Chapter 02

Literature Review

2.1 Introduction:

The introduction chapter presented above as an attempt to introduce the topic under discussion which is "Library Management System". In the chapter, a basic introduction to what a library is, what are the major kind of libraries, the functions of library and most importantly the operations in a library was presented. Also the chapter was developed in such a way as to provide a basic introduction to library automation as a concept, its origins and the way in which automation was done was also notified. A detailed explanation of the different housekeeping functions together with the AICTE norms in India of library requirements in business schools providing post-graduation in Management was also explained. Upon giving the basic introduction to the topics the later part of the chapter was devoted towards establishing the need and the significance for the study to be undertaken to explain the logic in considering the importance of this research. Once that was established then the research problem and research questions were formulated based upon which the objectives of the research were finalized. Finally the scope of the research was clearly defined so that any chance of ambiguity would be eliminated. The next critical step in the research process is to explain the research topic in clear terms by not only introducing the readers to basic concepts related to the research topic but also the existing research undertaken by eminent researchers and scholars in the research area. This entire literature review chapter would be dedicated in establishing a logical and conclusive understanding on the research topic and all the sub topics related to that special attention is devoted to the research topic and makes the readers get a clear picture on the topic which is being addressed upon in this dissertation.

In the writing advice being provided to the research scholars and research students which acts as a guideline to their research to improve the quality of the researches conducted in their university, the University of Toronto defines the concept and function of ‘Literature Review' as under:*" The purpose of a Literature review is to convey the readers about what are the knowledge and ideas which have been established n a particular topic together with their strengths and weaknesses. A literature review is not only a descriptive list of materials available and a set of summaries, rather its developed on the basis of a guiding concept which might be the research objective or the problem that a researcher is discussing or their argumentative thesis in itself"* (UST, 2018).

Literature review in simple terms includes the current knowledge on a particular topic together with the substantive findings which are supported by the theoretical and methodological contributions to a particular topic being chosen for a research. Literature reviews generally use the secondary sources of information and never include new or any original experimental work. They are also used commonly with the research proposal also with the primary goal being situating the proposed current study to be aligned with in the body of literature together with providing a context for the prospective readers of the thesis or dissertation. They act as the staple for research in every field of academics. The role of a literature review as a part of a thesis or a dissertation is considered to be quintessential considering the basic fact that it is the first attempt to make the readers understand the research topic in a comprehensive manner. It not only provides the readers a way to understand the research topic through search and evaluation on the existing literature and body of knowledge being developed by eminent scholars on a particular field but also helps in developing a guideline on how the research should be proceeded further and what is the new original work that can be created out of the existing work considering something must not have been addressed completely or some sub sections needing to be developed further through the research process. Explicitly, a research literature review's role in a dissertation s to collect, organize, integrate and analyze the scholarly research, concepts and theories which have been developed in to an organized manner so that it becomes a disseminator of information a specified research topic which is easy to be studied and understood. Literature reviews in a research thesis are developed with the following specific objectives in mind:

- To investigate and identify the list of sources which contain the context and content related to the research area under discussion
- To provide in n organized fashion the previous works which have been undertaken previously on the area of the research
- To be able to comprehend meanings out of the existing research works
- To critically evaluate and analyze the literature and comprehend inferences from it
- To be able to create a platform wherein the controversies in existing literature being coined by the eminent researchers and scholars are clearly identified, understood and analyzed and presented.

- To find out if there are alternate views that exist with reference to the research topic
- To clearly identify and finalize of any GAPS that exist in the existing research which might ether be some topics which need further research or some topics which might need more attention as they would have been left out.
- To utilize the GAPS found and make them as an opportunity to further enhance the research
- To be find an opportunity to define sub-areas within the broader scope of the research topic which can be focused to create some additional content to the existing body of knowledge
- To make sure that the sub-areas found out in the broader research area which might require further analysis.

Having understood these objectives and the importance of literature as part of research study it is imperative to not only include it as a part of it rather makes a conscious effort to make sure that the objectives of a literature review are satisfied with due efforts. A conscious effort would be made to find the sources which contain the resources and information about the research topic to include them in the existing research which would enable the researcher to throw some light on the nuances of the research topic and also the sub topics or related topics to it. In particular what the researcher has tried is to analyze and find if there are any GAPS in the existing literature being collected from multiple sources as developed by eminent scholars and researchers from the field. The existing researches on library automation and library management systems in particular to find out if there is any further cope for research if found on what basis can be extended further. The strengths and weaknesses of the existing literature are being taken in to consideration and discussed in detail to find out the further scope of research. This is done inline within the basic structure of a literature review which is to take the research further in the logical sense.

The most critical aspect of a literature review is to provide a scope for the research as it is imperative to make sure that the topic which is chosen for the research is more precise and relevant so that the chance of obsoleteness is done away with. The major topics which would be discussed as a part of this literature review would include:

- Libraries of the world their origins, growth and future
- Indian libraries
- Library types and roles
- Library operations
- Library automation
- Library management systems
- Academic libraries in Business schools in Mumbai
- AICTE requirements and adherence to norms
- Future developments in library automation

Data sources:

The researcher has used multiple sources for collection of secondary data. The major sources used in this study include the following:

- Text books and reference books related to Library science and Library automation to gather basic idea on the topic
- High impact factor Research papers from Peer Reviewed Journals across from national and Internationally acclaimed authors and critics
- Articles, periodicals and opinions from leading library related publications and national dailies and websites
- White papers being published by organizations who are in to library automation products and services
- Theses and dissertations submitted, published and used as references at a national and international level which have already been added to the body of knowledge on library automation
- Institute's websites and prospectus which claim about the status of their academic libraries

Having read these existing literature from both the online and offline sources the researcher was able to develop the literature review. During the development of the literature review the following things were kept in mind.

- Checked on if the authors and researchers whose content has been included have formulated and established relevance of topics related to the research area or not?
- If the topics considered are in line with the research area then the next step is to check if they exist within proper scope and relevance in relation to the research area?
- The next step is to understand the basic approach and treatment undertaken by the existing authors and researchers in the research topic.
- Then the mode of approach which they have adopted has to be found out among critical or evaluative or interpretative?
- What are the secondary sources which they have used in their research and whether and what are the citations which they have included?
- To check if those secondary sources being used by them qualify to be added to the body of knowledge on the research topic and can be included in this research?
- Whether the literature from these are clear, precise and relevant to make a clear understanding on the research issue under consideration?
- Whether the existing literature is comprehensive enough or lacking in some specific areas?
- What are the strengths and weaknesses of the existing research and what is the scope for further development due to it?
- Is there a pressing opportunity for further research on the basis of available existing literature?
- If the literatures are referenced from empirical studies then it becomes imperative to check the accuracy of the design so as to ensure that the recommendations, measurements and conclusions being developed on the basis of those literature would be accurate valid and relevant?

By making sure that this point being kept in mind the researches has tried to induce more logic and objective in following up the research process. With these basic guidelines the research undertook the task of reading, analyzing and referencing the existing literature being available on library and library automation and was able to get the following output.

1) Firsthand knowledge about the libraries their history and origins, growth and future
2) How to enhance knowledge, skills and attitude towards starting, progressing and conducting a research study and specifically on finding sources of existing data relevant to the research topic.
3) Getting oneself become more familiar with different styles of writing and patterns from the existing literature so that how to effectively communicate and follow the guidelines is understood better.
4) Knowledge on how effectively establish relationships the underlying concepts with the ulterior motive of exploring them in detail?
5) How to effectively use an existing research on the specified topic to aid in expanding or contracting the scope for further and detailed research.
6) Knowledge on how to create a flow in dissemination of information in an organized manner so as to make sure that the readers are able to find a seamless flow
7) To understand how to avoid errors which may arise in developing concepts either of which may be grammatically or semantically wrong. This can be understood by analyzing the existing research.
8) Ability to clearly identify the strengths and weaknesses of the existing literature being conducted on the research topic and ensure that the same is addressed.
9) Trying to develop a unique style of analyzing, presenting and developing the analysis in a different way which has not been done earlier.

10) To be able to develop new concepts and introduce and clarify new definitions and add value to the existing concepts and definitions if t is permitted within the scope of the present research study.

11) Ability to infer new meanings and theories on existing concepts upon proper understanding of the literature because of which new nuances of the topic can be identified leading in to new ideas being developed

12) How to ensure comprehensive capabilities being developed in order to enhance out of the box thinking in developing new ideas which are related to existing body of knowledge

13) The most critical gained through this effort is how to use semantics as a means which can connect ends between multiple subtopics so that new concepts and theories can be developed which might lead in to creation of new theories.

Together with all the intended benefits that a literature review provides, the most important benefit is the opportunity that it provides a researcher on identifying the research gap which exists between the past research, present situations which lead into probable outcomes expected from the study.

"Use of Library Management Software(LMS), Across AICTE approved management institutes in Mumbai City", is focused on the following topics as a major constituent of the literature review.

- **Library**
- **Library Automation**

The topics which would be presented in sequence in the literature review are as follows:

- Libraries of the world their origins, growth and future
- Library history in India
- Library types and roles
- Library automation
- Library management systems
- Academic libraries in Business schools in Mumbai
- GAPS in Literature

2. 2 Libraries of the world their origins, growth and future:

A library deriving its name from the Latin word 'Liber' which means book and from the Latinized Greek word 'Bibliotheca' has been traditionally been referred to as a collection of books used for reading or studying or inversely a building or a room in which such a collection is being kept. Thames and Hudson (2013) , in their book " The Library: A world history explore and explain the evolution of libraries across the ages among different cultures in detail. Their work in detail investigates about the role of technology innovations together with the changing cultural attitudes being able to change the design fabric of the libraries from what they were as tablet storehouses of ancient Mesopotamia to what they have become a highly functional media center. Their study is more inclusive as it refers the evolution from the clay tables of ancient times to the next medieval age where the book catalogue emerged which were actually heavy and precious manuscripts being chained to the individual tables. Then the invention of the printing press lead in to the next stage where books became relative smaller and less heavier making them to be shelved. The wealthy people increasingly acknowledged their capability to collect a wide range of books and in the process the collection of books was considered to be a status symbol to them. Then came the modern era where libraries had to face a huge challenge from the digital media and saw a rapid decline in their user patronage as well as user numbers. The civic purpose of the library had to be established by incorporating them with cafe's, art galleries so as to establish a connect with the patrons. And now the automated libraries are taking the library as an institution to the next generations through the technological advancements.

The times when libraries were first introduced there was literally no difference between a record or an archive room or a library which states the fact that the libraries have indeed existed since the time when records have been maintained. The earliest references to a proper library or an archive was found in a temple in the Babylonian town of Nippur which is dated back to 3rd Millennium BC, where there were a number of rooms which were filled with clay tablets suggesting of a well-stocked library or archive was found.

The following is the timeline of ancient, medieval and modern libraries of the world as referred by Encyclopedia Britannica (2018):

Ancient Libraries:

- The Assyrian clay tablets found at Tell el-Amarna in Egypt which are dated back to 2nd Millennium BC which were collected and maintained from the temples by Ashurbanipal, the last of the great kings of Assyria who was ruling in between 668 BC to 627BC.
- In China, the older archives were said to be destroyed by the emperor Shih Huang -Ti who believed that his Ch'in dynasty should be regarded as the first because of which he ordered to destroy all the historical records which is regarded as the repression of history. So the first instance of a library or an archive dates back to 206 BC when the Han dynasty took over China and works of antiquity were recovered and record keeping and classification schemes were developed. So the Chinese system of libraries in actuality dates from the 2nd century to the 20th century presently.
- In the western world the idea of book collection and libraries in particular started with the ancient Greek temples which seem to have possessed libraries in earlier times and had archived repositories. The first evidence of an organized library started with the great schools of philosophy being centered in Athens during the 4th Century BC. stoics as they didn't have any property are devoid of libraries and the schools of Plato and Epicureans had libraries of their own. On the other hand the Peripatetic school of Aristotle with the intention of developing scientific research had a full-fledged library which was recreated with the surviving texts by Andronicus of Rhodes and by Tyrannion in Rome about 60 BC. Taking inspiration from Aristotle's library, a library was established in Alexandria with the intention of collecting the whole body of Greek literature by Ptolemy II Philadelphes in the 3rd Century BC which was the original idea of this father Ptolemy I sorter.
- The city of Rome was considered to be place for many libraries including the ones which were of Cicero, Lucius Licinius Lucullus, Julius Caesar and Asinius Pollio. Subsequently Libraries were also set up by Tiberius, Vespasin and Trajan from 10th Century to 5thCentury which also were also acting as the Public record offices in Rome.
- In the eastern side Constantinople picked up the library tradition starting with the ordering of 50 copies of the Christian scriptures and continued by collecting various

scriptures and the traditions have been continuing for thousands of years. Around 9th Century the scriptures were increasingly replaced by epitomes or summaries.

- In the Islamic world, after the death of Prophet Muhammad in 7th Century lead in to the large scale evangelism of the Quran which ultimately lead in to establishment of archives and libraries in mosques. The first instance of such a library was being developed on the inspiration of the University of Alexandria was proposed by Muʿāwiyah I, who reorganized his personal library in a such a way as to a prototype being used by his successors. Around 750 AD when the Abbasids seized the throne from the Umayyad's many classical Persian and Greek works had been translated and preserved. By the 10th Century Baghdad and Cordoba had developed themselves as largest book markets in the world. Monks and Scholars from other religions were often sent there to acquire books. Some of the other libraries of the Islamic world include Baghdad, Cairo, Alexandria and also Spain. Also there was also libraries which were prevalent at that point of them were Cordoba, Toledo and Granada which were present from 12th Century.

Medieval Period:

- The emergence of libraries in the medieval period cannot be discussed without the reference to the monastic communities which were in Europe since the 2nd Century AD. They were the first ones to understand the importance of a library by setting them up under the supervision of a 'Precentor' whose duty was to issue the books and take inventory of them on a daily basis. The monasteries included a 'Scriptoria' which is a place the manuscripts were being copied and preserved. Some of the Scriptoria which became famous during the time were

    - Monte Cassino and Bobbio in Italy
    - Luxeuil in France
    - Reichenau, Fulda and Corvey in Germany
    - Canterbury, Wearmouth and Jarrow in England

  In these places several rules were being laid down to people for the usage of the books and curses were invoked on people who made off with them. Books were also lent to other monasteries and to general secular public also by making the monasteries perform

the functions of a public library also. By 11th Century the monkish students in the monasteries deposited the lecture notes made on Aristotle, Plato, law, medicine and other subjects there by extending the contents of the libraries in the monasteries.

- Apart from the monasteries the libraries of the newly formed universities became the main centers of study till the end of the middle ages. Books at that point of time were very costly owing to which they were available and affordable only by the rich and famous. In the 13th ,14th and 15th centuries there was a huge development in case of private book collections. Some of the influential collectors include Philip the Good, The Duke of Burgundy, the French kings Louis IX and Charles V who is noted as the founder of the Kings library called as the Bibliothèque du Roy which was later renamed to Bibliothèque Nationale or the national library.
- In the 14th Century scholars such as Niccolo Niccoli, who was the librarian to Cosimo de' Medici the ruler of Florence along with Gian Francesco and Poggio Bracciolini collected the manuscripts of the writers of Greece and Rome and incorporated them in the library. On seeing Niccoli's library, Cosimo de' Medici set up the Biblioteca marciana in Florence in the convent of San Marco.
- In the year 1571 Cosimo's grandson opened up the rich library of 'Lorenzo the Magnificent' which later went on to become a public library. Designed by the famous Michelangelo, this magnificent library exists in the name of Biblioteca Laurenziana
- The other libraries of this period were the library of Matthias Corvinus of Hungary and the library of Escorial in the year 1557 which was based on the collection of Philip II. The Vatican library dates its foundation to this period of time.

- During the years 1536 to 40 in England a huge backlash happened against the monastic libraries through Henry VIII and their treasures were dispersed and even more wholesale destruction happened in 1550 when Henry VIII and Edward VI aligned themselves with the humanists and the universities because of which all the churches and the libraries associated with them were purged of books which were embodying the learning's of the medieval ages making the losses incalculable

- It was only until 1660 when the losses caused were reduced by collecting the scattered manuscripts by Matthew Parker, the archbishop of Canterbury under the reign of Queen Elizabeth and with the help o her principal advisor William Cecil. The other collectors involved in the restoration were Sir Robert Cotton and Sir Thomas Bodley. Matthew Parker eventually went up to the Corpus Christi College in Cambridge and Sir Robert Cotton went up to form the British Museum Library which is now a part of the British library and Sir Thomas Bodley set up the Bodleian Library at the oxford.

- The medieval period also saw large scale reformation in other parts of Europe in Germany and Northern countries where many contents of monastic libraries being destroyed and classic case was seen in German under the reformation leader martin Luther who in spite of his personal affinity towards libraries had written a letter in 1524 to all the German towns to stop any pains or money to be spared in setting up libraries. Due to this the libraries of Hamburg in 1529 and Augsburg in 1537 date from that times.

- Moreover the thirty years war in Germany caused the libraries to suffer in a great way. The Bibliotheca Palatina at the University of Heidelberg which was founded as early as 1386 was taken as a spoil of war and was handed over to the Pope Gregory XV by Maximilian I of Bavaria in 1623

- In 1620 Gustavus Adolphus sent the whole libraries to Sweden in order to swell the library of the university of Uppsala which he had founded. On the other hand dissimilar things happened in Stockholm , France, Italy Southern Germany and Austria where the Roman Catholic faith remained unshaken from the reformation because of which the older libraries remained intact and also they were supplemented by the newer libraries which were set up by the Jesuits for educational purposes.

- In the case of the Islamic world also just like Europe the libraries initially were attached to the Mosques and Madrasahs as the contents were largely related to religious books and only the adjunct libraries carried the secular nature books being open to secular public. Part from these libraries majorly were confined to the places and wealthy homes. The major contents of these libraries included regional histories, geography, astrology, travel and alchemy.

The new age of libraries in 17th and 18th centuries and emergence of national libraries:

The 17th and the 18th centuries can be called as the golden centuries of libraries because of the widespread affiliation towards books leading in too many people getting interested in scholarly activities making libraries an epicenter of knowledge dissemination. Private collections were assembled in Europe and North America which eventually became the core of today's great state and national libraries. This period also saw the establishment of many new national collections and Universities worldwide. Some of the notable development of this period are as follows:

- In 1598 Grantham Library in Lincolnshire was set up which is one of the first parish libraries attached to the church and to be used by the clergy.
- 1653 saw the emergence of the parish libraries in Bolton and Manchester together with the Manchester town library which is still in existence found from the lay donation of Humpry Chetham a Manchester merchant.
- In the 18th century in England and Throughout Europe and in the United States the vogue was widespread towards the circulation and subscription based libraries together with the emergence of societies which were providing reference service and lending collections to their members thereby exerting a huge influence on the formation of a popular literary taste especially in fiction
- On the other hand there was a growing need for a new approach to the library organization which was felt in the largest and powerful influential collectors like Cardinal Mazarin in France and others. The First library to inculcate changes was the Escorial Library in Madrid. They were the predecessors in taking away the practice of arranging their collections in cases lining the walls and did away with setting them up at right angles to the light source

- In 1617 Jacques-Auguste de Thou who was a lawyer and the councilor of a state started the practice of standing books with their spines facing outward in France and gradually abandoned the old practice of chaining books to their cases

- In 1627 Gabriel Naudé who was the in charge of Mazarin's Library was the produce the first modern treatise on library economy called as *Advis pour dresser une bibliothèque* which was the first guideline on how to establish a library.

- The idea incorporated by Naudé of a scholarly library which is systematically arranged and displaying the whole of recorded knowledge and open to all scholars was well received by many successors and mainly by Gottfried Wilhelm Leibniz who had conceived the idea of a national bibliographical organization which is capable of providing the scholars with easy access that is written on a particular subject.

- In 1593 in France, Bibliothèque du Roi, got De Thou as the director after the reorganization was done by Louis XII in the 15th Century

- In 1691 Mazarin's library was reopened after the huge unrest known as the 'Fronde' happened and was open to public again. It remained as one of the greatest libraries in France until the French revolution when it was incorporated with the other collections to form the 'Bibliothèque Nationale' which is still one of the greatest libraries of the world.

- In the year 1604, August, Duke von Braunschweig established a library which eventually became the Herzog August Bibliothek at Wolfenbüttel which remains to be the finest libraries in Europe since the dawn of the 18th Century

- Prussian State Library found its origin from the library which was assembled by the elector Friedrich Wilhelm of Brandenburg in the year 1659
- The private collections of eminent collectors such as Sir Hans Sloane, Sir Robert Cotton, and Edward and Robert Harley, earls of Oxford went on to become the base for British museum collection in the year 1753 which was later enlarged later in the year 1757 by the addition of the Royal Library.

- The effects of the French revolution took a huge toll in the development of Libraries in entire Europe by sealing the fate of many monastic and church libraries and this pread to countries like France in 1789, Germany in 1803 and Spain in 1835.
- In the year 1792, this spread over to the aristocratic families and befell on their collections which were eventually added to the *dépots littéraires*.

Latest Developments:

At the dawn of the 19th century the difficulties in library management owing to their growth in size which had lead in to the following troubles:

- Haphazard growth
- Weakness in administration
- Non-existence of service standards
- Inadequate funds for acquisition
- Librarian's post largely looked upon as a temporary or a part time position
- Cataloguing being done in arrears and lacked a proper method

- Some of the libraries which were an exception to these trend was the Library at the University of Göttingen, which was managed by the first librarian Johann Gesner who working in coordination with the Curator of the University Von Münchhausen, and following the principles being laid down by Leibniz was instrumental in managing the library in such a way that the library consisted of a very good catalogue of carefully selected literature which was available to all making the library the best Organized library of the world.
- The other notable contributions to library management came from Sir Antonio Panizzi who was a political refugee from Italy and went on to work for the British Museum from 1831. He was responsible for revolutionizing the library administration by making sure that the books present in a library should be aligned with the declared objectives of the library. He developed the rules for the cataloguers and focused on the need to maintain an elaborate catalogue. His work in the library administration won him much appreciation in the Library of Congress in Washington D.C

- The middle of 19th century saw the idea of community libraries being advocated in a big way through the public expenses. This lead in to a huge spike in the development of library provision. This was extended to the tune of enacting an act in the British parliament where the law was to enable local councils to levy a rate for setting up the provision of free library facilities.

- At the dawn of the 21st century there was a paradigm shift in the concept of a library and librarianship due the radical developments in the new information technologies. Especially at the end of the century the advent of computer based systems in providing an enormous network of information to individuals changed the way how information was shared from the traditional library set up where the books and other materials from them or sister libraries being supplanted by the use of electronic database which included everything from library catalogues to subject area indexes and abstracts to journals together with entire electronic books.

Virtual libraries are seemingly on the rise due to the growing patronage towards worldwide electronic network which is changing the role of a library from a storehouse site. Also it is redefining the role of a professional librarian to a technology expert capable of motivating people to use technology to aid in their information search.

2.3 Library history in India:

When we discuss about the history of libraries one important thing that has to be noted is that the history of libraries are indeed as old as the history of writing in itself. Almost 5500 years ago when people first started recording their ideas using various materials including:

- Clay
- Metal
- Wax
- Wood
- Papyrus

- Silk
- Leather
- Parchment
- Paper
- Film
- Plastic
- Magnetic tapes
- Electronic forms

Whenever every form of these materials were used to generate collections the concept of assembling those connections as libraries have been in existence (The world book encyclopedia, 2012). In the previous section the history of the libraries of the world, their origins and expansion were discussed in detail. This section would be devoted to explain the libraries in India.

Ancient Age:

- In ancient India the libraries were established and promoted by the kings and emperors the first among which was King Bhoj who had a palatial library which holds "Kadambari" the most famous work of Bambahatta the Sanskrit poet and scholar (Chohan, 1998[i]) [i]
- In the beginning of the 5th Century a Chinese Pilgrim Fahein, who had spent more than half a decade in the country collected Buddhist scriptures as well as recorded information about the Buddhist kingdoms and Jatavana Monastery and preserved them in a library which was being used by scholars and religious teachers (Gupta and Singh, 2006)[ii]
- The presence of an comprehensive library in the Nalanda university was recorded by another Chinese Buddhist monk and Scholar, Hieun Tsang who had visited India much later than Fahein did. He has recorded that the Nalanda university library indeed was home to much scholarly activity and had an advanced library culture. 30 years later I-Tsing visited Nalanda Library and made use of the resources there. The library at that point of time had a comprehensive collection of books out of which he had copied about 400 Sanskrit works from about 5,00,000 verses.

- The other universities which had valuable books in their libraries during that period were Vikramshila and Taxila (Archives Department, 1918)[iii].

- The growth of libraries was further stimulated during the Mughal period as the rulers believed that their existence is also relied upon their education and knowledge because of which they had given much importance to the socio-cultural development of their kingdoms. Private libraries were being part of their forts and some of the rulers who were patronizing libraries were Babar's daughter, Gul-Badan Begum followed by Emperor Humayun who had set up a private library in Agra fort. Akbar's library was regarded as one of the best with its rich collection of Sanskrit, Persian and Arabic books. It was even said Akbar had a personal library which was mobile and was carried over to wherever he visited.

16th – 19th Century Libraries of India:

- While the growth of Indian libraries is being discussed between the 16th and the 19th Century the names of Maharaja Sawai Man Singh of Jaipur and that of Maharaja Ranjit Singh of Panjab are remembered much owing to their appreciation and patronage towards library services in India. The famous Saraswati Mahal Library formed in the 17th Century was incorporated by the Maharaja of Tanjavore and it still remains to be the most unique institution in its collection of texts as well as services. The libraries which were established by these kings were initially operating as private institutions and access to them was hugely restricted and allowed only to the kings, princes and the selected set of scholars and their loyalists (Sathikumar, 1993).

- The huge European settlement in India during the 17th and the 18th Century saw a huge impetus to the emergence of libraries in the country and particularly the city of Calcutta saw a huge impetus as it became the hub for all British settlements in India in their early days.
- In 1707 the East India Company established the Fort St.David Library in Cuddalore and it was followed by a circulating library proposed by the by the Society of promotion of Christian Knowledge which was the first of its kind in India.

- Some of the other notable libraries during that time were:
    - Fort St. George Library in the year 1714
    - East India Company's Bombay library in 1715
    - John Andrews Circulating Library at Fort William, Calcutta in 1770
    - Calcutta Circulating Library in 1787
- In the early years of the 19th Century the presidency towns of Bombay, Calcutta and Madras had public libraries which were financed by the Europeans residing in this town (Jagdish,1979)[iv].

- In the year 1808 the Delivery and Registration Act of Bombay was established which is considered to be a major development in the library movement in India.
- Some of the other notable libraries which were present during the period were:
    - Asha Grnthalaya in Waltair in 1800
    - Calcutta Literary Society's Library in 1818
    - United Services Library, Poona in 1818
    - Raghunandan Library,Puri in 1821
    - Bombay General Library in 1830
    - Bibliotheque Publique in 1827
    - Public Livaria in 1832 changed to Bibliotheca Nacinal de Nova, Goa
- In 1835 the public library in Calcutta was set up which is considered to be most significant because it served the needs of all classes of people and later became the National Library of India
- In the year 1860 Jesse Mitchell set up a small library in Madras as a part of a Museum and opened to public i the year 1896 which was named as the Connemara Public Library. In the year 1948 it became the State Central Library and also it can be claimed as the first true public library.
- In the year 1867, the Government of India enacted the Press and the Registration of Books Act XXV the provisions of which made it mandatory of the publisher of a book to deliver a copy free to the provincial Government concerned to be transmitted to the Central Government and more copies if the provincial government desired which lead in to the huge influx in to the public libraries of the country.

- In the year 1876 the Khuda Baksh oriental library was established in Patna by Maulvi Muhammod Baksh Khan who had left 1500 transcripts which formed the part of the library which was opened to the public in the year 1891.

Libraries in India in 20th Century before Independence:

- In the year 1891 the Imperial Library was established in Calcutta which was them amalgamated with the Calcutta Public library by the promulgation of the Imperial Library Act of 1902 by Lord Curzon. The Government of India immediately after Independence had passed the national Library Act in the year 1948 which made the Imperial library to be henceforth being called as the National Library of India

- In the year 1910 a scientifically organized free and open public library system was set up in Baroda by the efforts of Maharaja Sayyaji Rao Gaekwad III whose contribution to public library movement of India was highly commendable. He was also instrumental in establishing the State-wide free public library network.

- Borden is considered to be one of the forefathers of Library movement in India. He was responsible in creating the first library school in India and also developed a library classification scheme specifically suited to Indian libraries. He was also instrumental in founding the Baroda Library Club and a journal called as 'Library Miscellany' which was published in three languages between 1912 and 1919 (Kaula,1965)[v].

- In the case of Punjab, the Punjab Library association was formed in the year 1915 by Don Dickinson. He also published the 'Punjab Library Primer' in the year 1916 which was the second Library science publication in India (Taher, 1994)[vi].
- In 1921 the 'The Indian Library Journal' was published in Andhra Pradesh and subsequently a Telugu Journal called as ' Granthalaya Saraswamu' was published

- In 1931 the five laws of Library Science was Published by S.R Ranganathan

- In 1931 the Colon Classification was published and in1934 the Classified Catalogue code was published.

- In 1914 the first conference of the Library Workers and persons interested was held in Beswada Andhra Pradesh

- In 1918 the first conference of the All India Library conference was conducted in Lahore

- In 1933 the Indian Library Association was launched in Calcutta and subsequently the All India Public Library conference was conducted in Madras in the year 1934 (Kaula, 1965).

- Between the years 1937 to 1942 a huge numbers of village libraries and travelling libraries were set up in Assam, Bihar, Punjab and Travancore.

- In 1939 a Library Development Committee was established by Government of Bombay under the leadership of A.A.A. Fyzeein which prepared a report and submitted in 1940. On the basis of the recommendations of the committee a State Central Library was set up at Bombay and a Regional Library at Pune. The committee also recommended the establishment of a District Central Library and a Taluka place in the State of Bombay (Chakrabarthi, 1993[vii]).

Indian Libraries in the 20th and 21st Century (Post Independence):

- The first national library was the one which can be traced back to the Calcutta Public library which came in to existence in 1935. Thereafter in 1903 the Calcutta Public Library and the Imperial library formed in 1835 were amalgamated to form the Imperial Library of Colonial India and finally renamed as the national library in 1948.
- The establishment of the Public libraries in independent India is largely due to the involvement of the Union Government in the Public library movement which saw the establishment of many libraries including the Delhi Public Library in 1951. It is

considered to be a significant development in the Library History of India as it was the first library to be developed under the UNESCO Public Library pilot project. The joint collaboration in this project by UNESCO and Government of India was an effort to bring the modern concepts in library science and implement according to Indian conditions. The factors responsible for success of the Delhi public library were governmental patronage and adequate finance and trained professionals managing things. But over the years the same importance has not been given to it making its status really poor (Verma and Agarwal,1994)[viii]

- In 1954 the Delivery of books and Newspapers Act was passed which made it mandatory for the publishers in India to deposit every copy of the book that they publish to the following libraries in order to establish the Indian national Bibliography (INB) which would be published by the Central Reference Library in Calcutta :

    - National Library in Calcutta
    - Asiatic Society (Central) Library Bombay
    - Connemara public library, Madras
    - Delhi Public Library

- By the year 1954, India had about 32,000 Public Libraries with a book stock around 7.1 Million volumes and much of the credit for this feat should go to eminent people like S.R Ranganathan and other leaders who supported and coordinated with him. After the first legislation for libraries in India was passed in 1948 which was 'The Madras Public Library Act' Ranganathan was able show to the other states that how library development could be achieved through library legislation.

- The following are the library legislations passed in the states in India

    - Andhra Pradesh Public Libraries Act, 1960
    - Karnataka Public Libraries Act, 1965
    - Maharashtra Public Libraries Act, 1967
    - West Bengal Public Libraries Act, 1979,

- Haryana Public Libraries Act, 1989
- Kerala Public Libraries Act, 1989
- Mizoram Public Libraries Act, 1993
- Goa Public Libraries Act, 1993
- Haryana Public Libraries Act, 198,
- Gujarat Public LibrariesAct,199,
- Orissa Public Libraries Act. 200,
- Gujarat Public Libraries Act, 200,
- Uttaranchal Public Libraries Act, 200,
- Uttar Pradesh Public Libraries Act, 2005
- Rajasthan Public Libraries Act, 2006
- Bihar Public Libraries Act, 2007
- Chattisgarh Public Libraries Act, 2007 and
- Pondicherry Public Libraries Act, 2007/2008

Governmental measures in Library administration:

Sinha Committee, 1957:

The Government of India had involved itself in developing the public library system in India and had a clear focus on developing the Intellectual capital in the country. As a first measure they had set up an advisory committee under Dr Sinha called as the Sinha committee in 1957, in order to suggest the improvement of public library system in the country. The main objectives of setting up of the committee was as follows:

- To determine the current needs in reading and how are they being met and what exactly is the role of the present library system in meeting those needs
- To determine the reading tastes prevalent and find out the agencies which provide suitable literature in satisfying them and on how to improve the reading tastes
- To recommend the future library structure in India
- To recommend on areas where a coordination between libraries and the education system can be established

- To determine and recommend the training required for librarians and also to find their conditions of service To recommend the administrative and the financial measures required to support the public libraries in India (Ministry of Education, India, 1961).

The recommendations made by the committee in the year 1958 after investigation are as follows:

- To establish a Public library system in every Indian state under the control of the State library Authority
- To establish an independent Directorate of Social education and libraries in every state
- To add 6 Paisa per rupee as part of Property tax as Library cess in every state

To simply put the committee has clearly mandated to create a hierarchical structure in establishing a comprehensive a public library system from the National level and drilling down till the village or the Panchayat level. If this was implemented it could have created an organized and comprehensive public library system in the country but unfortunately the implementation has not happened till date.

Working Group on Libraries-1965:

A working group on libraries was set up by the planning commission in 1965 under the Chairmanship of DR. V.K.R.V Rao to suggest measures to streamline the public library system in India and the committee submitted its report in 1966. The report of the committee consisted of suggestions to create a balanced development of public libraries as part of the Fourth Five year plan between 1955 to 1971 together with a prospective plan for the next 15 years. The major recommendations of the working group are as follows:

- To create a separate Division / Branch for library affairs.
- To set up 3 model public libraries in the country in line with the Delhi Public Library.

The planning commission again had set up a Working group under the Chairmanship of Dr N. Seshagiri in 1984 to come up with modernization plans for the library services and informatics for the 7th Five year plan between 1985-90. The committee submitted its report on July 1984 and came with the following recommendations:

- Top priority to be given to the enactment of a Public Library Law in India
- A comprehensive network of libraries to be planned and developed in all the states of the country

- Proper coordination among the public library development activities together with the activities of the Social Education departments as well as the extension activities of the department of agriculture

Enactment of Copyright Act 1957:

The enactment of the Copyright Act is seen as the landmark in the history of public library system in India which had the following clauses combined as fair dealing exemptions.

- The right of public libraries to make sure that there are three copies of books which are not available for sale in India
- Researchers of previously unpublished library resources to get a fair chance of reproducing them in publications with the need to identify themselves as authors
- Fair dealing of Library artistic , musical and dramatic works from the ambit of infringement so that they can be utilized if in case of private use.

At an overall level this made the public library to be amenable to a varied range of usage by its members without incorporating the fear of prosecution.

Raja Ram Mohan Roy Library Foundation-1972:

One of the most remarkable development in the library movement in the country was the establishment of Raja Ram Mohan Roy Library Foundation in the year 1972 in order to spread the library services all over the country with active cooperation with the State Governments, Union territory administration and NGO's working in the field with the following objectives in the mind:

- To Promote the library movement in India
- To Adopt the national library policy
- To develop the national library system which integrates the services of national libraries and all other types of libraries
- To Propagate and adopt the library legislation in the country
- To provide financial and technical assistance to libraries
- To provide financial assistance to voluntary organizations and library associations enabling promotion of library development
- To ensure the periodic publication of reports on library development
- To work as a clearing house of ideas and information on library development of India and elsewhere
- To act as an advisor to the Government on library development

- To promote research in problems of library development in India (Baraua,1994).

National Policy on Library & Information System (NAPLIS):

The National Policy on Library and Information System (NAPLIS) was set up under Prof D.P Chattopadhyay in 1985 to give recommendations related to Public Libraries. NAPLIS, submitted its report on may 1986. On the basis of which another committee was constituted to look at the implications of the report and create an action plan in this regard (Bhatacharjee, 2002). An empowerment committee was set up in the year 1988 and the task being to implement the recommendations. A working group was also constituted which submitted its report in 1993 calling for the implementation of 29 of the 60 recommendations as proposed by the NAPLIS. The following are the most critical of the recommendations proposed by NAPLIS.

National Policy on Library & Information System (NAPLIS)

- The State Legislative Enactments should come up with proposals for maintenance and development of public libraries
- Model Public Library Bill to be revised by the Central Government in such a way that the funds for library development should come from each State which may be allotted through the general revenue or from the local taxes
- Funds provided to libraries should be part of plan expenditure
- Emphasis on rural libraries should be priority and establishment of rural community centre or community library to be undertaken where there are a cluster of villages are present. This can be build upon by the resources from agencies dealing in adult education, public health and it should be the duty of the State and Central Governments to maintain this centre.
- Assistance provided by the Central Governments to the States should be increased for better development for public libraries and this has to be managed together with RRRLF which would be the coordinating agency.
- To create standards and guidelines for proper library service.
- A Comprehensive system of libraries to be created including National, Regional libraries in Metros forming an integrated system
- With the Ministry of Human Resource Development as the reporting authority a National Commission on Libraries and Information System or National Commission

on Informatics and Documentation may be constituted by an Act of Parliament which will have representation from appropriate central and state agencies. This body will be vested with the implementation of the NAPLIS programs.

- Creating of national depository libraries in Chennai, Mumbai and Deli to be complementing the efforts of the National Library
- To mandate the maintenance and up gradation of the national Bibliography by including a comprehensive coverage of the national output of documents
- National level awareness campaigns to create awareness on need to preserve the cultural heritage
- Preservation of document procedures to be vested with the national libraries
- National libraries should be responsible for preservation of documents, and preservation facilities needs to be created there.
- To establish proper linkage between the libraries, archives and museums for national preservation
- To establish a community centre in every Panchayat centre
- To establish a link between the community centre library and primary schools if those schools do not have a library of their own.
- The community centre library to play a major role in adult education
- Community centre library should have an important role in adult education programs.
- District library to include facilities and recreation for disables citizens
  Distinctive culture to be maintained by building libraries in minority areas and areas having tribal connection
- Resources including publications covering Open university and vocational courses which are necessary for distance education to be included as part of library's collections
- The national Information Grid to include the complete State Library network comprising of Village libraries through the communication centre, district library and the state library (Sahib, 2003)[ix].

These are the measures from the government to ensure the development of Library networks in the country. The next Section will include the types of libraries and special emphasis on academic libraries.

2.4 Library types and Roles:

Libraries on the basis of the patrons that they serve are divided in t four major categories. They are:

1. **Academic Libraries -** which serve the needs of stakeholders in colleges, institutes and Universities
2. **Public Libraries** - Which serve the information needs of citizens living in a village or a town or a city
3. **School libraries** - Which serve the needs f Kids from Kinder garden to Year 12 together with parents and others
4. **Special Libraries** - which are catering to special needs of people associated with hospitals, museums, corporations. Military, government departments and private businesses

In this study emphasis is more on the academic libraries and the following section would be dedicated on the academic libraries. An academic library consists of multiple factors to be taken in to consideration which includes the administration of the library, the financial aspects, document collection methodologies, Staff in the library, services provided, physical facilities, usage of library by the students, research scholars and faculty. Also the things that are under the purview of academic libraries are information seeking behaviour of the stakeholders in a library, use pattern, usage satisfaction with reference to the overall functioning of a library. The following is a collection of researches being conducted on status on academic libraries in India.

In one of the earliest researches conducted on library facilities in training colleges in India Mukherjee (1965)[x] found that the academic libraries in many of these institutions did not even have the proper space for functioning properly. On the other hand some of the colleges did not even a library of their own to be used by the faculties and they had to depend upon the university

libraries which they were affiliated to. This was exactly the status of affairs of the academic libraries in India. Also there multiple studies being conducted to find the status of different aspects of academic libraries in the consecutive years. In the year 1969 a study was conducted by Hingwe (1969)[xi] on understanding the organizational patterns of Academic libraries which had the main objective of finding the adequacy of library facilities and whether they are capable of supplementing the teaching and research programs of the institutions that they are a part of. It was found from the study that on comparison of the newly established and the long -standing institutions, the new institutions were relatively spending more funds on building library infrastructure and basic collection and on the other hand the established institutions were not increasing their expenditure on libraries in proportion to the increase in the number of students, teachers as well as the price of ten collections. In a nutshell this study proved that the importance to be given for libraries in academic institutions were more on the theoretical plane was not actually experienced in practice. Similar kind of studies have been conducted in many states of the country in academic institutions and the libraries which are part of it. In a study conducted in the state of Kashmir, Raina (1980) [xii]found that the libraries in the selected colleges being chosen for the study did not have a comprehensive set up and the library collections were majorly outdated and comprised only of text books. There were hardly any reference books and the only library services being provided was circulation service alone. They were following a closed access system and the funds to manage the libraries were inadequate and the rate of acquisition was very slow. In a similar study conducted among the colleges affiliated to Gulbarga University in Karnataka, which was aimed at finding the status of libraries and the staff and the services provided it was found to be an altogether disappointing picture of the libraries as found by Kumbhar (1986) where in most of the libraries did not even have a own building for operations

and there was a acute lack of qualified librarians to run the show. Most of the funds were spent only on books and rarely periodicals were added as part of their collection. This has been the state of affairs in many of the libraries across the states in eh initial stages.

In a study conducted on the state of Punjab on the condition of academic libraries in the state of Punjab and the problems being faced by them by Jasmer Singh (1990)[xiii] as a part of his doctoral dissertation, the data showed that the prevalent position of the libraries was that the collections were not comprehensive enough and he biggest problem being faced was the lack of adequately trained staff who could render the library services properly to the stakeholders in the academic institutions. An altogether different problem was being faced in the libraries associated with academic colleges in Delhi where the librarians were facing huge trouble in dealing with both the teaching and non-teaching staff on the return of books. The main reason for this was the presence of the library rules only on paper and was not followed rigidly nor implementation of the rules were given due importance by the authorities who were in charge of these libraries (Bajpai,1995)[xiv].

Chopra (1995)[xv] while doing a research on the problems faced by academic problems in colleges in Punjab and reconsidering them to check whether the older problems still exist or not was able to group the problems faced by the libraries in to three major categories.

- The problems related to the management of the colleges
- The problems related to the principals of the colleges
- The problems related to the library staff

The major problems underlined were

- Shortage of staff
- Inadequate funds
- Physical facilities
- Circulation of books
- Stock verifications
- Library working hours

Comparing the state of affairs in a developing country like India on the status of the Libraries would also be able to give a clear picture on the condition of academic libraries. In a study conducted in Nigeria on the status of the college of education libraries, Awolola (1998)[xvi] found out that the libraries were not being able to perform their functions properly owing to the main reason being inadequate funds to manage them in a better way. This particular fund issue if addressed properly would indeed help in developing the libraries further. The author also suggested that standards and guidelines should be formulated specifically for the efficient functioning of the academic libraries in particular. On the other extreme there are pillars of education like the Indian Institutes of Technology which are considered to be spreading education revolution in India. They consist of libraries which were supposed to supplement the learning objectives of the students and support the academic staff. Singh (1999), took up a study to compare the reader's services being prevalent in the IITs in India and was able to find that the major reader's services such as

- Circulation
- Reference
- Inter-library loan
- Current awareness service
- Translation
- Photocopy
- Document reservation
- Bibliographical services

Were all very much in practice and done effectively and among the services the CDROM search was the most popular service. He concluded that the libraries in IITs were very much in line with transforming themselves as digital libraries of the future.

Al-Ansari and Al-Enezi (2001)[xvii] in their research conducted to find the current status of health sciences libraries in the kingdom of Kuwait on the basis of their resources, facilities and the services being provided found that majority of the staff were not equipped enough to manage the libraries and they were not professionals. The libraries by themselves were providing only basic information services and the level of automation was not significant. Considering the fact that funds were not an issue in that country, the commitment towards library development was

relatively less. In the same year a study was undertaken by Joshi (2001)[xviii] to find the status of veterinary college libraries in the state of Maharashtra. Some of the major findings of this study were that

- The book collections were totally found to be inadequate considering the information needs of the users of the library and the growth was also relatively slow
- The journal subscriptions were pathetically less
- The libraries were understaffed with less staff juggling between providing various services

On the basis of this the author recommended that a proper orientation program for the library staff be conducted through the aegis of the Indian Council for Agricultural research and Agricultural research to not only make the staff understand the importance of the libraries but also help in performing their duties better. In another researcher conducted in the state of Maharashtra in the colleges of education by Veer (2004)[xix] it was found that similar kind of state remains there too. After a period of two years a research was conducted to examine the prevailing position of 30 agricultural universities in India with reference to the documentation and information services being provided by them. The study found that the libraries in the Agricultural universities were effective in providing Current Awareness Services (CAS) as well as bibliographic services (Gautam and Srivastava ,2006)[xx]

There were two research studies conducted in Nigeria to find the status of academic libraries and among them the first one was the study conducted in the law colleges and the libraries associated with them. The study concluded that all the libraries were indeed containing the same information sources in law but the libraries were devoid of professional management and most of the librarians were not professionally qualified. Serial sections were not found properly in more than half of eh libraries in law colleges the strength of the staff in the library was also very much inconsistent (Oyesiku et al.,2006)[xxi]. The second study was conducted in the colleges of education and the libraries being associated with them. This study was majorly conducted to find the status of the library service standards being followed. The study revealed that the libraries were indeed providing only the basic services in line with the requirements of the National Commissions for colleges of education and not very much aligned towards providing the indexing and abstracting services (Adebayo, 2007)[xxii].

In a study conducted to understand the effectiveness of the collection services being provided in the college libraries by Partap (2007)[xxiii] , it was found that the quantum of collection varied with reference to the vintage of the college libraries. The older and already existent college libraries had a better collection of books and reference materials as compared to the relatively new libraries. The working hours of the libraries on an average was between only 6 to 7 hour a day. On the basis of the research it was suggested that it is mandatory to conduct a user education program in order to ensure that the staff in the library are able to understand and implement the need for increasing the range and depth of collections and services in the libraries. In a similar study conducted to find out the level of implementation and usage of the electronic information services in the libraries of fisheries colleges in South India it was found that the libraries are increasingly adopting to the electronic information services so that the stakeholder's need for relevant and updated information was kept at top priority (Sujatha and Mudhol , 2008)[xxiv].

Roles of academic Libraries:

The most important role of academic libraries in facilitating research and the literature has also acknowledged the pivotal role of academic libraries in ensuring that the research quotient in the academic institutions are held in the highest order. With the growing emphasis on research as an important ingredient in determining the quality of an educational institution and the collections that are held by a library remains critical to manage the library provides better services. The libraries of today are not doing what they did in the past or neither what would they be doing in the future (Kaufman ,2005)[xxv].

The libraries in universities play a more significant role in supporting the research process. They don't act only as storehouses for books and journals rather they provide physical space for student learning as well as provide systematically digitized information. Especially the role of digital services being offered is more appreciated and helpful to the technologically savvy students and younger generation of academicians considering their adaptation to digital technologies to a greater extent (Ka ,2005)[xxvi]. In a research conducted in Indian Universities Singh (2007) concluded that research is being gaining increased importance in Indian universities and the universities are seen to be increasing their fund allocation towards researches and the rank of the universities are based upon their research output. He also concludes that there is a need to re-examine the role of academic libraries in facilitating the research process in

universities. If done this would ensure that the academic libraries would be able to provide their services more effectively and provide better support to their users.

Webb (2007)[xxvii] in his research concluded that academic libraries are acting as gateways to academic knowledge through their own collections as well as facilitating access to materials. In line with their core activities which define their purpose of their existence the academic libraries should also support the research activities of the researchers through their services. The most important reason for which the university libraries are dedicated is to how they perceive the needs of the students as well as the researchers in a university. If they are not able to properly do this then they would not be in a position to assist the research activities effectively as well as their contribution towards the university's research would not be in line with the expectations (Haglund ,2008) [xxviii] . In spite of a large portion of the literature supports the active involvement of academic libraries in research activities and their role in facilitating research is considered to be significant there is much debate that the overall support of the academic libraries to research was not strategic. Research indicates that the academic libraries instead of developing a comprehensive research collection of their own were seen to be relying heavily upon inter-library loans in order to support the research activities (Patterson 2009)[xxix].

Another important aspect to be noted in the context of academic libraries is that the usage of academic libraries is largely dependent upon the perceived familiarity of the user's on the library and its resources in particular. Those of users who are very familiar with a particular library are more prone to use it. In order to make the user's use the library more effectively it is imperative for the librarians to make sure that the patrons are motivated to use all the resources available in the library not only within the library premises but also how to use the library's resources remotely (Simmonds, 2001)[xxx]. So it is more on the hands of the librarians to make sure that the libraries are promoted as a means to ensure the research activities in the educational institutions. The rapid technological changes that are presently happening in the academic libraries are needed to be managed and understood properly by the library managers, information professionals as well as the knowledge workers so that they can respond faster to the dynamic environment (Rowley ,2004)[xxxi].

There are the existing researches which have been conducted on academic libraries. The next section would be dedicated towards understanding the automation of operations in a library.

2. 5 Library Automation:

Increasingly there has been huge changes in the library system as well as the information dissemination owing to the use of computers, the application software's which make then run, the growing use of internet and networking. This has made huge changes in the functioning of the libraries in themselves. This only is limited to the systems but also requires deployment of effective and efficient staff members who can properly disseminate the information for the benefits of the users of the library (Edwards ,1998)[xxxii]. The qualities and the qualifications of the staff in the library are more in scrutiny today because they are the actual resources who can implement the services of the library to the users so that the objectives of the library are met. In the digital era, the manpower coupled with proper knowledge becomes the prerequisite of giving exact information to the users in the context which they require. Both technology and manpower has to be improved and it should be a constant endeavor for the library to manage the library in a better way (Purnima Devi ,2006)[xxxiii]. Libraries and the librarians managing them today are planning to manage the digital libraries in adept with the technological changes and at the same time make sure that the traditional functions of the libraries are also take care and no stone is left unturned. There are lot of administrative and staffing perspectives being necessary to implementation of the digitization which is happening the field of library science. It has become a prerequisite that any one managing the library should effectively be knowledgeable in computer and software proficiency (Hamedan Branch,2009)[xxxiv]. The most important thing that has to be noted in regards to the transformation of libraries is that the basic function of the libraries have not changed much but rather the applications and practices are changing due to the application of different technologies. The housekeeping services have totally changed with the introduction of technology. This changes in operations of a library can be termed as library automation.

Definition of Library Automation:

The automation of a library seems to be highly inevitable in the present age of information and information technology. Simply put library automation is the use of automatic and semi automatic machines which are in to data processing to perform the traditional activities of a library such as acquisition, cataloguing and circulation. Rather there has to be clear understanding that the automation of a library is more aligned towards managing the operations

of a library and not much in to information retrieval, automatic indexing and data abstraction etc. Automation can be simple defined as ' the technique of making an apparatus or a total system which can operate on its own automatically' (Sehgal and Behl, 1996)[xxxv]. The Encyclopedic Dictionary of Library sciences defines Automation as ' the technology which is concerned with the development of a system and processes which are put in place so that they minimize the necessity and extent of the human intervention in their operations (Ishvari et. al., 1993)[xxxvi].

The Encyclopedia Americana defines automation as any continuous integrated operation of a producing system which uses either the electronic computer or other automated systems in related equipment's to regulate as well as coordinate the quality and quantity of what is being produced. The automatic control which is being exerted on by either mechanical or electronic devices on an apparatus or a process or a system which takes place with the intervention of human organs or just by observation efforts or by decision can be called as automation (Webster Dictionary, 1966). Harder D.S (1936) was the first researcher who introduced the concept of automation and did so by defining it as the automatic handling of parts which happens in between progressive production processes. The technology of automatic working through which the handling method together with the processes as well as the design of the process material are integrated in such a way as to ensure the utilization is economically justifiable in mechanization of thought and effort so as to achieve an automatic as well as self regulating chain of process in certain cases (London Goodman, 1956) .

The four main activities of a library traditionally have been

- Acquisition
- Serial control
- Cataloguing
- Circulation

When these traditional activities are performed with the use of computerized system it may well be qualified to be called as library automation. Even though predominantly computers are seen to be primarily involved in library automation, there is also a very significant role being played by telecommunication technologies as well as reprographic technologies which to a greater extent provide support to the library automation process (Kumar,1987)[xxxvii].

Bhargava (1987)[xxxviii] defines library automation as the " process which mechanizes the routine and repetitive operations of a library". The predominance of computerization and the computerization of a library's housekeeping functions are called as library automation. He further adds that the most significant invention of human being which is dedicated towards data processing and converting enormous amount of data in to meaningful and useful form of information with rapid speed, accuracy and reliability is a computer.

The automation of a library is seen to be vital for efficiently managing a library owing to the following reasons (Rao,1996):

- Automation improves he control over collections being maintained
- Automation improves the overall control over the library operations
- Helps in improvement of the existing services as well as on any new services to be introduced
- Betterment in sharing of library resources in a particular region
- Helps in duplication of library works to effectively reduce the wastage of manpower and resources
- Improve the services of the existing staff members

Apart from these benefits there has been other factors that have made it necessary to modernize and automate the library activities which includes social, economical and technological factors. The other factors include:

- The enormous growth in literature which includes published, unpublished and near published documented in multiple forms which are on the rise has not been able to be collected by individual and individual libraries have called in for automation which helps in sharing of resources.
- The limitations in managing the libraries which are cause majorly by the manual operations presently
- Manual operations making it nearly impossible to make sure that the resource sharing by means of collections from other libraries

- The basic benefits such as speed, efficiency and accuracy of operations, space saving, introduction of new services and less duplication always are in the favour for automation of library services (Lahkar, 1995)[xxxix].

Apart from the generic reasons there are many specific reasons for certain libraries to choose the automation path which might include the following:

- Some of them might want to increase their productivity which often combines with the diminishing resources
- The idea of automation may have come from the management of the libraries in itself
- The inspiration for automation may have come from the staff in the library
- Sometimes the equipment's for automation might be available through default means or by serendipity
- Or may be forced or getting interested to be get over the bandwagon and leap on the opportunity looking at others
- The people in charge of libraries may want to emulate best practises and over run the bench marks among libraries in vicinity

In spite of these generic or specific factors the libraries are not in anyways of their own choices of getting automated and how automation should be done systematically and logically and follows a three-part context.

1. The automation environment in which the library operates
2. Assessment of the needs of the library and its clientele
3. The level of cost consciousness of the library administration

Once decided and implemented the automation environment is largely responsible for affecting the decision making process of the library in a great way. Usually it is seen that certain libraries operate in an environment wherein they already have certain computer capability by themselves or the organizations that they are a part of. The computer capabilities may include the following resources:

- In house mainframe
- In house mini computer
- Timeshared devices

- Word processors
- Micro computers

While taking in to account of the financial aspects the libraries by themselves are considered to be cost centres. They are not meant to be earning profits and very rarely it is seen that a library often making a profit. That is the main reason for libraries to be usually under great pressure to utilize the in house computing facilities so that huge investments are not at stake as the ROI cannot be looked upon in a near term or in certain cases never. Librarians were generally seen to be averse of a fully functional automated system but they seemed to be preferring services such as DIALOG, SDC and BRs together with networks such as OCLC and RLIN which seemed to be used majorly in libraries in India (Chander Prakash, 2000)

Library Automation : A Brief History:

The following timeline will represent the history of library automation:

- The concept of library automation started in the United States in a modest way around the 1950s. computerized indexes were the first form of automation as started by Dr HP Lunh. Even though the computers found their way in to libraries during this decade their usage and application were highly limited mainly because of the huge hardware costs to be incurred in setting up of those systems s well as the lack of the application software packages for managing libraries.

- During the next decade in the 1960s as the cost of computer hardware came down, there was also a n appreciable and sincere efforts in developing new application software for

libraries. In the year 1960 the American Chemical Society published its first chemical titles through computers.

- In 1963 the most significant development in this field was seen as MARC I which was discussed by WK Gilbert who prepared a report on the computerization of Library of congress. The project was initiated in the year 1966 and the library congress brought out the first catalogue in the Machine Readable Catalogue (MARC) form was started and completed. On seeing the heartening welcome this project the other projects initiated were MEDLARS and INTREX which were similar projects of producing Machine Readable formats.

- In case of India the Indian Statistical Institute in Calcutta was seen as the pioneer in installing a computer in the year 1955 and there by leading to develop a indigenous computer in the year 1964

- INDSOC was the first instance of computers being used in India in libraries where in it bought out the first union catalogue of 'regional union catalogue of scientific serials - Bombay Poona' in 1973.

- In the year 1978 INSDOC initiated the SDI service as a part of the NISSAT project with the help of the CAN/SDI software in IIT Madras.

- During the 1970s many libraries got themselves involved in preparing computerized databases with the financial support provided by NISAAT and notable among them were
  - CALIBET (Calcutta Library Network)
  - DELNET (Delhi Libraries Network)
  - INFLIBNET (Information and Library Network)
  - PUNENET (Pune Library Network)
  - NICENET
  - INDONET
  - SERNET

Considering the price of computer hardware going down drastically and many software options the usage of computer automated systems is drastically on the rise.

Library automation in India

The major benefits being offered by using computers which include the large scale capacity of storage, quick processing speed, access and retrieval of information together with the dissemination of information has motivated many libraries and information centres to start using computers on a large scale for these activities.

- During the initial stages, barring a few big academic institutions including the DTs the Indian Institutes of Management and the other premier institutions such as CSIR. NASSDOC, DRTC, DRDO and BARC the other institutions and their academic libraries were very poor.
- The central universities such as JNU, Hyderabad, Pondicherry, IGNOU and OSMANIA university libraries were even deprived of technology usage till the 1990s.
- By the introduction of the new education policy of 1986, it had recommended the improvement of the libraries and information centres in the universities and the centres of higher learning. More categorically it had specified the usage of Information Technology in order to ensure that the libraries can provide effective library and information services to the academic community.
- In the year 1992 the Government of India directed the University Grants Commission to give recommendations of the prospects of modernizing the university libraries and information centres. An accommodation of a special paper in " Application of Computers in Library Activities" was done by the UGC for specifically focussing on the improvement of library and information in educational courses in India.
- The intervention of UGC thus ensured that the computers were introduced leading to a transformational change in the whole of library and information management in India. As a part of it there were many national, regional and city based information networks such as NICNET, INDONET, ADINET, CALIBNET, DELNET, MALIBNET, ERNET emerged gradually and institutions increasingly joined these networks and actively participated in them (Vashishith, 1994).

- On the basis of the recommendations of the high-powered committee of UGC, an inter university centre called as INFLIBNET was established with headquarters in Ahmadabad which was for computerization, automation and networking of the libraries in the universities (Sinha and Satpathy, 1998).

Emerging Need for Library Automation:

The present age is called as the age of science and technology. The libraries have taken a full circle where they started with a paperless mode of operation and are returning to paperless mode of operation due to technological innovations. Using manually operated devices it has become increasingly difficult to gain accessibility to desired literature from multiple fields of knowledge. The changing needs of modern society together with the constant developments in the field of science and technology has changed the way how librarianship is being looked upon and every task being performed in a library today is being performed through automation for faster results.

The work and culture of librarianship has radically changed in the present day scenario of information revolution. The advent of information technology has made it possible for a specific information to be retrieved globally with the effective use of software packages and online networking systems there by making libraries and information centers to be de-institutionalized. The rapid growth of computer technology has indeed been able to gradually weave a kind of electronic webs around the globe a few years ago. It is been increasingly been used in libraries in developing countries and is been on a limited usage in the third world countries. If we take the dissemination of information in particular, information technology together with computer technology has made it possible to conquer even space and time(Alaka Burahogain,2001).

The need for automation has been emphasized for the following reasons among many (Jagadesha and Mahesh, 1998).

- The tried and tested traditional methods which had been used in the past for handling of information seems to be inadequate owing to the rapid increase in information as well as the rate at which information growth is happening.
- The voluminous increase in the information as well as the rise in the degree of specialization required makes it relatively difficult for the information to be updated.

- The major benefits of using computers which include the speed, accuracy and vast storage capacity s required by library systems are being demanded with proper techniques in place.

- The increased need for cooperation and sharing of resources together with the hope for achieving savings through automating the systems has called in for switching over to automation.

Apart from these automation provides the following operational advantages:

- Flexibility in operations
- Increase in processing speed
- Improved accuracy, efficiency together with consistency and improved work control
- Reduction in repetition of clerical work
- Helpful in making bibliographical control together with checking and updating
- Improves the budgetary control effectively

Major Objectives of Library Automation:

One of the most critical issues which are demanding attention of the researchers and scholars worldwide is the problem of storage and dissemination of information particularly in the area of science and technology where the volumes of data and information is increasing in an unprecedented rate. Considering this rapid inflow of information storing it, organizing it and disseminating it requires a complete and systematic way of computerization which would make it relatively easier. A system aided with computer technology will indeed make it flexible, convenient and more comprehensive together with being economical in the long run. The primary objective of library computerization is to integrate all the library functions which would lead in to ensuring an easy and accurate retrieval of information. The other objectives include

- To alleviate the bottlenecks which are often encountered in the circulation of library materials. Help in online searchers across databases, easy to compile bibliographies and more importantly overall accuracy in the process

- To facilitate effective resource sharing and establishing cooperative agreement among the libraries by making sure that the bibliographic data in the machine readable form is easily exchanged between similar kind of libraries operating locally as well as globally.
- To ensure the speedy retrieval of information which is made possible by the use of computer systems which have the capability to search thousands of records in microseconds and giving out instantaneous results.

- To ensure the accuracy in the information being provided which is made possible by installation of correct programs in place. And more importantly boredom can be avoided unlike manual process as it is a machine based system which can do repetitive process again and again.
- To be able to tap the advantage of a online access process which allows for the search through the entire library catalogue without even required to move away from the desk or physical contact with the library if the systems are connected through a local LAN (Local Area Network) or a WAN (Wide Area Network)
- To aid in improvement of the technical process efficiently so as the routine activities of the library including acquisition, accessioning, classification, cataloguing and circulation are being carried out in an effective manner with the use of computer aided processes.
- Updating of records in real time is relatively easier as compared to manual processes
- To ensure better utilization of library space where in more information can be stored in a small apace by the use of data storage devices
- To easily generate reports of circulation and overdue customers at an instant without having to spend much time in browsing through manual records for longer hours.
- The overall activities can be streamlined which includes activities such as budgeting, staff scheduling, collection analysis and development.

The next section will present some of the basics of library automation.

Basics Of Library Automation:

Library automation clearly stating is all about automation of all the basic functions of a library using computer systems. The functions which are generally included in the purview of automation include:

- Acquisition
- Cataloguing
- Serial control
- Circulation
- Inter-library loan

In the recent past the advent of computers together with the introduction of many application software packages has ensured that the information professionals switching towards the automated systems to streamline the library functions. The seamless integration of hardware and software acts as a blend which ensures that the library functions are automated and some functions among them are given priority of automation. For example in public libraries serial control might be given priority and in case of special libraries serial control and in case of university libraries acquisition might be given top priority. Usually cataloguing which is the most critical activity in a library which is generally automated more.

Essentials For Library Automation:

The following are the prerequisites of developing the automation of a library:

- A huge collections of books
- Enough finances to buy and use the resources
- Suitable computer hardware and software
- Training for the staff
- Training for the users

Factors for Library Automation:

The following are the factors which have prompted the automation of the library services:

- The usage of computer and magnetic tape as storage medium helps in reducing storage space as well as well as increase in speed

- Search process many a times require using special usage of keywords or other methods to be used which can aid in retrieving information in a better and faster manner which might not be possible if a manual system is being used.
- A computerized database can be designed to be interactive based upon the requirements of the users.
- Real time output can be generated in a printed bibliographic format with the option of multiple copies at any instant.
- A Single database can be used in a way to use multiple combination of services to the users.
- The entire database can be even stored in smaller data storage devices which can be transported easily if required.
- The proximity of human errors which are relatively high in a manual system are reduced thereby leading to better usage of human capital

Steps involved in library automation:

The most critical and penultimate step in the automation process is to first decide on going for automation. Once that critical decision is being made, the next step is to perform an analysis of the existing systems. Once the activities which needs to be computerized are determined the next step is to do a detailed analysis of each and every activity to be involved.

- Identification of the data elements
- Calculation of the local storage space required
- Ensuring that the software to be acquired or developed is capable of handling and managing the multiplicity of the data
- Estimation of the back-up storage which is required
- Identification of the various facilities which require computerization

- Identification of common data elements across functions

The following are the general steps in the library automation and computerization:

- Survey and analysis of the existing system,
- Decision of services requiring automation
- Ensuring automation activities not to disturb the existing functions conducted parallel.
- Training and handholding of manpower in a phased manner
- Allocation of management decision with regards to management position being held
- Proper accounting of the financial aspects
- Procurement of required hardware and software
- Inclusion of recurring financial requirements to be included as part of plan
- Staff motivation towards inclusion of information technology systems.

Implementation Methodology:

The following is the methodology to be followed during teh library automation process:

- First is to decide on various functions of each activity in the library automation process
- The next step is to identify the data elements being used as input for each of the functions
- Following it will be the determination of the size of the files and the files to be input including records, files and media
- Once the input is being decided the next step is to determine the output which is required for each of these functions
- Like the input the output is also identified in the form of records, files and media together with determining the size of the files.

- The next step is the development of acquisition of the software programs which are to be used to complete the process of automation. At this stage the compatibility of the software has to be checked before the implementation.
- After the final implementation process is completed periodical evaluation should be initiated.

Problems associated with Library Automation:

Like any computerized system, the library automation system is not devoid of any problems which act as inhibiting factors in implementation of the same. The following are the inhibiting factors which create problems in the implementation of automation across libraries.

- There might be a lack of motivation among the management and staff towards the implementation and acceptance of information technology in itself.
- There might be lack of overall organizational effort towards modernizing the library as such
- Financial constraints may lead in to complications of whether to go for automation or not
- The non-availability of trained professionals for implementation and user training might lead in to complications
- There may be lacuna in a standard or proven technology which is widely accepted
- The senior staff of the library might act as advocates for the manual process and might be averse towards the implementation of technology backed systems in place
- There might be a lack of suitable library management software packages or thee might be lesser access to them.
- The selection of the right software package might be an issue

Having understood the basics of library automation and the pros and cons of implementing it the next step is to understand how exactly is the automation process done. The subsequent sections will throw light on the process of library automation.

Components of Library Automation:

There are about 9 different components which are part of a library automation process. Before proceeding in to them one has to make a note that careful planning is the prerequisite in automation of library services and it includes taking all the points in to consideration.

Adepoju (2015) in his research paper "Library Automation: A case Study of Ekiti State Library Board, Ado-EKiti" this paper shows the Information about automation of the Ekiti State Library Board records using the X-Lib Library Automation system Software. . This study researcher used the Descriptive research of the survey type and utilized questionnaire to generate data for the study. Researcher 120 copies of questionnaire were distributed to the users of Ekiti State Library Board. Data collected were analyzed using frequency count of simple percentage. Above study also revealed that a computer languages barrier influences the user's ability to use the computer. The studies further analyze the rationale behind the automation, the level of use of computer and problems encountered by the application and recommendations were made to get their systems and services fully computerized.

Tyagi and Senthil (2015) in their paper " Library Automation in India: Assessment of Library Services Platforms" highest the Library automation in India and automation efforts in libraries have moved from standalone database systems to clout-based system, traversing generations of library management systems and integrated library management system in between. This paper also discuses on present day technological state-of –affairs in the libraries. The traditional terminologies vis-à-vis the cloud associated architecture has been touched upon.

Robert Iles and Emre Erturk (2016), They pointed that cloud based applications that are used by academic library operators are not limited to resource databases, but also other applications that students regularly use in conjunction, while reading references and writing assignments. Therefore libraries want to leverage the increasing end user information literacy levels. This can be done by better interfacing library systems with popular cloud based tools such as Dropbox, Google Docs and Office 365. EZproxy, as a core library application, offers a cloud hosted software as a service version, which seems to be the best option in the long term.

1. AIM:

The first and the most critical component is to establish the reason as to why the particular set of library activities need to be computerized. It remains as the focal point for integrating, operating and managing the entire activities directed towards the overall automation process.

2. Processing:

Once the aim is established the next action is to do the processing which involves the process of developing a predetermined sequence of step by step operations required to allocate and assign the information materials as well as all the other items required to achieved the desired result or service as an outcome of the automation.

3. Computer System:

The third and the critical component in the automation processes is the computer system which acts as the back bone for the entire operations. The computer used as support can either be a

micro computer or a mini computer and some cases be a mainframe also. The size of the computer to be used is determined by the following factors:

- The nature of the functions to be performed
- The actual number of functions to be supported by the computer
- The volume of processing activity which is anticipated
- The size of the information files which are required to be stored in the machine storage devices

The computer being selected to use must have the following capabilities:

- Sufficient memory to store all work related information
- Operating system
- Application software
- Processor capability to manage the volume of work
- Ability to manage subsequent users at same time
- Able to be updated for future requirements
- Enough capacity to sustain probable future work
- Enough auxiliary storage spaces for all file essentials m order to ensure capacity for future growth
- Sufficient number of terminals together with ancillary devices such as printers and scanners.

4. Computer Software:

Once the hardware is put in place then the next step is to make sure that the required software is in order to support the activities of the library. Software in purview here includes all the step wide instructions which are used to command the machine to perform its relative share in the processing function. The software can be developed either by a commercial vendor or by another library and in certain cases developed locally also. It can also be a integrated software or a standalone version too. Stand alone software's are generally used when the requirement is to automate only of the activities of the library and an integrated system is being used when the automation happens across acquisition, circulation, serial control etc. where there is a requirement to share common files and information.

5. Data Communication:

The fifth component in an automation process is data communication which is to ensure the command and information to flow from the computer system which supports the automation activities to all the points in the library where the processing is required and event through the main server system which either is located within the library or elsewhere.

6. System Documentation:

The next component is the documentation which is in the form of reports, manuals and memoranda. Usually created to be used by the library staff and others for training, referencing and quality control during the operating, maintaining and managing activities these are the written documentations being used for storing information on automated activities.

7. Human Resources:

The next component is the human resources who are needed for the following activities:

- To share the processing with the computers to support the activities
- To provide management and leadership for the activities
- To operate, manage and to maintain the computer system which supports the activities.

The role of the staff can be classified as under

- To initiate processes
- To provide information to computers for processing
- Decision making with regards to steps in processing and the services to be provided
- Attending activities which are not being supported by the computer system.

Proper training has to be provided to the staff to perform these activities properly.

8. Other Resources:

The eighth component consists of all other resources including

Information

Equipment

Furniture

Consumable supplies

Monetary resources

9. Environment:

The last component is the physical environment in which the entire automation activity is being conducted. It is essential to have sufficient physical space so that the activity runs through seamlessly. Care should be taken to ensure proper lighting, temperature, noise control and cleanliness to be maintained failing which the entire installation process will face tough challenges.

Automation of Functional areas:

This section would be used to cover the functional areas which are to be automated. One of the laws of Library science proposed by Ranganathan talks about the fact that the documents of the library should have maximum users. By effectively utilization of Information technology in different functional areas of libraries and information centres this is has been made possible as there is tremendous improvement in the services being offered by the libraries. Library automation generally covers the house keeping functions of the library which include

- **Acquisition**
- **Cataloguing**
- **Circulation**
- **Serial control**

In certain libraries it has expanded the scope to even OPAC's CD-ROM networks, DTP and Office automation.

Acquisition:

The acquisition function of a library considered to be the most critical is essential as it is directly related in satisfying the mission of a library. It involves doing large loads of paperwork, handling materials in large quantities, reconciliation of the orders, fiscal control, invoice handling etc which makes the best choice qualifying for automation. Automation of the acquisition function leads in to accurate timely and complete information on order status , vendor details ,fiscal data

etc to be maintained and updated real time there by reduction in personal effects and time consumption involved in the process. Most importantly it provides a proper system of monitoring the acquisition activities which increases the cost effectiveness of the operations together with the benefits of speed in creation of receipts and improved fund management and helps in resource optimization.

Cataloguing:

The most fundamental and traditional activities in the libraries worldwide is the cataloguing activity which involves the descriptive cataloging and production of the library's catalogue. The cataloging system maintains the titles -in-process of all the items in library which are accessioned. It is also provides the services such as CAS (Current Awareness Service) including SDI, Special bibliographies and list of the recent arrivals to the library. When the catalogue is being computerized it may be even developed to be a by -product of the book ordering system through which the book catalogue of various library units can be printed and even distributed to other branch libraries.

Circulation:

Circulation which is termed as the highly visible as well as the central function of a library is encompassing all of the following

- Patron loan processing and Management
- Includes close reserves
- Material booking and in-house use of library collection
- Also at times provide an option for generating and printing bar coded ID cards including photographs of the members.

Purely clerical and repetitive in nature the circulation function is right for automation and if done will result in vastly improving the ability of the library in accurately record the lloan transactions and to monitor them, record them and even record the return items and support the overall circulation function.

Serial Control:

The serial control function of a library includes all the functions supporting the procurement and management of serial collections within a library. As the serial control is becoming complex over the years due to the spike in volumes it requires a huge amount of manual work which is labor intensive and demanding a higher degree of accuracy and undivided attention call for automation like other library functions. Once automates it would ensure that the serials can be handled easily, quickly and in less expensive ways.

Article Indexing System:

An article indexing system is being used for indexing and abstracting articles from multiple journals, technical reports, monologues and conference proceedings etc. the system also included the following activities

- Scanning of articles
- Citation entry
- Online author search
- Keywords
- Word based free text searches
- Documentation lists
- Personalized SDI
- Bibliographies on specific subjects

Information Retrieval System:

Relatively a new concept as compared to others like cataloguing and classification which are also used for information retrieval. The important aspect of this system is that it allows simultaneous use of multiple users at one instant and the importance is totally dependent upon the potentialities of the computer as an storage and retrieval device of information. An information retrieval system deals in

- Techniques and processes of representation
- Storage and retrieval of information of a set of items which includes serials, documents, microfiche, microfilm etc.

OPAC System (Online Public Access Catalogue):

The main role of an OPAC is to provide access to the library's holding through the various catalogues including:

- Author catalogue
- Title catalogue
- Subject catalogue
- Classified catalogue
- Publisher's index
- Conference place index
- KWIC/KWOC indexes

An OPAC system is capable of providing the facility to request acquisition of titles, together with the requisition to reserve materials and also can send personalized SDI, overdue/recall/collect notices and messages through e-mail.

Web- OPAC System:

A Web OPAC system helps in searching library catalogues through the use of web browsers such as Google Chrome or Internet Explorer or Firefox by enabling the use of a Graphical User Interface (GUI).

Information Services:

The changing dynamics of library operations together with the increased need for speedy and easier dissemination of required has made information storage and retrieval as the top priority for a library. The catalogue of books and documents and the data base of a catalogue of other journals and documents with detailed indexing are the primary information being provided by the information services. Some of the services which can be offered through them include

- Current Awareness Bulletin
- Documentation Bulletin
- Bibliographies

- Documentation lists

With these basic understanding of library automation the existing literature on library automation is presented as under:

Michael (1989)[xl]; as a part of his research on library structure before and after automation concluded that

- All major organizational structures across multiple libraries seem to be one
- The functional structure of libraries often are leading in to predominance of internal processing functions over the external service functions
- The need for libraries to be more service oriented is relatively higher than ever owing to the increasing dissatisfaction which can be curbed by replacing existing systems with better alternative structural models.

Aguolou[xli](2002); as part of his research suggested that the library automation that has started way back in the 1970's in majority of the universities in Nigeria have not been successful owing to the fact that there is a huge lack in technical knowhow of the software development and maintenance of the systems including both hardware and software. He also laments that fact that in spite of being one of the earliest adaptors of library management systems the Nigerian Universities are not being able to exploit the benefits because the library automation has remained in the pioneering stage for over two decades and there has not been not much progress as expected.

Vyas (2003)[xlii]; in his study conducted to find out the different aspects of library automation, availability of reading material, concludes that the university libraries are interested in library automation but the existing INFLIBNET system which is presently in use should be streamlined in a way to attend the grievances of the existing users. Multilingual scripts needed to be developed in the system so that the data base is speeded up for operations.

Onoriode (2012); in his study carried out to reveal the importance of automation to acquisition and collection development in academic libraries, revealed that most of the libraries included in the study owing to the lack of a automated system were facing huge problems. Automating them would ensure better management so it becomes imperative for the libraries to choose an automated system which is supporting their mission for acquisition and collection functions which would lead n to effective library service being provided.

Ifidon(2006)[xliii]; as a conclusion of his research writes that automation ahs always existed as a feature of the acquisition department as part of the automatic ordering systems. The major benefits that it has given include

- Streamlined procedures and work flows
- Customized management and information system
- Sounder evaluation
- Stricter auditing
- Enhanced access to available study materials
- Accession list can easily be produced
- Selectors can easily be notified of new titles and approval as they appear
- loading of approval and exchange data on local systems can be processed in minutes
- Desiderata file can also be calculated

Adomi (2009)[xliv]; in his research has appreciated the role of automation system when a new stock for the library is being selected and the three steps of ordering, receiving and invoicing are carried out. He also points out the efficiency of the system in managing financial control by being able to set priorities for different items in the collection and based upon which budgetary allocation being done to avoid misunderstanding among all stakeholders involved. This would lead in to making all acquisition functions to be performed in a relaxed way and more cautiously with due importance being given to accuracy and speed.

Abdulraheem(2005)[xlv]; in his research to find out the status of the information services in Nigerian Universities concluded that out of the total information services to be made available in a university only 40% were available and utilized. Federal universities which were allotted more funding than non-federal universities were not utilizing them properly. The major obstacles which were inhibiting the usage of information systems were.

- Inadequate funds
- Telecommunication connectivity
- Uninterrupted power supply
- Human resource capabilities

Clausen (1999)[xlvi]; in his study examined the qualities of websites together with the library websites in particular proposed a criteria for evaluation of websites of academic libraries under six criteria including

- Design and structure
- Quality of information
- Links and navigation
- Aesthetic impression
- Miscellaneous
- General assessment

The results indicated that the library websites of Danish libraries were found to be better than average and also suggested that regular updating of websites together with user studies and comparative evaluations are very critical.

Oulanov and Pajarillo (2001)[xlvii]; who focused on the WAN based Online data base called as City University of New York (CUNY) which was being accessed by staff, students and researchers spread over New York Metropolitan area representing multiple colleges and Universities concluded that WAN based automated system was much appreciated and utilized.

Lynch (2000)[xlviii]; in his research tried to find the shift in library use owing to ICT signifies the

shift due to the automation of libraries. The shift has been represented in multiple phases

- Automation of library routines
- Innovation accomplished by experimentation with new capabilities
- Transformation represented by the digitization of library materials

He further adds that the transformation was not possible until digital content was made available, accessible to majority of the libraries.

Mirza (2014)[xlix]; while analysing the status of hardware, software, networking and IT support which are available in university libraries of Pakistan concluded that vast majority the university libraries in spite of having computers and other peripherals are not being able to use them properly

Saracevic (2000)[l]; in his research discussed upon evaluation of digital libraries and presented a set of elements being used in the evaluation. They include

- Collection
- Access
- Preservation
- Use
- Networks and Security
- Integration
- Cooperation
- Staffing
- Costs

Nicholson (2003)[li]; while talking on the advantages of automated data collection over manual methods presented the following benefits:

- Managing large quantity of data
- Data captured from traditional systems containing only partial data
- Tracking becomes relatively easier
- Biblio-mining process or data warehousing or data mining can be done effectively
- Ability to conduct large scale and in-depth studies

Tiwari (2002)[lii]; as a part of his study concludes that automation of libraries in itself is a divergent issue in terms of the skills, resources and their abilities. He further adds that eh 'library without walls' has been made a reality and very soon 'virtual library' is going to be the order of the day. He further adds that the future of library would be information kiosks where people with limited computer knowledge would be able to access information. The information scientists would be able to create human computer interfaces which would be managed by library scientists

The next section would be dedicated towards Library Management Software (LMS) exclusively

2.6 Library Management Software:

Software includes 'set of computer programs which are being designed and develop specifically to accomplish tasks'. When we refer to software it includes the programs r the discrete units of software which are used to enable the computer to carry out a particular task. For every operation of a computer there is a software which makes the working capability of the computer. A computer without a proper software is as good as any hardware. Indeed it is the software that gives the power to the computer to cater to user needs and requirements. Software is generally considered to be of two types

- System software
- Application Software

Systems Software includes all the programs which are developed and dedicated to manage the computer in itself. It generally includes the operating system and the file management utilities. The operating system manages the computer hardware and through the set of instructions it makes the computer to perform the basic tasks which we want it to. Without the systems software in place the computer would need instructions every time when it is expected to do a task. On the other hand, the Application Software or simply put applications are called as the productivity programs or the end-user programs due their capability of enabling the users to complete the tasks. The wide array of application software starts from the office software used to create documents and spreadsheets to high level analytical tools used by experts to perform high end technical analysis. Application software is specific to the task for which it has been designed and can be customized to the user's requirements which is not possible in case of system software. But it is the system software which ensures that the application software is being executed in a computer.

Library Management Software:

The concept of ' Library Automation' and its applications and advantages being accepted by the librarians, patrons, academic institutions, managements and the Governments in charge of public libraries had given a huge spike in terms of tools and mechanisms being developed and deployed to make library automation possible. As computers were started to be increasingly used in the libraries the need for application software which would make the computer to work with regards to automate the library functions emerged. This led in to a situation where the market is now being literally flooded with a huge variety of software packages which are specifically

designed to support the house keeping functions of a library which include acquisitions, circulation, cataloguing, serial control etc. Some of these software's have been specially designed for individual routine functions such as cataloguing whereas majority of them are for an integration all library housekeeping functions.

The library management software present in the market can be broadly classified in to three major categories.

1. Library Management functions - Acquisitions, cataloguing, circulation and serial control
2. Management support functions - MIS, Statistics, Accounting, Budgetary control
3. Database Information Retrieval functions - Database design, searching, maintenance, generation of personalized SDI, catalogue cards, indexes and bibliographies

Libraries and information centers are seen to be increasingly using a wide variety of these software for housekeeping activities such as acquisition, cataloguing, abstracting, indexing, circulation and serial control or for information retrieval services such as OPAC, WebOPAC, CAS and CDI together with administrative activities such as accounting and maintenance. Among the integrated software the CDS/ISIS which has been developed and promoted by UNESCO predominates all others and it is made available at a nominal cost to computerize library activities from NISSAR/DSIR to all government organizations and funded academic institutions. On the other hand, the commercial packages despite their cost have been used because of their comprehensive functionalities of covering all library activities. Some of the commercial packages include LIBSYS, LIBRA, LIPSUITE, SLIP etc. Contrary to them are the in-house developed software packages of institutions like the SUCHDA, GRANTHLAYA, KLAS etc. These kind of software are now being sold to and used by many institutions mainly academic libraries. The latest are the open source library packages which are gaining approval among libraries not only because of the cost factor but rather on the technical advancements as they are upgraded on a regular basis.

Various housekeeping functions of the library are taken care by the library management software and the software being used is supposed to the following features.

Preliminary Features:

The preliminary features required in a LMS include the scope for training using the software and proper documental which includes a well designed manual.

General Character:

The general character required in the software include:

- The software has to be completely integrated
- The software has to be compatible to work in multiple platforms
- It should have a data format which is understandable
- It should have the capabilities for group work
- The software should be user friendly
- The software should provide the scope for Object Linking and Embedding (OLE)
- The software should be Graphical user Interface bases
- Should be capable to handle enormous records
- High level of reliability
- Scope of customization should be high
- Should be consistent in its output

New technologies:

- High level of network capability
- Having an interface for internet connectivity
- Enabled with RFID, bar-coding and Smart card interfaces
- Web based OPAC would be necessary
- Embedded with a camera for photo ID generation

Modules:

- Acquisition
- Cataloguing
- Circulation

- Serial control
- OPAC
- Library administration

Security:

- Login and log off credentials
- Power out features
- Extendibility of the software is necessary
- Provision of import as well as export of data
- Post installation support from the commercial vendor

Availability of the software:

Library Management software are majorly classified in to three major categories.

- In-House
- Commercial
- Co-operative

In-House:

There may be parent organizations which the library is a part of might be having a computer department or software specialists being a part of it. In these kind of set up the libraries by themselves can use the services available to them to develop the software for them. Even presently there are numerous libraries which are using in-house software. In spite of the fact that the in-house developed software are not developed scientifically and there huge skepticism on the testing on them but they are considered and used as the cost of development of the same are very less. In certain cases the general purpose software packages such as the word processors, spread sheets and Data Base Management Systems (DBMS) can be alternatively used if such a demand arises (Saxena and Mehta, 1992).

Commercial Packages:

There is a school of thought which emphasizes that the core competency of a library lies in handling the collections and users and not in to get involved in software development. This might be either because of the lack of programmers to develop the software for themselves or might not have the time for development as it might interfere in their daily operations and might

not also not have sufficient finances to experiment. In such kind of a scenario libraries opt for a commercial Library management software from vendors who are specialized in software development which not only saves time and money but makes the library to focus on core competence.

Generally the vendors offer a solution to a particular problems which are faced by several libraries and develop a package accordingly. These packages many a times incorporate more sophistication over packages which have been developed in-house. Some of the major advantages which the vendors developed commercial packages offer are:

- No development time for libraries
- Implementation can be done in the shortest possible time
- Tried and tested software readily available
- Personalization and customization offered as per user requirements

In case of the commercial software packages being developed they are usually developed as an outcome of huge research involved in the development process together with proper testing through real time or simulations which makes them more or less suitable for all kinds of libraries. The only grey area which might inhibit the favourability towards commercial library management software is the cost involved.

Co-operative:

An emerging trend in the global scenario is the co-operative software development ventures which are increasingly gaining approvals in many developed countries. These kind of cooperative ventures tend to be more cost effective and also provide a scope of interaction and exchange between library professionals and software developers. In India it has been relatively difficult to predict the success of such ventures as they are still in the pioneering stage (Laxman Rao, 1993[liii]).

Library Management Software in India:

Even though research and development is on a larger scale in developed countries the quantum of indigenous in-house developed software in India is not far ahead. There are also many agencies which are in to development of software's for libraries. A brief account of Library Management Software is given below:

SOUL:

Software for University Libraries (SOUL) is a library management software which is being developed by INFLIBNET centre in Ahmadabad. It is a comprehensive total solution designed for library automation and management. SOUL is designed using a Client Server architecture which would enable extra strength to the storage capacity as well as it provides multiple access to the data base at same instant and coupled with higher levels of security and adds on with back up and re-storage facilities. This software has been specifically developed keeping in mind of operational requirements of libraries.

LIBRA 2000:

LIBRA is a library suite being developed by Ivy systems from New Delhi. It is a system which has the capabilities of a multi-user as well as highly user friendly. It facilitates the following housekeeping functions such as

- Acquisition Control
- Circulation Control
- Cataloguing Control
- On-Line Retrieval

LIBRARIAN:

LIBRARIAN is a Library Management Software (LMS) marketed by Soft-Aid Pune and it has been developed y professionals in consultation with library professionals in order to cater to the housekeeping operations of a library to be automated.

LIBRIS:

LIBRIS is a Library Management Software being developed by Frontier Information Technologies which is a comprehensive and user friendly menu driven library software which covers almost all of the housekeeping functions of a library.

KOHA:

Contrary to the commercial Library Management Software's there are also open source software which are seen to be gaining increased patronage among the libraries around the world. They have been preferred not only because of the cost effectiveness but more due to the customization being offered and the up gradations that happen on a regular basis. KOHA is one among the most renowned Open Source Integrated Library Management System (ILS) which is used in Public, School as well as special libraries. It is a web based ILS with a SQL database as a backend system with the MARC being used as a catalogue. KOHA consists of all the features that is expected from an ILS which include: Web 2.0, Customizable search, circulation and borrower management, a comprehensive acquisition system, union catalogue facility, ability for up scaling and multi user multi access, reading lists, reporting , online and offline circulation and segmentation.

Apart from these other Library Management Software's used extensively include

- Libsuite
- Libsys
- SLIP+++
- SLIM 21 advance
- SWIRL
- TESION

With so many options being available, libraries are in a fix to choose the best suitable software for their operations. The following are the criteria which might act as guidelines for choosing the right LMS for the libraries.

Criteria for Evaluation of Software Package for Library Use:

- User Friendliness
- Integration
- International bibliographic format

Apart from these basic criteria it needs to be understood that every library management software has their own strengths and weaknesses. So it is under the purview of the library management to decide whether the software would be suitable to the working environment of the library. It becomes imperative for the management to browse through the complete literature about the software and also to check with the other libraries where the software is being currently used. This will ensure that a comprehensive pre-installation evaluation which is being done with a demonstration of the software is value added. The complete evaluation of the same would be starting with a detailed approach towards the problems faced by the library and how the components of the software can match up to the expectations after which the testing and evaluation is done and then negotiation over the maintenance and service.

[liv]Subhash and Sunil (2015) in their conducted study on "Adoption of Open Software in Indian" examined 91 institution in Indian using OSS for Library management and OPAC of these institutions are accessible in public domain. There are 96 open access repositories created by using OSS which are accessible in public domain. Avobe Article discloses that 8 institutions in India have two open access digital repositories each which are created by OSS and 14

Chauhan (2018), This paper is the evaluation of use of KOHA Library Software in O.P. Jindal Global University .for this research author has taken survey based. Data that was collected data with the help of questionnaire along with personal interview . Total 15 OPJGU Library professionals are spread across JGU university library had participated in this study. Collected data was analyzed and interpreted through tables and charts. Findings: It is found that from the

study that professionals have good perception towards KOHA and they also agreed with KOHA as free SW with original source code through KOHA LMS It is suggested that Staff and user should be given proper orientation on benefits and outputs of KOHA. Implication: Koha must be fully utilized in maximum use services. Use of Koha should not be restricted to any category of staff. All staff should be involved service provision chain and they should be exposed to training and retraining in manipulating .

2.7 Academic libraries in Business schools in Mumbai:

The following is the list of AICTE Approved management Institutes in Mumbai

List of AICTE approved post graduate management Institute in Mumbai		
Allana Institute of Management studies	Atharv Institute of	Chetana's Institute of Management and

	Management studies	Research
Chetana's R.K. Institute of Management and Research	Chanakya Institute of Management studies and Research	IES's Institute of Management Research
LalaLajpatrai Institute of Management and Research	MET Institute of Management and Research	NMIMS Institute of Management studies and Research
Rizvi Institute of Management and Research	SVKM's Ushapraveen Gandhi college of Management	Thakur Institute of Management studies and Research
Jamnalal Bajaj Institute of Management studies and Research	NL Dalmia Institute of Management studies and Research	Shri Durga Devi Saraf Institute of Management studies and Research
Sasmira"s Institute of Management studies and Research	Kohinoor Business School	SP Jain University
Mahatma Gandhi Mission Institute of Management	Vivekanand Institute of Management studies	SIES Institute of Management
Maratha Mandir's Baba SahebGawde Institute of Management studies	Gurunanak Institute of Management studies and Research	V.N Bedekar Institute of Mangement studies and Research
BharatiVidyapeeth Institute of Management studies and Research	HK Institute of Management studies and Research	Somaiya's Institute of Management studies and Research

Source:(https://www.aicte-india.org/downloads/MGMT-15-16/Maharashtra_MGMT.pdf)

The All India Council for Technical education is the organization which gives affiliation to all the professional courses in the country and it has laid down norms for the institutions who want to be affiliated towards AICTE. The norms which govern the professional institutions are given in Annexure -1 of AICTE guidelines Specifically, the Appendix 5 talks about Norms for Books, Journals, Library facilities, Computer, Software, Internet, Printers and Laboratory Equipments for Technical Institution.

The library requirements are given in section 5.3. Books Journals and Library facilities for technical institutions which covers management institutions which have MBA, MCA and PGDM as under.

Here the student strength is represented as B which is the No of division in first year in both shifts + no of divisions in second year in both shifts.

B:

Number of Books : = 100

Volumes = 500 X B

National journals -= 12 X B

International Journals = As desirable

E Journals = Required

Reading room facility = 25% of the total students up to maximum of 100 at a time

Multimedia PCs for Digital library/ internet surfing located in the reading room = 1% of the total number of students

Apart from these the following guideline shave been stated mandatory

- Book titles and volumes required at the time of starting new Institution.
- Yearly increment. Component for additional division / course.
- Journals and Books shall also include subjects of Science & Humanities.

- Digital Library facility with multimedia facility is essential.
- Reprographic facility in the library is essential.
- Document scanning facility in the library is essential.
- Document printing facility in the library is essential.
- Library books/non books classification as per standard classification methods is essential.

  Availability of NPTEL facility at the library is essential.
- Computerized indexing with bar coded / RF tagged book handling is desired

These norms are mandatory for the management institutes to adhere to in order to ensure being affiliated through AICTE which would ensure trust on their institute and course from the parents and students. When we look at the specified norms it can be understood that an Integrated Library System (ILS) or a LMS is essential for the libraries of management institutes to ensure adherence. All the institutes comply with these norms and implement the systems in place. But what needs to be understood is the fact that whether the LMS being implemented being used to reap the benefits of it and whereas it is able to satisfy the expectations of the stakeholders remains the elusive question which needs to be addressed through this study.

2.8 GAPS in Literature:

Upon studying the comprehensive literature on libraries and library automation systems in place through the secondary sources from both online and off line sources, the following are the GAPS which have been identified.

- Even though there has been multiple studies on Library management software being conducted at a national and international level the academic libraries in Mumbai has not been researched much

- The Studies majorly are either focussed on one set of stakeholders in a library be it the staff in the library or on the users. There are very few studies involving both.

- AICTE has specified norms and all the management institutes and they are supposed to manage their libraries in accordance to that. Very few studies have been already been done in this regard.

These research gaps would lead in to development of this specific research which would be focusing on the status of Library Management Software in AICTE approved Management Institutes in Mumbai.

Hence the literature which covers the research topic of Library automation as well as the associated sub sections are presented which would be helpful in creating a comprehensive of the research topic. The next chapter would be dedicated towards explaining the research methodology to be undertaken in the study.

[i] Chohan, Amarshing .(1998). Development of Education in the Jammu and Kashmir State,.1.

[ii] Gupta, Sangita and Singh, Gurudev. (2006). Public Library System in J & K State., Jammu: Sonal Book Enterprises, 32

[iii] Archives Department, Government of Jammu. (1918). Annual Administrative Report. Jammu: State Archives, p.1.

[iv] Jagdish, M. (1979). History of Libraries and Librarianship in Modern India since 1850. Delhi. Atam Ram.

[v] Kaula, P N. (1965). Facets and Phases of Indian Library Development, In N. B. Sen (Editor). Development of Libraries in New India. New Delhi: New Book Society of India, 159.

[vi] Taher, Mohamed (1994). Encyclopedia of library history. New York: Garland, 272

[vii] Chakrabarti, Bhubaneshwar (1993). Library and Information Society. Kolkatta: The World Press, 101

[viii] Verma, I. N. and Agarwal, U. K. (Editors) (1994). Public library services in India.Udaipur: Himanshu

[ix] Sahib, S. (2003). Library and Literacy Movement for National Development. New Delhi: Concept

[x] Mukherjee, A.K. (1965), "Library Facilities in Training Colleges of India," IASLIC Bulletin, Vol. 10, No. 1, PP. 54-68.

[xi] Hingwe, K.S. (1969), "Organizational Patterns of Academic Libraries", Library Herald, Vol. 11, No. 3, PP. 139-153

[xii] Raina, Roshan (1980), "Degree College Libraries in Kashmir: A Survey", Annals of Library Science and Documentation, Vol. 27, No. 1-4, PP. 12-19

[xiii] Jasmer Singh (1990), "College Libraries in Punjab: A Statistical Analysis of the Problems", PhD thesis, Department of Library and Information Science, Guru Nanak Dev University, Amritsar.

[xiv] Bajpai, S.K. (1994-1995), "Evaluation of College Library Services in Delhi", Library Herald, Vol. 32, No. 3&4, PP. 139-143.

[xv] Chopra, H.R. (1995), "College Libraries in Punjab: Some Problems Re-Considered", In Sewa Singh and Madhuri Arora (Ed.), Handbook of college libraries: problems, development, finance and other related aspects, New Delhi: Beacon Books, PP. 109-114

[xvi] Awolola, J.O. (1998), "College of Education Libraries in Kwara State (Nigeria): A Comparative Study", Library Herald, Vol. 36,No. 3, PP. 152-158.

[xvii] Al-Ansari, Husain A.; and Al-Enezi, Sana (2001), "Health Sciences Libraries in Kuwait: A Survey of Their Resources, Facilities, and Services", Bull Med Libr Assoc., Vol. 89, No. 3, PP. 287-293. Available from http://www.ncbi.nlm.nih.gov/pmc/ articles/PMC34562/ (24-02-10).

[xviii] Joshi, C.R. (2001), "Veterinary College Libraries in Maharashtra:A Survey", ILA Bulletin, Vol. 37, No. 01, PP. 13-16.

[xix] Veer, Dharamraj Kalyanrao (2004), "College of Education Libraries in Maharashtra: A Survey", Ph.D. thesis, Department of Library and Information Science, Dr. Babasaheb Ambedkar Marathwara University, Aurangabad. University News, Vol. 42,No. 06, PP. 24.

[xx] Gautam, J.N.; and Srivastava, Mahendra Narayan (2006), "State-of-the-Art of Documentation and Information Services in SAU Libraries in India", Library Herald, Vol. 44, No. 1, PP. 33-40.

[xxi] Oyesiku, F.A.; Amusa, O.I.; and Odunew, A.O. (2006), "Resources, Services and Management of Academic Law Libraries and Law Firm Libraries", International Library Movement, Vol. 28, No. 4, PP. 181-205

[xxii] Adebayo, E.L. (2007), "Library Services Standards Implemented in Colleges of Education in Nigeria", Pakistan Journal of Social Sciences, Vol. PP. 279-281. Available from http://medwelljournals.com/fulltext/pjss/2007/279-281.pdf (18-01-10).4, No. 2,

[xxiii] Partap, Bhanu (2007), "A Study of Staff, Collection and Services of College of Education Libraries in the Districts Jalandhar, Kapurthala and Amritsar of Punjab", M.Phil dissertation, Alagappa University, Karaikudy, Tamilnadu

[xxiv] Sujatha, H.R.; and Mudhol, Mahesh V. (2008). "Use of Electronic Information Sources at the College of Fisheries, Mangalore, India", Annals of Library and Information Studies, Vol. 55, No. 3, PP. 234-245.

[xxv] Kaufman, P.T.(2005) Role and mission of academic libraries: Present and Future

[xxvi] Ka, Wai Fan. (2005) The role of university libraries in supporting research in Hong Kong: facing a new challenge. Campus-Wide Information Systems, Vol. 22, no.1: 43-50

[xxvii] Webb, P. J.(2007) Providing effective library services for research. London: Facet Publishing.

[xxviii] Haglund, Lotta, and Olsson, (2008) The Impact on university libraries of changes in information behavior among academic researchers: a multiple case study. The Journal of Academic Librarianship, Vol. 34, no. 1: 52-59.

[xxix] Patterson, Avril. (2009) Research support through resource sharing: challenges and opportunities for Irish academic libraries. Inter lending & Document Supply, Vol. 32, no.2: 87–93

[xxx] Simmonds, Patience L. and Syed Saad Andaleeb (2001) Usage of academic libraries: the role of service quality, resources, and user characteristics. Library Trend, Vol 49, no.4: 626- 634

[xxxi] Rowley, Jennifer. 2004. Researching people and organizations. Library Management, Vol. 25, no.4/5: 208-214

[xxxii] Edwards Vilas,". (1998) "Self-services: transforming the role of library staff." Autumn 1998 SCONUL Newsletter, University of Sunderland

[xxxiii] Purnima Devi. (2006) "Role of UGC in manpower development in the field of library and information science in India." Annals of Library and Information studies, Vol. 53, p.143-148

[xxxiv] Hamedan Branch (2009) "Managing Digital Libraries in the Light of Staff and Users: An Approach" International Journal of information Science and Management, Vol.7 , No 132, Iran

[xxxv] Sehgal, R L and Behl, D K (1996) Manual on Computer Applications Training in Library Science. New Delhi: Ess Ess, 1996, Pp. 31-35.

[xxxvi] Ishvari, Corea, et. al. (1993) Encyclopaedia of Information Sciences. Vol. 1. New Delhi: Akashdeep Publishing House

[xxxvii] Kumar, P S G (1987) Computerization in Indian Libraries. New Delhi, B P Publication, 1987.

[xxxviii] Bhargava, D G (1989) Manpower for Library Automation : Retrospect and Prospect.In: Paper Presented at the Seminar on Information Handling in Libraries in the 21st Century, 22-25 Feb, 1989, Rewa: India

[xxxix] Lahkar, Narendra (1995) Computerization of Libraries : A Brief Study. In: Librarianship A Challenging Profession In Assam, 1995, Pp. 23-28.

[xli] Aguolou C. C. & Aguolu I. E.(2002) 'Libraries and information management in Nigeria: Computerisation of academic and research libraries in Nigeria, problems and prospects'. Maiduguri: Ed-linform, 2002

[xlii] S. D. Vyas (2003), Application of Information Technology in University Libraries of Rajasthan: A Survey Report, Caliber 2003 , P 1-7

[xliii] Ifidon S. E.(2006) 'Modern theory and practice of library collection development'. Ekpoma: Department of Library and Information Science, Ambrose Ali University, Ekpoma. Pp. 1 – 49

[xliv] Adomi E. E. (2009) 'Library and information resources'. Benin City: Ethiope Publishing Corporation, Pp. 1 – 103

[xlv] Abdulraheem Sani, Muta Tiamiyu (2005), Evaluation of automated services in Nigerian universities, The Electronic Library Vol. 23 No. 3, 2005 pp. 274-288

[xlvi] Clausen, H. (1999), "Evaluation of library web sites: the Danish case", The Electronic Library, Vol. 17 No. 2, pp. 83-7

[xlvii] Oulanov, A. and Pajarillo, E.J.Y. (2001), "Usability evaluation of the City University of New York CUNY þ database", The Electronic Library, Vol. 19 No. 2, pp. 84-92.

[xlviii] Lynch, C. (2000) From Automation to Transformation: forty years of libraries and information technology in higher education, Educause Review, 35 (1), 60–8

[xlix] Mirza, Muhammad Sajid and Mahmood, Khalid, (2014)"A Study of IT Infrastructure in Pakistani University Libraries" Library Philosophy and Practice (e-journal). Paper 1122

[l] Saracevic, T. (2000). Digital library evaluation: Toward an evolution of concepts. Library Trends 49(3), 350-369.

[li] [li] Nicholson, S. & Stanton, J. (2003). Gaining strategic advantage through bibliomining: Data mining for management decisions in corporate, special, digital, and traditional libraries. In Nemati, H. & Barko, C. (Eds.). Organizational data mining: Leveraging enterprise data resources for optimal performance. Hershey, PA: Idea Group Publishing

[lii][lii] Tiwari, Aravind. (2002). Evaluation of electronic libraries. New Delhi: APH Publishing Corporation

Chapter 3

Research Methodology

3.1

Research Methodology : Theory and Rational

Introduction:

As management science becomes more collaborative and data intensive, library science also needs to align its services to its users in a better manner. The researcher in her professional career observed that, information technology has been one of the major factors causing changes in the way people communicate, locate, retrieve, and use information. It lead the libraries to be automated. Whenever services become automated there are certain basic housekeeping services that any automated software must have to offer similar library service experiences. On this premise the objectives of this research were as follows:

1. To the study the effectiveness and usage of library software in AICTE approved management Institutes in Mumbai.
2. To find out the available modules and their applicability in library softwares.
3. To analyze the cost effectiveness of these software's and after sales service for annual maintenance service from the company.
4. To study the advancements in technology and the user friendliness of these software's.

However the researcher also recognizes the fact that there is need to keep an eye on the development of new services that could be necessary in this category and move on to adoption of the same. These new opportunities would be identified through a detailed analysis about the implementation, usage and adaptability of Library software's in the AICTE approved Management institutes in Mumbai and if yes then which software is frequently used by the institute, there are some in-house software's developed within the institute along with the availability of software's which are available in the market to like Soul, libsuit, SLIM+++,

SLIM 21 Advanced etc, to name a few. This study can be a baseline survey for finding out opportunities in the library software automation.

On this backdrop the research methodology has been designed. In any applied science it is imperative to relevant reader views on board as these perspective may be the basis for establishment of the hypothesis that the author has about the subject matter basis her noticing , experiencing and believing that have been developed due to publish information that is available in the Library.

The study thus conceptualizes a methods enquiry about the different kind of stakeholders of the category and the subject matter. Thus, any research is a methodical and planned inquiry among the key stakeholders that leads to collection of imperative and meaningful data. An in-depth analysis of the data then can be change into information to create new opportunities into the category.

Every research is done with the help of primary data that is collected through surveys, and through secondary information that is available in open domain and in paid domains. Fusioning the different data types the researcher can establish relationships or predict events or explain the phenomena or identify new opportunities.

Given the topic of this research Use of Library Management Software(LMS), across AICTE approved management institutes in Mumbai City it is clear that the population of institution is finite. On this ground , the researcher also spoke to key stakeholders of library service users, i.e. the faculty and students in this doctoral research.

R**esearch Methodology is the logical flow or steps that the researcher designs for as** a possible way to find out the result of a given problem that the researcher feels/believes is present and needs to be addressed.

In this research the researcher took the following six steps to design the research methodology:

Step 1 : **Defining the Problem :** With the changing pace in Academia it is essential for an institute to every time enhance the quality and features of the library software so that it becomes much effortless to store the huge data with utmost convenience. Thus this research assess the usage of software's for the purpose of possible changes any institute needs to bring in so that the institute is able to offer library services through a most convenient manner. In this stage it was important to discuss with the decision makers, librarians and users of the services and

review secondary data that is available in this category. The researcher accordingly had a discovery phase to define the problem in clear manner.

On this backdrop by nature, thus this research more descriptive and aims to assess the role of technology and application of the same to help develop next steps given that digital future is the most predicted environment of the future across different industries and academic libraries cannot be an exception. So, in this research given the role of software's and technology, a question on "Interactive Software" is also included and is not defined. Instead opinions are being sought from the stakeholders in order to develop a right road map ahead in terms of product configuration modules the area of library software.

Step 2: **Developing the design elements for addressing the problem definition**:

Given the problem definition of assessing the current usage of software to find out possible road map ahead the researcher they took following steps . The design elements being:

- **Research Objectives**: This is a logical fall out after the problem definition stage.The objectives that were developed were answering the key questions to help establish the relationships. Thus the objectives revolved around finding out the ownership f softwares, usage of modules in the software's and associated cost structures. It also had a specific problem occurrence section to find out about the challenges that library management team typically faces. These research objectives that are aforementioned thus helped to formulate the right research questions.
- **Type of research approaches employed**: Three types of research methodologies were employed for this data collection, secondary data review, qualitative informal conversational interviews with the stake holders and quantitative research through questionnaire . All the information that was gathered in the secondary and the qualitative phase was used in developing thee quantitative questionnaire. Since this research is more descriptive in nature a simple questionnaire was prepared for univariate analysis. This research methodology that was set up accomplished the research objectives of establishing ownership and usage patterns of the institutions in case of library software's and also pointed out few possible opportunitities for maximising the usage of books among the concerned fraternity as per the fther of library science.

- **Research Design and Formulation**: This is specific blue print of research that is to be conducted that specifies the approaches developed above.
    - **Secondary Data**: Here the researcher reviewed role of technology in library management .Several newspapers, journals, books, academic articles were used to help define the research problem.

- **Primary data unstructured**: For all the qualitative data informal conversations were set up with librarians , teachers and students. This discussion helped the researcher develop the quantitative questionnaire for librarians, teachers and students.

- **Primary data structured**: All quantitative data that was collected was through face to face interviews. Most of the data that is collected is categorical and ordinal in nature. Single code and Multi code questions were used along with a lot of open ended questions given that this is a baseline study as adoption of softwares is a fairly recent phenomena.

- **Sampling Plan**: Mumbai is the study centre. There are totally 40 number of AICTE associated institutions in Mumbai . Out of which 40 institutions were targeted for librarians , faculty members and students. At an overall level 40 librarians, 200 faculty and 400 students are covered in this doctoral research. For students and faculty convenience sampling was adopted.

Step 3**: Field work and Data Collection:** This is a crucial and important step. There are data integrity issues that can come up. So the researcher herself ensured data collection across all the three sets of stake holders. However, in some case among librarians and faculty despite three visit if the data was not captured then the researcher emailed the questionnaire and sought an email response. But this was only in 30% of cases.

Step 4 : **Data Preparation and Analysis**: Further to data collection the researcher prepared a briefing note for the analysis team and conducted data entry and analysis using excel and quantum tools. Suitable based on statistical idea that can be used to the questionnaire was made by researcher . For knowledge and extracting more information from the data that is collected it was planned to use cross tabs, and code the open ended responses. In addition to tools such as Excel for data entry, Quantum for univariate analysis , SPSS was also used for Chi-square test for hypothesis testing during quantitative analysis. These different methods of

analysis such as frequency analysis, descriptive statistics, cross tabulations that are used in this research have helped the researcher to come up with rich findings.

In this study following analysis types are taken

1) **Percentage analysis and T - tests**: This type of analysis is simple and helps the researcher to maintain basic accuracy of the data that is collected as well as presented in different questions across all different a banner points such as income, gender, SEC etc.T tests are simple because on reviewing of the basic tables at question to question level the significance findings get highlighted through basic tables.
2) **Cross tabulation** : This type of analysis is conducted across two different variables to derive deeper understanding of the relationships.
3) **Chi Square tests**: Because the variables in the hypothesis testing are categorical, chi square tests were conducted to establish significant findings compared to expectations on single questions.

Step 5: **Report Preparation**:

In the context of the objectives and the decisions that needs to be taken following chapterisation is being followed:

Step 6: **Managerial Implications**: Any research especially in the business context leads to managerial implications. In this report there are three sets of findings pertaining to three stake holders. As end notes in every stakeholder's findings managerial implications are presented. However , the researcher has also integrated the findings across segment and has worked upon an overall managerial implications chapter to give a road map ahead for software's, and library sciences as a domain given its important role in the society.

The Role of Research in any management discipline:

The role of research is significant in any management discipline. Following paragraphs will highlight the role of research in any management discipline:

1. **Understanding of user behavior**: An assessment of users through a systematic process will help understand users recent behavior with respect to product category and industry segment. This understanding is important to align all the challenges that the user is facing and bring about changes in the product configuration.
2. **Understanding of the new opportunities**: A detailed research like this will help to create solutions in response the user challenges . This problems faced highlights the weaknesses, and opportunities for the current software companies.

Given that software's are the new entrant in this domain, this primary research is expected to be foundational which can be reviewed as a baseline assessment of technology. The academia and technology development companies can take into considerations the findings and create necessary product configurations that definitely need to be adopted by educational institutions. At an overall level therefore an inferential approach to tackle the technology and role of technology in the digital world can be adopted to expand the role of library services in the near future.

Chapter -4

Conceptual Framework of the Study

Library and Society:

The need for redefining the position and the objectives of all the institutions which are working with information, knowledge and culture is seemingly understood as an integral part of the development of the information society. Among others the most discussed are Media and Education which are poised as the mass information providers to the society as their spread of information is large and audience is relatively bigger. Particularly in the case of education, libraries which are recognized as one of the primary sources of access to open information has been increasingly be concentrated than in the initial stages as the access to open source of information is accepted to be the very crucial for the democratic information society development. The clear need for the information society to maintain the institutions which would be spearheading the concept of collection and organizing information and more importantly providing general access to it has been accepted worldwide. When there is overall development in the ideas of independent learning and acting the libraries have a larger role today more than ever. The citizens among all things have to be having access to all information which is considered to be the key raw material and yet can be a zero resource too if in case the there are no access points to it as well as the documentations containing the information is not stored in order.

4.1 Library and Society:

The most important functions of a library lies in the acquisition, organization, preservation and offering for use of the publicly available information irrespective of its form ranging from Print to network in such as a way as to ensure that whenever it is required it can be accessed to and put in to use. This long term systematic work is unique to libraries and not shared by many of the other information sources (Ryynänen Mirja, 1999)[i]. Libraries and the societies which they are a part of seemingly are inter-linked and inter-dependent. A society without libraries has very little significance and the library without the society has no reason for existence. Libraries are seen as

the vehicles of social change and their role in the social development cannot be undermined owing to the following reasons:

- Libraries help in assembling, organizing, preserving, socializing and most importantly serve all the expressions which might be embodied in any form and size including manuscripts, texts or periodicals other document forms which have been produced as means of communication
- They help in the transmission of knowledge from the earlier generations to the present generations
- Helping in the accumulation of the further build of knowledge from one generation to another
- Aiding in the contemporary development of knowledge by reducing the repetition of efforts which leads in to wastage of research potential of humanity
- To enhance the research effort by providing easy access through faster search options for the literature
- More importantly aiding in the perpetual self-education among individuals
- To make sure that all the recorded information on various subjects and concepts is collected as such to be socialized and made available to be served freely among all who are in need of the information in just at the time they need it
- Helping in knowledge developed required to develop the economic resources of humanity so that the challenges faced by the ever increasing population is overcome and they are in a comfort zone by able to cater to their needs, wants and demands
- To enable individuals, communities and countries to exist in a mutually co-operating and mutually tolerant and peaceful environment
- The books, pictures, sound records, videos and other forms of information provided by the libraries help in a self-dependent use of leisure which is elevating
- Libraries help in increasing the opportunity for spiritual awakening of all members in a community as well as overall humanity

Libraries apart from these roles are beneficial to the society in more than one ways. They have not been representing institutions of learning but also in a social context they have been places

where people come seeking information or seeking answers to their queries. Over the period of times libraries have always been in the centre of cities which provided an opportunity for the residents to gather to share information. It was just one among the public places in the likes of a amphitheatre or a park or a plaza which can turn in to a impromptu forum. With the shift in societal norms where people are no more encouraged to loiter around public places and heavy curbs have been laid on impromptu gatherings cross the world citing annoyance and illegality many of these gathering and the places used for them have lost their prominence and libraries being one of them. This has led in to the development of a concept called as the 'third place" in any society -a place for gathering as a community which is neither a home or a place of work for the participants. This concept was defined by Oldenburg (1999) initially even though he has not mentioned libraries specific in his book yet the libraries can be looked upon as a 'third place' which is more of a neutral territory where people of the society are treated equally with fair chances to accumulation of resources which suits the ideas of existence of a library in itself.

There has been numerous studies advocated to the fact that libraries are places which do not consider economic status of individuals and provide level playing opportunities. In a study conducted in Norway, the authors (Aabø & Audunson, 2012; Aabø, Audunson & Varheim, 2010) illustrate the idea of levelling in a society where an unemployed man is looking for employment in a computer and sitting across is a recently published author researching for his subsequent literatures. It has always been found through researches in libraries that irrespective of socio economic status of individual's together make up for the patrons for the libraries across the world. Even though their activities confined to their personal requirements and fall under the category of usual functions of a library their set up makes libraries to be part of the 'third place'. The neutrality that the libraries provide are ensuring that people with multiple cultural background have no issues in mingling at a place whether for any organized activity or a structured trip for people to learn a native language or in certain cases for a causal interaction. Through this libraries have been able to fulfilling the need for the society's need for a place for people to meet (Aabø & Audunson, 2012, p. 145). Until this point when only the 'physical spaces' of a library are considered in the concept of neutrality and third places in the society. What happens is interesting is note is the emergence of digital libraries which are not confined to just physical spaces. Libraries are not only communities and functions but also linking people

and ideas to each other (Pomerantz and Marchionini, 2007) and a library is in itself much more than a physical building. This view is further agreed upon by Leckie and Buschman (2007) who state that the concepts of communities and place are in actuality nor synonymous to each other and further state that the like-minded people can create communities online too without being ever visiting a common location. In fact the digital libraries are more advantageous as they provide a collaborative learning environment without the restrictions of physical space there by making possible for the formation of online communities which are for less socialization and more by common interests. In a way this attributes to the positives negating the negatives of less commonality in individuals and more commonality on their interests. This confirms that even without a shared common place the digital libraries are also aligning to the concept of 'third place' developed by Oldenburg by providing a common space for exchange of ideas, collaborate with each other and discuss important topics.

Hence these researches prove that even though there are multiple reasons for people to come to a library, the more stronger is the sense of 'Place' of a library in a society. The neutrality, the third place and common interest is what connects the library and the members of a society where everybody feels that they are being treated fair and there is a place to improve upon their knowledge without being marginalized due to their background whatsoever it may be. Hence it can be concluded that the libraries indeed are fulfilling their position in the communities or societies that they are a part of by being able to provide a place for the members of societies and communities for their private as well as their parochial activities making people to interact among one another at every level of the socialization process.

4.2 Advancement of Library

The advancements in technology and more importantly the changes in information technology has had a lasting impact on the libraries. In a technology fuelled world the libraries have been able to rebound themselves and are thriving owing to them being ready to embrace technological advancements as and when they were introduced. They no longer are the warehouses of books and literature rather they are in the transformational phase of being the centres of creativity, research and collaboration. The expectations of the library patrons have changed a lot and

people are expecting to be able to find and access information from where ever they are. This has made many public libraries to use computers in their premises as well create digital library platforms across the internet to enable the patrons to reach them. Slowly libraries have started themselves to be converted in to hubs of technology offering computerized services enabling e-books, databases etc. In the developed west, the libraries are moving to next levels where libraries have emerged which are totally book free. Technology has been starting to be used in many activities which was never envisioned like

- GPS enabled applications capable to locating the materials inside the library
- Mobile applications enabling the patrons to access library from remote
- Access to 3D printers and binding services in many cases
- Delivering the books through robots or drones

Technology on the other hand also possess a lot of challenges to the libraries and the librarians managing it in the way of its distribution and operational functions. The large availability of information in the form of databases, e-books, archives and other digital materials have made the organizational innovations a mandatory process in the libraries. Just the way bookstores were becoming irrelevant the libraries were poised to be the next in line which the libraries are over turning due to the adaptation of technology. A search engine definitely has the capability to at an instant to pride a plethora of information more quickly and easily yet the onus on the quality of the information being provided lies with no one which is a big compromise which does not hold in the case of libraries.

A simple library card which was used just as a access to books and periodicals is nowadays more than that and it is an access to information across the globe and the librarians who are managing this play a major role than ever before. So the role of libraries have changed from book houses and that of the librarians have changed from stewards of information. With the changing needs of patrons as well as the technologies advocate for many changes the libraries still remain as a place filled with information, imagination and a community. Among all the advancements the most important concepts are

- Advancements in ICT

- Digital Libraries

Advancements in ICT:

Information and Communication Technology or ICT in Short used often used as an extended synonym for Information Technology (IT) rather it's a term which is used to stress the unified role that communications technologies and telecommunications together with computer technology including the hardware and the software are used in cohesion with storage and audio visual systems which enable the users to access, sore, transmit and manipulate information. Neither the acronym of ICT nor a definition for it has been universally accepted till date owing to the fact that it is a constantly evolving field and these changes are many a times difficult to cope up with. The simplest way to work with ICT is to make sure that all the existing technologies be used effectively by individuals and organizations in effective use of information. One of the major areas where ICT is making a mark is its use in libraries.

Application of ICT in Libraries:

ICT is highly useful in libraries in such a way that it influences the libraries to create the databases on their own and making them available to all the users through the networks. The inter-dependent, mutually supportive and inter-related activities of the library including acquisition, circulation, office management and information can all be maintained through establishing a comprehensive ICT based infrastructure. There are four major areas in a library wherein the information technology based gadgets can be used and be much relevant for he modern library and are found to be highly convergent. The areas are:

1. Computer technology
2. Communications technology
3. Reprographic technology
4. Printing technology

The effective use of Information technology under these areas would ensure that a library functions effectively under a IT infrastructure.

Computer Technology:

In library operations presently computers are being extensively used enabling a greater streamlining of operations of libraries and communication centres. The various fields of a library where the computer application takes place includes broadly can be classified as:

1. Information resource building
2. Data entry
3. Classification and cataloguing
4. Circulation control
5. Serial control
6. Documentation and allied services
7. Information retrieval

The following are the activities which can be computerized under these functions.

1. **Information resource building:**

Information resource building includes all the activities which are mentioned below:

- Vendor Selection
- Preparation of order and cancellation of the order lists
- Creating terms and conditions of the supply
- Preparation of budget and maintenance of accounts
- Checking of duplication of entries
- Checking of library holdings
- Overdue order checking

- Creating records of items in order
- Creating record of the vendor related data including received and non-received items and receipts to the vendor
- Use order file and invoice through items verification
- Creating item wise inspection by concerned departments
- Preparation of the payment after accessioning process
- Creation of item-wise subject-wise and chronological final report

Data Entry:

Database entries have to be made for books, serials, audio visuals, CD-ROMS, Electronic data storage devices, periodicals, gifted items, reports and most importantly for the clients or members associated with the library.

Classification and Cataloguing:

- Preparation of catalogue cards
- Online -cataloguing process
- Checking for duplication in catalogue cards
- Creation of duplicate catalogue cards in case of loss or damage
- Authority file preparation with subject heading list
- Generation of automatic added entries like author, title and series
- Monthly accession list generation
- Centralized catalogue development

Circulation Control:

- Registration and cancellation of memberships
- Issuance, renewal, return and reservation of the documents and producing slip for the proofs
- Producing penalty slips for charges for late return, loss of materials, binding and production
- Maintaining circulation statistics
- Handling Inter library loan.
- Implementation and managing bar code system.
- Preparation of Reports
- Preparation of statistics of circulation.

Serial Control:

- Serials data Input
- Creating Order list of new serials.
- Finalize and implementation of the Mode of payment and prepare for payment.
- Creation of receipt and record updation
- Creation of receipt to vendors or publishers.
- List preparation for present holdings, additions, missing, cancelled serials chronologically and subject-wise
- Managing the renewal and cancellation of present subscriptions
- Manage reminders and follow-up of missing issues
- Implementation of binding control.
- Creation of accession register for bound serials
- Preparation of budget and maintenance of accounts/statistics

Documentation and allied services:

- Mange the Indexing and abstracting of micro and macro documents in the library
- Construction of the Thesaurus
- Union catalogue construction
- Managing the bibliographical control
- Creation and management of the Current Awareness Services.(CAS)
- Managing the Literature search
- Management of Selective Dissemination of Information.(SDI)
- Collection and storage of newspaper clippings

Information Retrieval:

- Creation and maintenance of the database
- Creation of interactive searching
- Saving in-house and external databases
- Searching and creating print outs of the queries on specified requirements
- Complete Information on books member-ship, inter library loan, penalty charges, periodicals, newspaper clippings, and reports
- Arrangement of keywords in accordance with number-wise, author, title, call number and edition

2. Communication Technology:

The process of transforming the information from the information source to destination is precisely what communication is all about. As it is the exchange of information, and its transmissions being the very essence in a social system its relevance is relatively high. It has become imperative for organizations to ensure that the communicate the information in a more efficient, effective and timely manner by using the communication technology. The major areas included in communication technology are:

- Online search
- Tele conference
- Voice Mail Box
- Satellite Technology
- Cellular telephones
- Audio-visual technology
- Fax
- CD-ROM
- DVD
- Video text
- Tele text
- Internet
- Intranet
- Extranet

3. Reprographic Technology:

Reprography otherwise referred to as micrograph is a reproduction process. Reprography has made a great impact on the document delivery system by making it possible to record micro

images in microforms including microfiche, microfilm computer output microform and Ultra fiche. Reprographics technology covers the following process.

Printing Technology:

Printing plays an important role the information and communication process. Printing technology has made evolutionary changes from the stage of making paper to invention of modern printing levels to the days of laser printing and the future of 3D printing. Printing technology covers the three processes:

- Technical Writing
- Editing
- Publishing

Impact of ICT on Libraries:

With the invention an intervention of Information and communications technology in the library their functioning has improved for better than ever. The rapid inventions in ICT based technology on a constant basis has made sure that the libraries are constantly improved on multiple aspects. The way how libraries use to access, store, retrieve, manipulate and disseminate information have been totally reshaped with the continuous development in the following areas.

- Computing technology
- Communications technology
- Mass storage

Since its inception the academic libraries have always been integral part of the higher learning institutions and have got their due importance and never been considered as appendix or an adjunct institution. With the introduction of the ICT based technologies the following changes are evident in the libraries.

- Reorganization
- Change in work patterns
- Demand for new skills
- Jon retraining
- Reclassification of positions

The following are the spheres of impact of ICT on academic libraries

- The electronic database, CD-ROMs and most importantly the introduction of the internet has made it sure that the access to information has been totally transformed.

- Every sphere of library activity including library collection, library building and consortia have been impacted by ICT.

- Academic libraries in particular are using modern ICTs for the following:
    - Automation of core functions
    - Implementation of effective and efficient library cooperation
    - Manage resource sharing networks
    - Implementation of Management Information Systems
    - Creation of institutional repositories of local contents
    - Creation of Digital Libraries
    - Initiation of capacity building programs
- The conventional LIS such as OPAC, the users and reference services , bibliographic services and Current Awareness Services (CAS) has been brought under unprecedented changes due to the implementation of ICT.
- ICT offers convenient time, place, cost effectiveness and most up to date information dissemination making the document delivery, inter-library loans and audio visual services and consumer relations functions to be provided more efficiently.
- ICT has been instrumental in creating an impact on the characteristics of information which is through changes in format, contents and methods of production delivery.

The impact of ICT characterized on information services by changes in format, contents and method of production delivery of information products.

Hence it is imperative that the adoption of ICT in libraries would ensure betterment in the information services being provided by them.

Digital Library:

The society has seen significant chances thorough the transmission on information and information technology aiding in archiving and accessing the knowledge in the digital form as well as helping in the preservation of traditional knowledge. The demand for the need of electronic information is increasing on a daily basis and with the exiting traditional systems it will become complex to manage the huge information. This major challenge for libraries in this scenario is to capitalize on these challenges and find ways to meet the demands and expectation of the new age digital users. The user community's needs have to be catered to by the libraries through some value addition in their existing services.

A digital library is a source which is used in order to rebuild the knowledge and helps in supporting the conventional library in a digital form. Using a network that can be used for retrieval of data a digital library is an organized assortment of data and information together with its supported services and a place where in the digital information is being stored. It is made up of two things:

- Digital content which is interconnected by establishing a link, query based relationship or a meta link
- A software based upon HTML or on a database management system

A single web page separately or a huge collection of digital data alone cannot be called as a digital library. Moreover a digital library is not something which can replace a traditional library rather they are seen as the future of the conventional libraries (Seadle, 2007). Many services

which are to be disseminated to the users require a digital library to provide the technological support to link them. The collection of information is not only restricted to the document storage but extends up to the digital artifacts which are stored in the digital format. The contents of a digital library can be stored locally or can be accessed remotely also. The term 'Digital Library' first came in to use as early as 1988 as a published record but the concept was idealized by Bush (1945) who created a vision based upon experience called as a digital library.

The association of digital libraries worldwide called as the Digital library Federation defines digital libraries as ' The organizations that are providing the resources to ensure the persistence overtime of collections of the digital works to make them readily available for the use of a defined community or a set of communities by the inclusion of specialized staff used in to select, structure, offer , interpret, distribute and preserve the integrity of the digital works' (Shiri 2003) . The following is a comparison between digital and conventional libraries:

Conventional Libraries	**Digital Libraries**
Collection confined to print format	Collection majorly in digital formats
Collections are stable with slow evolution	Collections are more dynamic and ephemeral
Individual collections are not linked to each other	Consists of multimedia and fractal objects
Minimal contextual metadata providing a flat data	Richer contextual metadata and scaffolding of data
Scholarly content is stored with validation	More than scholarly data is stored with multiple validation
Access points are limited with a centralized management system	Access points are unlimited, more distributed collections and better access control
Correlation between the physical and logical organization	The physical and logical organization are virtually present

Transactions are usually one -way	Transactions are more dynamic and real time
Access provided is free and universal	Access provided is free and fee based

Source: Dr Mayank Tripathi- Library Philosophy and Practice-2010

Digital Library - Characteristics:

Lancaster's idea of a paperless society have been made a reality due to the recent developments in the library technology and practices (Jebaraj and Deivasigimani, 2003). The following are the effects of digital technology in libraries.

- A digital libraries constitutes of permanent documents
- Enabling of quick handling and ephemeral information
- Individuals working alone can use digital libraries
- The physical boundaries of data which existed have been eliminated
- Collaboration and support for communications is enabled
- Publication and storage of digital information is enabled by compression of data storage
- Telecommunications are used for facilitating storage, retrieval use and exchange of the digital resources

Functions of a digital Library:

The following are the functions of a digital library:

- To provide access to large volume of information to the users wherever they are and whenever they need it
- To provide access to primary information sources
- To support the text and multimedia content
- To provide accessibility through intranet and internet
- To provide an user friendly interface for use

- To provide easy access through hypertext links
- To work on a client-server architecture
- To provide options for advanced search and retrieval
- To enable the integration with other libraries

Purpose of Digital Library:

- To expedite the systematic development of procedures so as to collect, store and organize information in a digital form
- To be able to provide efficient delivery of information in an economic way to all users
- To be encouraging the cooperative efforts in research resource., computing and communication networks
- To strengthen the communication and collaboration among the educational institutions
- To establish a leadership position in the generation and dissemination of knowledge

Major components:

The major components of a digital library include:

- Infrastructure
- Digital Collection
- Systems function
- Telecommunication facility
- Human resources

Planning for Digital Library:

A digital library can be formed in either of the two ways:

- Developing a digital library from a traditional library
- Direct development of a digital library

It includes coordination between multiple departments and individuals to ensure a digital library in place. The following are the steps in the development of a digital library.

- Create the IT infrastructure
- Plan for digitization process
- Plan for access and access control
- Plan for staffing
- Planning for furniture, equipment and space
- Plan for associated service
- Planning for funding

Creation of digital resources:

The following are the steps in the creation of digital resources in a library

- Creation of a database consisting of digital materials which is open to all users over the campus' LAN
- Creation of a hand bandwidth internet connectivity
- Develop focus on the acquisition of digital resources
- Subscription to electronic journals and gradual elimination of print subscriptions
- Subscribe to licensed databases
- Creation of a local digital content which is available in the universities and institutions

Advantages and Limitations of digital libraries:

The following are the advantages of a digital library:

- Provides unlimited storage space at a much lower cost
- Reallocation of funds from traditional methods to digital means
- Creates a situation of no boundaries
- Availability round the clock
- Provides multi-user access
- Provides enhanced information retrieval
- Older print materials can be preserved

The following are the limitations of digital libraries:

- There is a lack of personal screening and validation
- There is a lack of preservation of a fixed copy being used for recording and duplication of scientific research
- Lack of preservation in the best in class literature in the form it was created
- There is a lack in differentiating between the valuable information from useless information
- Leading in to job loss for publishers and librarians
- Lack in differentiating the hidden costs

The challenges faced by the computer science professionals and Library information professionals will require more streamlined digital systems. Libraries would be having more departments and programs in the digital arena. It has been accepted that the digital libraries are effective in distributing the learning resources to students and other users. While planning for a digital library it requires a thoughtful analysis about the organization and its users and more importantly the cost required for infrastructure and maintenance has to be acknowledged (Adams, Jansen and Smith, 1999).

4.3 Technology and Library Software:

Libraries after a long period of gestation have started to adopt the automation and modernization with taking in to account of their financial and technical inabilities which act as hindrances to the adoption of the same. Even though financing appears at the outset to the major problem, in

actuality it is the technical issues such as the procurement of hardware and the necessary software, the database and the manpower requirements are the serious issues in adoption of automation. In spite of these the adoption of library automation and library management software has seen a huge development over the years. From the Mid 1970's library management softwares came to existence in almost all parts of the world. Library management softwares can be broadly divided in to four different generations.

Generation I:

LMS which were developed and classified as the first generation LMS were majorly module based catering to one specific function of a library and had very little or no integration between the modules. The major modules developed during this stage are circulation module and cataloguing module. They were developed to run on specific hardware platforms only and on proprietary operating systems.

Generation II:

The second generation of LMS which were developed saw that there was portability between various platforms and had seen the introduction of UNIX and DOS based systems. The LMS developed during this stage were developed in such a way as to offer links in between the specific functions. These systems were majorly command driven as well as menu driven systems.

Generation III:

The third generation of LMS were those which were fully integrated library systems which are based upon relational database structures. These systems embodied a range of standards which were considered to be a significant step towards setting up of an Open System Interconnection (OSI). They also developed colours and Graphical User Interface Systems (GUI) with specific features such as windows icons, menus, and direct manipulation which became standards and norms in this generation of LMS.

Generation IV:

In the fourth generation of LMS the software's developed are developed on completely web-centric architecture and facilitate the access to other servers over the internet. These systems were developed to allow access of multiple sources from a single multimedia interface (Mukhopadhyay and Parthasarathi,2002).

The concept of library automation was in this infancy stage during 1954 to 1970 and during the first half of the period it saw a trend of developing applications basically for the benefit of the users. The second half on the other hand saw applications being developed which used computer for performance of routine tasks of the library.

The period from 1970 to 90 is known as the adolescence period of library automation and during this the library automation helped in the development of technical specifications, requirement analysis and functionalities which are desired from an automated library system. The introduction of Internet in the late 1980's saw a completely new set of dimensions to the world of information. Libraries have started to prefer completely web compatible softwares which consist of all functionalities based on web. Recently the open source softwares have also emerged as available alternative to the commercial systems (Mukhopadhyay and Parthsarathi,2006) .

4.4 Library Automation Standards:

The following are the international standards which are as follows:

Metadata standards:

- Dublin Core
- EAD
- LOM
- VRA
- Core Categories

Information exchange standards:

- AACR
- LCSH
- ISO10160
- 10161
- ISO2709

Communication Standards:

- MARC
- UNICODE
- TCP/ IP
- Z39.50
- Z39.71
- OPEN URL

Content representation standards:

- PDF
- HTML
- WORD FILE
- XML

Interoperability standards:

OAI-PMH and others

Some of the literature available on these standards are as follows:

- Metadata is called as the "data about data". Meta data is dependent on a large part on the resources for which they were created. This particular standard is widely used for cataloguing in an electronic environment and whenever meta data standards are used with cataloguing it provides consistency and exhibits tremendous flexibility (Sherbini and Klim,2004).

- When automation process was started, when there was absence of approved standards the professionals started using roman numbers for documents as the computers were using only binary digits of roman script to represent the English language. Over the years ISCII which was a new technology developed as an extension of ASCII with values form 126 to 155 was used by library professionals to develop bilingual data bases and text files on DOS and Unix systems. The next was the development of fonts for windows based

applications which aided in developing websites and document files. Now the requirements of multiple languages to be used a Unicode was developed which helps in the solution of localization of the problems of the world language. It is a multilingual standard which is also used for localization of Indian language materials (Chandraker, 2004)

- The centralization of the resources shared by the libraries worldwide are promoted by Z39.0 protocol. This protocol is used by personal bibliographic managers such as reference managers, End note, Procite etc, which are used to access the bibliographic protocols (Wu,2004)
- The recent growth of electronic information calls for standards to be used for development of architecture and organization of the electronic information. Open URL solves majority of this problem by providing a standard format for the transportation of bibliographic metadata about the objects between the information services. It is used effectively in libraries mainly because it provides for appropriate ways to link across information sources.

- MARC 21 standards are very helpful as they are encoded in individual character sets which include the ASCII, ANSEL and Unicode also. MARC 21 allows for the use of Unicode without any constraints on the structure and data content (Aliprand,2005).

- When the digital archives were started to be used the protocols such as MARC, Z39.50 and ISO 2709 were not able to match their requirements. This required to higher order standards to be established.

LMS-Databases:

In the initial days of computing the data was kept in to the data files with programs being written to interact with these data files in order to produce the reports. This actually required a complete development of programs every time which was solved by the creation of a file management

system which solved most of these of writing programs every time. A database a systematic approach towards the database management system was developed. Database is defined as a organized collection of structured data or a unit of information or data records which is independent of any application in a computer memory which is used to serve the need of multiple users. This implies that the database management system comprises of a collection of programs those of which enable an user to store, modify and extract information from a selected database.

The success of any information centre lies not only in the resources but also but more importantly in the identification and enlisting of various information sources together with the development of the requisite tools for maintenance of these information sources. For making this work it is essential to work on the bibliographic databases (Ravindran, 1997). The different national and international databases such as UKMARC, USMARC, CCF, UNISIST etc have to managed through international standards established for generation of the exchange standards (Mishra, 1997).

Character encoding is another important aspect of database management as the web and everything associated with it requires character encoding by the developers. When there is a creation of multi-script databases, character encoding becomes a most important criteria to be taken care of (Chandraker,2002). When there is a need for storing and managing many different types of digital content the relational database management systems (RDBMS) is the best suitable for providing solutions for XML. There are certain relational databases which provide for special mechanisms for accommodating XML, there are also other technologies which have emerged which facilitates the use of XML representation of data which is housed within an RDBMS.

Technology interface in Library Management Systems:

The following are the components of technology interface.

- RFID

- API
- VRS
- PDA
- Computer integrated telephony
- Smart card readers
- Biometric devices

Radio Frequency Identification Device (RFID):

RFID is used to checking the stock circulation, and security systems in a library wherein the RFID tags are increasingly been used replacing the traditional barcodes and magnetic strips to identify and track items

Application Programmer Interface (API):

API is a is one of the features of Integrated Library Management systems which are used to help the systems staff in libraries to modify the vendor's software to fit local requirements. They also help in faster upgrading of software.

Virtual Reference Service (VRS):

A relatively new component of the ILMS, VRS is associated with the Web OPAC to connect to a librarian for a reference related service. Some cases it houses a chat technology which is used to interact with a reference librarian in real time.

Personal Digital Assistant (PDA):

A computing and storage device which is handheld, PDA's are used for information access and dissemination without the use of the desk or study cartel.

Computer Integrated Telephony*:*

Computer integrated telephony is used for sending reminders and information on reservations to users, for all the circulation-related transactions such as book renewals, checking of account status and cancellations or reservations over the telephone.

Smart Card and Reader*:*

Smart cards embedded with an intelligent, single-chip microcontroller facilitates the implementation of a very high level of data security. and means that data can be securely updated or written to the card after it has been issued. Recent developments include the integration of reusable memory–Electrically Erasable Programmable Read Only Memory (EEPROM)–onto a single-chip microcontroller.

Biometric Devices:

The usual biometric devices being used are

- Finger print reader
- Voce recognition
- Face recognition
- Retina recognition

Security Measures used in Library Automation Software:

As the libraries have been increasingly using network based systems which help in smoother communication as well as increase in outputs, the emergence of security threats are also ever increasing which might lead in to breach of network security and resulting in costly damages. So it is imperative to secure the perimeter of the network for which the following are used.

- Firewalls
- Routers
- Intrusion detection system (IDS)
- Virtual private network (VPN) mechanism
- Screened sub-nets

Networking Architecture used in Library Management Software's

Networking used in libraries is of the following types:

- Single-user system

- Multi-user system
- Local area network
- Client- server architecture

Benefits of LMS:

Implementation of LMS in a library provides multiple benefits among which the following are the major benefits.

Improved Customer Service:

Implementation of LMS reduces the workload off of librarians and other staff acquisitions, cataloging and circulation, making them serve their patrons in a better way. This extra time provided by processes speeded up by LMS can be sued by the library staff to answer reference questions and helping patrons in researching or finding the right information.

Cataloging Improvements:

MARC (Machine Readable Cataloging) and other automated catalogues which allow for cataloging of library items there by allow the librarian more time to dedicate to improving customer service, but it help in ensuring the sharing of materials from one location to another at a much easier and affordable rate.

Easier Access:

When a LMS is being used it is not only easier for finding books and journals in the library but also online from a home computer or elsewhere. The automation of library collections also more flexibility as demand increases.

Collections:

Improvement in the variety, amount and quality of materials library's collection is enhanced by the use of a LMS. LMs helps in weeding out old, outdated and irrelevant books and materials from the collection making it streamlined and relatively easier to find the right item.

Lasting Effects:

LMS helps the library collection to be more sustainable by adhering to needs of a technology-based society, through information dissemination, paired with the ever-decreasing amount of funding for libraries. Using LMS would allow libraries to add on features when they become available in the future, thereby reducing the effort to overhaul their collections and cataloguing methods.

Current state of Library software:

Technavio (2017) published a report on the status of the Library Management Software (LMS) market in the world. The following are the key points of the report.

- The following are the companies which are key vendors in the global library management software market. They are
    - Civica
    - Innovative Interfaces
    - ProQuest
    - SisiDynix

- The global library management software market is poised to grow at a CAGR of more than 3% till 2021.

- The APAC region is identified as one of the most important growth market for library management software.

- Growing markets such as China, India and Japan are showing an increased interest in spending towards library automation and library management software's.

- The next development in the Library management software arena is the Cloud based integrated software systems which is already being developed by CR2 technologies which they have developed as a knowledge platform for education and healthcare sectors.
- Apart from the traditional addition of books and research papers to their collection the public libraries have started adding digital newspapers and magazine contents.

The report also identifies three major trends which are driving the global library management software market. They include:

- Increase in the use of open source library management software
- Increase in platform support for library management software
- Evolution of digital newspapers and magazines

Increase in the use of open source library management software:

One of the major trends in global library management software is the development of Open Source Library management software. An open source software is one whose source code is available usually under a license or under public domain which permits the users to study, change and improve the software as well as redistribute it in a modified or a unmodified form. Usually developed in a public or a collaborative manner it is similar to a user developed content. An open source software is characterized by sharing and collaboration which are basic elements of open source. There has been different kinds of open software solutions which are embraced by libraries. They include

- The basic operating system
- Document processing systems
- Library Management softwares
- Digital library software

Some of the most renowned library management software's used globally are KOHA, NewgenLib, Evergreen etc., Among them KOHA is a full feature based LMS used across the world by libraries. KOHA is a perfect alternative to the commercial LMS as it is build on the ILS

standards and also uses the Open Public Access Catalogue without any vendor lock-in which provides access to technical support as and when required.

4.5 Increase in platform support for library management software:

Even though the current technology demands a cloud and web based LMS yet most of the LMS used is offline, which requires platform support owing to which there is an increase in platform support for the software. It is also seen that vendors who are providing more solutions for cloud-hosted and web-based library management software also provide support for the platforms., CR2 Technologies a software vendor has developed their LMS for four major platforms which include **LIBRARIAN**, **webLIBRARIAN**, **Cybrarian**, and **MobOPAC**.

Evolution of digital newspapers and magazines:

With addition to the earlier discussion it is seen that there is a trend towards private and public libraries providing digital newspapers and magazine in addition to popular books and research papers.

List of LMS:

The following is an Exhaustive list of LMS software's being available at a national and international level.

Library Management Software		
S No	**LMS**	**Vendor**
1	Insignia Library System	Insignia Software
2	Destiny Library Manager	Follett
3	Atriuum	Book Systems
4	Koha ILS	LibLime
5	OPALS	OPALS
6	Handy Library Manager	PrimaSoft PC
7	Koha	ByWater Solutions
8	Accessit Library	Accessit Library
9	MODERNLIB	SAKTHI Technologies
10	LIBERO	Insight Informatics
11	SirsiDynix Symphony	SirsiDynix
12	LIBSYS7	LIBSYS
13	Millennium	Innovative Interfaces
14	LPT:One	EnvisionWare
15	Readerware	Readerware
16	All My Books	Bolide Software
17	Auto Librarian	MC2 Systems
18	Genesis G4	Library Resource Management Systems
19	Soutron	Soutron
20	VERSO	Auto-Graphics
21	LIBRARIAN	CR2 Technologies

22	Aleph	Ex Libris
23	Aura Online	Aura Software
24	Autolyb	Databiz Software
25	Bibliotheca	Ansell Productions
26	Book Collector Pro	Collectorz.com
27	Boopsie for Libraries	Boopsie
28	CyberTools for Libraries	CyberTools
29	Deeksha Library Management System	Deeksha Systems
30	Easylib Library Auotmation Software	Easylib Software
31	Eprints	EPrints Services
32	Evergreen ILS	Evergreen
33	FIRST LMS	FIRST Software Solutions
34	FlashScan-MAX	Library Automation Technologies
35	Journal Finder	WT Cox
36	KLAS	Keystone Systems
37	Lexwin	LEX Systems
38	Lib-Portal	P-DOT
39	LibAnswers	Springshare
40	Libdata	Libdata.com
41	Liberty	Softlink America
42	LibGuru	Spring Time Software
43	LIBMAN	Spring Time Software
44	Library Solution	Sabinet
45	Library Vision	Vision Forecasting
46	Library.Solution	The Library Corporation
47	LibraryPro	Primetech Software
48	LiBRARYSOFT	New Generation Technologies
49	LIBSOFT	Environ Infotech
50	M2L	MINISIS
51	MindLibrary	Mindmill Software
52	OpenText Library Management	OpenText
53	PC Card Catalog	Library Concepts
54	Progen Lib Junior	Limrose Group
55	Reademption Library EcoSystem	Reademption Solutions
56	ROVAN LMS	Rovan Software Solutions
57	Schookee	Virgosys Software
58	Series-M	Tek Data Systems

59	SignUp	Demco
60	SLIM21	Algorhythms Consultants
61	WorldShare Management Services	OCLC

i. Mirja Ryynänen, "The role of libraries in modern society"(1999),7th Catalan Congress on Documentation

ii. Phadke, D. (2010). Granthalaya Sangnkikaran Aani Aadhunikikaran (4th ed.) Pune: Universal Prakashan, pp. 52-54

iii. Raina, Roshan (1980), "Degree College Libraries in Kashmir: A Survey", Annals of Library Science and Documentation, Vol. 27, No. 1-4, PP. 12-19.

iv. Rao, N Y J and Ramchander, M : Books to Bytes : Library Information Technology in the New Millennium. New Delhi, Ess Ess Publications, 2000

v. Reddy, E Rama; Rao, K Nagatja and Burhanuddin, Mhd. : Computerization of University Libraries : A Case Study of Library of Hyderabad University, ed. C.P. Vashishth. Delhi: ILA, 1991. Pp. 5-7.

vi. S. D. Vyas (2003), Application of Information Technology in University Libraries of Rajasthan: A Survey Report, Caliber 2003 , P 1-7

vii. Sean Burns.(2014) Academic Libraries and Automation: A Historical Reflection on Ralph Halstead Parker, Libraries and the Academy, Vol. 14, No. 1, pp. 87–102

viii. Taher, Mohamed (1994). Encyclopedia of library history. New York: Garland, 272

ix. Vashisth, C P : Library Services for All by 2000 AD. Presidential Address at 39th All Indian Library Conference, Department of Public Libraries, Govt, of Karnataka, Bangalore, January 7-10,1994

x. Verma, I. N. and Agarwal, U. K. (Editors) (1994). Public library services in India.Udaipur: Himanshu

xi. Webb, P. J. 2007. Providing effective library services for research. London: Facet Publishing

Chapter 5
Data Collection, Analysis and Hypothesis of the Study

5.1

Survey Findings: Librarians

Background:

In this doctoral research study 40 librarians from cross section of management institutions were surveyed . Academic institutions and libraries in these institutions have a unique place in the society. Libraries have always been used by professionals in different sectors in the creation of new knowledge. Libraries accomplish this task by ensuring that the knowledge that is there in the books is organized, restored and made available for coming generations. Libraries are considered synonymous with education but they can actually fuel social, cultural and economic development . To this effect there are many inspiring stories like that of Mr. William Kamkwamba from Malawi who borrowed one book on windmills from the local library and learnt how to build an energy-producing turbine for his village. That one book he borrowed changed not just his life but the whole village communities life. Such stories point out towards why many countries now are very keen to ensure that libraries continue to offer knowledge services so that new thoughts, actions and deeds can be stimulated.

The development of technology and application of technology in this field of library science will only expand its role and relevance in the academic world and beyond. This was the central thought of the researcher which led to this research which evaluates the usage of soft-wares in this field by their chief patrons, meaning the librarian themselves, students and professors who are considered as the primary users of this entity.

The technology and the digital world provides an enhanced opportunity for librarians to be even more actively engaged in the new knowledge creation process. Most softwares are interactive and can have the capability to offer knowledge gathering services remotely too to anybody living

anywhere in the world. These capabilities definitely expand the role and amke them more relevant to the society and the academic world.

This questionnaire (Refer Appendix I) was prepared after a short qualitative discussion with the librarian fraternity. This ensured that the questions incorporated in the questionnaire used the terminologies that were actually popularly utilised by the librarians themselves . The focus of the questionnaire was on :

- **Sample Profile**: The aim here was to establish the librarian and institution vintage.
- **Institute affiliation**: The aim here was to find out the affiliation with parent council. It is important to help develop library strategies that can be implemented in a standardized manner to offer undifferentiated library services across institutions affiliated under its aegis given that library is an infrastructural service by any educational institution and the patrons do deserve similar or standardized library services.
- **Ownership of software's**: There are many company/brands of Library software's that are available in the market. It was important to understand the decision-making journey for owning these software's.
- **Experience with the software:** It was important to understand the experiences with the software's to help develop effective strategies that will help librarians to use these software's and maximise the benefits of the same.

The findings from this survey can serve as baseline assessment for the softwares and their utilisation in the institution to highlight possible opportunities or areas of limitations so that effective library strategies can be evolved to ensure an expanded role of this service in order to facilitate performance of their patrons and users in the knowledge lead economies.

The sample size is 40. The method of data collection was primarily face to face using pen/pencil with the questionnaire. The appointment was pre fixed by the researcher. However , three visits were given and if despite three visit f the interview did not get complete in the face to face scenario then the questionnaire was emailed and the respondent sent a electronic response to the researchers.

While detailed tables are presented towards the end of this chapter , overall findings will be presented in the body of this chapter to highlight the key findings under the aforementioned four sections.

Sample Profile: **Key profile parameters: Age (Librarian and Librarian service, Institution Vintage) and Student population** :

Figs in %	Total
Total	**40***

Age of Librarian	
Up to 35	40
36 & above	60
Age of Establishment of the Institution	
Up to 15	43
16+	55
No. of students in the college	
Up to 400	58
401+	40
Librarian - No. of yrs. with the college	
Up to 5 Yrs.	43
6+ Yrs	75

The sample profile points out towards a matured set up whether it is an institution or the key custodians of the institute. There are five laws of library science, propounded by Dr. S. R. Ranganathan (1892- 1972), the father of library and information science in India. One of them is that Library is a growing organism. Given that most institutions are 16 years plus it is poised to bring in changes so that it grows with the market and sector.

In fact (Refer tables on page number 4.6.4) which clearly highlights that 62% of institutions established before 2000).

1. **Institute affiliation**:

In order to get an insight on institute affiliation following question was asked:

Q. (REFER QUESTIONNAIRE IN THE APPENDIX) Whether the College is affiliated to AICTE:

Figs in %	**Total**
Total	**40***
Yes	95
Deemed university	3

Clearly majority of institutions are associated with AICTE. All India Council of Technical Education is a statutory and national body that accredits educations institutes to run graduate and post graduate programmers. Since this is an statutory body this body has an authority to bring in the necessary changes if needed for the growth of education sector and society at large. The role of software as is emerged in this baseline research can be used by this statutory body to bring in necessary changes and help make these services not just available but accessible 24*7 to all its patrons.

2. **Ownership of software's**:

Following key questions were asked by the researcher to establish the ownership of software type:

- Out of the following options, which software is used in your Library?

A list of library software's were presented to the librarians as an aid and they had to tick the software's they own in their institute. Following table highlights the top three software companies/brands that are currently owned by the institutions:

Figs in %	Total
Total	**40***
SLIM 21 Advance	25
SOUL	15
Koha	15
Egranthalya	13
Total	68%

The market at this time seems very fragmented and this typically happens when there is huge unorganized market in the sector. Its a case of concentrated or fragmented market. In a concentrated market there is a mechanism of depth of services, features of product are more or less standardized and pricing information is transparent where as in fragmented markets there is uncertainty and un-standardization of product and product features.

The findings reveals that the market situation is fragmented and does present an opportunity for the role of the regulatory body which can specify some basic important features that every institute must have, and could have brands and modules/features, so that they offer similar quality of library services to the users of the services.

- Which are the software modules available in your Library from the below given options?

Figs in %	Total
Total	**40***
Cataloguing	98
Acuisition	98

Report	93
Stock tracking	90
Circulation history	88

So clearly these emerge as the top five modules that must be most used too. This insight helps to get a basic software product configurations for such a service.

- Who is the decision making authority to purchase the software?

Figs in %	**Total**
Total	**40***
Director/Dean/Management	75
Librarian	10

- Who referred you to go for this software?

Figs in %	**Total**
Total	**40***
Director	55

Clearly the above two findings reveal that the decision is top down and given the technical role it is important to make this decision more participatory so that the librarian who is the key custodian of this software is able to use the software better and maximize its utilization.

3. **Experience with the software:** Overall across parameters the experience that is provided seems to be good. But the researcher feels that the software's potential is not being fully utilised by the fraternity and this is a matter of application and training which may be is required to be disseminated by service providers and regulatory body in the view of expanded role that the researcher has envisaged for the library services given the technology interface.

Following key questions are asked to assess the experience with the software's

- **Is the software interactive:** Nearly 85% of librarians say that it is interactive (REFER TABLE 4.6.13) But on asking what are the interactive features that it offers, the mentions are in the space of email support, remote service etc. However it is felt that the active technology features such as search, subscribe and filter do not get mentioned pointing towards the need of familiarisation of these features and training on using it to maximise the benefits of technology and digital world.
- **Is there any back-up support system available for the said software**: It is encouraging to observe that 93% (REFER TABLE 5.6.15)feel that the companies do offer back
- **How often the company representative visits to your institute to enquire about the working condition of the software?:** Mostly only on calling is the response by 85% of librarians (REFER TABLE 5.6.27). This needs to be looked into.
- **The facility which is provided by the Software Company is it good**: 88% say that the service is good. (REFER TABLE 5.6.29)
- **Is the above software user friendly**:98% say it is user friendly . (REFER TABLE 5.6.32)
- **How many times does the faculty and student use the software?** Teachers use it for 15 days and students use it for 18 days so it is fairly intensively used service. (REFER TABLE 5.6.36/5.6.37)
- **Problem occurrence in the software:** This question reveals that 2.65 times problems occur in a given month**.** (REFER TABLE 5.6.34)
- **Would you like to recommend this software to any other institute** : 68% say that they would recommend the software but the difference between the scores on Facility is good 88% and recommendation is about 20 points and that is huge gap. This reveals that there are some discomfort and areas of disappointments among librarians and that needs to be addressed.

To conclude: The managerial implications of the above findings point out towards following two key inferential findings:

1. A need of a strong role of the regulatory body to set up norms for institutions and software company to ensure that library software services is not just a knowledge repository services. As observed that the decisions of purchase are at the institution level and that's leading to a technology adoption which is extremely differential and driven by the institutions mandate. AICTE can have a role here to mandate minimum features to offer similar library services to the users like educational curriculums.
2. Further when the awareness of features of the modules is evaluated 21% librarians have mentioned about the 'search' function. It appears that given that there is an expanded role that librarians need to play in educational industry which goes beyond being repository of knowledge services and moves into an active role of creating new knowledge that is research based this function needs to be used more frequently.

3. The top five software's that emerged are:

Figs in %	Share in the institutional market	Whether interactive software % saying yes	Whether recommended: % saying yes
Total	**40***		
SLIM 21 Advance	**25**	**100**	**100**
SOUL	**15**	**80**	**66**
Koha	**15**	**100**	**100**
Egranthalya	**13**	**100**	**80**
Total	**68%**		

These findings indicate that the role of regulatory body is highly required to ensure standardised services across service providers.

5.2
Survey Findings: Professors

Background:

In this doctoral research study 200 professors from cross section of management institutions were surveyed . Professors are the teaching faculty and have a unique position when it comes to influencing and using the library services. Professors are like the students are primary users of these libraries and therefore it was important to ascertain their perceptions was the key thought of the researcher.

Currently professors /or management faculty need to be very research oriented in their approach of teaching. This is especially true about management teachers because management is more about applied sciences. Further there is a professional requirement to do academic writing in order to publish well researched papers in the domain of their teaching. All these requirements are heavily dependent on library services. On this back drop it is evident that therefore this teaching community will be one of the primary users of library services. In this context it was important to ascertain the user perception about these technology software's that the academic libraries use. Because these software's will be the enablers for expanding the role of library sciences was the next emerging thought of the researcher.

This questionnaire (Refer Appendix II) was prepared after a short qualitative discussion with the teacher community. This ensured that the questions incorporated in the questionnaire used the terminologies that were actually popularly utilised by the teachers themselves . The focus of the questionnaire was on :

- **Sample Profile usage of library services**: The aim here was to establish the awareness and usage of these software's among the teachers who are also primary consumers like the students of these services.
- **Software feature awareness**: The aim here was to find out the level of awareness of different features that the software offers.
- **Experience with the software:** It was important to understand the experiences with the software's to help develop effective strategies that will help teachers to use these software's and maximise the benefits of the same.

The findings from this survey can serve as baseline assessment for the software's and their utilisation in the institution to highlight possible opportunities or areas of limitations so that

effective library strategies can be evolved to ensure an expanded role of this service in order to facilitate performance of their patrons and users in the knowledge lead economies.

The sample size is 200. The method of data collection was primarily self-filling using pen/pencil and the questionnaire in the institutions setting.

While detailed tables are presented towards the end of this chapter , overall findings will be presented in the body of this chapter to highlight the key findings under the aforementioned three sections.

Sample Profile: **Key profile parameters: Level of Software Awareness among Professors population** : In case of this community too the highest awareness is for SLIM software and it is at 36% followed by SOUL and KOHA at 14 and 15% each Refer table 7 in Professors tables section .

The response to **Q1 REFER QUESTIONNAIRE IN THE APPENDIX Was:** How many times do you visit the library **(SA)**

4.

Figs in %	**Total**
Total	**200**
Every day	59
Thrice in a week	16
Twice in a week	17
Once in a week	8
Average usage	18.59 days in a month

On usage of library services, therefore, 100% of the faculty use these facilities at least once a week. This statistics is a very encouraging finding and reflects upon the relevance of these services to the teaching community.

The response to **Q2 REFER QUESTIONNAIRE IN THE APPENDIX Was:** How much time do you spend in the library? **(SA)**

Figs in %	Total
BASE	200
(0.5) Less than 1 hour	10
(1.5) Between 1 to 2 hours	35
(2.5) More than 2 hours	55
Average Time (in Hrs.) spent in Library	1.96

The feedback of spending 2 hours is also encouraging showcasing that the teaching community spend a fair amount of time consuming library services.

5. Awareness of Features

The next few questions that were asked were about the features that are new and old service features of an academic library. Presenting below the questions and the associated findings that emerged:

Figs in %	Total
Total	**200**
Reading services	**100**
Reading room facility	100
Reference facility	100
Library orientation	85

Newspaper clipping services	88
Inter Library loan	80
Figs in %	**Total**
Total	**200**
Reprography services	78
Internet Facility	100
Online & Offline Database	100
OPAC Services	83
Selective Dissemination & information (SDI)	5

Clearly therefore these findings point out that the internet, reproduction and database services are popular among the teaching community. But these features are more like housekeeping functions or features but when it comes to interaction features like SDI the awareness and usage too drops significantly.

Library Science fraternity are trained into three broad activities for library and information services; which are Information communication, Knowledge distribution and knowledge organization. SDI "Selective dissemination of information was a concept first described by Hans Peter Luhn of IBM in the 1950s. Software was developed in many companies and in government to provide this service in the 1950s and 60s, which allowed distribution of items recently published in abstract journals to be routed to individuals who are likely to be interested in the contents. For example, the system at Ft. Monmouth automatically sent out (by mail) a different set of abstracts to each of about 1,000 scientists and engineers in the army depending on what they were working on. The selection was based on an "interest profile," a list of keywords that described their interests. ". These kind of features fall in interactive features giving curated information to the user community.

The library science professionally can keep communicating with their user profiles depending upon their interest profile . But clearly there is a need of stronger messaging or different ways of communication to ensure that teaching community is made aware of these engaging features and software's itself so that they maximize the usage of library services.

These kind of services when offered and used the perception about academic libraries will be

more relevant given that "academic writing" is one of the growing need that has to be performed by teaching community to ensure that the educational environment is throbbing and vibrant with new information, application and perspectives. Libraries can only support the teaching community in building such learning environments.

3.Experience with the software's:

Following key questions were asked by the researcher to establish the experience with the software type:

Figs in %	Total
Total	**200**
Advantages of using software : Search facility and Issuance facility	76% said this is the most advantageous search service and 12% said issuance
Expectations : Training on software, Abstract service	11% mention training followed by 3% saying Abstract services
Problems faced	52% do not express any opinion and 10% express that there is problem however most problems are very temporary
Good/Very Good software REFER Table 19 in Professors section	18% consider it as a good software but a whopping 45% are unable to respond
Satisfaction with the software	75% this population is satisfied

Although some user perception is observed clearly the image of software's usage is not emerging as strong. There is a need to orient the users and help them participate. These active participations will help them to develop software perceptions and their own image towards library software's.

To conclude: The managerial implications of the above findings point out towards following three key inferential findings:

4. Library professionals need to educate the teacher community about the utilisation of the software's into their work environment.
5. Further to the awareness of features of the modules it is necessary to demonstrate how to use the different features so that the teachers are able to use all the features of the library software to maximise the knowledge that is being stored in the library through the books, journals and magazines.

6. These findings also indicate that the role of regulatory body is highly required to ensure standardised services to teacher community by the library science professionals given that assessment of service quality of any service can be judged by only user profile. If the teacher community is not active in assessment then this is a warning alert to the regulatory body. The library science professionals should also take note because this institution is changing rapidly due to technology and if it needs to be relevant to the society it has to carve out a role for itself.

5.3
Survey Findings: Students

Background:

In this doctoral research study 400 students from cross section of management institutions were surveyed . Students have a unique position when it comes to library services. Students are the primary users of these libraries and therefore it was important to ascertain their perceptions was the key thought of the researcher.

Currently students being from the younger age-group are also considered on a higher gradient when it comes to being internet and technology savvy. In fact in the recent years it is observed that younger generation uses a lot of social networking sites to collect and collate information, to be connected with their friends and peer group or likeminded people. On this back drop it is evident that therefore the library science professionals/community can make use of this social environment. In this context it was important to ascertain the user perception about these technology software's that the academic libraries use. Because these software's will be the enablers for expanding the role of library sciences was the next emerging thought of the researcher.

This questionnaire (Refer Appendix III) was prepared after a short qualitative discussion with the student community. This ensured that the questions incorporated in the questionnaire used the terminologies that were actually popularly utilised by the students themselves . The focus of the questionnaire was on :

- **Sample Profile**: The aim here was to establish the awareness of these software's among the students who are primary consumers of these services.
- **Software feature awareness**: The aim here was to find out the level of awareness of different features that the software offers.
- **Experience with the software:** It was important to understand the experiences with the software's to help develop effective strategies that will help students to use these software's and maximise the benefits of the same.

The findings from this survey can serve as baseline assessment for the software's and their utilisation in the institution to highlight possible opportunities or areas of limitations so that effective library strategies can be evolved to ensure an expanded role of this service in order to facilitate performance of their patrons and users in the knowledge lead economies.

The sample size is 400. The method of data collection was primarily self filling using pen/pencil and the questionnaire in the institutions setting.

While detailed tables are presented towards the end of this chapter , overall findings will be presented in the body of this chapter to highlight the key findings under the aforementioned three sections.

Sample Profile: **Key profile parameters: Level of Software Awareness among Student population** : The response to **Q1 REFER QUESTIONNAIRE IN THE APPENDIX Was: Are you aware about the software used in your library (SA)**

1.

Figs in %	Total
Total	**400**
Yes	280
	70
No	120
	30

On awareness clearly 30% of the student population is not aware of software that is institutionalised for consuming library services and that is not a very encouraging finding.

2. Awareness of Features

The next few questions were asked only to the students who are aware of the software that is being institutionalised in the library. Presenting below the questions and the associated findings that emerged:

Figs in %	Total
Total	**280**
Q 1a Name of the software	SLIM 21: 30%, SOUL:19% , KOHA: 14%

Clearly therefore out the 70% aware students at the maximum level only 30% students were aware of the name of the software that was used	
Feature Awareness	
Able to locate the books with the help of OPAC	100%
Able to locate the books by Title	100%

Figs in %	Total
Able to locate the books by Author	100%
Able to locate the books by Publisher	100%
Able to locate the issuing details with the help of available software	100%
Are you able to get the information about the new arrivals through the available software	100%
Are you able to search journals/magazines	56%

Clearly therefore these findings point out that the search function is popular and the student community is aware of these features but when it comes to interaction features like information about new arrivals etc. the awareness levels drops.

Library Science fraternity are trained into three broad activities for library and information services; which are Information communication, Knowledge distribution and knowledge organisation.

The library science professionally keep communicating with their students and other users. But clearly there is a need of stronger messaging or different ways of communication to ensure that student community is made aware of different features and software's itself so that they maximise the usage of library services.

Information on new arrivals, journals and magazines actually ensure that all the trending topics are covered and if the information of this is not consumed by the students then the perspectives can get limited and this is not a very encouraging learning environment.

3.Experience with the software's:

Following key questions were asked by the researcher to establish the ownership of software type.

Figs in %	Total
Total	**280**
Is usage of software time consuming	96% feel that it is not time consuming
No Problems faced	99% did not face any problems or if faced any problems they are very temporary
User friendly software	99% consider it as a user friendly software
Satisfaction with the software	14% and 86% of this population is not able to give their opinion

Although some user perception is observed clearly this dimension is not as encouraging. There is a need to orient the users and help them participate. These active participations will help them to develop software perceptions and their own perceptions towards library software's.

To conclude: The managerial implications of the above findings point out towards following three key inferential findings:

1. Library professionals need to educate the student community about the utilisation of the software's into their work environment
2. Further to the awareness of features of the modules it is necessary to demonstrate how to use the different features so that the students are able to use all the features of the library software to maximise the knowledge that is being stored in the library through the books, journals and magazines.

These findings also indicate that the role of regulatory body is highly required to ensure standardized services to student community by the library science professionals given that assessment of service quality of any service can be judged by only user profile. If the student community is not active in assessment then this is a warning alert to the regulatory body. The library science professionals should also take note because this institution is changing rapidly due to technology and if it needs to be relevant to the society it has to carve out a role for itself

5.4 Librarian Data Tables

Demographic Analysis

1. Frequency Analysis Management Institute of in Mumbai City

Frequency count is performed to identify the count of responses received for varied Management Institute

Table 5.4.1. Responded Received from the Management college Librarian in Mumbai City

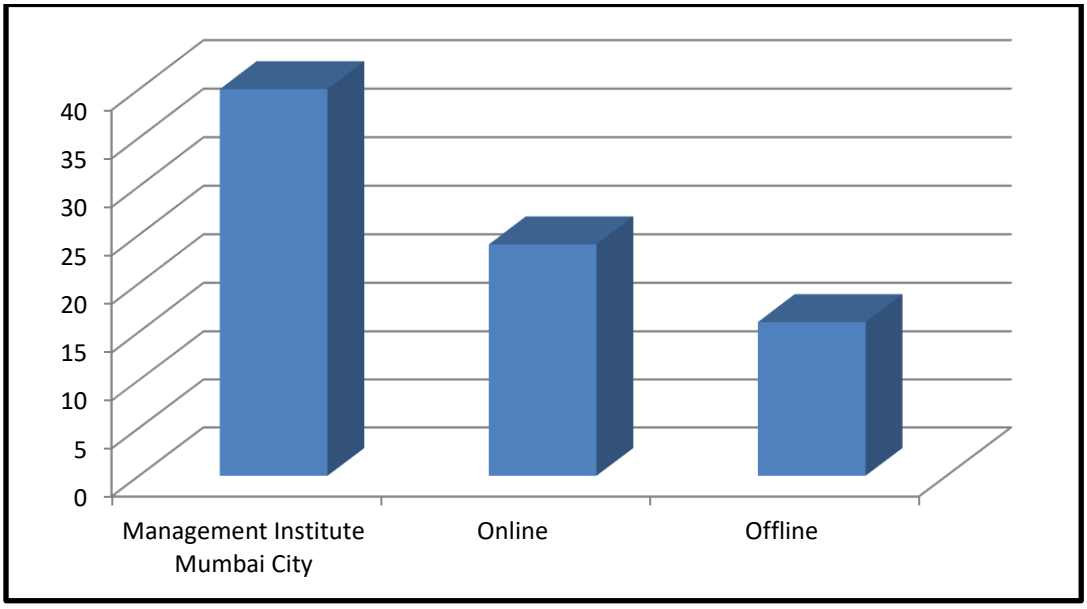
	Sr. No.	Name of Institute	Response Mode	
			Offline	Online
Mumbai City	1	Atharva Institute of Management & Research	Yes	-
	2	Jamnala Bajaj Inst. Of Management Studies		Yes
	3	SASMIRA's Institute of Management Studies and Research	Yes	
	4	Thakur Institute of Management Studies & Research	Yes	
	5	Mumbai Education Trust Institute of Management	Yes	
	6	Mumbai Institute Management & Research	Yes	
	7	IES Institute of Management & Researcg	Yes	
	8	K.J.SOMAIYA Institute of Management & Research	Yes	

	9	Babasaheb Gawde Institute of Management & Research		Yes
	10	DES's Navinchandra Mehta Institute of Technology & Development	Yes	
	11	Allana Institute of Management Studies	Yes	
	12	GNVS Institute of Management	Yes	
Mumbai City	**13**	St.Francie Institute of Management & Research		Yes
	14	Chetana's Institute of Management & Research	Yes	
	15	Chetana's R.K. Institute of Management & Research	Yes	
	16	P.T.V.A's Institute of Management	Yes	
	17	Lala Lajpatrai Institute of Management	Yes	
	18	Sir.M.Visvesvaraya Institute for Management		Yes
	19	Vidyalankar Institute of Technology	Yes	
	20	Xavier Institute of Management & Research	Yes	
	21	Aditya Institute of Management studies and Research		Yes
	22	Vivekanand Education Society Institute of Management Studies & Research	Yes	
	23	Sheila Raheja School of Business Management & Research		Yes
	24	Kala Institute of Management Studies & Research		Yes
	25	Rizi Institute of Management	Yes	
	26	S.P.Jai Institute of Management & Research		Yes
	27	Durgadevi Saraf Institute of Management Studies	Yes	
	28	GNIMS Business School	Yes	

	29	Alkesh Dinesh Mody Institute of Management	Yes	
	30	N.L.Dalmia Institute of Management Studies & Research		Yes
	31	Welinger Institute of Management		Yes
	32	H.K.Institute of Management	Yes	
	33	Don Bosco Institute of Management		Yes
	34	Kohinoor Business School	Yes	
	35	NMIMS		Yes
	36	Rustomjee Management Institute		Yes
	37	Sysdenham Institute of Management	Yes	
	38	Jankidevi Bajaj Institute of Management Studies		Yes
	39	Sinhgad Institute of Management		Yes
	40	Aruna Manharlas Shah Institute of Management & Research		Yes

(Source: excel output)

Chart No : 5.4.1



From Table No .5.4.1 & Chart No.5.4.1 shows the Librarians responded received from the Management Institute .These All Management Institute are located in Mumbai City. Total 40 Respond 24 is an offline and 16 is the Online Response mode .

Table 5.4.2

1. **General Demographic Information**

Demographic information is the basis of Descriptive Design and various underlying variables were analysed to identify the frequency and generalize conclusions.

Table 5.4.2 Demographic Frequency Analysis

Sr. No.	Variables	Sub Categories	Frequency	Percent
1.	**Gender**	Male	14	35.0
		Female	26	65.0
2.	**Age Group**	**Up to 35**	**16**	40.0

		36 & above	24	60.0
3	**Age of Institute Establishment**	**Up to 15 Year**	17	42.5
		16 & above	23	57.5
4	**No. of students in the college**	**Up to 400**	23	57.5
		401 & above	17	42.5
5	**Librarian - No. of yrs. with the college**	**Up to 5 Yrs.**	10	25.0
		6 & above	30	75.5

(Source: SPSS output)

Following are the Charts of the Demographic Variables.

Chart 5.4.2 Gender Counts

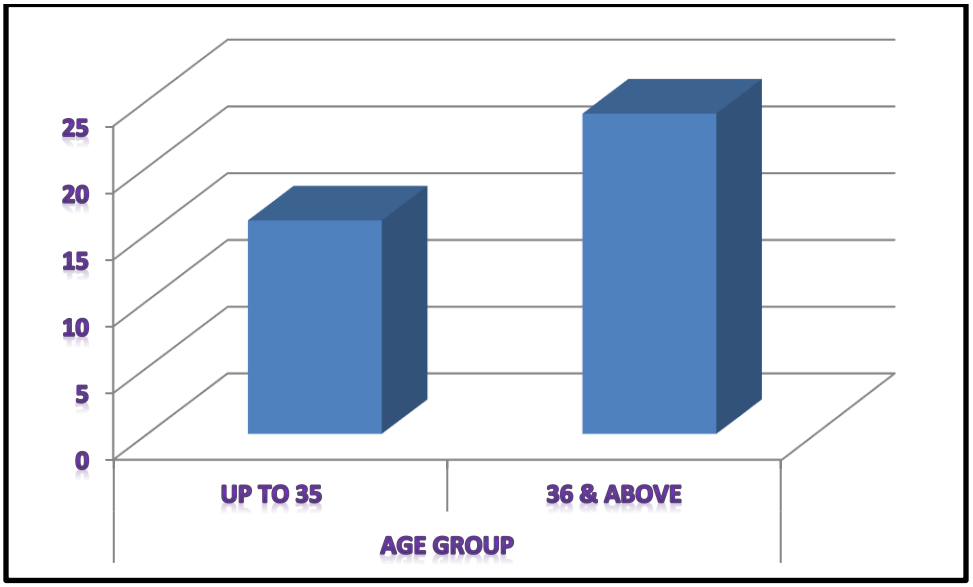


Chart 5.4.3 Age Counts of Librarian

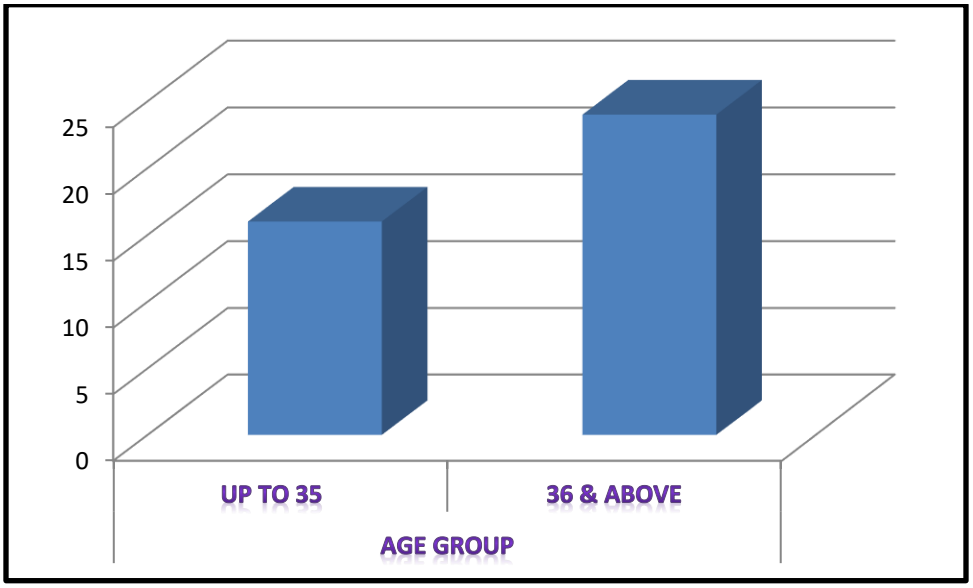


Chart 5.4.4 Age of Institute Establishment

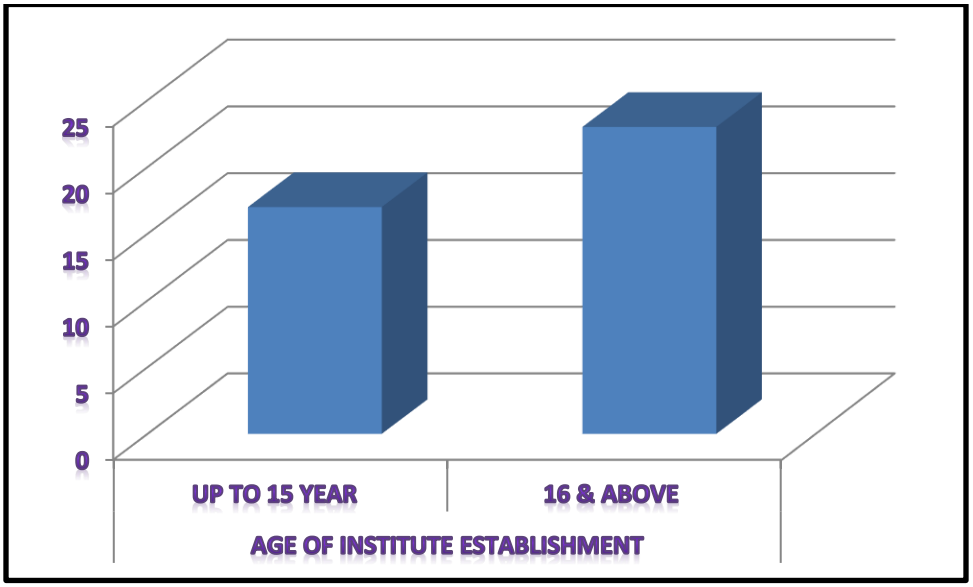


Chart 5.4.5 No. of students in the college

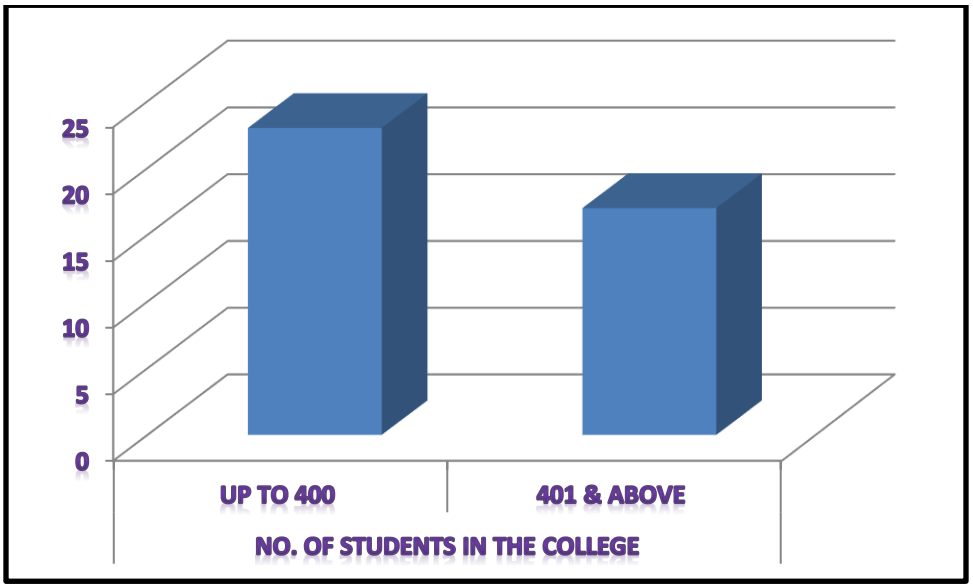


Chart 5.4.6 Librarian - No. of years. with the college

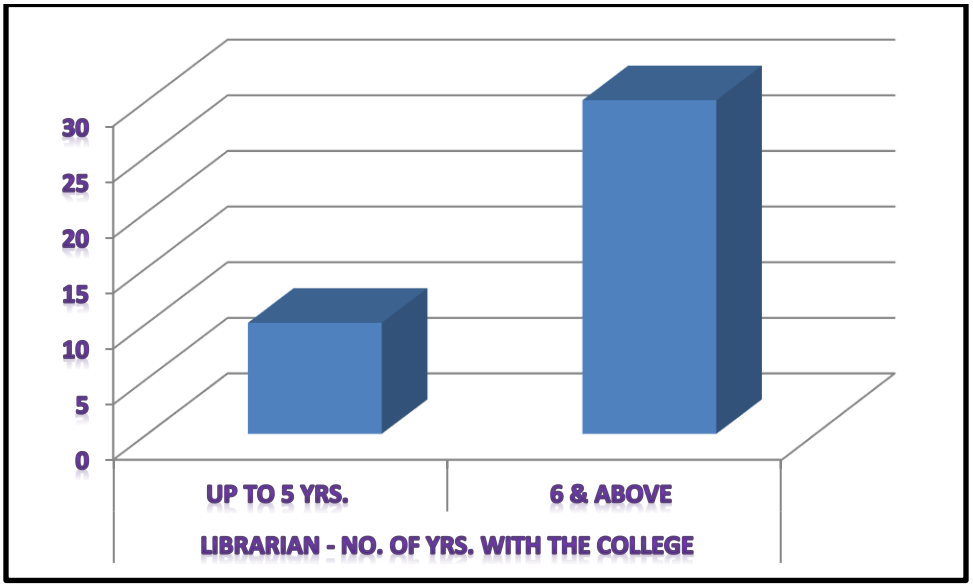


Table No. 5.4.2 & Chart 5.4.2 is explain about the gender status of in Management Institute in the Mumbai City . In this we can find out that 26 % Librarian are female category and 14% and Male category Average age of Librarians is 38 years.

Chart 5.4.6 is shown us 30% Librarian are more than 6 years working with the Institute So that we can consider that Librarians are experience holder in the professional .

Table 5.4.3 Educational Qualification of Working Librarian

Qualification	Frequency	Percent
B.LIB	**40**	**100**
M.Lib	**40**	**100**
M.Lib,M.Phil	**04**	**10**
M.Lib ,NET	**05**	**13**
M.Lib,Phd.	**02**	**05**

Chart 5.4.7

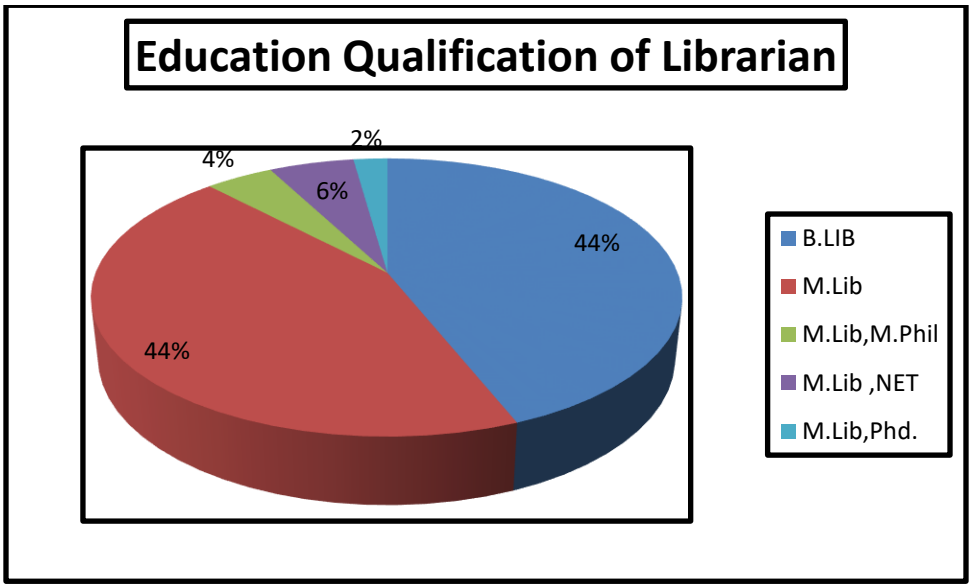


Table 5.4.3 & Chart 5.4.7 shows that 100 Percent Librarians are Qualified with B.Lib & M.Lib degree. As per the AICTE Norms Management Institute Librarians are Must have the M.lib Degree with the 6 % .Only 2 percent of the Librarians have a doctoral qualification . 4 percent Librarian have their M.Phil degrees in the Library and Information Science.

Table 5.4.4 Management Institute are Affiliated to AICTE

	Total	Frequency	Percent	Cumulative Percent
BASE	**40**			
Yes		**39**	**97.5**	**97.5**
No		**0**	**0**	
Deem University		**1**	**2.5**	**100**
Don't know/Not Applicable		**0**	**0**	
	40	**40**	**100**	

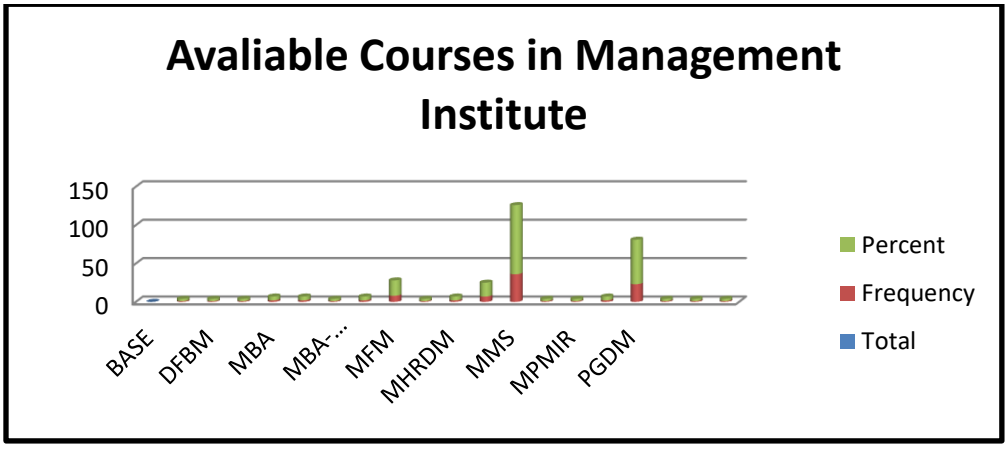
AICTE stands for an autonomous body known as All India Council for Technical Education. It is an advisory board which grants approval for colleges that want to introduce new courses and subjects. Thus, **AICTE approved** PGDM (Post Graduation Program of Management) program play extremely important criteria while selecting your college. So for ruing the MBA Course Institute mandate to take a approval of AICTE.

It is evident from Table 5.4.4 that 97.5 % Management Institute are Affiliated with All India Council for Technical Education (AICTE). Only 1 percent Management Institute is under the Deem University .

Table 5.4.5 Available Courses in the Management Institute

	Total	Frequency	Percent
BASE	**40***		
BMS		**1**	**3**
DFBM		**1**	**3**
EPM		**1**	**3**
MBA		**2**	**5**
MBA-Retail		**1**	**3**
MCA		**2**	**5**
MFM		**8**	**20**
MFSM		**1**	**3**
MHRDM		**2**	**5**
MMM		**7**	**18**
MMS		**36**	**90**
MMS , MIS		**1**	**3**
MPMIR		**1**	**3**
Online MBA		**2**	**5**
PGDM		**23**	**58**
PGEMP		**1**	**3**
		1	**3**
PGPM		**1**	**3**

Chart 5.4.8



Take out on type of institutions : All Management Course are available in Institute .Example :MMS ,PGDM ,MBA etc.

Table 5.4.6 Year of Establishment of Institute

Year of Establishment		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40**				
1920		**1**	**2.5**	**2.5**	**2.5**
1965		**1**	**2.5**	**2.5**	**5**
1981		**2**	**5**	**5**	**10**
1983		**2**	**5**	**5**	**15**
1993		**2**	**5**	**5**	**20**
1994		**1**	**2.5**	**2.5**	**22.5**
1995		**1**	**2.5**	**2.5**	**25**
1996		**1**	**2.5**	**2.5**	**27.5**
1997		**3**	**7.5**	**7.5**	**35**
2000		**4**	**10**	**10**	**45**
2001		**1**	**2.5**	**2.5**	**47.5**
2002		**3**	**7.5**	**7.5**	**55**
2003		**2**	**5**	**5**	**60**
2004		**2**	**5**	**5**	**65**
2006		**1**	**2.5**	**2.5**	**68.5**
2008		**1**	**2.5**	**2.5**	**71**
2009		**2**	**5**	**5**	**75**
2010		**6**	**15**	**15**	**90**
2011		**2**	**5**	**5**	**95**
2013		**2**	**5**	**5**	**100**
Total		**40**	**100**	**100**	

Above Table No.5.4.6 show the Institute Year of Establishment of the Management Institute Covered in the study .It is observed that as many of Institute are establish on before 2000. Approx. 38 % Institute are establish before 2000 .

Table 5.4.7 Number of Students in the college

Student Intake		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40***				
60		**1**	**2.5**	**2.5**	**2.5**
120		**8**	**20**	**20**	**22.5**
140		**1**	**2.5**	**2.5**	**25**
200		**1**	**2.5**	**2.5**	**27.5**
240		**5**	**12.5**	**12.5**	**40**
300		**4**	**10**	**10**	**50**
325		**1**	**2.5**	**2.5**	**52.5**
400		**2**	**5**	**5**	**57.5**
420		**1**	**2.5**	**2.5**	**60**
450		**1**	**2.5**	**2.5**	**62.5**
480		**2**	**5**	**5**	**67.5**
500		**3**	**7.5**	**7.5**	**75**
640		**1**	**2.5**	**2.5**	**77.5**
720		**1**	**2.5**	**2.5**	**80**
750		**1**	**2.5**	**2.5**	**82.5**
800		**2**	**5**	**5**	**87.5**
960		**1**	**2.5**	**2.5**	**90**
1000		**2**	**5**	**5**	**95**
1200		**2**	**5**	**5**	**100**
Total		**40**	**100**	**100**	

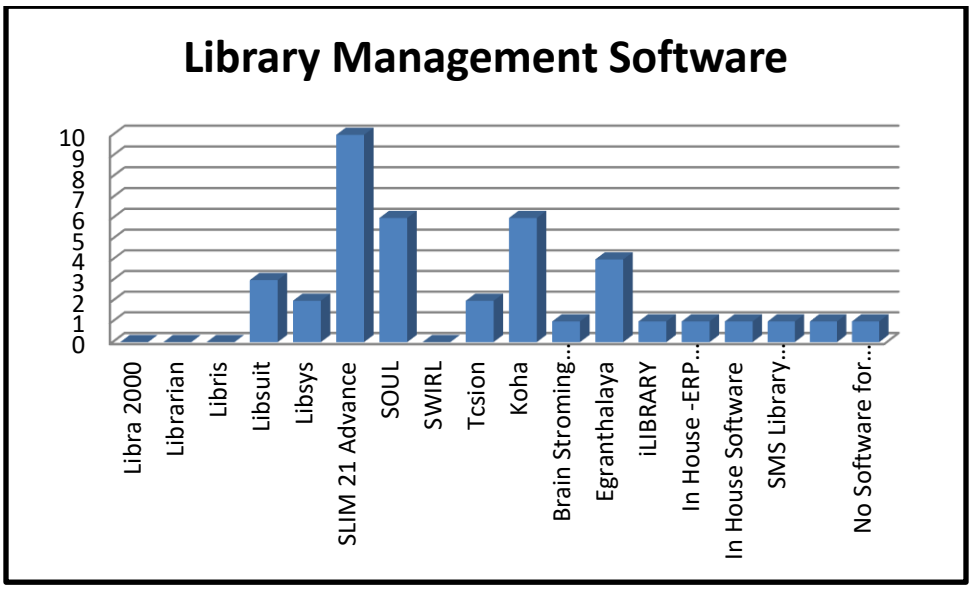
Taken Out of Students Population :

- 26% colleges have students below 200,
- 31% between 200-400 students
- 44% above 400

Table 5.4.8 (Q1) which Library Management Software used in the library

Name of the Library Software	Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40***			
NET Respond	**39**	**98**		
Libra 2000	**0**	**0**	**0**	0.00
Librarian	**0**	**0**	**0**	0.00
Libris	**0**	**0**	**0**	0.00
Libsuit	**3**	**7.5**	**7.5**	7.50
Libsys	**2**	**5**	**5**	12.50
SLIM 21 Advance	**10**	**25**	**25**	37.50
SOUL	**6**	**15**	**15**	52.50
SWIRL	**0**	**0**	**0**	52.50
Tcsion	**2**	**5**	**5**	57.50
Koha	**6**	**15**	**15**	72.50
Brain Stroming International (In-House)	**1**	**2.5**	**2.5**	75.00
Egranthalaya	**4**	**10**	**10**	85.00
iLIBRARY	**1**	**2.5**	**2.5**	87.50
In House -ERP Soluation	**1**	**2.5**	**2.5**	90.00
In House Software	**1**	**2.5**	**2.5**	92.50
SMS Library Management System	**1**	**2.5**	**2.5**	95.00
	1	**2.5**	**2.5**	97.50
No Software for Library work	**1**	**2.5**	**2.5**	100.00
	40	**1000**	**100**	

Chart 5.4.9



Take out on Software's used: Share of companies

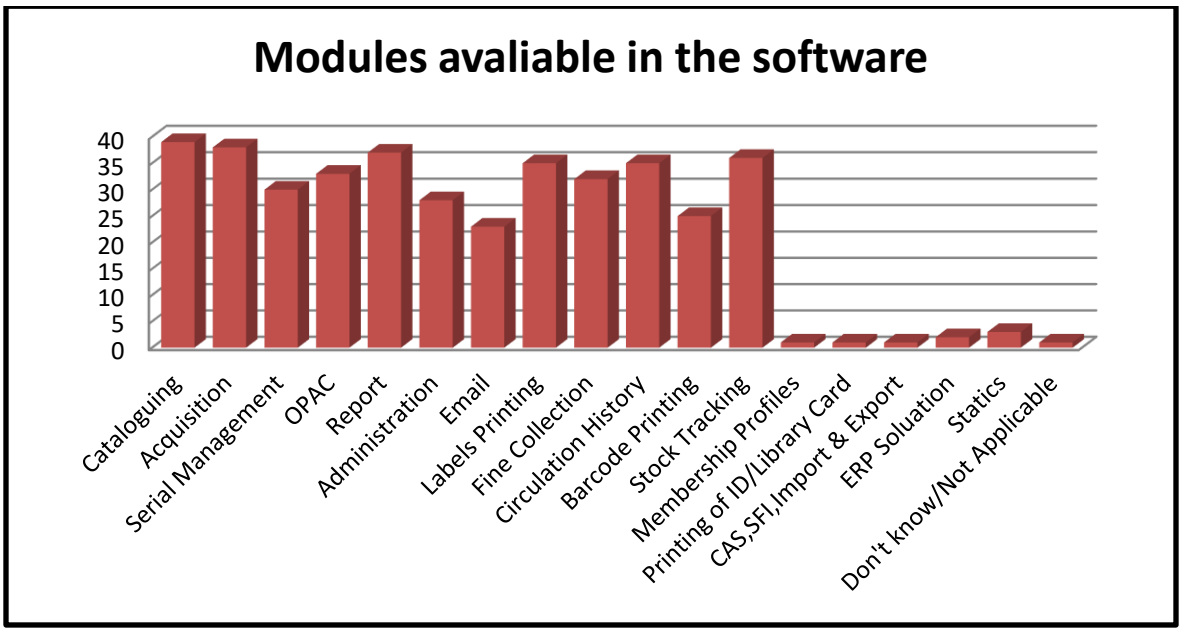
From Table No .5.4.8 & Chart No. 5.4.9 Highest share is Algorhythms Consultants Pvt.Ltd. SLIM21 Advanced is at 25% and leading followed by SOUL from INFLIBNET at 15% which is an Indian company followed by Koha open sources software which is developed by LIBLIME KOHA a non profit group. National Informatics center developed software is at 13%.

In the Market several Number of the Library management software are available As per the Institute requirement and based on budget they finalize the software for day-to day Library Work. Some of the institute using the in-house software for the Library . From the table it is also observed that Institute are Librara2000,Libris,Libsys.SOUL-developed by INFLIBNET ,Tcsion –Developed by TCS,SMS Library ,SWIRL for the Library automation.

Table 5.4.9 (Q4) Software modules available in the library

Name of the Modules in Software		Frequency	Percent
BASE	40*		
Any Mentioned (NET)	39		
	98		
Cataloguing		39	98
Acquisition		38	95
Serial Management		30	75
OPAC		33	83
Report		37	93
Administration		28	70
Email		23	58
Labels Printing		35	88
Fine Collection		32	80
Circulation History		35	88
Barcode Printing		25	63
Stock Tracking		36	90
Membership Profiles		1	2.5
Printing of ID/Library Card		1	2.5
CAS,SFI,Import & Export		1	2.5
ERP Soluation		2	5
Statics		3	7.5
Don't know/Not Applicable		1	2.5

Chart 5.4.10



Taken Out 5 top Modules owned :

From Table No. 5.4.9 & Chart 5.4.10 it get the Information about which are the Modules are available in present Library Management Software.

- Cataloguing : 98%
- Acquisition: 95%
- Report :93%
- Stock Tracking:90%
- Circulation History & Labels Printing : 88%

Table 5.4.10 (Q5) Years since using the Software

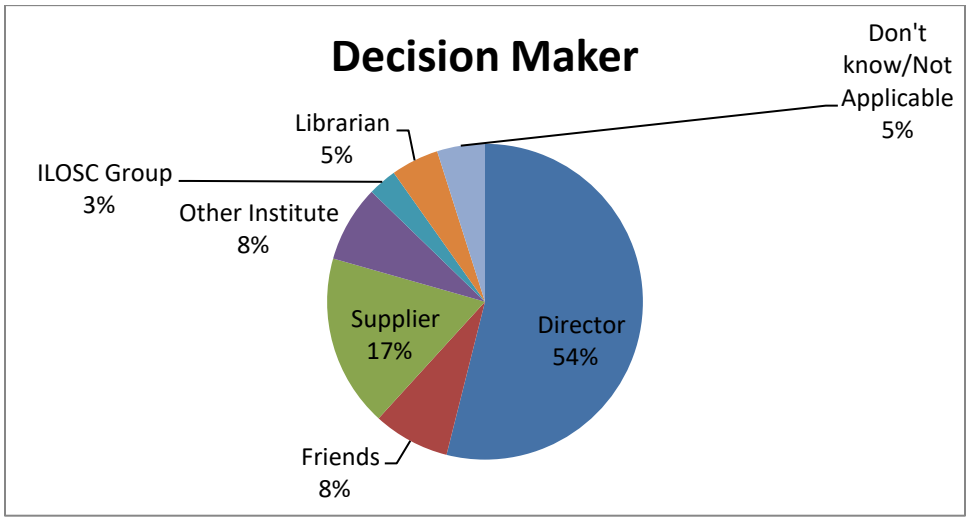
Year Since Using the Software		Frequency	Percent
BASE	**40***		
(1.0) 1 Year		**4**	**10**
(2.5) 2-3 Years (2 years/3 Years)		**11**	**28**
(4.0) 3-5 years (3-5/4 years/5 years)		**15**	**38**
(6.0) >5 years (8 Years/more than 8 years/6 years/7 Years/10 years)		**9**	**23**
Don't know/Not Applicable		**1**	**3**
Total		**40**	**100**
Average no. of years using the SW		**3.73**	
S.D.		**1.57**	
S.E.		**0.25**	

Take out on vintage of usage :
Recent user ship : Average user ships stands at 2 years and Average Number of Year using the software is 3.73 percent.

Table 5.4.11 (Q6) Library Software Referred By

Recommender		Frequency	Percent
BASE	**40***		
Any Mentioned (NET)	**38**		
Director		**22**	**95**
Friends		**3**	**55**
Supplier		**7**	**8**
Other Institute		**3**	**18**
ILOSC Group		**1**	**8**
Librarian		**2**	**3**
Don't know/Not Applicable		**2**	**5**
Total		**40**	**100**

Chart : 5.4.11



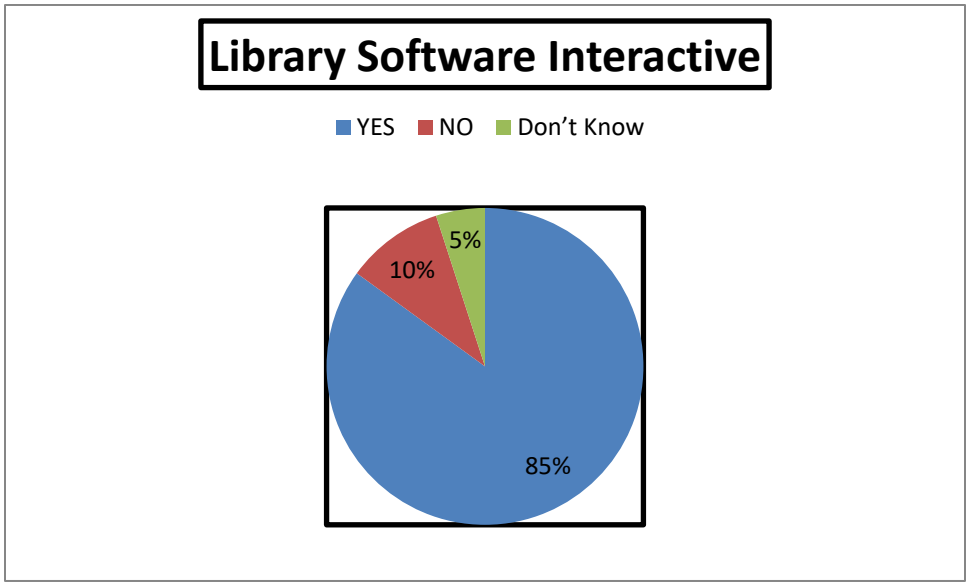
Take out on who referred the decision :

Mostly a top down decision, directed by the Director

Table 5.4.12 (Q.7) Is Library Software interactive

Response		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	40*				
Yes		34	85	85	85
No		4	10	10	95
Don't know/Not Applicable		2	5	5	100
		40	100		

Chart : 5.4.12



Take out on instructiveness :

Mostly it is endorsed that the used Library software is interactive. 85% User is Saying Used Library Software is Interactive

Table 5.4.13 (Q.7) Details of Interactive

Details of Interavtiveness of Software		Frequency	Percent
BASE	34*		
By remote Access ,by Email, by Telephone		2	6
ERP Solution		2	6
If we feed the wrong data software show the particular error		1	3
It is user Friendly Easy to use		1	3
Open Source Software		3	9
Software Implementations is vert easy		1	3
User Friendly		1	3
While generating Reports		1	3
Don't know/Not Applicable		22	65
		34	100

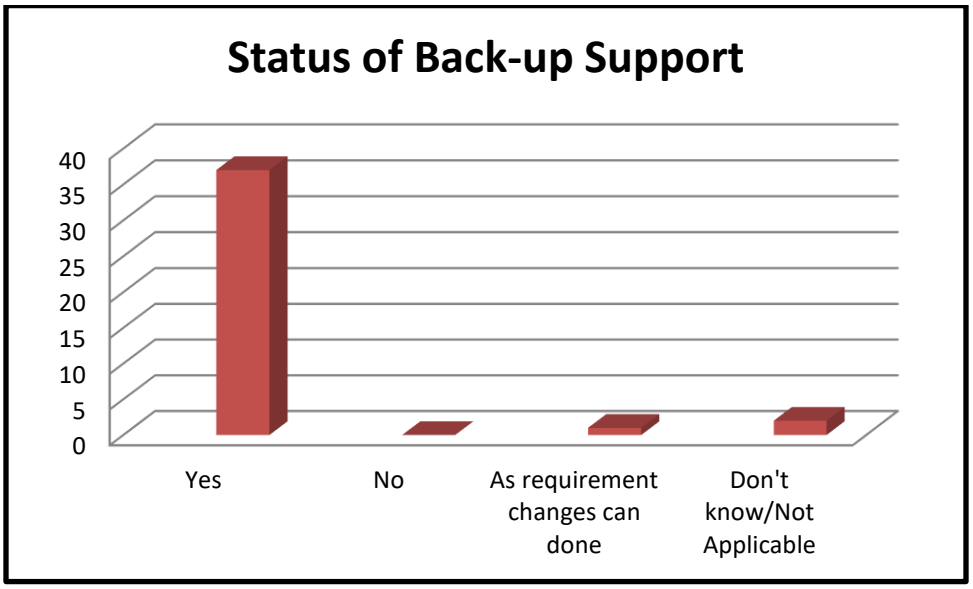
Take out on the Details of Instructiveness:

It is observed that 65% Librarian are not answer the question but 35% population has specify the that why that software is interactive .
Very basic features mentioned on being interactive which actually tend to be like hardware features, whereas interactive refers to features like 'search' or ' subscribe and filter' ... The librarians have not mentioned any of these technological features which are offered under the interactive library .

Table 5.4.14 (Q.8) **Back up support system**

Response		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40***				
Yes		**37**	**92.5**	**92.5**	**92.5**
No		**0**	**0**	**0**	**92.5**
As requirement changes can done		**1**	**2.5**	**2.5**	**95**
Don't know/Not Applicable		**2**	**5**	**5**	**100**
Total		**40**	**100**	**100**	

Chart :5.4.13

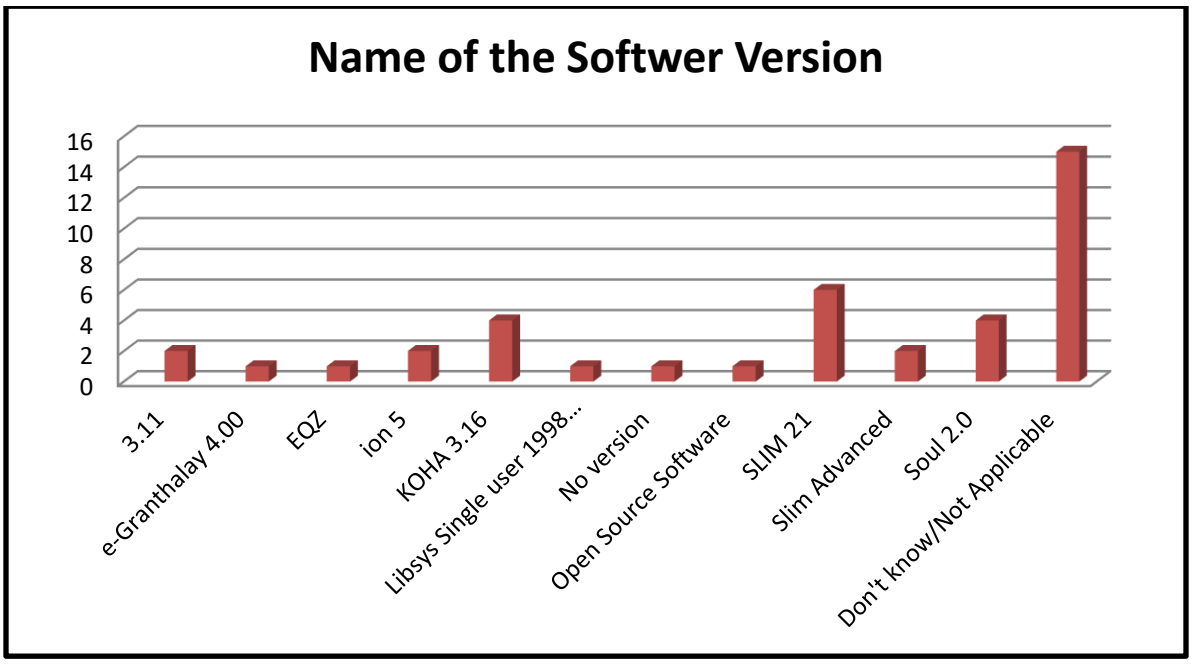


In the Any Software Back-Up support is the Very Important Module. All the Software Companies must have to give this services to the client .So we observed that most of the Software compiler are providing this Services the Institute .As per the table 92.5% Institute are said yes to providing this services Generally Colleges are generating back-up data once in a month or once in a week .

Table 5.4.15 (Q9) Software version

Name of the version		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	40*				
3.11		2	5	5	5
e-Granthalay 4.00		1	2.5	2.5	7.5
EQZ		1	2.5	2.5	10
ion 5		2	5	5	15
KOHA 3.16		4	10	10	25
Libsys Single user 1998 version		1	2.5	2.5	27.5
No version		1	2.5	2.5	30
Open Source Software		1	2.5	2.5	32.5
SLIM 21		6	15	15	47.5
Slim Advanced		2	5	5	52.5
Soul 2.0		4	10	10	62.5
Don't know/Not Applicable		15	37.5	37.5	100
Total		40	100	100	

Chart :5.4.14



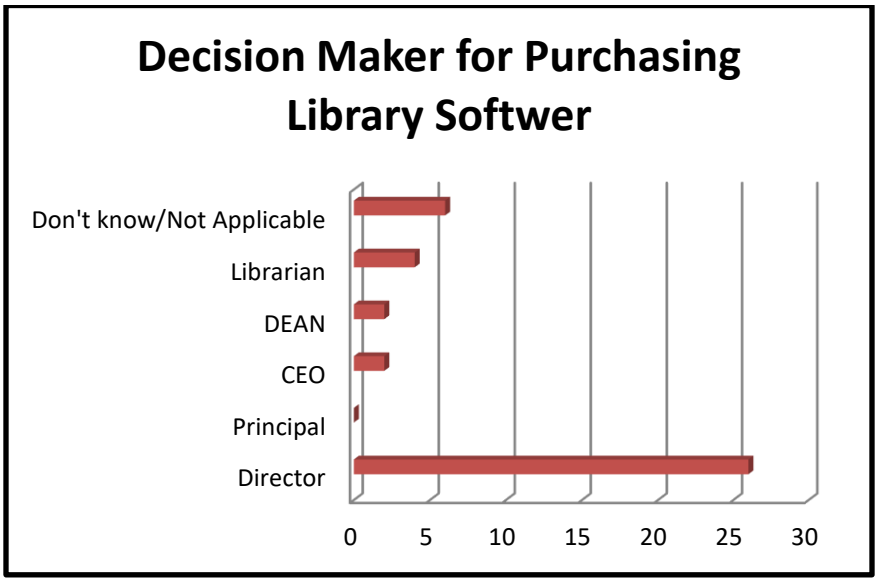
Take out on version vintage :

Close to 38% Institute are do not know the Software version and that's not an encouraging finding

Table 5.4.16 (Q10) Decision Maker

Decision Maker		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	40*				
Director		26	65	65	65
Principal		0	0	0	65
CEO		2	5	5	70
DEAN		2	5	5	75
Librarian		4	10	10	85
Don't know/Not Applicable		6	15	15	100
Total		40	100	100	

Chart :5.4.15



Take out on decision-making : Above the Table 5.4.15 provides the details of the Decision Maker for Purchasing the Library Management Software for the Institute.65% responder mentioned that Director of the Institute is the Main Decision Maker for Purchase. General Tendency is mostly top Management are involve in Decision Making.

Table 5.4.17 (Q11) Budget allocated for Library Software

Budget for Software Development		Frequency	Percent
BASE	**40***		
Rs. 10000		**1**	**3**
Rs. 30000		**3**	**8**
Rs. 50000		**3**	**8**
Rs. 100000		**1**	**3**
Rs. 105000		**1**	**3**
Rs. 150000		**2**	**5**
Rs. 200000		**1**	**3**
Rs. 250000		**1**	**3**
Rs. 300000		**4**	**10**
Rs. 350000		**1**	**3**
Rs. 500000		**1**	**3**
Rs. 150000		**3**	**8**
Per User Payment		**2**	**5**
No Cost		**2**	**5**
1.5 (Purchased cost)		**1**	**3**
Don't know/Not Applicable		**13**	**33**
Total		**40**	**100**
Average (Rupees)		**168409.09**	
S.D.		**129994.38**	
S.E.		**27714.89**	

Take out on budgets : On an average the budgets are little above 1.5 lakhs

Table 5.4.18 (Q12): Institute is taken AMC of Library Software

AMC for Software		Frequency	Percent
BASE	40*		
Yes		23	58
No		6	15
After completion of one year, will take AMC		1	3
Company is closed		3	8
Not applicable		2	5
Not Required because Subscription Based payment		2	5
Not Taken		1	3
We call company Technician as per our requirement		1	3
Don't know/Not Applicable		1	3
Total		40	100

Take out on annual maintenance : AMC is Means Annual Maintenances Charges . These Charges is taken by the Companies from client .This charges they are charging for one year for all services Table 5.4.18 explore only 58% have taken an AMC. Some of the Institute are using the In-House Software for the AMC is not applicable to them ..

Table 5.4.19 (Q13) AMC Charges

		Frequency	Percent
BASE	**40***		
Rs. 5000		**1**	**3**
Rs. 10000		**2**	**5**
Rs. 12000		**1**	**3**
Rs. 15000		**1**	**3**
Rs. 17000		**1**	**3**
Rs. 20000		**5**	**13**
Rs. 21000		**1**	**3**
Rs. 25000		**3**	**8**
Rs. 27000		**1**	**3**
Rs. 30000		**1**	**3**
Rs. 40000		**2**	**5**
Rs. 50000		**1**	**3**
Company is closed		**3**	**8**
NA		**2**	**5**
Per Visit 1500		**1**	**3**
Software take care by IT Department		**2**	**5**
Don't know/Not Applicable		**12**	**30**
Average (In Rupees)		**22600**	
S.D.		**11033**	
S.E.		**2467.1**	

Take out on maintenance :

Above Table 5.4.19 Provides the details of the amount spend on the AMC OF the Library Management Software. This charges Vendor Charging for One year to the Institute On an average the maintenance cost is Rs.22,600.With this charges all Technical and It related Problem has been take care by Companies . Some time companies providing new update version in period of AMC as well as additional module , Training , Personal Visit to the Institute

Table 5.4.**20 (Q15) Frequency of Software up gradation**

Period of Up-Gradation of LMS		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	40*				
Every Year		13	33	33	33
Once in Two Years		6	15	15	48
Once in three years		4	10	10	58
6 MONTHS		3	8	8	66
Open Source Software		1	3	3	69
(1.25) More than one year		1	3	3	72
NA/NO		2	5	5	77
Don't know/Not Applicable		10	25	25	100
Total		40	100	100	
Average frequency of SW upgradation (in Yrs.)		0.87			
S.D.		0.52			
S.E.		0.1			

Taken Out on frequency on up gradation :

From Table No .5.4.20 it can be show the frequency level of software .On an average once in 8 months is observed as a requirement for up-gradation .Software Up-gradation process show the development of the software .

Table 5.4.21 (Q16) Budget for revised version (in Lacs)

		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40***				
As per Company Demand		**3**	**7.5**	**7.5**	**7.5**
Free		**1**	**2.5**	**2.5**	**10**
It is included in the AMC Amount		**7**	**17.5**	**17.5**	**27.5**
No budget		**1**	**2.5**	**2.5**	**30**
Don't know/Not Applicable		**28**	**70**	**70**	**100**
		40	**100**	**100**	

Take out on up-dation or new version:

There is no major budgets are allocated. It is expected as a free feature or included in the AMC amount.

Chart No:5.4.16

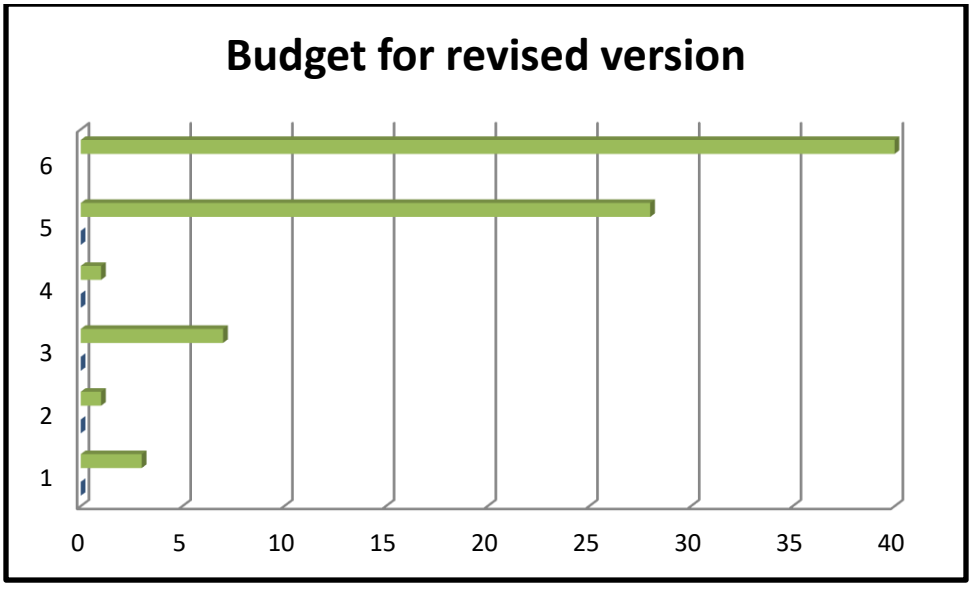


Table 5.4.22 (Q17)) Number of times upgraded of Software

Time of Software upgradation		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	40*				
1		**8**	**20**	**20**	**20**
2		**2**	**5**	**5**	**25**
3		**7**	**17.5**	**17.5**	**42.5**
4		**1**	**2.5**	**2.5**	**45**
5		**0**	**0**	**0**	**45**
No upgrade happened last year		**1**	**2.5**	**2.5**	**47.5**
NA		**1**	**2.5**	**2.5**	**50**
Don't know/Not Applicable		**20**	**50**	**50**	**100**
Total		**40**	**100**	**100**	
Average no. of times upgraded		**1.95**			
S.D.		**1.12**			
S.E.		**0.26**			

Take out on an real life upgradation that was done :

From Table 5.4.22 shows that within a year how many times Library Management Software has been up-gradated .Software upgradation process shows the development of IT Systems. In the table we can observed that Up- gradation is actually done in about two years in the Institute . With the software up-garadation institute get the benefit of Bugs removal, customized Module also provide, Easy to work / more easier, Faster & smoother, New features to be incorporated.

Table 5.4.23 (Q20) which kind of Action or Responsibility of Software company taking when problem occurs

Action / Responsibility		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	40*				
A person from company visit the Institute and solve the Problem		**5**	**12**	**12**	**12**
All Problem Solved by In-house Engineers		**1**	**2.5**	**2.5**	**14.5**
company solve the problem and they provide good Techniqual support		**1**	**2.5**	**2.5**	**17**
Data recovery		**15**	**38**	**38**	**55**
Problem solve by IT Department		**1**	**2.5**	**2.5**	**57.5**
Responsibility take by IT Department they regularly taking the back up		**1**	**2.5**	**2.5**	**60**
They have a cloud based data backup facility		**2**	**5**	**5**	**65**
to take backup files from software and reinstallation of software		**3**	**7.5**	**7.5**	**72.5**
Yes they are taking responsibility		**1**	**2.5**	**2.5**	**75**
No responsibility taken by company		**4**	**10**	**10**	**85**

Don't know/Not Applicable		**6**	**15**	**15**	**100**
Total		**40**	**100**	**100**	

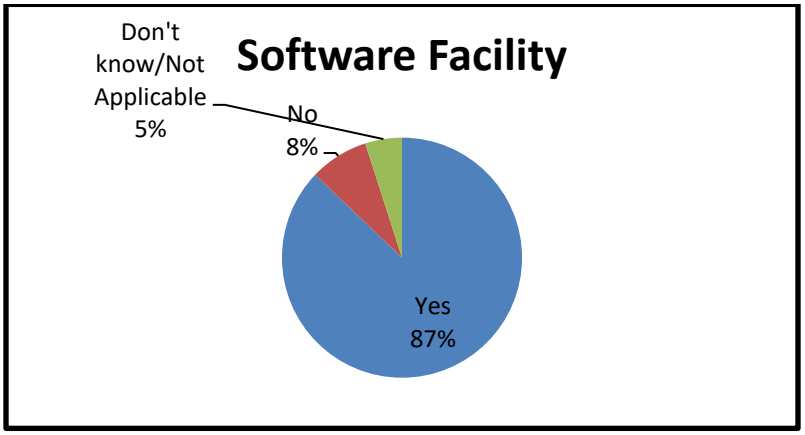
Take out:

From Table No.5.4.23 it can be get the information about the Software Companies are vied supplying a software to the institute they might be taking the reasonability of the software if any problem is occurs . Mostly only on calling is the response by 85% of the librarians. Some time Techniques of the Companies are visiting to the Institute . Sometime they Solve problem on-line.

Table 5.4.24 (Q22) Are you Satisfied with SW Company Facility of service provided by them.

		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40**				
Yes		**35**	**87.5**	**87.5**	**87.5**
No		**3**	**7.5**	**7.5**	**95**
Don't know/Not Applicable		**2**	**5**	**5**	**100**
Total		**40**	**100**	**100**	

Chart :5.4.17

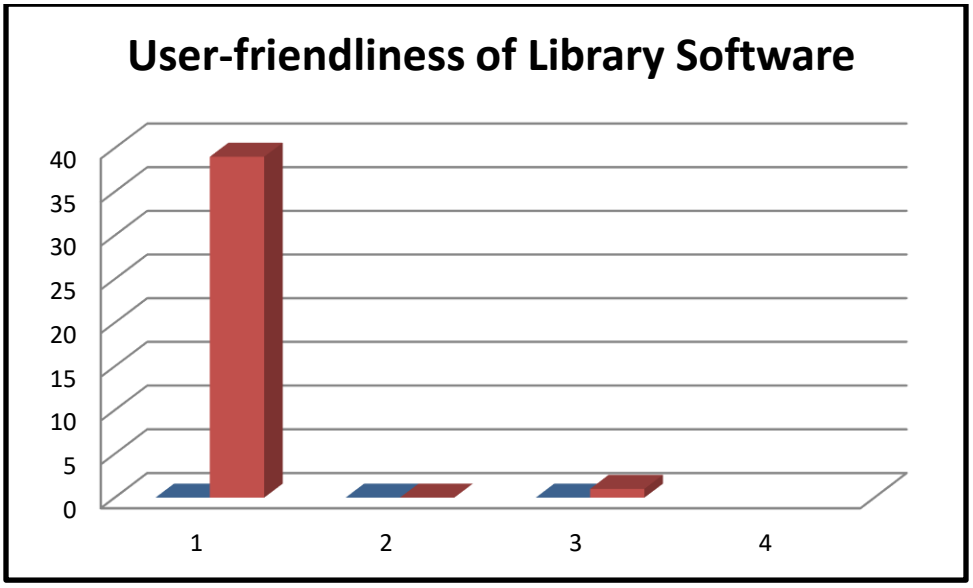


Take out service facility provided : Form Table 5.4.24 and Figure 5.4.17 show the information about SW Company services. Majority of the librarians 88% Satisfied of Service .

Table 5.4.25(Q24) User-friendliness of Library Software

	Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40***			
Yes	**39**	**97.5**	**97.5**	**97.5**
No	**0**	**0**	**0**	**97.5**
Don't know/Not Applicable	**1**	**2.5**	**2.5**	**100**
Total	**40**	**100**	**100**	

Chart No:5.4.18



From Table No.5.4.25 & Chart No.5.4.18 show that User Friendliness of the Library Management Software .it can be seen that 97.5% Librarian are saying the available Library Management software is user-friendly . A whopping 98% feel that the software irrespective of the brand is user friendly

Table 5.4.26 (Q24)(A) If, Library Software is user - friendly Yes, How?

		Frequency	Percent
BASE	**39***		
All necessary module are available		**1**	**3**
best software		**1**	**3**
but not as such		**1**	**3**
Circulation is Very helpful / Easy for circulation counter		**2**	**5**
cloud based		**2**	***5***
Easley get all kind of reports/Easy to generate Reports		**5**	**13**
easy for data entry		**3**	**8**
Easy to Access		**3**	**8**
easy to learn		**4**	**10**
All Modules are very easy to understand/Easy to Understand/its easy to understand/Very Easy to understand		**5**	**13**
Easy to work on it so specific Training is not required		**3**	**8**
ERP Solution so department are connected with each others		**2**	**5**
Good for academic Library		**2**	**5**
Interface		**1**	**3**
It give proper direction to user how to use the Software		**1**	**3**
its very interactive		**1**	**3**
Its very user Friendly/User Friendly		**6**	**15**
Menu driven modules		**2**	**5**
Modules		**1**	**3**

Quick searching in OPAC simple data entry		**1**	**3**
Reports		**1**	**3**
scanning the document facility is available		**1**	**3**
Search in books/Search Module is also very good/Students can search the book/we can search the books for anywhere		**8**	**21**
Suitable for any Library requirement		**1**	**3**
Full fully our all requirement/They full - fully our requirement/This software fulfill our all requirement		**3**	**8**
Unique Title Option is good		**2**	**5**
Universal Software		**1**	**3**
various modules		**4**	**10**
Web based catalogue is available		**1**	**3**
Don't know/Not Applicable		**1**	**3**

Takeout on why yes on user-friendly:

Table No : 5.4.26 Show the information about the how user is feel , available Library software is user-friendly Mostly the answers are for the easy search function at 21% followed by most features being available and ease of learning and understanding.

Table No : 5.4.27 (Q26) Frequency of problem

		Frequency	Percent
BASE	**40***		
(25) Every day		**0**	**0**
(4) Once in a week		**0**	**0**
(1) Once in a month		**1**	**3**
(0.5) Occasionally		**34**	**85**
(40) its requlary		**2**	**5**
Don't know/Not Applicable		**3**	**8**
Average (per month)		**2.65**	
S.D.		**9.05**	
S.E.		**1.49**	

SPSS Output

Taken Out on problem Occurrence :

The Above Table No: 5.4.27 presents the details of how many time Institute or Library face the problem in the present Library Management Software .with the result we can see the 2.65 is on an average in the Month Library get problem in the month.so this is fairly regular occurrence .

Table No : 5.4.28 (Q25) Problems faced while handling the SW

		Frequency	Percent
BASE	40*		
Barcode the size of the lable was not in proper		1	3
databased is based on catalogues		2	5
in magazine entries we faced some problem		2	5
Proper training was given to library staff for two days		2	5
software is not professional		1	3
software is not that much interactive		1	3
sometime server problem so we can't check our data		3	8
some time we can't generate the reports/Report cant found		3	8
Sometime face network problem		1	3
sometime get hang		1	3
Sometime get problem in connectivity between server & System		1	3
speed of software its get some problem in something		1	3
Nothing		14	35
Don't know/Not Applicable		13	33

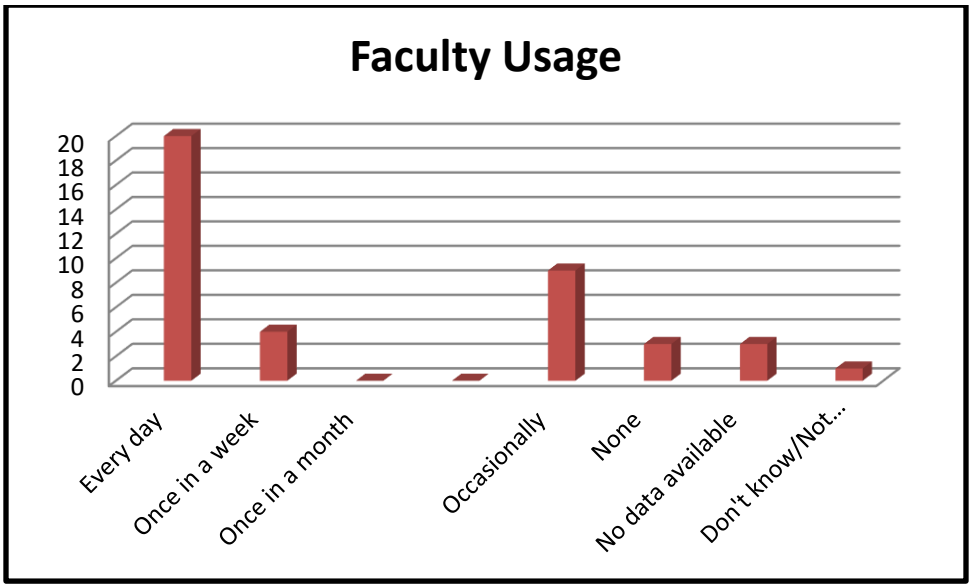
Take out on problems and its occurrence :

Above Table 5.4.28 shows the information about which are generally problem faced in the managing Library Management software . We can see the table there will be No major problems found in the software . based on the answer wit can be see the most of problem in related network or Institute Internal It Problem. 8% Librarian is saying they are facing the problem in the server . for thesis problem institute It infrastucher should always Strong. Librarian should arrange the Training Programs to the Library Staff Members .however some mentions are on no report generation or no training , or some user manual not getting entered .

Table No : 5.4.29 (Q27) Freq. of usage by faculty

Faculty Ratio for using the Software		Frequency	Percent
BASE	40*		
Every day		20	50
Once in a week		4	10
Once in a month		0	
Occasionally		9	23
None		3	8
No data available		3	8
Don't know/Not Applicable		1	3
Average (per month)		14.46	
S.D.		12	
S.E.		2	

Chart No:5.4.19



From Table No.5.4.29 & Fig No.5.4.19 shows the rating of the usage ration of the faculty towards Library Management software .As the table on and average within a 15 days faculty are using the Library Management Software for searching the Library Materials or Books etc. This ration library can increase with the help training.

Table No.5.4.30 (Q28) Freq. of students usage

Student Ratio for using the Software		Frequency	Percent
BASE	40*		
Every day		23	58
Alternate Days		3	8
Once in 3 days		2	5
Once in 5 days		4	10
Occasionally			
(0.05) None		3	8
Till date students are not using the software		2	5

Don't know/Not Applicable		**3**	**8**
		18.04	
Average (per month)			
S.D.		**10.32**	
S.E.		**1.74**	

From Table No.5.4.30 shows the rating of the usage ration of the faculty towards Library Management software .As the table on and average within a 10 days in the moth student are using the Library Management Software for searching the Library Materials or Books etc. This ration library can increase with the help training. As we understand the librarian are conducting user's orientation program for starting of the Years. In that they must have introduces the Library Software to the students

Table 5.4.31 (Q29) Freq. of complaints made by students/faculty

		Frequency	Percent
BASE	**40***		
Once a week		**1**	**3**
Every fortnight		**0**	**0**
Once in a month		**0**	**0**
Occasionally		**27**	**68**
Alternate Days		**1**	**3**
Every day		**3**	**8**
No Complain in Library module / Not yet		**4**	**10**
Don't know/Not Applicable		**4**	**10**
Average (in days) frequency of complaints made by students / faculty		**2.65**	
S.D.		**7.3**	
S.E.		**1.22**	

Take out on faculty and student complaints:

Table No . 5.4.31 shows the details of complaints ration of faculty and students towards using the Library Management Software. We can observed with the table there will be no major problems are facing the students and faculty. It matches with the problem occurrence feedback, and it is at least 2.6 times in a month.

Table 5.4.32 (Q30) Time period for rectification created in LMS

Rectification Options		Frequency	Percent
BASE	40*		
Immediate		21	53
Within an hour		5	13
With in 3 hours		5	13
Occasionally		1	3
Every fortnight		1	3
depend on the problem		1	3
Company is closed		3	8
Don't know/Not Applicable		2	5
Total		40	100
Average Time (in Hours)		2.14	
S.D.		8.66	
S.E.		1.51	

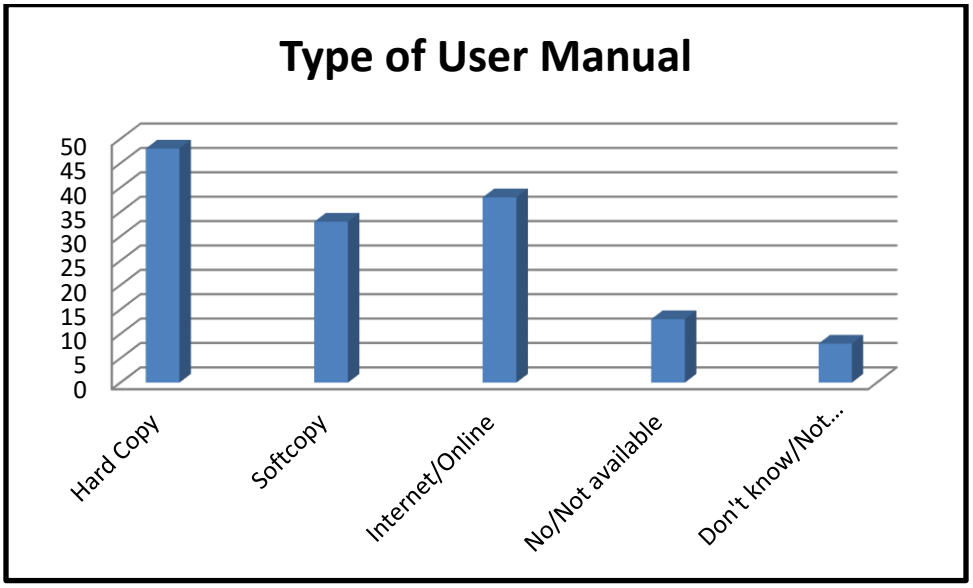
Take out on rectification :

From the Table No.5.4.32 shows that Ration of rededication in Library Management Software. 53% population are agree that, software problems is ratify very immediate. With is table we can see the satisfaction level of user . On an average the problem gets rectified in 2 hours.

Table No. 5.4.33(Q31) Type of user manual available

		Frequency	Percent
BASE	**40***		
Hard Copy		**19**	**48**
Softcopy		**13**	**33**
Internet/Online		**15**	**38**
No/Not available		**5**	**13**
Don't know/Not Applicable		**3**	**8**

Chart No.5.4.20

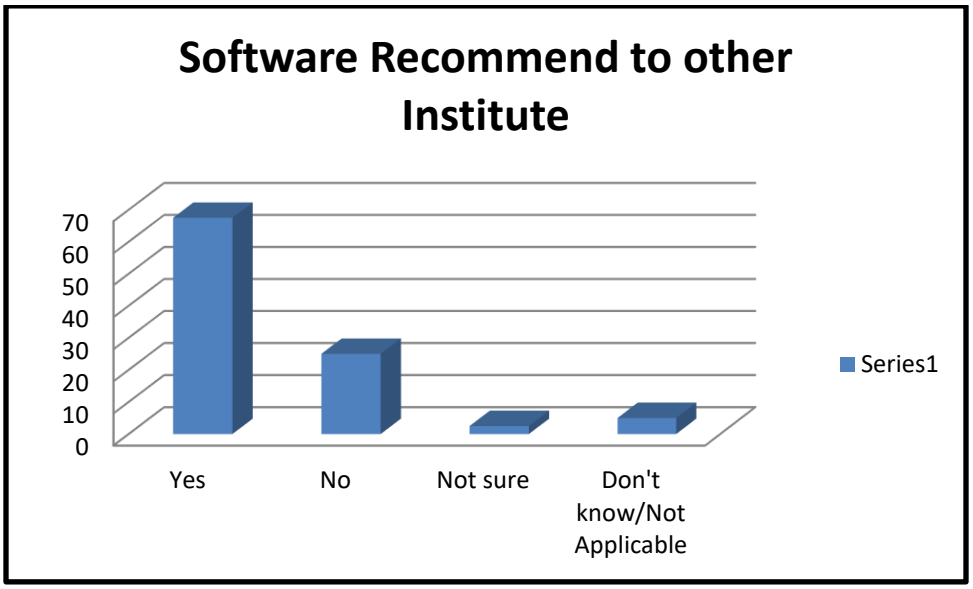


Take out on manual type: From No.5.4.33 & Fg.5.4.20 show the maximum usage of User Manual . Although 48 % say there is a hard copy but most responses are in the space of soft copies.

Table 5.4.34 (Q32) Recommend this Software to other Institute

		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**40***				
Yes		**27**	**67.5**	**67.5**	**67.5**
No		**10**	**25**	**25**	**92.5**
Not sure		**1**	**2.5**	**2.5**	**95**
Don't know/Not Applicable		**2**	**5**	**5**	**100**
Total		**40**	**100**	**100**	

Chart . 5.4.21



From Table No 5.4.34 & Chart No.5.4.21 Software Recommendation level .it can be observed that 68 % recommending available Library Management software to the other institute .

5.5

Professor Data Analysis

Table 5.5.35 (Q.1) Freq. of visit to library

Professor Data segment

Visit Freq.		Frequency	Percent
BASE	200		
Every day		117	59
Once in a week		15	8
Twice in a week		33	17
Thrice in a week		31	16
Once in a month		1	1
Don't know/Not Applicable		3	2
Total		200	100
Average No. of times in a month		18.39	
S.D.		8.25	
S.E.		0.59	

From Table No. 5.5.35 it get the information about Library visit frequency of Professors . We can observed that 117 professors are regular visit the Institute Library**.** AS per the data on and or average 18.39 population visit the Library in the Month **.** so we can say that, 100% of professor population use this academic library services at least once a week .

Table 5.5.36 (Q2) How Much Time spend in library

Options		Frequency	Percent
BASE	200		
Less than 1 hour		19	10
Between 1 to 2 hours		69	35
More than 2 hours		109	55
Don't know/Not Applicable		3	2
Average Time (in Hrs.) spent in Library		1.96	
S.D.		0.67	
S.E.		0.05	

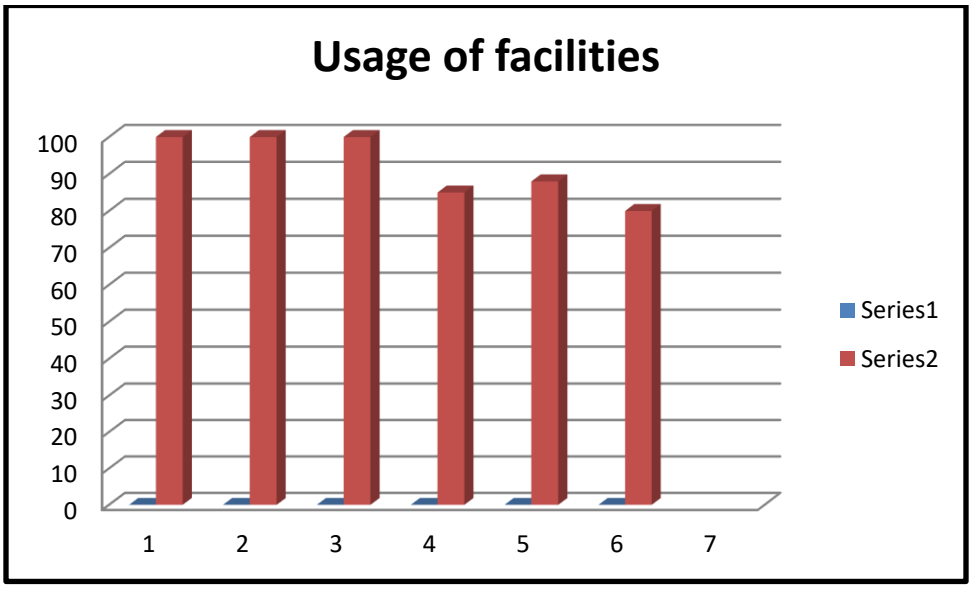
Library is Knowledge of the temple .So faculty for gaining or updating them self they are spending more & more time in the Library .

Above Table 5.5.36 we can see that 2 hours is the average time professor spent in the library.

Table 5.5.37 (Q3) Traditional facilities while using library

Name of the Facilities		Frequency	Percent
BASE	200		
Reading Service		200	100
Reading room facility		200	100
Reference facility		200	100
Library orientation		170	85
Newspaper clipping services		175	88
Inter Library loan		160	80

Chart No.5.5.22



Take out : From Table No .5.5.37 & Chart No. 5.5.22 it can be observed that Fairly high awareness of different services that are offered by Library .

Table 5.5.38 (Q6) Faculty Awareness about Library Management Software

Name of the Software		Frequency	Percent
BASE	**200**		
Algorhythm consultants Pvt Ltd/Algorthym		**28**	**14**
COMET Solutions		**5**	**3**
Egranthalaya/E-granthalaya		**21**	**11**
Firstray Consulting		**5**	**3**
iLIBRARY		**5**	**3**
In house/In house Software/in-house software		**13**	**7**
INFLIBNET		**4**	**2**
Koha		**30**	**15**
Libsys		**8**	**4**
National information center/NIC		**2**	**1**
SILM 21 Advance/SLIM 21 Advance		**44**	**22**
SMS Library Management System		**3**	**2**
SOUL		**27**	**14**
Tcsion/Tcs		**9**	**5**
Not using the software		**15**	**8**
Don't know/Not Applicable		**25**	**13**

Take Out: Table No. 5.5.38 it can observed that ,faculty are aware about the Library software. Most of the faculty members remember the name of the software.

Table 5.5.39 (Q.7) Faculty view about Advantages of this Library Software

Advantage of LMS by Faculty Segment		Frequency	Percent
BASE	200		
All/Book/Journal/CD/Magazine/project/Project Reports search/Library Staff help us for searching book from software/Library staff help us to find out book/search library materials		151	76
Availability of Books		1	1
book reservation/reservation of books in library		9	5
Quantity of the books/Qty of the books/quantity of the books		4	2
Issue returned		2	1
easy to access		2	1
For issue/Issue Details/issue history/Issue the Book /Issue the book from the library/Issue the book Journal CD/Issue Library items/Issue Library Materials		23	12
getting new arrivals in the library/getting new arrivals information/getting new arrivals of books, magazine /New Arrivals/New Arrival of the books/Information/of Library		16	8
Issue and retured History/issue and returned the book/Issue -retuned Details		6	3
its very useful		1	1
User friendly		3	**2**
OPAC Module		10	5
we can get access in the library		1	1
Advantage of LMS by Faculty Segment		**Frequency**	**Percent**

BASE	200		
we send demand of books		2	1
old question papers		1	1
Only Access in the Library		1	1
syllabus and question papers		1	1
No training is done for us		1	1
Library staff only use the software/Not using the software/Directly not use current software /we used the software in Library to help of Staff/We use through the library staff		9	5
Don't know/Not Applicable		36	18

From Table **5.5.39** shows the detailed information about advantage of Library Management Software in Faculty view. It can be observed that faculty members are using the Software in different –different purpose. Most of the faculty members are using search module for searching book, Journals, Project Reports , CD. etc.

Table 5.5.40 (Q8) Expecting any other facility in the said software.

Faculty Expectation About Software		Frequency	Percent
BASE	200		
Abstract is required		1	1
APP is required		1	1
back issue history/Book Issue details		3	2
Book Reservation		1	1
can we get budget as per department		1	1
content of books/content of Journal as well as book		4	2
find out the Journals,CD project reports also		1	1
Full access is need for us /Full Access of the software/we get the access of the software/required		5	3
Magazine / Journal Arrivals Details		1	1
Mobile Application		15	8
More training is required		11	6
Need Access from home		1	1
need online access		3	2
Online software is required		2	1
OPAC		3	2
New Arrivals Information or pop's		2	1
New Book information can we get in the by mail or Mobile		3	2
New Project update Information		1	1
Journals List		1	1
Online database links also get add on this		1	1
Online Book search option is required		1	1
personal uer ID and password		1	1
Project Reports Information required		1	1
softcopy of the book		1	1
Software is not user-friendly		1	1
software will get connected with FB		1	1
Faculty Expectation About Software		Frequency	Percent
BASE	200		

we can read book online		**1**	**1**
Research facility for books		**1**	**1**
Not frequently using the software/we are not using the software		**1**	
None / Not expecting anything		**40**	**20**
Don't Know / Can't Say		**92**	**46**

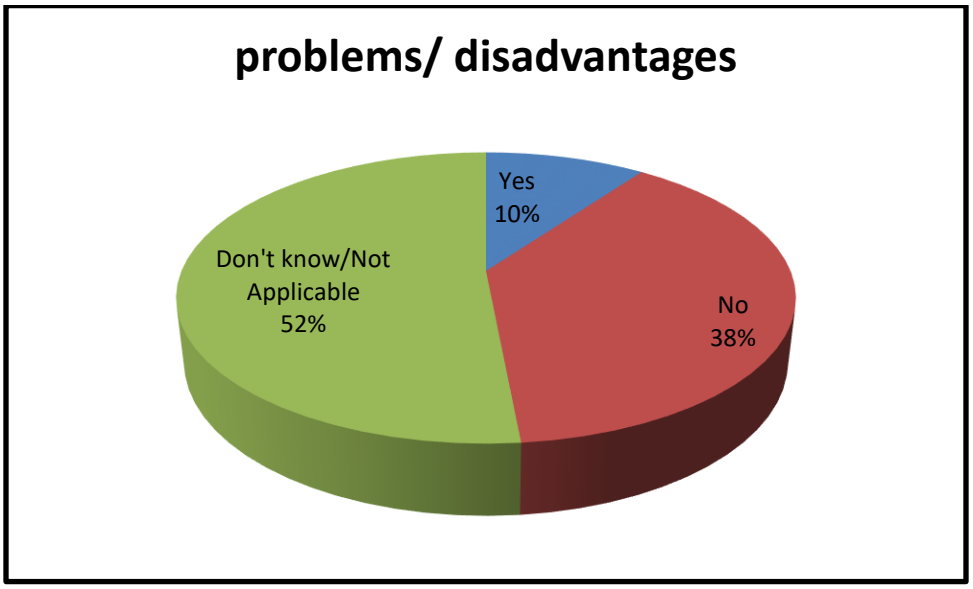
Take out:

From the above table 5.5.40 represent the Faculty Members expectation about available software .form the table fairly good response on the training aspects with respect to library services software's, these trainings will trigger usage and expectations better... Some mentions on the need of library services being more into the business of curating information too has emerged and this is encouraging.

Table 5.5.41 (Q9) Find any problems/ disadvantages in the software

		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**200**				
Yes		**20**	**10**	**10**	**10**
No		**77**	**38.5**	**38.5**	**48.5**
Don't know/Not Applicable		**103**	**51.5**	**51.5**	**100**
		200	**100**	**100**	

Chart No. **5.5.23**



From Table No.5.5.41 & Chart No.5.5.23 10% of respondents in this segment feel that there are problems for using the Library Software . The problems mentioned are basic and it appears that even basic functions sometimes become problems. Training seems to the solution.

Table 5.5.42 (Q. 10) Frequency of facing such problems

Frequency of Problem		Frequency	Percent
BASE	**200**		
Every day		**1**	**1**
Once in a week		**2**	**1**
Once in a Month		**20**	**10**
Occasionally		**122**	**61**
Don't know/Not Applicable		**55**	**28**
Total		**200**	**100**
Average frequency (days in a month) of facing problems		**0.79**	
S.D.		**2.07**	
S.E.		**0.17**	

Take Out :Above Table No.5.5.42 shows the problem frequency to faculty member in Library Management Software. According to data average level of monthly problem is 0.79. So it can say that, Problem occurrence is not very intensive.

Table 5.5.43 (Q. 11) Nature of the problems

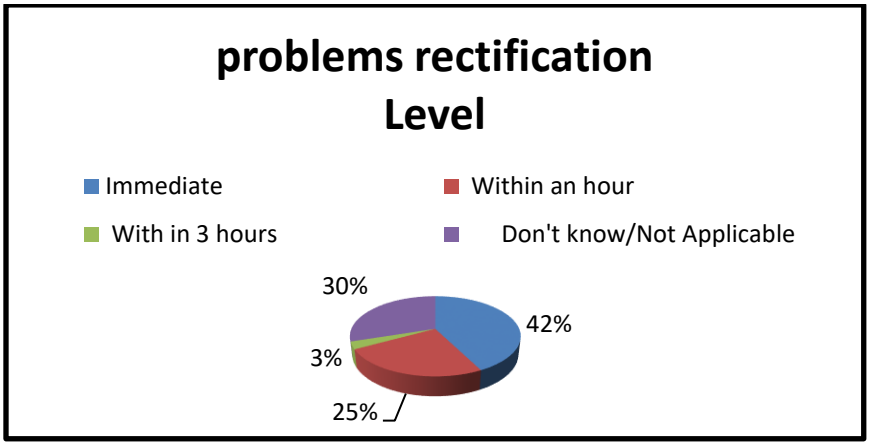
Nature of Problem		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	200				
Short term		48	24	24	24
Temporary		94	47	47	71
Long Term		1	0.5	0.5	71.5
Don't know/Not Applicable		57	28.5	28.5	100
Total		200	100	100	

T**aken Out:** As per the Table no.5.5.43 observed that faculty faced the temporary problem in Library Management Software . Mentioned the problems are temporary.

Table 5.5.44 (Q12) How soon the problems are rectified

Problem Rectification Level		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	200				
Immediate		85	42.5	42.5	42.5
Within an hour		49	24.5	24.5	67
With in 3 hours		6	3	3	70
Don't know/Not Applicable		60	30	30	100
Total		200	100	100	
Average time (in hrs.) taken to rectify the problem		0.78			
S.D.		0.53			
S.E.		0.04			

Chart 5.5.24

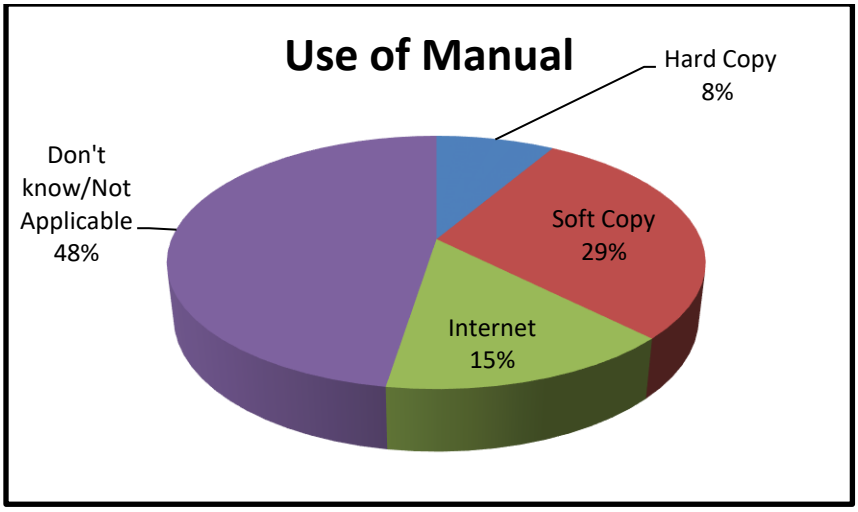


Take out: From Table No 5.5.44 & Chart No.5.5.24 we can observed that whatever problem has been created in the software it will get rectified with a Immediate solution level. Problem rectification level on and average 0.78 time in hours.

Table 5.5.45 Software User guide /Manual available for Faculty Members

Type of Manual		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**200**				
Hard Copy		**17**	**8.5**	**8.5**	**8.5**
Soft Copy		**58**	**29**	**29**	**37.5**
Internet		**30**	**15**	**15**	**52.15**
Don't know/Not Applicable		**95**	**47.5**	**47.5**	**100**
Total		200	100	100	

Chart No. **5.5.25**

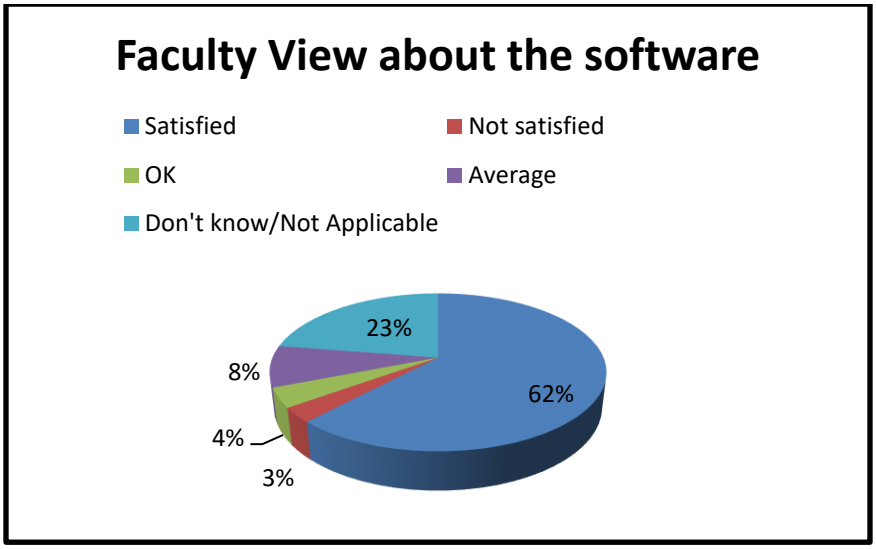


From Table No.5.5.45 & Chart No.5.5.25 show the information about the usage level of User manual it can be available in Library. It can observed that 29% faculty are using the soft copy of manual ,15% faculty are taking help of Internet as a user manual only 8% user using hard copy of manual but 48% faculty are not aware but the user manual for using the software . A large proportion unaware of the user manual's**.**

Table 5.5.46 (Q14) satisfied with the services provided by the library software.

Faculty View about software		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**200**				
Satisfied		**124**	**62**	**62**	**65**
Not satisfied		**6**	**3**	**3**	**65**
OK		**8**	**4**	**4**	**69**
Average		**17**	**8.5**	**8.5**	**77.5**
Don't know/Not Applicable		**45**	**22.5**	**22.5**	**100**
Total		**200**	**100**	**100**	

Chart No. **5.5.26**



From Table 5.5.46 & Chart No.5.5.26 it will get the information about Faculty Member view about the using the software. It can observed that or and above 62% Faculty are satisfied with existing software . 4% population are average satisfied with the software. Only 23% are dissatisfied or they are not mentioned their opinion .

Table 5.5.47 (Q15) Any other module of software is required to be installed in this LMS.

Faculty Requirement about Software		Frequency	Percent	Faculty Requirement about Software	Frequency	Percent
BASE	200					
Availability of book		1	1	Self access of the software is required	1	1
Back issue returned history		6	3	suggest the book for students	1	1
Best reader		1	1	we must get access in our PC	1	1
Book Issue details		3	2	New Books Details	1	1
Book reservation facility		2	1	OPAC facility is not their	1	1
Magazine details		1	1	popular book details	1	1
Over dues Mail from software		1	1	No module required	10	5
Mobile App		1	1	Don't know/Not Applicable	166	83
more training is required		1	1			
Total					200	100

From Table No.5.5.47 information Research on Library Software on based on Professor Segment. Professor strongly said that they required the more training session about using the Library Software.as well as they required the book returned history record module in the Software. Faculty are looking software connect with the Google .So they will come to know the best seller Book details .with this information they will suggest the Books to the Library.

Table 5.5.48 (Q16) Faculty Overall Feedback about Library Management Software

Faculty Feedback about LMS		Frequency	Percent
BASE	200		
Mobile App is required		10	5
Author wise search is very difficult		2	1
Satisfied with Training company		1	1
Library must have to arrange the training for Teachers		16	8
Library must have to buy new Library software		6	3
More searching options		2	1
OPAC is very good facility		1	1
User friendly		51	23
Not using the Software		3	2
Don't Know / Can't Say		108	54
Total		**200**	**100**

From Table No 5.5.48 it can be observed that faculty view about said software It can be seem Close to 18% feel this is a good service, but 45% are still not willing to express their opinion .Population need more training about said software .Librarian keep awareness about the available software .

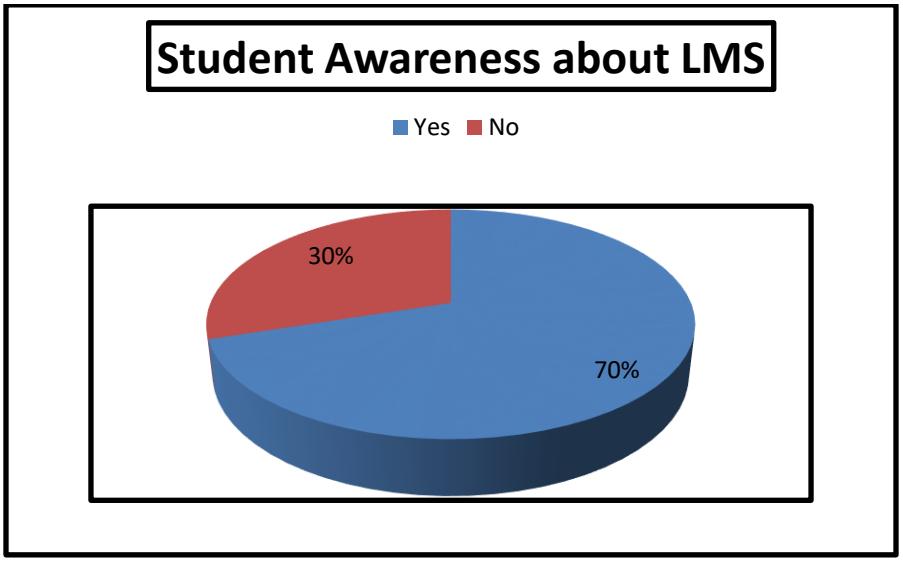
5.6

Student Data Analysis

Table 5.6.49 (Q1) Students Awareness about the Library Software

Student Awareness LMS		Frequency	Percent	Valid Percent	Cumulative Percent
BASE	**400**				
Yes		**280**	**70**	**70**	**70**
No		**120**	**30**	**30**	**100**
Total		**400**	**100**	**100**	

Chart No. **5.6.27**

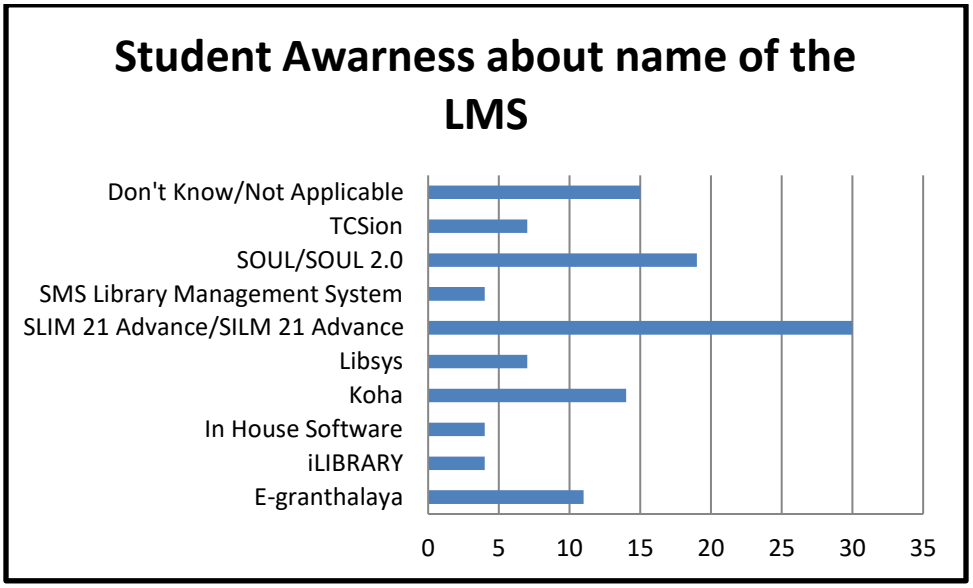


From Table No.5.6.49 & Chart No.5.6.27 its can be observed that 70% student population aware about the available software in Library . Only 3% Student re population not aware about the software .we can say this is a achievement of Library Orientation program which can be conduct by Library for Student.

Table No.5.6.50 **(Q1) Names of the library software used (OE)**

Name of the Software		Frequency	Prcent
BASE	**280**		
E-granthalaya		**31**	**11**
iLIBRARY		**10**	**4**
In House Software		**10**	**4**
Koha		**38**	**14**
Libsys		**20**	**7**
SLIM 21 Advance/SILM 21 Advance		**84**	**30**
SMS Library Management System		**10**	**4**
SOUL/SOUL 2.0		**53**	**19**
TCSion		**20**	**7**
Don't Know/Not Applicable		**40**	**15**
		280	**100**

Chart No. **5.6.28**

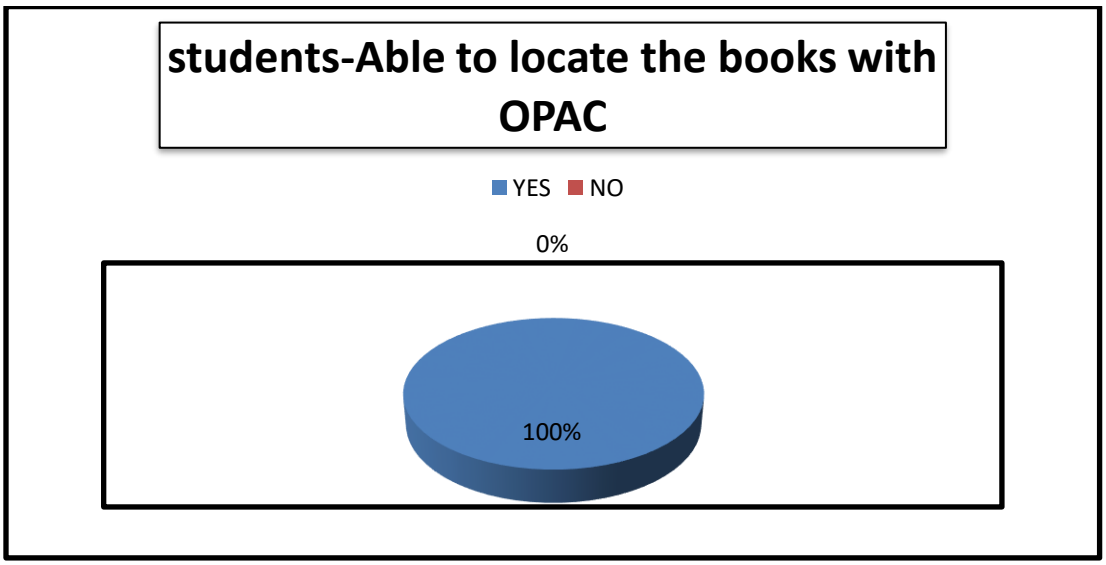


Highest awareness is for SLIM 21, Followed by SOUL and KOHA

Table No.5.6.51 **(Q2a) Advantages of said software used in library for students –Able to locate the books with OPAC**

Student Feeedback	BASE	Frequency	Prcent
BASE	280		
Yes		280	100
No		0	
		0	

Chart No.5.6.29

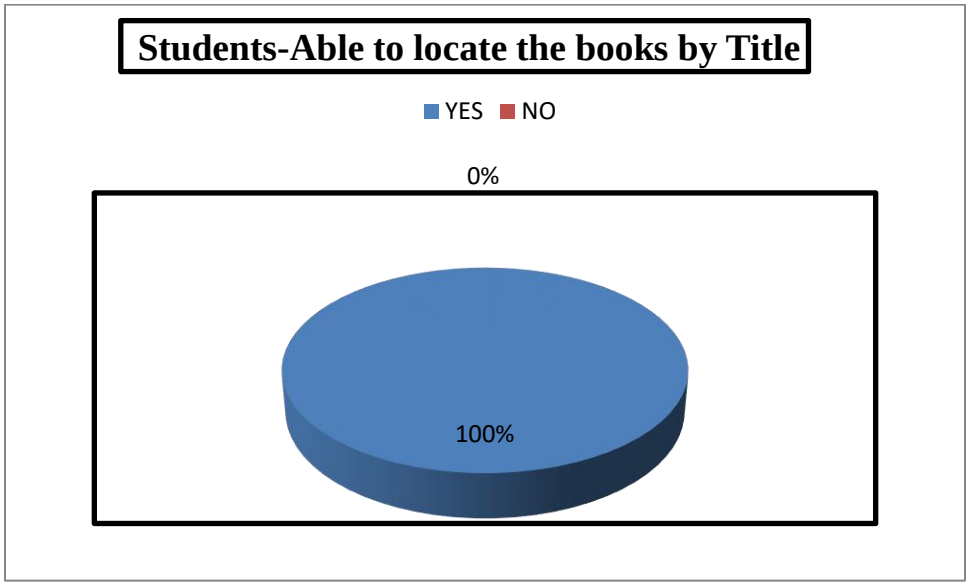


From Table No. 5.6.51 & Chart No. Chart No.5.6.29 it can be observed that Location of the book is easily being found out due to software and 100% of students among those who are aware agree on this advantage.

Table No.5.6.52 (Q2b) Advantages of said software used in library for students - Able to locate the books by Title

Student Feeedback	BASE	Frequency	Prcent
BASE	280		
Yes		280	100
No		0	
		0	
Total		280	100

Chart No.5.6.30

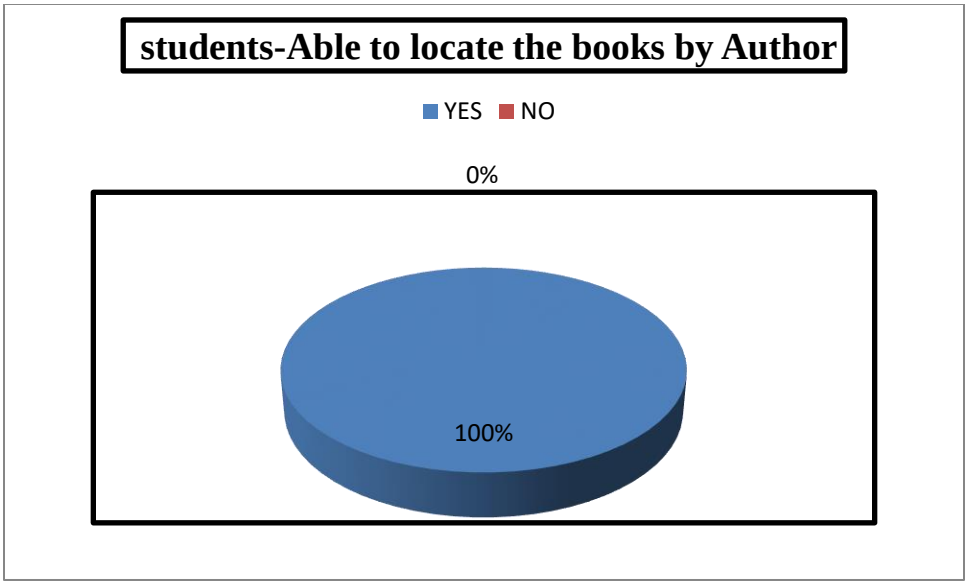


From Table No.5.6.52 & Chart No.5.6.30 This advantage of location of title also gets endorsement from 100% students.

Table No.5.6.53 (Q2c) Advantages of said software used in library for students Able to locate the books by Author (SA)

Student Feeedback	BASE	Frequency	Prcent
BASE	**280**		
Yes		**280**	**100**
No		**0**	
		0	
Total		**280**	**100**

Chart No.5.6.31

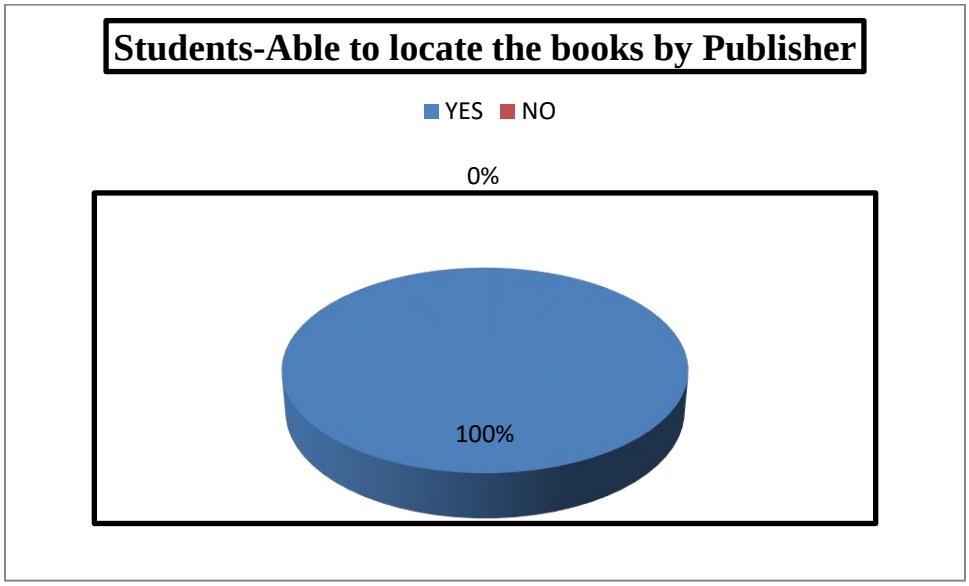


From Table No.5.6.53 & Chart No. 5.6.31 it can be observed that Locating the book by author as an advantage is also endorsed by students.

Table No.5.6.54 (Q2d) Advantages of said software used in library for students - Able to locate the books by Publisher's Name (SA)

Student Feedback	BASE	Frequency	Prcent
BASE	**280**		
Yes		**280**	**100**
No		**0**	
		0	
Total		**280**	**100**

Chart No.5.6.32

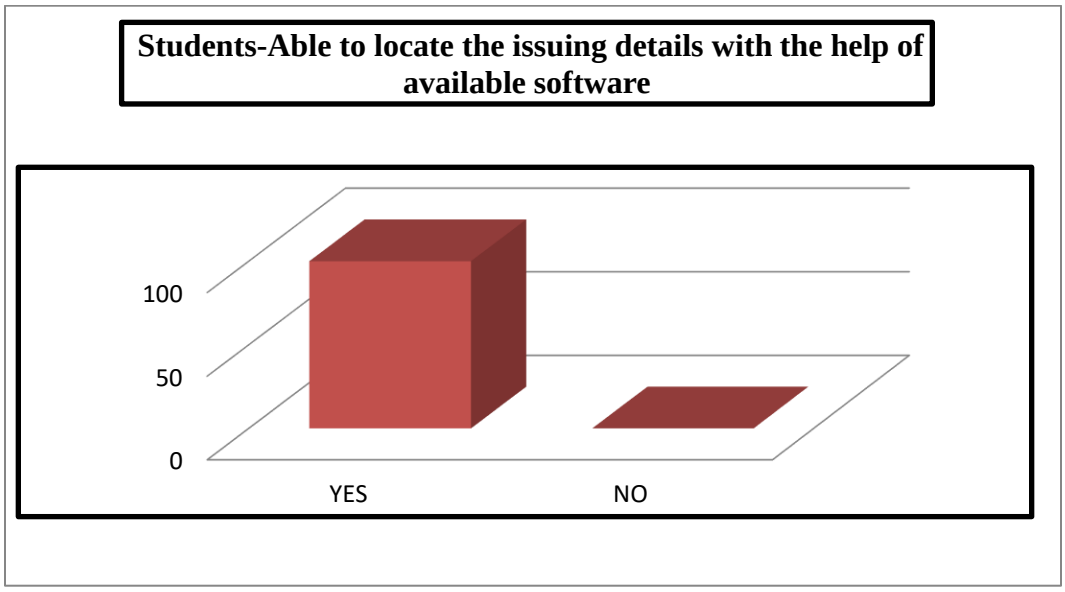


From Table No.5.6.54 & Chart No.5.6.32 it can be observed that Location by publisher is also endorsed by 100% student population.

Table No.5.6.55 (Q2e) Advantages of said software used in library for students Able to locate the issuing details with the help of available software (SA)

Student Feeedback	BASE	Frequency	Prcent
BASE	280		
Yes		280	100
No		0	
		0	
Total		280	100

Chart No.5.6.33

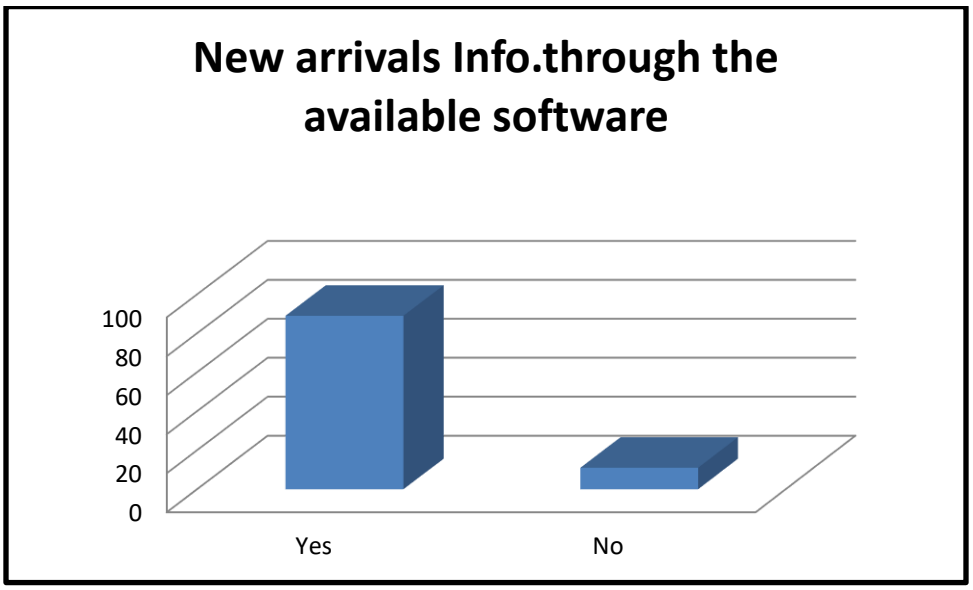


From Table No.5.6.55 & 5.6.33 it can be observed that, 100% student population endorsement on issuing details.

Table No.5.6.56 (Q3) Are you able to get the information about the new arrivals through the available software (SA)

Student Feeedback		Frequency	Prcent
BASE	**280**		
Yes		**248**	**89**
No		**32**	**11**
Total		**280**	**100**

Chart No. 5.6.34

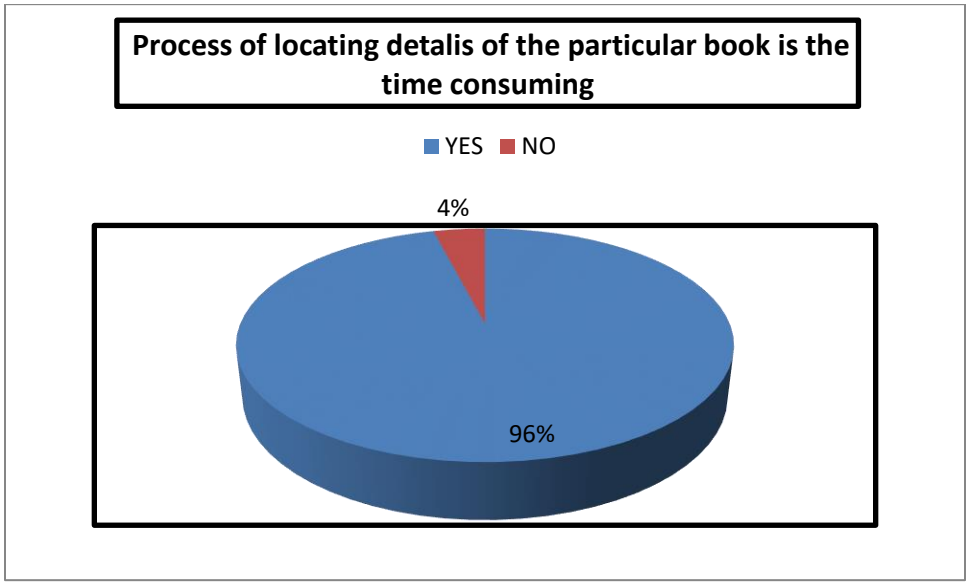


From Table No. 5.6.56 & Chart No .5.6.34 can be observed that, This feature is endorsed by only 89% of the students. Sometime this kind of module is not available in software.

Table No.5.6.57 (**Q.4**) **Is the process of locating details of the particular book is time consuming (SA)**

		Frequency	Prcent
BASE	**280**		
Yes		**270**	**96**
No		**10**	**4**
Total		**280**	**100**

Chart No. 5.6.35

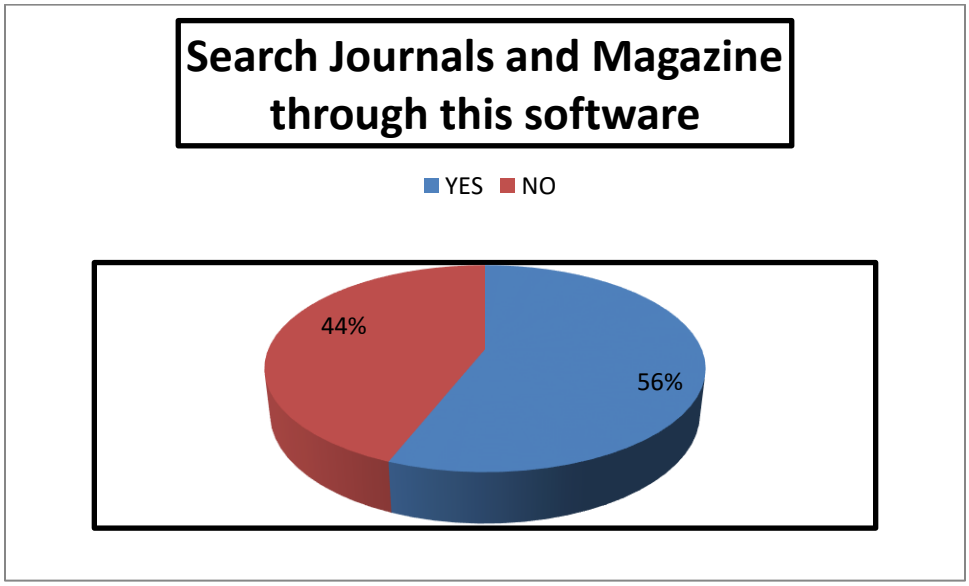


From No. 5.6.57 & Chart No.5.6.35 it can show the process of locating details of the particular book is the time consuming . The whole process is considered time efficient.

Table No.5.6.58 **(Q5) Are you able to search Journals and Magazines also through this software (SA)**

		Frequency	Prcent
BASE	280		
Yes		157	56
No		123	44
Total		280	100

Chart No. 5.6.36



From Table No.5.6.58 & Chart No.5.6.36 show the result of search Journal & Magazine through this software .

Table No.5.6.59 (Q7) Did you find any problems/ disadvantages in the said software while using (SA)

		Frequency	Prcent

BASE	**280**		
Yes		**0**	**0**
No		**277**	**99**
Don't know/Not Applicable		**3**	**1**
Total		**280**	**100**

From Table No. 5.6.59 it can be observed that ,No problem is encountered by aware users.

Table No.5.6.60 (Q10) Nature of the problems

		Frequency	**Prcent**
BASE	**280**		
Short term		**0**	**0**
Temporary		**278**	**99**
Long Term		**0**	**0**
Don't know/ Not Applicable		**2**	**1**
Total		**280**	**100**

From Table No. 5.6.60 it can be show the details of Only temporary problems are experienced .

Table No.5.6.61 (Q11) How soon the problems are rectified (SA)

		Frequency	**Prcent**

BASE	**280**		
Immediate		**248**	**89**
Within an hour		**30**	**11**
With in 3 hours		**0**	**0**
Don't know **Not Applicable**		**2**	**1**
Average time taken in hours to rectify problems		**0.55**	
STD		**0.16**	
STE		**0.01**	

Take out:

From Table No.5.6.61 show the on the Problems are so immediately solved that it hardly is recognized as problems. As per the Table Average time taken in hours to rectify problems.

Table No.5.6.62 (Q12) Is the above software user friendly? (SA)

BASE	**280**	**Frequency**	**Prcent**
Yes		**278**	**99**
No		**0**	**0**
Don't know/ **Not Applicable**		**2**	**1**
Total		**280**	**100**

Take Out:

From Table No. 5.6.62 show the ratio of user friendly . Most of students are consider it as user friendly.

Table No.5.6.63 (Q13) User guide available

		Frequency	Prcent
BASE	**280**		
Hard Copy		**24**	**9**
Soft Copy		**75**	**27**
Internet		**161**	**58**
Don't know/Not Applicable		**20**	**7**
Total		**280**	**100**

Take out: From Table No.5.6.63 it can observed that 9% Population are using the hard copy,27% are using the soft copy and Internet 58% are using the Internet as a user guide as a user guide .Most seem to be using the internet guide

Table No.5.6.64 (Q14) Satisfied with the services provided by the library software (SA)

BASE		Frequency	Percent
	280		
Satisfied		**40**	**14**
Not satisfied		**0**	**0**
OK		**0**	**0**
Average		**0**	**0**
Don't know/Not Applicable		**240**	**86**
Total		**280**	**100**

From Table No.5.6.64 show the student satisfied level of using the Library management software . 40% students population are satisfied with services and 240 % student are not satisfied . The opinion on satisfaction is not very encouragingly yes but most seem to be indifferent to this question.

5.6.65 **(Q16) Overall Feedback (OE)**

		Frequency	Prcent
BASE	280		
YES		248	88
NO		32	12
Don't know/Not Applicable		280	100

Take Out: From Table No.5.6.65 it get the information about the Overall Feedback therefore is derived and it is felt there is a need to express the opinion and opinion is not existing because there is no expectations from the software's.

5.7

Hypothesis Under Test

It is important to begin this chapter with an understanding about "what is a hypothesis"? A hypothesis is an **educated guess** about something in the world around . Any hypothesis should be testable, either by experiment or observation.

Typically, therefore, a hypothesis is a statement of belief . Further to the statement, it is important that the statement is tested statistically for its being a reality and the truth. Hence hypothesis testing in statistics is a way for the researcher to test the results of a survey or experiment to see if the researcher has got meaningful results with respect to it being a true phenomena or with respect to some relationships that the researcher has hypothesized.

In this context following hypothesis were made at the beginning of the journey of this doctoral research. Given that this research is a descriptive research the tests are conducted only to ensure the goodness of fit, meaning for making a definitive statement that the sample is representing the real life situation when it comes to role of software/technology in the field of academic libraries . It is proposed to do the Chi-square test. The Chi-square is intended to test how likely it is that an observed distribution is due to chance or a reality. It is also called a **"goodness of fit"** statistic, because it measures how well the observed distribution of data fits with the distribution that is expected if the variables are independent or are actually behaving when the enquiry is census. In this doctoral research therefore the chi square for goodness of fit test is being used to examine how closely this data represents the population. Wherever the data is observed to be 100% in accordance to what the researcher has believed, there is no statistical test that has been applied as in such situations the variable is considered as "constant" or a natural state.

A Chi-square test is designed to analyse **categorical** data. That means that the data has been counted and divided into categories. The data in the sample is examined in order to see whether this distribution is consistent with the hypothesized distribution of the population or not. Presenting below the summary of hypothesis, the associated questions and test that were conducted:

Hypothesis	**Question number and Questionnaire reference**	**Name of the test and definition**

1) Ho: All AICTE institutions do not use any software Ha: All AICTE institution use atleast one software	1) REFER QUESTIONNAIRE IN APPENDIX (_I) Q1 from Librarian questionnaire :Out of the following options, which software is used in your Library?	Chi square test conducted and it is Statistically Significant representing that this sample represents the population.
2. H0: All AICTE institutions do not continuously do technology advancement for library software. Ha: All AICTE institutions continuously do advancement of technology for library software	1) REFER QUESTIONNAIRE IN APPENDIX (I) Q15. From librarian: How often the software version requires to be upgraded?	Chi square test conducted and it is Statistically Significant representing that this sample represents the population.
3. H0:Library software is not easy to operate Ha: Library software is easy to operate	1) Librarian questionnaire: REFER QUESTIONNAIRE IN APPENDIX (_I) Q24.Is the above software user friendly? 2) REFER QUESTIONNAIRE IN APPENDIX (_III) Students: Is the above software user friendly? Q12	Librarian 100% response so no need to do a statistical test. Variable became constant due to 100% response. Chi square test conducted and it is statistically significant.

4. Ho:. Most of the students, faculty and library staff are not satisfied with the use of this software. Ha: Most of the students, faculty and library staff are satisfied with the use of this software.	REFER QUESTIONNAIRE IN APPENDIX (_I) 1) Librarian: Would you like to recommend this software to any other institute? Librarian: Q32 REFER QUESTIONNAIRE IN APPENDIX (II) 2) Professors & Students: Are you satisfied with the services provided by the library software? Q14	Chi square test conducted and it is statistically significant. 100% response on positive aspect from students in q14 so no test required.
5) Ho: Problem occurrence is high Ha: Problem Occurrence is not high	1) REFER QUESTIONNAIRE IN APPENDIX (I) Librarian: How often the problems occur?Q26 2) REFER QUESTIONNAIRE IN APPENDIX (II) Professors & Students: Did you find any problems/ disadvantages in the said software while using? Q9 & Q7	Chi square test conducted is statistically significant across Librarians, and Professors. 100% response on positive aspect from students n q7

Detailing the hypothesis and the tests below:

1)

Ho: All AICTE institutions do not use any software

Ha: All AICTE institution use atleast one software

Librarian segment:
Chi-Square Test

Frequencies

Any Software used

	Observed N	Expected N	Residual
Yes	1	20.0	-19.0
No	39	20.0	19.0
Total	40		

Test Statistics

	Any Software used
Chi-Square	36.100[a]
df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20.0.

Chi-Square Tests

	Value	df	p-value	Result
Pearson Chi-Square	36.100[a]	1	.000	Rejected

Take Out: Using software is become imperative so all institutions are using some software or the other.

2.

H0: All AICTE institutions do not continuously do technology advancement for library software.

Ha: All AICTE institutions continuously do advancement of technology for library software

Librarian segment:
Chi-Square Test

Frequencies

NQ15

	Observed N	Expected N	Residual
Yes	3	15.0	-12.0
No	27	15.0	12.0
Total	30		

Test Statistics

	NQ15
Chi-Square	19.200[a]
df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 15.0.

Chi-Square Tests

	Value	df	p-value	Result
Pearson Chi-Square	19.200[a]	1	.000	Rejected

Take Out: Software needs upgradation of technology by adding new or customized feature and that practice is seen even in academic libraries.

3

H0:Library software is not easy to operate

Ha: Library software is easy to operate

Librarian response table using frequency distribution:

(Q24) SW User-friendly (SA)									
		Age of Librarian		Age of Establishment		No. of students in the college		Librarian - No. of yrs. with the college	
	Total	Up to 35 .	36 & above	Up to 15	16+	Up to 400	401+	Up to 5 Yrs.	6+ Yrs
		A	B	C	D	E	F	G	H
BASE	40*	16*	24*	17*	22*	23*	16*	17*	30*
Yes	39	15	24	16	22	22	16	16	29
	98	94	100	94	100	96	100	94	97
No	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
Don't know/Not Applicable	1	1	0	1	0	1	0	1	1
	3	6	0	6	0	4	0	6	3

Student segment:

Chi-Square Test

Frequencies

Is the above software user friendly Q12

	Observed N	Expected N	Residual
Yes	278	140.0	138.0
No	2	140.0	-138.0
Total	280		

Test Statistics

	Is the above software user friendly
Chi-Square	272.057[a]
df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 140.0.

Chi-Square Tests

	Value	df	p-value	Result
Pearson Chi-Square	272.057[a]	1	.000	Rejected

Take Out: The custodians of the software's and the largest users of the library i.e. the students are finding the software usage to be user-friendly.

4.

Ho:. Most of the students, faculty and library staff are not satisfied with the use of this software.

Ha: Most of the students, faculty and library staff are satisfied with the use of this software.

Librarian Segment:

Chi-Square Test

Frequencies

NQ32

	Observed N	Expected N	Residual
Yes	11	19.0	-8.0
No	27	19.0	8.0
Total	38		

Test Statistics

	NQ32
Chi-Square	6.737[a]
df	1
Asymp. Sig.	.009

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 19.0.

Professors Segment:

Chi-Square Test

Frequencies

nq14

	Observed N	Expected N	Residual
.00	51	100.0	-49.0
1.00	149	100.0	49.0
Total	200		

Test Statistics

	nq14
Chi-Square	48.020[a]
df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 100.0.

Chi-Square Tests

	Value	df	p-value	Result
Pearson Chi-Square	48.020[a]	1	.000	Rejected

Student Segment:

(Q14) Satisfied with the services provided by the library software (SA)

BASE: Those who aware about software used in library

Proportions: Columns Tested (1%, 5% risk level) - A/B - C/D

*** small base; ** very small base (under 1) ineligible for sig testing**

	Total	Yes	No	Yes	No
		A	B	C	D
Figures in absolute and Percentage					
BASE					
	280	248	32*	-**	277
Satisfied					
	40	8	32	0	40
	14	3	100	0	14
Not satisfied			A		
	0	0	0	0	0
	0	0	0	0	0
OK					
	0	0	0	0	0
	0	0	0	0	0
Average					
	0	0	0	0	0
	0	0	0	0	0
Don't know/Not Applicable	240	240	0	0	237
	86	97	0	0	86
		B			

Take Out: Across segments high satisfaction is observed, but student community are not responding to this question so there is a need of educating this community about the services.

5) **Ho: Problem occurrence is high**
Ha: Problem Occurrence is not high

Librarian segment:

Chi-Square Test

Frequencies

NQ26

	Observed N	Expected N	Residual
.00	34	18.5	15.5
1.00	3	18.5	-15.5
Total	37		

Test Statistics

	NQ26
Chi-Square	25.973[a]
Df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.5.

Professors Segment:
Chi-Square Test

Frequencies

Find any problems/ disadvantages in the said software while using Q9

	Observed N	Expected N	Residual
Yes	20	48.5	-28.5
No	77	48.5	28.5
Total	97		

Test Statistics

	Find any problems/ disadvantages in the said software while using
Chi-Square	33.495[a]
Df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 48.5.

Chi-Square Tests

	Value	df	p-value	Result
Pearson Chi-Square	33.495[a]	1	.000	Rejected

Student Segment:
(Q7) Did you find any problems/ disadvantages in the said software while using (SA)

BASE: Those who aware about software used in library

Proportions: Columns Tested (1%, 5% risk level) - A/B - C/D
*** small base; ** very small base (under 1) ineligible for sig testing**
#page

Get information about new arrivals Found problem / disadvantage using SW	

Figures in absolute and Percentage

	Total	**Yes**	**No**	**Yes**	**No**
		A	**B**	**C**	**D**
BASE	280	248	32*	-**	277
Yes	0	0	0	0	0
	0	0	0	0	0
No	277	245	32	0	277
	99	99	100	0	100
Don't know/Not Applicable	3	3	0	0	0
	1	1	0	0	0

Take Out: Problem occurrence is rare.

To Conclude: In the process of hypothesizing the researcher is essentially being the "devil's advocate" while stating the position when making the null hypothesis. It is therefore easy to conclude basis these tests and observations that the academic libraries are poised to play an expanded role in this technological and digital era making its role relevant in these times.

However the custodians of academic libraries must ensure educating the student community of all the services and new services that are embedded in the technology.

Chapter 6

Conclusion, Suggestions Future Scope And Limitations

6.1 Conclusion

This doctoral research is a base line assessment of utilisation of library technology services by institutions, professors and students.

The impact of Information Technology (IT) is widely seen across the globe and in different types of libraries. IT has become an important part of all aspects of the library management spanning all its functions right from: library operations and administration, information resources, to research based services etc. IT has virtually unlimited potential for variety of useful applications in libraries offering large and variety of knowledge services. Globally proper exploitation of new technologies in library is no longer a matter of choice but a matter of survival in an era of rapidly changing technology as information has become a new age currency in a world which is now more focused on information/knowledge as a capital resource to develop itself . In fact basis this , success of many educational institutions is now dependent on a modern library that is increasingly offering all the modern and technology led services.

The research findings pointed out towards following "Managerial implications" across the three key segments viz: Librarians, Professors and Students:

Librarian:

1.A need of a strong role of the regulatory body to set up norms for institutions and software company to ensure that library software services is not just a knowledge repository services. As observed that the decisions of purchase are at the institution level and that's leading to a technology adoption which is extremely differential and driven by the institutions mandate. AICTE can have a role here to mandate minimum features to offer similar library services to the users like educational curriculums

2.Further when the awareness of features of the modules is evaluated 21% librarians have mentioned about the 'search' function. It appears that given that there is an expanded role that librarians need to play in educational industry which goes beyond being repository of knowledge services and moves into an active role of creating new knowledge that is research based, it is felt that this function needs to be used more frequently.

3.The top five software's that emerged are:

Figs in %	Share in the institutional market	Whether interactive software % saying yes	Whether recommended: % saying yes
Total	**40***		
SLIM 21 Advance	25	100	100
SOUL	15	80	66
Koha	15	100	100
Egranthalya	13	100	80
Total	68%		

These findings indicate that the role of regulatory body is highly required to ensure standardised brands across institutions and involvement of the librarians themselves in using the software. To illustrate case in point most librarians are trained on SLIM21, so may be that is the reason it has higher market share and cent percent recommendation scores. Training on software could enhance software usage and recommendation and this could be indicated by the management and librarian themselves.

Professors & Students:

1. Library professionals need to educate the teacher and student community about the utilisation of the software's into their work environment.
2. Further to the awareness of features of the modules it is necessary to demonstrate how to use the different features so that the teachers and students are able to use all the features of the library software to maximise the knowledge that is being stored in the library through the books, journals and magazines.
3. These findings also indicate that the role of regulatory body is highly required to ensure standardised services to teacher and student community by the library science professionals given that assessment of service quality of any service can be judged by only user profile. If the teacher and student community is not active in assessment then this is a warning alert to the regulatory body. The library science professionals should also take note because this institution is changing rapidly due to technology and if it needs to be relevant to the society it has to carve out a role for itself.

At an another level, i is also observed that budgets are discretionary and not deliberated upon by the management. This needs to be looked into given that the core nature of any technology is change in the hardware and software. Obsolescence in any technology is the order of the day hence management has to keep updated budgets in this regard even with respect to Library software's as libraries are expected to go beyond being "repository of collections" to a catalyst

for discovery and creation of knowledge by making this place as a central place where people, knowledge, and research intersect to tackle world's greatest challenges.

Overall thus on reviewing the implications across the three sections it is felt that there is a need of creating a vibrant learning environment in management institutions and that is the responsibility of management, technology companies and the concerned staff of the institutions. The learning environment will facilitate the expanded role of library services and the user community will be able maximise the usage of these services. In this regard it is important that the management, manufacturers of the technology software's and the users of these software's continuously interact to help develop a learning environment.

6.2 Suggestions

Suggestions: Basis this research following actions are suggested for better utilisation of the technology services:

Manufacturer led:

1. Effective training to the librarians , other staff and user community. This should be followed by refresher training every quarter during the first year of ownership of the software.
2. Technology services are constantly updated. But educational institutions are constrained for budgets so the manufacturers can look at different models of affordable payment structure such as Subscription model, Pay as you use model etc
3. Since library services is about maximisation of knowledge services, it is important that the manufacturing company also takes feedback on utilisation of software to help remove barriers of usage.
4. In addition to User Manual , there is a need for "One Page Step Wise User Menu" to be created for every feature in the module such as Cataloguing which is back end process or Search/SID which is more user/ used feature.

Management led:

1. A dialogue mechanism has to be set up to find out technology and financial challenges faced by the users and custodians to take an appropriate action. To illustrate the case in point: Discussion on every report that is generated through the software is tabled for discussion to ensure that the technology services are used by maximum users to the maximum/optimum level.

Regulatory led:

1. Standardisation of software followed with technology progression journey for every institution for remaining accredited with the apex body.

Librarian community led:

1. Task groups to be more involved into usage and application of software by creating key metrics on usage through a process of dialogue.
2. Librarians should contribute into research and development of all the different subject matters through information curation by way of all the new features embedded in the technology such as machine learning etc.
3. Regular feedback from the user community on software performance.

6.3 Future Scope

1. A research of this kind is envisaged across different lines of education such as Engineering, Medical, Hotel management and even schools.
2. Technology and information is continuously growing . So a research on technology services in this field is proposed on a periodic basis to arrive at new needs and challenges.
3. Manufacturers can consolidate their market shares at a national and international level by doing market surveys for a continuous competition mapping and user needs and requirements.

6.4 Limitations of this study

In this research the management vision is not been taken into consideration yet.

In this research the current situation of technology services and its role in the near future is being discussed.

Bibliography

1. Abdulraheem Sani, Muta Tiamiyu (2005), Evaluation of automated services in Nigerian universities, The Electronic Library Vol. 23 No. 3, 2005 pp. 274-288

2. Adomi E. E. 'Library and information resources'. Benin City: Ethiope Publishing Corporation, Pp. 1 – 103, 2009

3. Adebayo, E.L. (2007), "Library Services Standards Implemented in Colleges of Education in Nigeria", Pakistan Journal of Social Sciences, Vol. 4, No. 2, PP. 279-281. Available from http://medwelljournals.com/fulltext/pjss/2007/279-281.pdf (18-01-10).

4. Al-Ansari, Husain A.; and Al-Enezi, Sana (2001), "Health Sciences Libraries in Kuwait: A Survey of Their Resources, Facilities, and Services", Bull Med Libr Assoc., Vol. 89, No. 3, PP. 287-293. Available from http://www.ncbi.nlm.nih.gov/pmc/ articles/PMC34562/ (24-02-10).

5. Aguolou C. C. & Aguolu I. E. 'Libraries and information management in Nigeria: Computerisation of academic and research libraries in Nigeria, problems and prospects'. Maiduguri: Ed-linform, 2002

6. Archives Department, Government of Jammu. (1918). Annual Administrative Report. Jammu: State Archives, p.1.

7. Awolola, J.O. (1998), "College of Education Libraries in Kwara State (Nigeria): A Comparative Study", Library Herald, Vol. 36,No. 3, PP. 152-158.

8. Bajpai, S.K. (1994-1995), "Evaluation of College Library Services in Delhi", Library Herald, Vol. 32, No. 3&4, PP. 139-143.

9. Bajpai, S K : Software Selection and Designing a Large Software System. In:Library Information Technology Management : A Librarian's Mannual. New Delhi, Ess Ess Publications, 1999.

10. Bhargava, D G : Manpower for Library Automation : Retrospect and Prospect.In: Paper Presented at the Seminar on Information Handling in Libraries in the 21st Century, 22-25 Feb, 1989, Rewa: India.

11. Bhattacharjee, R. (2002). Public Libraries Section – Country Reports. India. Retrieved February 6, 2014 from http://www.ifla.org/VIIs8/annual/cr02-in.htm.

12. Buragohain, Alaka: Presidental Appeal. AC LA News Bulletin. Vol. 2,2001

13. Chakrabarti, Bhubaneshwar (1993). Library and Information Society. Kolkatta: The World Press, 101.

14. Chohan, Amarshing .(1998). Development of Education in the Jammu and Kashmir State,.1.

15. Clausen, H. (1999), "Evaluation of library web sites: the Danish case", The Electronic Library, Vol. 17 No. 2, pp. 83-7

16. Chopra, H.R. (1995), "College Libraries in Punjab: Some Problems Re-Considered", In Sewa Singh and Madhuri Arora (Ed.), Handbook of college libraries: problems, development, finance and other related aspects, New Delhi: Beacon Books, PP. 109-114.

17. Clayton, M : Managing Library Automation. Eldershaw Gower Publishing Co. Ltd. 1987,72p.

18. Edwards Vilas,". (1998) "Self-services: transforming the role of library staff." Autumn 1998 SCONUL Newsletter, University of Sunderland.

19. Gautam, J.N.; and Srivastava, Mahendra Narayan (2006), "State-of-the-Art of Documentation and Information Services in SAU Libraries in India", Library Herald, Vol. 44, No. 1, PP. 33-40.

20. Gupta, Sangita and Singh, Gurudev. (2006). Public Library System in J & K State., Jammu: Sonal Book Enterprises, 32.

21. Haglund, Lotta, and Olsson, Per. 2008. The Impact on university libraries of changes in information behavior among academic researchers: a multiple case study. The Journal of Academic Librarianship, Vol. 34, no. 1: 52-59.

22. Hamedan Branch. "Managing Digital Libraries in the Light of Staff and Users: An Approach" International Journal of information Science and Management, Vol.7 , No 132, Iran

23. Hingwe, K.S. (1969), "Organizational Patterns of Academic Libraries", Library Herald, Vol. 11, No. 3, PP. 139-153.

24. Ifidon S. E. 'Modern theory and practice of library collection development'. Ekpoma: Department of Library and Information Science, Ambrose Ali University, Ekpoma. Pp. 1 – 49, 2006

25. Ishvari, Corea, et. al. Encyclopaedia of Information Sciences. Vol. 1. New Delhi: Akashdeep Publishing House, 1993

26. Jagdish, M. (1979). History of Libraries and Librarianship in Modern India since 1850. Delhi. Atam Ram.

27. Jasmer Singh (1990), "College Libraries in Punjab: A Statistical Analysis of the Problems", PhD thesis, Department of Library and Information Science, Guru Nanak Dev University, Amritsar.

28. Joshi, C.R. (2001), “Veterinary College Libraries in Maharashtra:A Survey”, ILA Bulletin, Vol. 37, No. 01, PP. 13-16.

29. Ka, Wai Fan. 2005. The role of university libraries in supporting research in Hong Kong: facing a new challenge. Campus-Wide Information Systems, Vol. 22, no.1: 43-50.

30. Kaufman, P.T. 2005. Role and mission of academic libraries: Present and Future.

31. Kaula, P N. (1965). Facets and Phases of Indian Library Development, In N. B. Sen (Editor). Development of Libraries in New India. New Delhi: New Book Society of India, 159.

32. Kumbar, T.S. (1986), “College Libraries under Gulbarga University Area: A Survey”, Library Herald, Vol. 25, No. 2-3, PP.121-135.

33. Kumar, P S G : Computerization in Indian Libraries. New Delhi, B P Publication, 1987.

34. Lahiri, R and Subramaniam, K : NELIBNET - A Promise of Prospect for Northeast India : An Outline. University News, vol. XXIX, No. 34, 1991. Pp. 9-13.

35. Lahkar, Narendra : Computerization of Libraries : A Brief Study. In: Librarianship A Challenging Profession In Assam, 1995, Pp. 23-28.

36. Laxman Rao, N : Software Selection for Indian Libraries. In: Library Science with Slant to Documentation and Information Studies. 30(4), Dec. 1993. Pp. 147-149'.

37. Lynch, C. (2000) From Automation to Transformation: forty years of libraries and information technology in higher education, Educause Review, 35 (1), 60–8

38. Mirza, Muhammad Sajid and Mahmood, Khalid, "A Study of IT Infrastructure in Pakistani University Libraries" (2014). Library Philosophy and Practice (e-journal). Paper 1122

39. Mirja Ryynänen, “The role of libraries in modern society”(1999),7th Catalan Congress on Documentation

40. Mukherjee, A.K. (1965), “Library Facilities in Training Colleges of India,” IASLIC Bulletin, Vol. 10, No. 1, PP. 54-68.

41. Nicholson, S. & Stanton, J. (2003). Gaining strategic advantage through bibliomining: Data mining for management decisions in corporate, special, digital, and traditional libraries. In Nemati, H. & Barko, C. (Eds.). Organizational data mining: Leveraging enterprise data resources for optimal performance. Hershey, PA: Idea Group Publishing

42. Oulanov, A. and Pajarillo, E.J.Y. (2001), “Usability evaluation of the City University of New York CUNY þ database”, The Electronic Library, Vol. 19 No. 2, pp. 84-92.

43. Oyesiku, F.A.; Amusa, O.I.; and Odunew, A.O. (2006), “Resources, Services and Management of Academic Law Libraries and Law Firm Libraries”, International Library Movement, Vol. 28, No. 4, PP. 181-205.

44. Partap, Bhanu (2007), “A Study of Staff, Collection and Services of College of Education Libraries in the Districts Jalandhar, Kapurthala and Amritsar of Punjab”, M.Phil dissertation, Alagappa University, Karaikudy, Tamilnadu.

45. Patterson, Avril (2009) Research support through resource sharing: challenges and opportunities for Irish academic libraries. Inter lending & Document Supply, Vol. 32, no.2: 87–93

46. Phadke, D. (2010). Granthalaya Sangnkikaran Aani Aadhunikikaran (4th ed.) Pune: Universal Prakashan, pp. 52-54.

47. Purnima Devi. (2006) “Role of UGC in manpower development in the field of library and information science in India.” Annals of Library and Information studies, Vol. 53, p.143-148

48. Raina, Roshan (1980), “Degree College Libraries in Kashmir: A Survey”, Annals of Library Science and Documentation, Vol. 27, No. 1-4, PP. 12-19.

49. Rao, N Y J and Ramchander, M .(2000) Books to Bytes : Library Information Technology in the New Millennium. New Delhi, Ess Ess Publications, 2000.

50. Reddy, E Rama; Rao, K Nagatja and Burhanuddin, Mhd. (1991):Computerization of University Libraries : A Case Study of Library of Hyderabad University, ed. C.P. Vashishth. Delhi: ILA, 1991. Pp. 5-7.

51. Rowley, Jennifer. (2004) Researching people and organizations. Library Management, Vol. 25, no.4/5: 208-214

52. S. D. Vyas (2003), Application of Information Technology in University Libraries of Rajasthan: A Survey Report, Caliber 2003 , P 1-7

53. Saracevic, T. (2000). Digital library evaluation: Toward an evolution of concepts. Library Trends 49(3), 350-369.

54. Sahib, S. (2003). Library and Literacy Movement for National Development. New Delhi: Concept.

55. Sean Burns.(2014) Academic Libraries and Automation: A Historical Reflection on Ralph Halstead Parker, Libraries and the Academy, Vol. 14, No. 1, pp. 87–102.

56. Sehgal, R L and Behl, D K (1996) Manual on Computer Applications Training in Library Science. New Delhi: Ess Ess, 1996, Pp. 31-35.

57. Singh, S.P. (1999), "Reader's Services in IIT Libraries (India): A Comparative Study", Library Herald, Vol. 37, No. 3, PP. 167-185.

58. Singh, S P and Kaula, P N .(1975)Automation in libraries. Delhi, *Metropolitan Book Co. Pvt. Ltd.*

59. Singh, Diljit,(2007) The role of the academic library in facilitating research: perceptions of postgraduate students. In Abrizah Abdullah et al. (eds). Building an information society for all: Proceedings of the International Conference on Libraries, Information and *Society*, ICoLIS 2007, Petaling Jaya, Malaysia, 26-27 June 2007

60. Simmonds, Patience L., and Syed Saad Andaleeb (2001) Usage of academic libraries: the role of service quality, resources, and user characteristics. Library Trend, Vol 49, no.4: 626-634.

61. Sujatha, H.R.; and Mudhol, Mahesh V. (2008). "Use of Electronic Information Sources at the College of Fisheries, Mangalore, India", Annals of Library and Information Studies, Vol. 55, No. 3, PP. 234-245.

62. Taher, Mohamed (1994). Encyclopedia of library history. New York: Garland, 272.

63. Tiwari, Aravind. (2002). Evaluation of electronic libraries. New Delhi: APH Publishing Corporation

64. UNESCO(1989) Division of Software Development and Application : Mini Micro CDS/ISIS 2.3 Reference Manual and CDS/ISIS Pascal Manual. Paris, UNESCO.

65. Vashisth, C P : Library Services for All by (2000) AD. Presidential Address at 39th All Indian Library Conference, Department of Public Libraries, Govt, of Karnataka, Bangalore, January 7-10,1994

66. Veer, Dharamraj Kalyanrao (2004), "College of Education Libraries in Maharashtra: A Survey", Ph.D. thesis, Department of Library and Information Science, Dr. Babasaheb Ambedkar Marathwara University, Aurangabad. University News, Vol. 42,No. 06, PP. 24.

67. Verma, I. N. and Agarwal, U. K. (Editors) (1994). Public library services in India.Udaipur: Himanshu.

68. Webster's (1966)Third New International Dictionary of the English Language (Unabridged).,148p.

69. Webb, P. J.(2007) Providing effective library services for research. London: Facet Publishing.

70. World Book Encyclopedia (2011). Library History. Vo. L-12. Chicago: World Book Co., 257-258.

71. Y**at**es, R.(1996) Library Automation : The Way Forward. Program, 30(3),Pp. 39-53

72. Aabø, S., Audunson, R., & Varheim, A. (2010). How do public libraries function as meeting places*? Library & Information Science Research*, *32*(1), 16-26.
73. Aabø, S., & Audunson, R. (2012). Use of library space and the library as place. *Library & Information Science Research, 34*(2), 138-149. doi:10.1016/j.lisr.2011.06.002
74. Adams, W.J., Jansen, B.J., & Smith, T. (1999). Planning, building, and using a distributed digital library. Third International Conference on Concepts in Library and Information Science.

75. Aliprand, John M. (2005)The structure and content of MARC 21 records in the UNICODE environment. Inf. Technol. Lib., 2005, 24(4), 170-79.
76. Bush, V. (1945). As we may think. Atlantic Monthly (July)
77. Chandraker, Rajesh (2004)Unicode as a multilingual standard with reference to Indian languages. The Electronic Library, 22(5), 422-24.
78. Jebaraj, D., & Deivasigamani, M. (2003). The electronic library: An Indian scenario. Library Philosophy and Practice 5 (2). Available: http://unllib.unl.edu/LPP/jebaraj.html
79. Mukhopadhayay, Parthasarthi. Progress of library management softwares: An Indian scenario. Vidyasagar Univ. J. Lib. Inf. Sci., 2002, 1-15.
80. Mukhopadhyay, Parthsarthi. (2006) Five laws and ten commandments: The open road in library automation in India. In Proceeding of the National Seminar on Open Source Movement–Asia Perspective, IIT, Roorkee, pp. 27-36.
81. Leckie, G. J. & Buschman, J. E. (2007). Space, place, and libraries: An introduction. In J. E. Buschman and G. J. Leckie (Eds.), *The library as place: History, community, and culture* (pp. 3-25). Westport, CT: Libraries Unlimited.
82. Pomerantz, J. & Marchionini, G. (2007). The digital library as place. *Journal of Documentation, 63*(4). 505-533. doi: 10.1108/00220410710758995
83. Ravindaran, Sreedevi. Bibliographic databases: Software issues. DESIDOC Bull. Inf. Technol., 1997, 17(5), 11-16.
84. Rhyno, Arthur (2003) From library system to mainstreamsoftware: How web technologies are changing the roleof system librarians. Library Hi-Tech,21(3),289-96.
85. Sherbini, Magada El. & Klim, George (2004) Metadata and cataloguing practices. The Electronic Library, 22(3), 238-48.
86. Shiri, A. (2003). Digital library research: Current developments and trends. Library Review 52 (5): 198 - 202
87. Wu, Carol H. (2004) Keeping pace with Open URL: A perspective. The Serials Librarian, 2004, 47(1&2), 117-28.

88. Khode Subhash & Chandel Sunil (2015),Adoption of Open Sources Software in India, Desidoc Journal of Library & Information,Vol.35,NO1.Journal ,2015,pp.30-40
89. Adepoju (2015),Library Automation : A case study of Ekiti Stae Library Board, Library Philosophy and Practices
90. Tyagi, A., & Senthil, V. (2015). Library Automation in India: Assessment of Library Services Platforms. *DESIDOC Journal of Library & Information Technology*, *35*(6)
91. Robert Iles and Emre Erturk (2016), Case Study on Cloud Based Library Software as a Service: Evaluating EZproxy, *Journal of Emerging Trends in Computing and Information Sciences*, Vol. 6, No. 10, October 2015
92. Sarma Gautam Kumar (2016) OPAC module in open source library management software: A comparative study , *DESIDOC Journal of Library & Information Technology*, January 2016,Vol. 36(1)
93. T.K.G.Kumar & Murli . (2017). Conceptions of indian LibSys software users on open source integrated library management system. *International Research : Journal of Library and Information Science, 7*(1)
94. T.K.G.Kumar (2017). Conceptions of indian LibSys software users on open source integrated library management system. *International Research : Journal of Library and Information Science*
95. Kureshi, P. S. L., Yadav, A. K. S., & Pednekar, D. D. (2017). Design and development of library website of homi bhabha centre for science education: An experimental study. *World Digital Libraries, 10*(1), 37-53.

96. Verma, L., & Kumar, N. (2018). Comparative analysis of open source digital library softwares: A case study. *DESIDOC Journal of Library & Information Technology*, *38*(5), 361-368.

97. Chauhan, K. (2018). Evaluation in use of KOHA library management software in OPJGU, sonipat. *Library Philosophy and Practice,* , 1-13