resources has your library acquired

Sr.No.	Items	Numbers
1.	E-Journals	
2.	E-Books	
3.	Full Text Articles	
4.	Online Databases	

5.	CD-ROMs/DVDs/Floppies	
6.	Audio Cassettes	
7.	Microfilms/Microfiches/Slides	
8.	Magnetic Tape/ Films / Music	
9.	Others	

29. Which types of E-Resources are subscribed for E-Resources section? ( Please tick (√) mark which is applicable)

- a) Full text Yes/ No
- b) Abstract Yes/ No
- c) Bibliographic Yes/ No
- d) Numeric Yes/ No
- e) Graphic Yes/ No
- f) Others (please specify) Yes/ No

30. What types of selection-criteria are followed for acquisition of E-Resources? ( Please tick (√) mark those are applicable)

- a) Recommendation of Head of the Dept./ Faculty members Yes/No
- b) Free Online Trial Access Yes/No
- c) Consulting other libraries Yes/No
- d) Short and Long Term Objectives Yes/No
- e) Need Assessment & Users requirement Yes/No
- f) Levels of Collections Yes/No
- g) Acquisition Procedures Yes/No
- h) Security / Authentication Yes/No
- i) Balance Between Print & e-Collections Yes/No
- j) Others (please specify) .....

31. Do you follow the under mentioned to evaluate the E-Resources? ( Please tick (√) mark those are applicable)

- a) Trial before use Yes/No

- |                                   |        |
|-----------------------------------|--------|
| b) Performance                    | Yes/No |
| c) Product review by expert       | Yes/No |
| d) Cost                           | Yes/No |
| e) Coverage                       | Yes/No |
| f) Limitations                    | Yes/No |
| g) Time lag                       | Yes/No |
| h) Perpetual Access facility      | Yes/No |
| i) Single/ Multi Users/Networking | Yes/No |

32. Do you catalogue and classify the E-Resources? Yes/No

If Yes, Please Tick (✓) mark

- a) For Subscribed E-Resources
- b) For CDS/DVs etc
- c) Free Online Resources
- d) Others

33. Is there any archiving policy for E-Resources ? Yes/No

If yes, please tick the format which you prefer for preservation:

- a) PDF Format
- b) HTML Format
- c) External Hard disk
- d) Others

34. Do you collect the users' feedback to take decisions for continuation or cancellation of existing subscription of E-resources? Yes / No

35. Are you following licensing and copyright agreements for E-Resources? Yes / No

If Yes, Please Tick (✓) mark the under mentioned

- |  |          |
|--|----------|
| a. Authorized users will use the resources | Yes/No   |
| b. Cost of Access                          | Yes/No   |
| c. Single User Access                      | Yes/No   |
| d. Multi User Access                       | Yes / No |
| e. Beyond Campus Access                    | Yes / No |
| f. Archival Backup                         | Yes/No   |
| g. Fair Use                                | Yes/No   |

- |                                    |        |
|------------------------------------|--------|
| h. Confidentiality                 | Yes/No |
| i. Multiple Format                 | Yes/No |
| j. Negotiations                    | Yes/No |
| k. Electronic Links                | Yes/No |
| l. Inter Library Loan              | Yes/No |
| m. Protection of Increase of Price | Yes/No |

36. How do licensing and copyright agreements enhance the ease of access to E-Resources?

### **Factors that influence the Use of E-Resources**

37. How many Hours the E-Resources Section remains open? ( Please tick (√) mark which is applicable)

- a) Below 6 hours
- b) 6-8 hours
- c) 8-10 hours
- d) Above 10 hours

38. What are the modes of access to E-Resources? ( Please tick (√) mark which is applicable)

- a) Campus Wide through IP authentication
- b) User Id/ Password
- c) Only in the Library

d) Any other Mode (Pl. Specify)

39. Who are the main users of e-resources ( Please tick (√) mark which is applicable)

- a) Undergraduate students
- b) Postgraduate students
- c) Faculty
- d) Research Scholar
- e) Others

40. Mention the total numbers of users are daily using E-Resources .....

41. Please Tick (√) mark the satisfaction level you find for users of E-Resources

Sr.No.	Items Used	Satisfied	Highly Satisfied	Dissatisfied	Highly Dissatisfied	Neutral
a)	E-Journals					
b)	E-Books					
c)	Full Text Articles					
d)	Online Databases					
e)	Educational CDs/DVDs/ etc,					
f)	Microfilms/ Microfiches/Slides					
g)	Magnetic Tape/ Cassettes ,Video					

	Films / Music					
h)	Others					

42. Do you agree that adequacy of E-Resources influences their optimal use?

Please Tick (√) mark the appropriate

- a) Strongly Agreed
- b) Agreed
- c) Undecided
- d) Strongly disagreed
- e) Disagreed

43. The absence of Library Staff support makes the access to E-Resources more difficult?

Please Tick (√) mark the appropriate

- a) Strongly Agreed
- b) Agreed
- c) Undecided
- d) Strongly disagreed
- e) Disagreed

44. Support of ICT technicians is required for proper maintenance of E-Resources impedes their use? Please Tick (√) mark the appropriate

- a) Strongly Agreed
- b) Agreed
- c) Undecided
- d) Strongly disagreed
- e) Disagreed

45. Success in use of E-Resources encourage their continued demand for further access

Please Tick (√) mark the appropriate

- a) Strongly Agreed



- b) Agreed
- c) Undecided
- d) Strongly disagreed
- e) Disagreed

46. Besides the above factors, which of these impedes the access to E-Resources, Please Tick (√) mark

- a) Less Opening Time
- b) Lack of enough computers
- c) Charges to access E-Resources
- d) Lack of Printing facilities
- e) Failure of Hardware & Software affect the functioning of e- Resources section
- f) Unstable network
- g) Unstable power supply

### **Use of Electronic Resources and Services**

47. Who are the main users of E-Resources?

(Please tick (√) mark which is applicable)

- a) UG Students
- b) Research Scholar
- c) PG Students
- d) Faculty

48. Do you provide Electronic Information services? Yes / No/ Will Plan

If Yes, Please Tick (√) mark whether following services are available?

- a) Current awareness services
- b) SDI services
- c) Multimedia service
- d) CD/DVD based service
- e) Online databases
- f) Web Opac

49. Which of these media have been taken to promote the use of E-Resources? Please Tick(√)

- a) Provide links from home page Yes/No
- b) Conduct orientation Programme for users Yes/No
- c) E-mail/Internet mailing link Yes/No
- d) Any other

50. List the E-resources mostly used in the Library

- a) .....
- b) .....
- c) .....
- d) .....

51. Do Your Library have separate website? Yes / No

If Yes Then Please Tick (√) mark the appropriate

- a) Easy to search for and find of electronic resources through the library's website Yes / No
- b) Availability of information and instructions to help in using the electronic resources. through the library's website Yes / No
- c) Notification of new or updated electronic resources through the library's website Yes / No

52. Do you agree that the impact of cutting – edge technology in libraries provides innovative

ways of managing and implementing electronic information resources & services via internet? (Please tick (√) mark which is applicable)

- a) Strongly Agreed
- b) Strongly disagreed
- c) Do not know

53. What would be the major impact of Electronic Information Sources on Digital Section  
 ( Please Tick √ )

<b>Library Professionals</b>	Positive	Negative	No effect
a) Services			
b) Productivity			
<b>Library Users</b>			
a) Meeting requirements			
b) Library-users relationship			
<b>Information services</b>			
a) Quality			
b) Quantum of information			
<b>Library as a whole</b>			
a) Usage of Library material			
b) Image			

54. Methods preferred by the users in using E-Resources ( Please Tick(√) )

	Preferred	Most preferred	Least preferred
Read Article Online			
Save articles for further use			
Take print outs in PDF/HTML/other format			

--	--	--	--

55. Electronic versions have some advantages for users. ( Please Tick(√) how important are the following characteristics )

	Very important	Important	Not important
Easy & wide keyword searching is possible through internet			
Articles are available in electronic form before they are published in print.			
Contains hyperlinks to other articles and related information.			
These are always available -24 hours a day, every day.			
Can store information in different format for future use also.			

56. Please select the problems faced by library professionals in proper management and utilization of E-Resources?

Sl No.	Problems	Please Tick
a)	Lack of infrastructure	
b)	No support from administration in training library professionals	
c)	Lack of support from authorities for implementing ICT applications in library	
d)	No initiative from professional associations to conduct specialized training programmes	
e)	Lack of co-ordination among library staff	

f)	Lack of scope for Library professionals due to ICT applications	
g)	Lack of interest on the part of users	
h)	Apathy of ICT applications	

57. What are your suggestions for updating the knowledge / skills of library professionals?

Please tick (✓) mark the relevant ones

a)	Regular attendance of relevant conferences/workshops	
b)	In-house training programmes for staff development	
c)	Going for higher studies/formal courses	
d)	Undertaking individual research work/publication	
e)	Discussion of professional matters with colleagues	
f)	Attending professional association meetings	
g)	Involvement in teaching	
h)	Searching Internet for relevant professional information	
i)	Regularly reading relevant professional literature	
j)	Learning from web resources	

58. Further Suggestions ( If any)....

Name:

Designation:

Phone No.:

E-mail:

Website if any:

Signature with official seal :

Date:

## **LIST OF ENGINEERING COLLEGES WITH FULL ADDRESS & WEBSITES**

### **1. Abacus Institute of Engineering & Management**

Address: Natungram, Dist. Hooghly, Mogra, West Bengal 712148

[www.abacusinstitute.org](http://www.abacusinstitute.org)

### **2. Aryabhata Institute of Engineering and Management**

Address: Vill: Panagarh Gram, PO: Panagarh Bazaar

Dist: Burdwan,

West Bengal 713148

<http://www.aiemd.org>

### **3. Academy of Technology**

Grand Trunk Road, Adisaptagram,

Hooghly,

West Bengal 712121

<http://www.aot.edu.in/>

### **4. Adamas Institute of Technology**

Barasat Barrackpore Road,

P.O. Jagannathpur,

24 Parganas North, Barbaria,

West Bengal 700126

<http://www.adamas.co.in/technology/>

### **5. Dr.B. C. Roy Engineering College**

Address: Jemua Road, Fuljhore, Durgapur,

West Bengal 713206 , [www.brec.ac.in](http://www.brec.ac.in)

**6. B.P.Poddar Institute of Management and Technology**

Address: 137, V.I.P. Road, Poddar Vihar,

Kolkata, West Bengal 700052

[www.bppimt.ac.in](http://www.bppimt.ac.in)

**7. Batanagar Institute of Engineering, Management & Science**

B7-360 / New, Ward No. 30 , Maheshtala ,

South 24, Parganas,

West Bengal 700141

[biems.edu.in](http://biems.edu.in)

**8. Bengal Institute of Technology**

College: 1 no. Govt Colony(on Basanti Highway),

Kolkata-700150,

West Bengal

<http://www.bitcollege.in/>

**9. Bengal Institute of Technology & Management**

Santiniketan , P.O.Dwaranda , West Bengal , PIN-731236

<http://www.bitm.org.in>

**10. Birbhum Institute of Engineering and Technology**

Address: District Birbhum, Suri, West Bengal 73110

[www.bietsuri.ac.in](http://www.bietsuri.ac.in)

**11. Brainware Group of Institutions**

Address: 398, Ramkrishnapur Road, Barasat, Near Jagadighata Market,

Kolkata, West Bengal 70012 , <https://www.brainwaretechnologies.org>



**12. Budge Budge Institute of Technology**

Address: Bardhaman- Bankura Road, Nischintapur, West Bengal 700137

<https://www.bbit.edu.in>

**13. College of Engineering and Management, Kolaghat**

Address: KTPP Township, Kolaghat, West Bengal 721171

[www.cemkolaghat.org](http://www.cemkolaghat.org)

**14. Dinabandhu Andrews Institute of Technology & Management**

Address: Block-S, 1/406A, Baishnabghata, Near Satyajit Roy Park, Patuli,

Kolkata, West Bengal 700084

[www.daitm.org.in](http://www.daitm.org.in)

**15. Future Institute of Engineering and Management**

Address: Sonarpur Station Rd, Mission Pally, Kolkata, West Bengal 700150

[www.futureengineering.in](http://www.futureengineering.in)

**16. Government College of Engineering and Ceramic Technology**

Address: 73, Abinash Chandra Banerjee Lane, Kolkata, West Bengal 700010

[www.gcect.ac.in](http://www.gcect.ac.in)

**17. Government College of Engineering and Leather Technology**

Address: LB-Block, Eastern Metropolitan Bypass, Sector-III,

Salt Lake City, Kolkata, West Bengal 700098

[www.gcelt.gov.in](http://www.gcelt.gov.in)

**18. Government College of Engineering & Textile Technology Serampore**

Address: 12, William Carey Sarani, Maniktala,

Serampore, West Bengal 712201

[www.gcetts.org](http://www.gcetts.org)

**19. Greater Kolkata College of Engineering and Management**

Address: Dudhnai, Ramnagar- 2,P.O.Piyali Town,Baruipur , 24 Paragana (S),

West Bengal,India, West Bengal 74330

[www.gkcem.ac.in](http://www.gkcem.ac.in)

**20. Guru Nanak Institute of Technology**

Address: 157/F, Nilgunj Road, Panihati, Kolkata, West Bengal 700114

[www.gnit.ac.in](http://www.gnit.ac.in)

**21. Heritage Institute of Technology, Kolkata**

Address: Chowbaga Road, Anandapur, P.O. East Kolkata Township,

Kolkata, West Bengal 700107

[www.heritageit.edu](http://www.heritageit.edu)

**22. Hooghly Engineering and Technology College**

Address: Vivekananda Road, Pipulpati Post, Hooghly, West Bengal 712103

[www.hetc.ac.in](http://www.hetc.ac.in)

**23. Institute of Engineering & Management**

Address: Ashram Building, GN-34/2, Sector - V, Saltlake Electronics Complex,  
Kolkata, West Bengal 700091

<https://iem.edu.in>

**24. Jalpaiguri Government Engineering College**

Address: Jalpaiguri, West Bengal 73510

[www.jgec.org](http://www.jgec.org)

**25. JIS College of Engineering**

Address: Block A, Phase III, Dist. Nadia, Kalyani,

West Bengal 741235

[www.jiscollege.ac.in](http://www.jiscollege.ac.in)

**26. Kalyani Government Engineering College**

Address: Kalyani, Nadia, West Bengal 741235

<https://www.kgec.edu.in>

**27. MCKV Institute of Engineering**

Address: 243, G. T. Road, Liluah, Howrah, West Bengal 711204

[www.mckvie.edu.in/](http://www.mckvie.edu.in/)

**28. Mallabhum Institute of Technology**

Address: Braja Radhanagar, Pathakpara, Bankura,

Bishnupur, West Bengal 722122

[www.mitbishnupur.ac.in](http://www.mitbishnupur.ac.in)

**29. Narula Institute of Technology**

Address: 81, Nilgunj Road, Agarpara,

Kolkata, West Bengal 700109

[www.nit.ac.in](http://www.nit.ac.in)

**30. Netaji Subhash Engineering College**

Address: Techno City, Panchpota, Garia,

Kolkata, West Bengal 700152

[www.nsec.ac.in](http://www.nsec.ac.in)

**31. Pailan College of Management & Technology**

Address: Sector 1, Phase I, Bengal Pailan Park, Amgachia Road,

Joka, Pailan, Kolkata, West Bengal 700104

[www.pgmt-india.net](http://www.pgmt-india.net)

**32. RCC Institute of Information Technology**

Address: Canal South Road, Beliaghata,

Kolkata, West Bengal 700015

[www.rcciit.org](http://www.rcciit.org)

**33. Siliguri Institute of Technology**

Address: Hill Cart Road, Salbari, District Darjeeling,

Sukna, West Bengal 734009

[www.sittechno.org](http://www.sittechno.org)

**34. Supreme Knowledge Foundation Group of Institutions**

Address: 1 Khan Road, Mankundu, Adjacent to Mankundu Railway Station,

Chandannagar, West Bengal 712139

[www.skf.edu.in](http://www.skf.edu.in)

### **35. Surendra Institute of Engineering & Management**

Address: Dhukuria, P.O New Chumta,  
Darjeeling, Siliguri, West Bengal 734009  
[www.siemsiliguri.org](http://www.siemsiliguri.org)

### **36. Techno India Salt Lake**

Address: EM Block, Sector V, Salt Lake City,  
Kolkata, West Bengal 700091  
<https://www.ticollege.ac.in>