

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

Each and every creature has its own way of communication since its origin. Communication, in essence, the sharing of information is being practiced by the living beings since their origin in the earth or in any other planet, if life is possible—bee dancing, ant's mouth to mouth touch etc. are few examples

The process of evolution in human civilization, from the stage of Homo Sapiens to Chimpanzee to modern human of 21<sup>st</sup> century, their intelligence on information sharing has significantly contributed in communication. For efficient communication the primitive human, before and while in Stone Age, did their best to record different types of information about their weapons, locations, prey etc. The primitive human also recorded information by various styles, forms of drawings, shapes of materials and the following generation learnt the practice, consequently style and culture of recording information became a convention importance. The importance of information, which the human experienced as a powerful means of getting things done, has continued in the form of the drawings, sketch, and/or shape of material for future use. The 'future use' concept ultimately helped the generation following them— for example chimpanzee received prey of ants by using sticks, in the process of evolution they also learnt to fire by striking two stones, build shelter, make their area/territory by fencing, to use tree barks to cover their body, to make weapons, to make clay pots (Adhikari, 2065:2).

Nobody knows when the first library was set up. It all began, most probably, when individuals (at different times and in different places) discovered that by making marks on pieces of stone, tree barks, lumps of clay, etc, they could convey messages to each other which previously had only been communicable by sound or gesture; further such messages could be used as accurate records of what had been said and done and so were useful additions to human memories. By about 2,500 B.C. the Egyptians had discovered a very satisfactory and relatively cheap writing material, papyrus, made from the sedges. Until about 700 A.D. books and other records were produced on papyrus.

The primitive human, wanted to know more on various happenings, nature, and astrology. Their leader, being interested in preserving the belonging assets, helped in

building a treasury. In Summeria, Mesopotamia, Assyria, information was recorded in soft clay tablets in pictogram, cuneiform script. Cuneiform is called the first script. The clay tablets which embodied information in sketched form were stored in great number. These were the first form of, what we call books. The practice continued from 5500 B.C. to 75 B.C. Later information was recorded in leather, bones, woods, coax, and these were preserved/ stored. This is the way how library is being developed.

### **1.1.1 Evolution of Library**

**First stage (5500 B.C.)—The clay tablets collection library:** Information was recorded by pictogram, and later cuneiform script was developed. These were existed in Sumerian, Assyria, Babylonia. 30,000 clay tablets were stored by king of Babylonia, Hammurabi in 1750 B.C. for example law of Hammurabi, which is still in existence in Luvra Museum, Paris.

**Second stage: (2700 B.C.)— Papyrus collection library:** Information was recorded in hieroglyphics, for example the papyrus book ‘book of the dead’ (70 ft. long). About 700,000 papyrus scrolls were collected in library of Alexandria (300 B.C.).

**Third stage (197 B.C.)—Parchment collection library:** Information was recorded in parchment, leather, wooden piece, bones. These were the prime materials as the documents of a library.

**Fourth stage (105 A. D)— Manuscript collection library:** Information was recorded in paper which was invented in china in 105 A.D. Huge proportion of hand-written paper also called incunabula was collected and kept in temples, churches, and monasteries etc. After 1100 A.D. many educational institutions (schools/universities) proliferated. Libraries were established in them for example Laurentine, Italy; Library of Oxford University and Vatican City (1460 A.D.), Biblotheque du Roi (1367 A.D.) by Charles-V and later became Bibliotheque Nationale of France (1779 A.D.).

**Fifth stage (1450 A.D.)— Printed paper collection library:** Printing press (1447 A.D.) by Johanne Gutenberg of Germany brought a revolutionary breakthrough in the proliferation of production of books all over the world. Libraries in various corners of world were established.

**Sixth stage (1945 A.D.)—Electronic media collection library:** Information is being produced or surrogated in electronic media for example in microfilm, microfiche,

cassette, magnetic tapes. After 1990s various discs e.g. hard discs, pen drive, CD, DVD, web, server, supercomputer, satellite, robotics and internet are being used extensively for the production, storage, dissemination and consumption of information. The libraries which exploit electronic and digital materials are called digital libraries. Now virtual libraries are also in existence (Ibid).

### **1.1.2 Library**

‘A building in which collections of books, CDs, news papers etc. are kept for people to read, study or borrow: a public/reference/university etc. library (Hornby, 2005:884).

‘Library is any organized collection of printed books, periodicals, any graphic, audio visual materials and services of staff to provide and facilitate the use of such materials as are required to meet the informational, research, educational, recreational needs of users’(ISO, 1982:135).

Library is a public institution or establishment charged with the care of a collection of books, the duty of making them accessible to those who require the use of them and the task of converting every person in its neighborhood into a habitual library user and reader of books. A modern library... is regarded as a service institution, its aim, is to enable the users to make the most effective use of the resources and services of libraries’ (Ranganathan, 1940:25).

In the strict sense the term ‘library’ is a collection of materials organized for use. The word derives from the Latin word ‘liber’ a book (Feather & Sturge, 1997:254).

The current bibliography of librarianship contains many references to electronic library, virtual library and other electronic extensions of the physical library (Ibid). It also covers digital library.

Digital libraries, of course are the most rapid growing form of library for example libraries in England, Hong Kong etc. The libraries there collect/subscribe digital contents, online journals, and online books for instance. Digital library is possible only after use of computers in libraries.

Kawatra has accepted the concept ‘library’ into several forms as: Traditional Library, Automated Library, Electronic Library, Digital Library, Virtual Library, Universal

Library, Cyberspace, Virtual Reality i.e. virtual library, virtual museum, virtual archive etc. are the examples of virtual institution (Kawatra, 2000:275).

### **1.1.3 Pioneers of Digital Library**

The vision of Digital library is not new. This is a field in which progress has been achieved by the incremental efforts of numerous people over a long period of time. However a few authors stand out because their writings have inspired future generations. Two of them are Vannevar Bush (1945), when he published a vibrant article entitled 'As We May Think' in the Atlantic Monthly journal and J.C.R. Licklider (1965) with his futuristic article entitled 'libraries of the Future' in the same journal (Arms, 2005:9).

Before digital library the term library automation was prevalent as a broad term. Library automation is the use of computer based systems in libraries (often referred to as information retrieval) and for library management. As evidenced by debate on the electronic library. Though exact date of use of computers in library is not clear, these were used first in library service in the United States of America. Hans Peter Luhn (1896-1964 ) the information scientist and engineer who worked on key word in context (KWIC) indexes and Selective Dissemination of Information (SDI ), also pioneered the use of mechanical, and later electronic/digital devices for the processing of textual materials. He used computers in library for his first information retrieval investigation. In the late 1940s he was asked by IBM to find a solution to the problem of searching chemical compounds represented in coded form and developed a machine (Luhn Scanner) to search files of punched cards on which these codes were recorded. The arrival of computer offered better solutions to these problems, and his 1958 paper 'A Business Intelligence System' proposed on automatic method to provide current awareness service to scientists and engineers. In 1960 the American Chemical Society adopted his KWIC method of indexing and published chemical titles by this method (Feather, 1997:254).

The development of library automation largely reflects the development of computer technology. Initially using mainframe and minicomputers in the 1960s, the first use of computers were for bibliographic databases; as library catalogues, these were often created on a cooperative basis. This led to the development and adoption of MARC (Machine Readable Cataloguing) practices. During 1970s a range of online systems

and services became available offering online search access from remote terminals to various databases of indexing and abstracting journals...libraries were amongst the first to embrace compact disc technology from the mid-90s, on scales ranging from local to global, and the resulting opportunities for transmitting data electronically are permitting information to be accessed and shared in ways previously impossible with paper-based systems. The basic infrastructure for digital library after computer is the networking of computers among them (server-client). The internet (network among computers) has revolutionized the service of library. In 1967, at an Association for Computing Machinery (ACM) meeting, ARPA (Advanced Research Project Agency) presented its ideas for ARPANET, a small network of connected computers. By 1969, ARPANET was a reality. Four nodes at the University of California at Los Angeles (UCLA), the University of California at Santa Barbara (UCSB), Stanford Research Institute (SRI), and the University of Utah were connected via IMPs (Interface Message Processor) to form a network, software called the Network Control Protocol (NCP) provided communication between the hosts (Forouzan, 2003:278).

In 1972 Vint Cerf and Bob Khan (from ARPANET) collaborated for the 'Interneting Project. Cerf and Khan devised the idea of a device called a gateway to serve as the intermediary hardware to transfer packets from one network to another (Ibid).

Tim-Burners Lee, who developed HTML (Hyper Text Mark-Up Language) in the 90s for developing World Wide Web, has also greatly contributed in the concept of digital—sometimes called online/universal library (Kawatra, 2000:275).

Since 1990, digital libraries and electronic publishing have moved from esoteric interests of a few visionaries to activities that are beginning to rival traditional publishing.

#### **1.1.4 Digital Library**

Digital library (DL) is a recent term used to refer to information systems (IS) and services that provide electronic documents—text, file, digital sound, digital video—available in dynamic or archival repositories. It is advanced version of electronic library, which provides services such as online index, full text searching and retrieval facilities, automated record keeping, via computers with information stored in CD, DVD, hard discs, magnetic tapes etc.

Digital library is a computer-based information system for acquiring, storing, organizing, searching, distributing, and displaying digital materials for end-user's access; not necessarily network-based but designed and constructed so as to be capable of attaching or being attached to a network (Ibid). Digital library stores, disseminates, preserves the information hitherto possible before.

The US Association of Research Libraries (ARL) identified five elements common to all definitions of the digital library in 1995 (Singh & Sonal, 2002:367).

- ) The digital library is not a single entity
- ) The digital library requires technology to link the resources.
- ) Linkages between digital libraries and information services are transparent to users
- ) Universal access to digital libraries is a goal.
- ) Digital library collections are not restricted to document surrogates but include digital artifacts that have no printed equivalent.

Digital Library Federation (DLF), a consortium of libraries and related agencies that are extensively engaged in the use of electronic information technologies to extend their collections and services, has established a working definition that reads as given: 'Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of the digital works so that they are readily and economically available for use by a defined community or a set of communities (Rhyno, 2004:xi).

Lynch and Garcin-Molina (1995) define digital library as a system which provides a community users with coherent access to large organized repository of information and knowledge (Vaidya ,2008:2).

“Digital library” defined by W.Y. Arms “is a managed collection of information associated services where the information is stored in digital format and accessible over the network” (Aryal & Bhatta, 2008:12).

The 'digital library' is a concept...fourth revolution in the history of communication. These have appeared along with many uncertainties and possibilities. The biggest uncertainty being the future of 'have nots' within, between and among the advanced and less developed countries, regarding providing access to digitized/networked

information...fluid nature of digitized information... copy right, security, and privacy are the issues which need immediate attention (Malwad, 1996)

With the advent of the multimedia era, the needs of electronic imaging are growing rapidly. In addition to traditional text-based information, digital libraries are adding up visual data, such as photographs, videos, motion pictures, maps, manuscripts, satellite pictures, and other special form of data (Ibid:51).

Digital library maintains all, or a substantial part of its collection in computer-process able form as an alternative to supplement or complement the conventional printed materials that currently dominates the library collections. Another prevalent distributed databases, most often in full text and multimedia, accessible online on computer networks. A unit of a digital library is a 'digital object' or information object which may be textual, audio, video, image, numeric, computer programmes or multimedia composites of such components for example: books, magazines videos, newspapers, satellite and spatial data(digital image), scientific, data sets, electronic journals, digital encyclopedias, dictionaries, and textual data bases etc One reason for using digital library technology is to manage large amounts of digital content such as millions of lines of textual material, thousands of images or hundreds of audio clips. Advances in storage technologies have enabled large amounts of contents to be made available locally at increasingly affordable costs. While discussions previously centered on megabytes (MB) of data, now it is not unusual to consider gigabytes (GB) and even terabytes (TB) of storage (Ravi, 2000).

Digital library system is composed of a family of automated systems that together provide a comprehensive capability to manage the digital content of an enterprise. It is useful to divide the capabilities of digital library systems into the following areas— Capture or creation of content, indexing and cataloguing (metadata), storage, search and query, asset and property rights protection, retrieval and distribution. Digital libraries are the networked collections of digital text, documents, images, sounds, scientific data, and software that are the core of today's Internet and tomorrow's universally accessible digital repositories of all human knowledge, defined by the US President's Information Technology Advisory committee report entitled "Digital libraries: Universal access to human knowledge (Chen, 2008:33).

Digital library is both a physical and virtual space in digital environment (Marcum, 2003).

Digital libraries are being implemented by people who work within conventional libraries, but also by people who do not consider themselves librarians or publishers. The real story of digital libraries is the interplay of people, organizations i.e. content and technology

### **1.1.5 Why digital libraries**

The fundamental reason for building digital libraries is a belief that they will provide better delivery of information than was possible in the past. Traditional libraries are a fundamental part of society, but they are not perfect. Can we do better? Enthusiasts for digital libraries point out that computers and networks have already changed the ways in which people communicate with each other by which a scholar or user is better served by sitting at a personal computer connected to a communication network than by making a visit to a library. Here are some of the potential benefits of digital libraries (Ali 2005:63).

- ) The digital library brings the library to the user
- ) Computer power (artificial intelligence) is used for searching and browsing
- ) Information can be shared (i.e. information by placing on a network makes available to everybody)
- ) The information is always available
- ) New forms of information become possible and digital library reduces cost

The doors of the digital library never close. A study at a British University found that about half the use of a library's digital collection was at hours when the library buildings were closed. Materials are never checked out to other readers, miss shelved, or stolen; they are never in an off-campus warehouse. The scope of the collections expands beyond the walls of the library. Private papers in an office or in a library on the other side of the world are as easy to use as materials in the local library.

Recently the digital library opened by the European Union is shut down after an hour it is unveiled. Its software could not respond the ten millions hits, more than double of the expected, in an hour demanding maps, documents and information (BBC World service, 2008)



### **1.1.6 Bases for digital library**

Digital technologies are making inroads into the system of education all over the world bringing information and education closer and closer day by day. As a result, more and more educational institutions are being transformed into virtual campuses.

The bases for a digital library are:

- ) Technical developments
- ) Electronic storage is becoming cheaper than paper
- ) Personal computer displays are becoming more pleasant to use
- ) High-speed networks are becoming widespread
- ) Computers have become portable

Digital libraries are emerging as substitute to the traditional libraries with enhanced facilities at a lower cost. Once developed and connected, the digital libraries will supercede all the traditional libraries of today reducing them to merely the museum of books. It is going to be happened within a short span of time since their vast capacity of accommodating resources, speed of information retrieval and accuracy in operations they offer is unparallel to the existing type of libraries (Ali, 2003).

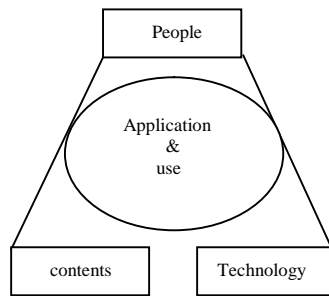
### **1.1.7 Content**

Simply, the collection of library material for dissemination of information or knowledge is referred as the content that is housed in or served through library.

Library collection, in other words library content is the chief element to be a library. No content no library.

The subject matter of a book, speech, program, etc. and the information or other material contained on a website or CD-ROM (Hornby, 2005:329).

With exciting convergence of content, technology and global collaboration, it has become clear that while technology is of vital significance, it is only a tool, content has been considered to be just as important as technology; if not more. In other words, with all the rich information resources in the world, if they are not digitally available, they will not be able to be accessed, retrieved, shared, and enriched on the web for end users.



*fig.: Relationship among content, technology and people in digital library environment*

It is inevitable that professional judgment will inform the evaluation process, but this should be balanced with measures derived from objective data. Collection centered measures will include size, rate of growth, the quality of the collection when compared with agreed external standards, and citation analysis. User study will help to gauge the utility of the collection. In order to derive quantitative as well as qualitative data it will be necessary to focus not only on user opinion but also on more specific measures such as stock availability and accessibility (Feather, 1997:62). Contents or the information resource in other words knowledge resource as most of the commentators regard the following as constituting information resources in organization or library is available in data, records, text, multimedia (i.e. together with sound, graphics, pictures, and video chips exist in single ‘document’ in digital form) for example Microsoft’s Encarta Encyclopedia.

In the digital environment, most libraries provide digitized and purchased resources such as through PERI/INASP, Blackwell Synergy, EBSCO Host, Medline, MEDLARS, CINAHL, HINARI, etc. Some libraries have their own digital collections such as theses and dissertations, scanned and digitized images, text etc. in electronic discs.

### **1.1.8 Technological Competence**

Technology, to be specific, information technology is the electronic technology for collecting, storing, processing and communicating information (Feather, 1997:220).

Information technology embraces computers, telecommunications and software systems that aid the organization, transmission, storage and utilization of what might better be called the knowledge resources (Ibid:191).

To these information resources (i.e. data, record, text, multimedia etc.) we may add expert systems and other manifestations of developments in artificial intelligence, such as the learning systems created through neural-net technology (Ibid).

‘Competence is the ability or skill to do something well...it is a skill that you need in a particular job or for a particular task’ i.e. in technical sense. If a person is competent she has enough skill or knowledge to do something well or to the necessary standard or has good standard but not very good (Hornby, 2005:307).

Competence is the underlying ability or knowledge or skill to perform certain tasks. The system of rules which the users...have mastered so that they are able to produce, understand...operate...and solve problem or perform certain operations strategically (Crystal, 2003:87).

Technological competence, in library means the ability to use various electronic, digital devices such as various software, hardware, etc. to perform the major functions (i.e. collection, management, dissemination, and preservation/storage) of library materials.

The librarian in digital environment is really passing hard times. If not all, many staff are facing different problems in various modern technical devices such as Audiovisual, computer, Network, Printer, Scanner, Storage devices, Software etc. due to lack of technological competence. They lack technological competence because they are either technically illiterate, or do not get pre- and/or in-service refresher course/training when the technology leaps ahead leaving human behind.

### **1.1.9 Digital libraries in Nepal**

Digital libraries are in nascent stage in Nepal as opposed to traditional libraries. Most libraries in Nepal are hybrid libraries which are traditional in essence also provide information/service via computers by using online or subscribed databases and digitized contents. In the networked information society libraries are desperately aiming to provide global information in accordance with the users demand.

In result few libraries are successful in being well equipped with technology, skill and fund. In these libraries, the digitized images are preserved and provided service to the users on request inside the library either by microfilm reader or by computer databases. The process for providing information on internet is going on to make accessible to the local and global user simultaneously (Vaidya, 2008:2). No exact data is available for the first digital library of Nepal. However NAST (Nepal Academy of Science and Technology) can be regarded as the first instance of the use of internet technology in Nepal. The credit of introducing Internet amongst Nepalese people however goes to the private sector. It was with the initiative of Mercantile Office Systems commercial e-mail service was first provided in June 1994. Mercantile first established connection to Singapore via a 64 kbps leased line through Nepal Telecommunications Corporation (NTC)

#### **1.1.10 Need of digital library in Nepal**

Geographically Nepal is a mountainous country. It has long history of civilization. The oriental philosophy and heritage are preserved in documents but due to its geography resource sharing is usually difficult within country and with the external world. The urgent need of digital library system in Nepal can be advocated to:

Enhance better library / information services

Fulfill the increasing resource gap / divide

Face the problem of continuing and raising difficulties in education

Increase productive efficiency in every sector such as in economical, political, research and developmental, health and daily life.

Enable education for all by 2015 A.D.

Preserve historical documents, resources, heritages etc.

#### **1.2 Statement of Problem:**

Library, be it traditional or digital, aims at providing right information (content) in right time—now possible with the aid of technology. The right information in the right time, through digital library, is the most staggered one. Traditional libraries are being inefficient to cope-up with the pressure of increasing number and the limited time of the information users. Traditional libraries could not cover varied informational resources which are regularly updated such as geographical, scientific, economical etc. information. Forms and formats of information is being born digitally

which made digital libraries efficient to reduce the spatial, economical, time gap between the information producer and end user. Moreover, relevance and precision are the important factors in disseminating information which can not be met by the traditional libraries. Traditional libraries can not protect the deterioration of valuable informational material which is frustratingly growing in rapid speed. Traditional libraries are outdated. They are needed to be changed into modern digital library because most of the activities are closely linked to digital / electronic media. It means the incompatibility of traditional libraries in various spheres of daily life i.e. in academic environment and communication system. Inter-lending, resource sharing activities are rather very slow with the use of traditional library system where as digital library completes the complex tasks within short span of time.

### **1.3 Objectives of the Study**

The objectives of the study are

- ) To evaluate the relevance of the content digitally served to the users.
- ) To find out whether the targeted users' needs are adequately quenched or not
- ) To find out the competence of the librarian to handle the modern technological devices and their operations in digital library environment.
- ) To find out the main factors for digital library to be lagged behind
- ) To compare and contrast the scenario of digital content and technological competence of selected libraries.
- ) To provide recommendations, based upon findings, to improve the situation of content and technological competence for the digital library system

### **1.4 Hypothesis of the study**

The issues mentioned below are the hypothesis of the research

- ) The digital contents being served to the targeted users are relevant to their need and purpose.
- ) Most of the digital libraries hire experts because the librarians can not do all the jobs related to the library even when they encounter a specific problem or the librarians themselves are competent at.
- ) Monetary deficit is the main hindrance in the development of digital library or other factors.

### **1.5 Limitations of the study**

The study has two parts. One is on the relevance of digital content housed in or served through a digital library to users and another is on the competence of the librarians to operate technological infrastructure used in their respective digital library. This study has covered only the selected libraries. The selected subject libraries for the evaluation of digital contents are:

1. British Council Learning Centre Library (BCLCL)
2. International Center for Integrated Mountain Development Library (ICIMODL)
3. Mountain Forum Secretariat Library (MFSL)
4. Tribhuvan University Central Library (TUCL)

To measure the technological competence of the librarian i.e. digital librarian, including the four mentioned above, the study is limited to the following libraries

5. Kathmandu Medical College Library (KMCL)
6. Madan Puraskar Pustakalaya (MPP)
7. National Judiciary Academy Library (NJAL)
8. Social Science Baha Library (SSBL)

The study is concerned with only the digital contents housed or served through the library to the users and skill of the librarian to operate technological devices for the functions of library. The study could be limited with only four libraries for the both concerns according to the law of impartiality. The sample size for evaluation of relevance of digital contents is good enough from four libraries where as for the study on technological competence it would be pretty small so to make the sample size bigger other four libraries, including those used for evaluation of digital contents, are purposively selected. The study has covered the period from June 2008 to August 2008.

### **1.6 Significance of the Study**

The digital library is emerging as an organization that extends the breadth. The scale of scholarly and cultural; evidences and supports innovative research and life-long learning...books, journals, paper-based archives, video, film, and sound recordings are visible in the digital environment as are online.

Most of the library user love to navigate information in digital environment. This study will be a momentous to all the stakeholders (service providers, parent

organization and users) to improve their status-quo. The entire field will get insight in quenching the targeted users through abundant digital contents and well-skilled librarian. Moreover, this burning and towering field is poorly treated. In order to widen the scope of digital library environment this study will be a milestone.

### **1.7 Definition of Terms**

**Automated library:** Automation of library functions, computerized catalogue, circulation, acquisition etc. holding mostly in print form, a few electronic resources are housed. (Sometimes called hybrid library)

**Competence:** The ability or knowledge to do something well...it is the skill that you need in a particular job.

**Conspectus:** A tool to enable libraries to describe their existing collection strengths and current collecting interests. It was conceived in 1979 in North America.

**Content:** The informational resource housed in or served through a digital library; i.e. digital library collection.

**Database:** Any systematically ordered collection of information, usually stored on computer files or on CD ROM. Data is generally structured so that it can be sought and retrieved automatically.

**Digital librarian:** The librarian / human resource who is providing all or any of library functions using information technology or digital library environment.

**Digital library:** Digital library is a computer based information system for acquiring, storing, organizing, searching distributing, and displaying digital materials for end-users access, not necessarily network-based. It is fully automated, all resources in digital form, high speed optical fiber LAN and access over WAN.

**Digitization:** The process of converting analogue information to a digital format.

**Electronic library:** A library which has fully automated functions, CD-ROM, networking, resources in electronic and conventional form.

**Information technology:** Electronic technologies for collecting, storing, processing and communicating information

**Information:** the organized and processed data which conveys significant or specific meaning about something.

**Library automation:** Use of computer based systems in libraries both for accessing information and for library management.

**Library:** A library is a collection of information in different forms printed, non-printed, published, unpublished materials, including audiovisual. The collected materials are catalogued and arranged to ease users for document / information search.

**Traditional Library:** the library which houses only physical and printed documents and its functions are concerned only with that type of material.

**User:** The consumer / navigator of information.

**Virtual library:** Library without walls provides access to resources. Library without resources—documents are not stored in any one location. They can be accessed and delivered from any work station. Library with little or no physical presence of books, periodicals, reading space, supporting staff but one that disseminates selective information directly to distributed library customers, usually electronically. It is an aggregate of libraries and electronic information resources because which are accessible electronically through personal computers; the focus of the virtual library being the individual users or their work stations.

### **1.8 Organization of the Study**

The research has followed the format set by the department. First chapter deals with the introduction of study, under which background of the study, statement of problem, objectives of the study, hypothesis, limitation of the study, significance of the study, definitions of terms and organization of study are incorporated.

The second chapter deals with literature review.

The third chapter, focus of study, is mainly devoted for understanding of the subject where the study is specifically and minutely presented on the aspects of digital library.

Under this chapter various digital libraries are focused.

Research methodology, research design population, sampling, procedure, data collection procedure and data analysis procedure are discussed in the fourth chapter.

Fifth chapter presents analyzed data, their presentation and interpretation to evaluate either the set objectives or hypotheses are positively met or not.

Sixth, the final, chapter deals with summaries, conclusions and recommendations.



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## CHAPTER 2

### REVIEW OF LITERATURE

Most researches in this field rely heavily on the Internet for current information, but some people are very conscious of the strengths of conventional publication. Innovations and current research are widely reported in articles, papers, thesis (published or unpublished), journals, magazines and paper presented at conferences. Related literature was reviewed in increasing-intention-order.

Research activities related to content have proliferated in the areas of digital collection creation, development, organization, standard, interoperability, scalability, and many others... No institution can provide everything, thus global collaboration in digital collection development becomes essential (Chen, 2008:33).

Libraries, the reservoirs of contents for data, information, and knowledge are supposed to serve the users in minimum delay universally. This is possible only through digital library. Many research activities were carried out on digital library. Through digital library the literature for research is growing faster. With the cutting-edge technology are various possibilities can be harvested in the field of digital library in developed world but in developing world, similar to digital divide, the research and development of digital library is in nascent stage. It means the literature is virtually unavailable.

Many research papers and thesis were written on library automation but on digital library it is the first research. No exact and systematic data on digital libraries, at least, which provide partial service in digital environment; is available. Very few papers were presented in Information and Knowledge Management (ICKM) held in Kathmandu from March 27<sup>th</sup> – 29<sup>th</sup>, 2008. The research on digital library, in Nepal is virtually untouched where as its development is being practiced as time forces.

Aryal and Bhatta (2008) have discussed various challenges to establish digital library in academic institutions of Nepal they have explained how to switch traditional library into hybrid library and ultimately into complete digital library.

Baidya (2008) has discussed various digital libraries in Nepal.

Bhandary (2008) has discussed how millennium development goals can be achieved with the help of free flow of digital content when traditional paper, physical documents are digitized.

Chen (2008) has proved in her paper how digital libraries are as instant knowledge bases in which technology help to collaborate and access content all over the world through her experience of global memory net; which was a collaborative effort with UNESCO World Heritage Project.

Das (2008) has provided a good lesson in her paper to build digital repository by using GSDL software.

Dhungana (2008) has discussed how modern information technology, i.e. digital library can help in managing conventional knowledge management. He urged to use our knowledge, technology, mechanism to move further in conventional content digitization and sharing through digital library system throughout the world.

Dulal (2008) has given a different fact in his paper that most academics/researchers use digital library environment; specifically WWW, e-journal, e-books, full text etc. as an extra resource. He quotes Carol Casey's and Shalini Urs's findings that creation of small focused indexes and metadata respectively can be the best solution for accessing specific type of digital information for maximum use by the end-users, as well as by cataloguers, scientists and so on.

Jain (2008) has discussed various challenges and opportunities in knowledge management in digital library such as objective, advantages, and barriers in implanting digital library. She has also presented a list of digital libraries of India.

Jawale (2008) has discussed how ICT i.e. digital environment help libraries in reducing costs, labour, time for acquisition, classification, and cataloguing, periodical management system, reference (CAS/SDI) service, resource sharing, storage, preservation, maintenance and open access publishing.

Pokharel (2008) in her paper digital libraries and society has discussed how digital library can contribute to society, socialization, and societal practices, services, and mechanism along with the need of digital library in society. She has also presented the stage, various barriers, challenges, and digital library and its necessity for sustainable development.

Singh (2008) has provided information of Indian initiatives in digital libraries by providing a list of 17 digital libraries and also discussed issues of digitization, its policy, content selection criteria, and preservation issues.

Smecher (2008) has explored how new technology and editorial process evolved in contributing online journal publication, which is possible through open source, contribute digital library by providing free (in fee and philosophical goals of library

i.e. freedom of information) for example content (online journals) via INASP, IBICT, PKP.

Yadab (2008) has discussed initiatives and problems of digital library of Nepal Health Research Council

Mbambo-Thata(ed.) (2007) have presented the situation of library's digitization and information literacy skills and digital collections in Zimbabwe. They have identified information literacy enhances the skills of technological operation in the digital environment.

Maharana et al. (2004) have found that information technology has made access to information easier, in the sense that all digital information such as data bases, full text journals etc. can be accessed through computers on the networks both at work and from home.... Libraries should develop local Area Network content creation through digitization, software/ hardware procurement.

Gupta (2003) wrote in his research article that with the use of computers over the past few years for accessing the digital information, the challenges have been raised for data preservation and access to users'.

Marcum (2003) has provided findings of research questions for the digital era library. How the expectations and demands of library users forced libraries to reassess their role in digital age. This article examines three essential issues i.e. the digital resources, their preservation and training or education needed for operating the library in digital environment. The researcher found that in the digital world, libraries and librarians do not—cannot work in isolation. The nature of digital information is such that both its creators and publishers along with technologists must join librarians in organizing its preservation. Approaches to recruiting skilled persons, education and providing on going training are important.

Gupta (2002) has emphasized on the strengths and weaknesses of digitization in an archival environment, explored the advantages and disadvantages of mounting digital archival materials on the World Wide Web and also explored some of the many issues involved in selecting and developing a digital archival collection.

Karki (2002) has stressed the urgent need of e-mail, internet, WAN, MAN, and standard library software to create electronic databases in various libraries to share content amongst them. He also suggests imparting technological education for the modern library practitioners by various education and training providing institutions.

Singh and Singh (2002) have discussed various characteristics, challenges and forms of digital library which is gaining foremost popularity among users is the easiest way to provide users with right content even through WWW in the digital environment.

Berry (1996) has discussed several digital library projects in the United States and abroad those are in progress with the goal of developing the enabling technologies for creating a single, integrated and universal library, composed of the large numbers of individual heterogeneous repositories. He has also discussed about the emerging world of networked digital information, increased intellectual access and participation interactivity, intellectual property and authorship in digital age. Various digital library initiatives are also explained. He has provided with various issues and possibilities and technological infrastructure e.g. satellite and fiber optic for content sharing a global digital library.

Goetz (200\_) has found that digital environment can impact on all parties involved in the information chain: authors, editors, publishers, agents, library users. Value is given to published information through new and sophisticated editorial techniques using digital techniques using digital technologies, and librarians, who manage the cost effective use of published information to the benefit of their patrons, remains critical to the effective use of research output. How legislative, licensing and publisher issues can be met are also discussed.

Developed countries are rich in digital content compared to developing countries for example US medical library subscribed to about 500 journals where as Nairobi (the epicenter of east Africa) Medical School Library received only 20 journals in 1998 (Pokhrel, 2008:81). Likewise another example from OJS (Open Journal system), 'as OJS is an open source project, it is difficult to accurately gauge the number of journals making use of it; however, the number of known journal is growing rapidly (OJS Journals by continent as of February 2008 after M J Suhonos) is given i.e. Asia 58, Europe 328, Africa 258, Australia and Oceania 47, North America 434, South America 336 (Smecher, 2008:361).

The number of people accessing digital collections through the WWW also shows explosive rates of growth the digital library is emerging as an organization that extends the breadth and scale of scholarly and cultural; evidences and supports innovative research and life-long learning...Books journals, Paper-based archives, video, film, and sound recordings are visible in the digital environment as are online.

Catalogue finding aids, abstract and indexing services, e-journal and e-print services, digitized collections, geographic information system (GIS), internet resources and other electronic holdings (Singh & Sonal, 2002)

Collection evaluation should be an intrinsic part of collection management but it can be a complex and expensive process. Collections are evaluated in order to find out how good they are, in breadth, depth, and scope—in terms of their relevance to the needs of the library's user community. In the course of such an evaluation, collection strengths and weakness will be identified. Opinion varies about how collection evaluation should be carried out. The conspectus method devised in the US by the Research Libraries Group is one that has been adopted or modified for use elsewhere. The method is based on a set of codified descriptions that record existing collection strength and current collecting intensity. However, many have been deterred from using the full conspectus methodology because of the level of detail it requires (Feather 1997:254)

While scoping out contents for digital libraries documents, multimedia and metadata etc should critically be considered. Curators of most digital libraries tend to be concerned primarily with providing access and management for digital material or objects, which are broadly defined as electronic entities made meaningful by computer or some other combination of hardware and software. There are usually two types of objects in digital libraries. One is an object that is surrogate for another object that exists in analog form such as electronic version of rare manuscript. The other type of object exists solely in digital form. Such objects are either born digital. Digital objects such as the objects in physical libraries typically are organized into collections that reflect a common theme or purpose. One of the unique aspects of digital libraries is that these collections are not always defined by possession but rather by access. The user of a digital library often is unaware of what system or sub-system delivers the objects being viewed, and these systems may lie virtually or physically well outside the organizations walls (Rhyno, 2004:1)

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## CHAPTER 3

### FOCUS OF STUDY

In the process of evolution of society information and knowledge has played a crucial role. The information or knowledge content was thought of as a primary ingredient of library, museum and so on. To aid in research, education and development, those contents were accumulated, organized and served to the users. User's time value, the preservation of the information and knowledge materials received importance in the due course. For this libraries used various products of science and technology. The convergence of independent devices of information communication technology has made the accessibility of information easier and equally timelier. The information and knowledge contents with the help of modern ICTs in the digital environment are gaining foremost importance. The collection in digital library environment is based in two ways. One is born digital contents (text, images, and graphics) and another is digitized contents. The importance of content can be argued with this expression— no content no library.

The digital content associated technologies led the libraries to advance their role as a digital librarian. So the digital librarian who worked or is supposed to work should have a good level of technological competence for the operability of the devices. This research has focused the digital contents and technological competence of librarian in the subject libraries.

The libraries which provide library service in digital environment are focused for this research. Among them the focused digital libraries are:

Sn.	Digital libraries focused for digital content	Digital libraries focused for technological competence
1	British Council Learning Center Library (BCLCL)	British Council Learning Center Library (BCLCL)
2	International Center for Integrated Mountain Development Library (ICIMODL)	International Center for Integrated Mountain Development Library (ICIMODL)
3	Mountain Forum Secretariat Library (MFSL)	Kathmandu Medical College Library (KMCL)
4	Tribhuvan University Central Library(TUCL)	Madan Puraskar Pustakalaya (MPP)
5	–	Mountain Forum Secretariat Library (MFSL)
6	–	National Judicial Academy Library (NJAL)
7	–	Tribhuvan University Central Library (TUCL)
8	–	Social Science Baha Library (SSBL)

### **3.1 Content and technology in digital library**

Digital libraries are organizations that provide the resources including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works, so that they are readily and economically available for use by a defined community or set of computers. In reality digital libraries will not be a single, complete digital system that allows users to promptly access all information, for all disciplines, from any where around the world. Instead, they will most likely be a collegian of disparate resources and disparate systems, catering to specific communities and user groups, created for specific purposes. They will also include perhaps indefinitely, paper-based collections. A fully developed digital library environment involves the following elements:

- A. Digital documents.
- B. The extraction or creation of metadata or indexing information describing the content to facilitate searching as well as administrative and structural metadata to assist in object viewing, management and preservation.
- C. Storage of digital content/ metadata in an appropriate multimedia repository.
- D. Client services for the browser, including repository querying and workflow.
- E. Content delivery via file transfer or streaming media.
- F. User access through a browser or dedicated client and
- G. A private or public computer network

Building digital library begins with creating digital content and collections. Content selection and acquisition is the state in which the created object is incorporated physically or virtually in the archive. The object must be known to the archive administration. There are two main aspects to the selection and acquisition of digital objects—content selection policies and acquisition procedures. Content selection policy is affected by the type, size and format of the digital content selected for a DL which dictates the need for the technological requirements of the hardware/software and IT capabilities for the future. There should be compatible software for accessing electronic resources even by converting the format i.e. from text to HTML or PDF. Other considerations are how the users will use DL, the access t electronic resources either through license considerations or other, number of users and speed of internet, capacity of the computer, professional and technological competence of the librarian. (Pradhan,2004:100)

### **3.2 British Council Learning Center Library (BCLC)**

British Council Learning Center (BCLCL) was established in 2008. Services:

The learning center is for all professional teachers. It also serves students and examination candidates registered at the British Council. It has links to useful websites for example to British Council, English language teaching and learning, Education UK, Examination, UK general etc.

#### **3.2.1 Objective:**

To provide a wide range of reference materials on education and English language learning and teaching as well as source materials on the UK.

#### **3.2.2 Digital library environment:**

**Contents:** It has predominantly e-resources. The collection consists of English language learning and teaching resources, IELTS preparation materials, E-brary (online books)—More than 9000 titles from more than 300 leading publishers, online databases (journals, newspapers, reference works), Encyclopaedia Britannica, dictionary, student encyclopaedia, multimedia and internet guide which has more than 200,000 links to websites selected, reviewed and updated daily. Infotract: 2 million Full-Text articles from 250 management journals. Oxford English Dictionary. Oxford Reference online. Ashridge virtual learning resource center: Full-Text of 200 journals, periodicals, specialized guides for English language teachers/learners. And a rich collection of CDs, DVDs, digital movie, film etc. is available.

**Technological aspect:** It has 28 laptop computers wireless connected for WAN with an ISP. Two librarians provide service to the digital library users.

### **3.3 International Center for Integrated Mountain Development Library (ICIMODL)**

International Center for Integrated Mountain Development Library (ICIMODL) located in Khumaltar was founded in 1983. It is an independent regional knowledge, learning and enabling centre serving the eight regional member countries of Hindu Kush-Himalayas—Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan— and the global mountain community.

### **3.3.1 Objectives:**

To promote the development of an economically and environmentally sound mountain ecosystem.

) To improve the living standards of mountain populations.

### **3.3.2 Digital library environment:**

**Contents:** It has rich collections of information in CDs, DVDs and in its web. It has been subscribing various electronic journals e.g. journals, databases available via INASP/PERI. It has one of the best collections of books, journals reports, statistical reports and grey literature (scanned) relating to various aspects of mountain development. Libraries bibliographic, Current Content services (CCS); Current Awareness Services (CAS), and SDI goes a long way towards meeting the needs of researchers and development works region wide. ICIMOD books online ([www.books.icimod.org](http://www.books.icimod.org)), which is available to all, is a new service from ICIMOD. It provides direct access to all technical and scientific publications published by the centre to download or order. It has full text and chapter-wise downloads options (PDF format) for all books published from 2000 onwards and some selected earlier publications (scanned). It has provision of modern library and information services and development of linkages / networking for resource sharing. As of Nov. 2007 nearly five hundred publications have been posted online via the web.

**Technological aspect:** It has three computers in the technical section for uploading and/or downloading the digital contents. Four computers (networked) for user's service. Wireless connection for WAN with an ISP. Three librarians provide service to the digital library users. Its website is [www.icimod.org](http://www.icimod.org)

### **3.4 Kathmandu Medical College Library (KMCL)**

Kathmandu medical college was established in 1997. From the very beginning of the establishment it had its own library. The library was started with few collections but now more than 8000 collection of books related to the medical fields are available in the library. Due to its specialization this is a special library. It consists of two libraries—one for the basic sciences which is situated in Duwakot, Bhaktapur and another for clinical sciences which is situated in Sinamangal, Kathmandu.

### **3.4.1 Objective:**

) To assist the medical students, doctors, staff, and others.

### **3.4.2 Digital library environment:**

**Contents:** A rich collection of information on medical practices, theories, texts, references, trainings, and research papers articles in CD/DVD and other discs, some of them are: digital films, videos. HINARI, AGORA, CHINAHL from INASP/PERI, Oxford journals, Blackwell synergy, Emerald, IOP (Institute of Physics) publication. Oari, Ebsco Host.

**Technological aspect:** Computers are available in the library for catalogue search and online or offline search which are networked for students, faculties, and staff. Wireless connection for WAN with an ISP. Fourteen librarians provide service to the digital library users. Its website is [www.kmc.edu.np](http://www.kmc.edu.np).

### **3.5 Madan Puraskar Pustakalaya (MPP)**

Madan Puraskar Pustakalaya (MPP) was started with the personal collection of Kamal Mani Dixit on Nepali literature. It has housed historical documents, manuscripts, endangered documents of archaeological importance, old books, newspapers, articles etc. It is now building digital library by developing various digital software (program). Massive digitization of old and endangered knowledge resource is going on. It is, as the library advocates, the biggest and best library for digitization (more than 7000 ancient photos are already digitized) in terms of technology and librarians. The library in the form of museum has now provided various digital content online via digital mpp project.

#### **3.5.1 Objectives:**

- ) To promote Nepali language and literature.
- ) To preserve endangered knowledge resources.
- ) To make accessible for the knowledge resources to the users (especially researchers).

#### **3.5.2 Digital library environment:**

**Contents:** Normally it focuses in digitizing the contents which are of archaeological importance. It has recorded them in various electronic discs and own web, which are made searchable by using keywords etc. Full text (around 300 titles means 300,000 pages of monographs) and full image (photograph more

than 700) are predominantly focused over online journals, and books. Ideally it helps and shares digital library experience to other libraries e.g. it has collaboration with Nepal press council library and establishing relationship with other libraries such as Social Science Baha etc. It has rich collection of digitized and digital contents in CDs, DVDs and other electronic discs.

**Technological aspect:** The computers in the technical section for uploading and downloading contents as server are networked to the users. Now it has been using MARC 21 for bibliographical record and self developed software for text and images / graphics. It has ADSL connection for WAN with an ISP. Eighteen librarians provide service to the digital library users. Its website is [www.mpp.org.np](http://www.mpp.org.np)

### **3.6 Mountain Forum Secretariat Library (MFSL)**

Mountain Forum Secretariat Library (MFSL), located in ICIMOD premises Khumaltar has a rich collection of database, CDs, and online library in its web.

#### **3.6.1 Objectives:**

- ) To promote sustainable mountain development at the local, national, regional and global level
- ) To address the variety of issues—poverty, health, tourism, environment, economic opportunities, transboundary projects and mountaineering etc.

#### **3.6.2 Digital library environment:**

**Contents:** MFSL has online library including full text documents, articles, bibliographic references, periodicals, and reference materials. Bulletin published bi-annually. Database of membership (458 institutional member from 71 countries, and 4071 individual members from 121 countries), related to mountains, metrology, hydrology, tourism, discussion lists on regional and thematic issues and its resolution. CDs, DVDs digital films, videos etc

**Technological aspect:** It has a one computer in the technical section for server to upload and download the digital contents wireless connection for WAN with an ISP. Users get networked environment of computers for information use and navigation. Its website is [www.mtnforum.org](http://www.mtnforum.org).

### **3.7 National Judicial Academy Library (NJAL)**

National Judicial Academy Library (NJAL) in the supreme court premises, a member of International Organization for Judicial Training was established in 2004 to serve training and research needs of the focus groups i.e. judges, government attorneys, government officers, private law practitioners who are directly involved in the administration of justice in Nepal. Its services are training, promotion and coordination of research and dissemination of information and advancement of judicial systems.

#### **3.7.1 Objectives:**

- ) To conduct training, conferences, workshops, seminars, symposium, interaction program for enhancement of knowledge and professional skill of focus groups listed above.
- ) To undertake research in the field of law and justice and to make available legal literature of scholarly and practical significance to them who are involved in judicial administration.

#### **3.7.2 Digital library environment:**

**Contents:** A rich collection of information on judicial conferences, workshops, trainings, and research papers articles in CD/DVD and other discs, some of them are gender justice, trafficking in women, current status of the directives issued by the supreme court, digital films, videos. HINARI, AGORA, CHINAHL from INASP/PERI, Oxford journals, Blackwell synergy, Emerald, IOP (institute of physics) publication. Oari, Ebsco Host.

**Technological aspect:** Two computers in the technical section and other computers are networked to researchers, users. Wireless connection for WAN with an ISP. Its website is [www.njanepal.gov.np](http://www.njanepal.gov.np).

### **3.8 Tribhuvan University Central Library (TUCL)**

Tribhuvan University Central Library (TUCL) was founded in 1959. The library is a trinity of users (student, teacher), library authority and university management. This is the largest library of nation in terms of collection (3,30,000 physical documents, national agency of INASP/PERI and NepJol), users (nearly 13000/year), and staff (92). Collection development, technical processing, reference service, electronic and digital services, preservation and



conservation of manuscripts and rare materials, user orientation, workshops, exhibitions, library training etc. are some of the activities of TUCL. Recently, on March 3, 2008, TUCL has signed an MOU with library, University of Miyazaki, Japan. TUCL is the national coordinating agency of International Network for the Availability of Scientific Publication (INASP) to implement their Program for Enhancement of Research Information (PERI) in Nepal since 2003. The library is also the national agency for issuing International Standard Book Number (ISBN) and has issued more than 13,500 books. TUCL is the chief library to receive overwhelming amount of collections, helps, gifts, which is also equally true with digital library environment i.e. digital contents, technologies etc. for example digital form of theses since 2006. For building digital library it has used Green Stone Digital Library (GSDL) software since 2008. It has been carrying various functions in the areas of collection development and organization, Creation and maintenance of computerized bibliographic databases, development of network for resource sharing, participation in various, seminars, workshops, library user education, and books display.

### **3.8.1 Objectives:**

- ) To support research and teaching learning of the university.
- ) To provide library and information functions (both conventional and digital format and furnish an environment of advanced study & research.
- ) To encourage membership and promote information literacy, readership and life long learning.
- ) To promote professional expertise in information management and conduct trainings in librarianship

### **3.8.2 Digital library environment:**

**Contents:** Various services such as CD-ROM (copy), Email/Internet, INASP/PERI program, online/offline full text database, scanning, website database are being rendered. Offline database consists of full text of publications of international monetary fund (IMF), UNESCO, World Bank (WB) etc. and master and PhD theses. Online full text databases consists of HINARI, India Economic Journal, Publications of Asian Development Bank (ADB), the international development magazine, UK; Technologia (technologies for the

advancement) International Journal, knowledge and learning. After the lunch of INASP/PERI in Nepal TUCL as a national coordinator agency, has provided membership formally for more than 200 academic/research institutions. This program has been providing full text databases of more than 25,000 full scientific electronic journals, and 90,000 abstracts. The library has 57,111 records of different subjects on this database. It has housed some of the world known databases such as Wiley inter-science, Ebsco Host, Springer Link, HINARI, AGORA, OARE. Another important program is Nepali Journal Online (NepJol). Its objective is to make accessible the Nepali scientific journals world wide through web. The Danish Government has helped for PERI with £25,000 grant each year (Chouhan, 2008:19)

**Technological aspect:** Computerized catalogue since 1995 and Internet facility to search for information on the web since 1997 have been served. Information literacy unit (ILU) was established in 2002. It has 2 computers for technological operations and 6 computers networked for users moreover booths are available for user's personal laptop. Wireless connection for WAN with an ISP in ILU. In addition it has various terminals to search for catalogue. It has been using GSDL for full text and graphics, OJS for online journals and CDS/ISIS software for bibliographical record. Its website is [www.tucl.org.np](http://www.tucl.org.np)

### **3.9 Social Science Baha Library (SSBL)**

Social Science Baha Library (SSBL) located in Gausala was established in 2002. It is a special kind of social library. It has only reference services. CAS, SDI, online search, CD burning, interlibrary loan etc. are also served. SSBL has been carrying the functions of development and organization of collection, creation and maintenance of computerized bibliographic databases, development of network for resource sharing and participation in various, seminars, workshops. (Aryal, 2007: 36)

#### **3.9.1 Objectives:**

- ) To provide information, knowledge materials documents to social science researchers, students.
- ) To help to research in various social issues, etc.

### **3.9.2 Digital library environment:**

**Contents:** It has digital and non-digital materials. It has various online resources (journals, databases) in full text, abstract etc. some of them are—Jstor (729 journals in 48 subjects), Blackwell synergy (882161 full text articles of 874 journals), EbscoHost (8 databases of academic business ERIC, Health etc), Emerald insight (120 database of library science), oxford journals ( more than 180 journals of biology, mathematics, physics, and medical etc.), Cambridge journals (191031 articles of 273 titles), Columbia international affairs online (papers of research, conference proceedings, journals, case studies etc), Delnet etc.

**Technological aspect:** It has 2 computers for uploading/downloading the digital contents. It has been using CDS/ISIS software for bibliographical record. A wireless connection for WAN with an ISP. Six computers are networked for users.

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## CHAPTER 4

### RESEARCH METHODOLOGY

After establishing the universal concept on digital library the researcher selected the libraries that operate library functions in digital environment. Then he collected information on the digital content and capabilities of digital librarian to operate the technological devices of the digital library set up.

#### **4.1 Sources of data:**

The researcher used both the primary and secondary sources of the data.

##### **4.1.1 Primary sources:**

Primary data were collected in the field through survey questionnaire. See appendix 1

##### **4.1.2 Secondary sources:**

The researcher consulted and went through various books on library and information, theses, internet, reports, records, encyclopedias, journals etc

#### **4.2 Population of the study:**

The libraries that provide library and information service in digital environment were the population of the study. In other words the libraries that house digital contents, e-journals, e-books, CDs and internet or digitized contents, images etc. were focused as the population of the research. The study has focused two aspects of digital library. One is on the relevance of the contents digitally served to the users and another is the competence of the librarian to handle the modern technological devices and their operations in digital library environment. For evaluation of relevance of digital contents only four libraries i.e. British Council Learning Center Library (BCLCL), International Center for Integrated Mountain Development Library (ICIMODL), Mountain Forum Secretariat Library (MFSL) and Tribhuvan University Central Library (TUCL) were selected. For technological competence of the librarian only eight libraries i.e. British Council Learning Center Library (BCLC), International Center for Integrated Mountain Development Library (ICIMODL), Kathmandu Medical College Library (KMCL), Madan Puraskar Pustakalaya (MPP), Mountain

Forum Secretariat Library (MFSL), National Judicial Academy Library (NJAL), Tribhuvan University Central Library (TUCL), Social Science Baha Library (SSBL) were purposively selected. In total 86 sets of questionnaire were distributed for three classes. First class had 60 set of questionnaire for users second class had 9 sets of questionnaire for librarians (in library) and third class had 17 sets of questionnaire for librarians who were responsible to handle digital library and all the questionnaire were received with response. To maintain uniformity

Table: 4.2 Population of the study

Sn.	LIBRARY	Total questionnaire distributed			Total questionnaire returned		
		On digital content		On technological competence	On digital content		On technological competence
		User	Library/ian	For digital librarian	User	Library/ian	For digital librarian
1	BCLCL	16	2	2	16	2	2
2	ICIMODL	14	2	2	14	2	2
3	MFSL	12	1	1	12	1	1
4	TUCL	18	4	4	18	4	4
5	KMCL	-	-	2	-	-	2
6	MPP	-	-	3	-	-	3
7	NJAL		-	1	-	-	1
8	SSBL	-	-	2	-	-	2
	Total	60	9	17	60	9	17
	Percent	100	100	100	100	100	100

*Pattern of questionnaire (distributed and received)*

and to ease for sound comparison in user's selection only 10 sets of users' response were selected randomly from each library.

### 4.3 Sampling Procedure:

Four digital libraries were selected for evaluation of relevance of digital contents to users and eight digital libraries were selected for the study of technological competence of the librarian respectively. Sets of questionnaire were prepared to elicit the relevance of contents for the users and the technological abilities of the librarian. The libraries were selected purposively after a pilot study but users in them were randomly selected.

#### **4.4 Tools for data collection:**

##### Questionnaire:

Sets of questionnaire were prepared to elicit the relevance of contents for users and technological competence of the digital librarians. The questionnaire had 3 parts including a cover letter clarifying about the task. Part I was to be filled up with personal information of the respondent. Part II consisted of real questions. Part II '1' consisted of questions to be filled up by the actual users of the digital library on the relevance of contents. Part II '2' had questions to be filled up by the librarians about the contents, their scope and policy to acquire the contents etc. Part II '3' was for the persons who indeed were related to operate the technological devices to build digital library and it had questions to reveal their abilities as a digital librarian.

The questionnaire was prepared on the guidelines of checklist which is based on the-best-of conspectus method.

The set of questionnaire and checklist are given in appendix 1 and 2 respectively.

##### Interview:

The librarians were asked with various questions on the digital library environment and the technological aspects. The interview was recorded and evaluated in the process of analysis.

##### Observation:

The real scenario was observed. Various records of library on users, decisions, and contents, technological status etc. were supervised.

Responses on relevancy of contents and technological capabilities have been organized in a systematic order for analysis such as classifying, coding and editing. Both descriptive and analytical methods have been used for the presentation of collected data and information.

#### **4.5 Process of data collection:**

After piloting the questionnaire to test its reliability, validity and adequacy the researcher modified the items in questionnaire. He distributed and received the questionnaire to the concerned respondents in person visiting the subject libraries. The analysis is based on the responses [(40 users of 4 libraries) 9 librarians who formulate

policy and make decision and 17 librarians who are responsible to operate the digital library set-up from eight different libraries.

#### **4.6 Process of data analysis:**

The analysis is based on the 40 responses of the digital library users along with 9 responses of the librarians for evaluation of relevance of digital contents and 17 responses of the librarians for their level of technological competence. The user's responses are associated and compared with the responses of librarians, records of library to find out the exactness of the digital content. Most important tables are further presented in diagram, pie chart.

#### **4.7 Testing of hypothesis:**

Conclusions are drawn by testing the set hypotheses on the basis of responses. Hypotheses are tested with chi-square ( $X^2$ ) test. The  $X^2$  test describes the magnitude of the discrepancy between theory and observations. It is defined as

$$X^2_{\text{obs}} = \sum_{r=1} \sum_{c=1} (O - E_{rc})^2 / E_{rc}$$

$$\text{Or, } X^2_{\text{obs}} = \sum [(O - E_{rc})^2 / E_{rc}]$$

Where O refers to the observed frequencies and E refers to the expected frequency (Gupta, 1992, p.168)

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## CHAPTER 5

### ANALYSIS PRESENTATION AND INTERPRETATION OF DATA

To analyze the relevance of the digital contents served through the library and the technological competence i.e. the skill to operate the technological devices and various tasks in digital library environment, the response are critically analyzed. Some ice-breaking questions are not analyzed. Important tables are further presented in various tables, charts, graphs and these are interpreted as given.

#### 5.1 Response from digital library users

##### 5.1.1 Purpose of library use

Simply, a question to elicit information for the purpose of using the library was put to the library users. Among the library users 62.5 percent have replied they used library

Table 5.1 Purpose of library use

Sn.	LIBRARY	PURPOSE OF LIBRARY USE			TOTAL
		Research	Academic	Pleasure	
1	BCLCL	-	10	-	10
2	ICIMODL	9	1	-	10
3	MFSL	9	1	-	10
4	TUCL	7	3	-	10
	Total	25	15	0	40
	Percent	62.5	37.5	0	100

Source: Field survey 2008

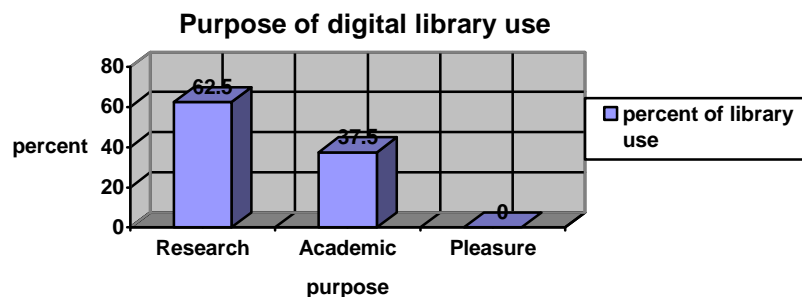


Fig.1

for research purpose, it means for writing thesis and report; 37.5 percent use the library for academic purpose, it means they have used the digital library to write their term paper etc.

### 5.1.2 Nature of digital content

A question was asked to the users about what nature of digital content mostly they wanted for from the digital library Most of the users in each library opted for full-text

Table 5.1.2 Nature of digital content

Sn.	LIBRARY	NATURE OF DIGITAL CONTENT			TOTAL
		Full-text	Abstracts	Bibliographic	
1	BCLCL	3	1	0	4
2	ICIMODL	2	1	1	4
3	MFSL	2	1	1	4
4	TUCL	2	2	2	6
	Total	9	5	4	18
	Percent	50	28	22	100

Source: Field survey 2008

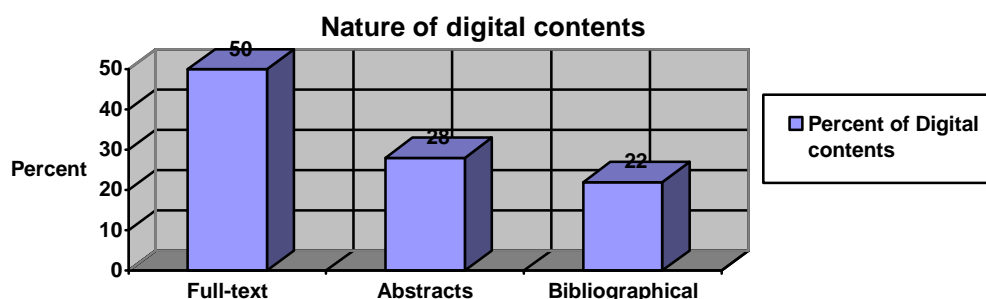


Fig.2

of digital contents. Their response was 50 percent where as 28 percent opted for abstracts and 22 percent opted for bibliographies. Users in all libraries except BCLCL opted for all types of digital contents.

### 5.1.3 Information availability

Users were asked whether they had received information to meet their need and purpose of library visit. The users have responded they always receive the exact information the percent is 62.5; and 32.5 percent have replied they received the exact

Table 5.1.3 Information availability

Sn.	LIBRARY	INFORMATION AVAILABILITY			TOTAL
		Always	Sometimes	No	
1	BCLCL	8	2	-	10
2	ICIMODL	7	3	-	10
3	MFSL	6	4	-	10
4	TUCL	4	4	2	10
	Total	25	13	2	40
	Percent	62.5	32.5	5	100

Source: Field survey 2008

information only sometimes. Only 5 percent of them have responded they have not got the exact information. The reply of the users of TUCL is different, this is because it has targeted for all types of users (see 5.2.2)

#### 5.1.4 Relevance of digital content

The user's evaluation on the relevance of the digital information being served by the library was asked. Their reply shows that among the users for 67.5 percent the

Table 5.1.4 Relevance of digital content

Sn.	LIBRARY	RELEVANCE OF DIGITAL CONTENT		TOTAL
		very good	Not sufficient	
1	BCLCL	8	2	10
2	ICIMODL	7	3	10
3	MFSL	8	2	10
4	TUCL	4	6	10
	Total	27	13	40
	Percent	67.5	32.5	100

Source: Field survey 2008

relevance of the information, served through digital library is very good but 32.5 percent, roughly half of that, have replied though good, the information is not as sufficient and qualitative as it was supposed to be. The relationship between the response and targeted users of library is matched. It means TUCL has targeted for varied users and they all have not got qualitative information as they have searched

for where as the libraries which target specific users, their purpose is met. These libraries are able to provide qualitative information.

### 5.1.5 Scope of digital content

To evaluate the scope of digital content, a question was asked to the users whether the scope of content they received was adequate and varied or not in subject matter and format. The user's reply has revealed that most of the users i.e. 75 percent have found

Table 5.1.5 Scope of digital content

Sn.	LIBRARY	SCOPE OF DIGITAL CONTENT			TOTAL
		Fairly good	Good	Not good	
1	BCLCL	9	1	-	10
2	ICIMODL	7	3	-	10
3	MFSL	8	2	-	10
4	TUCL	6	3	1	10
	Total	30	9	1	40
	Percent	75	22.5	2.5	100

Source: Field survey 2008

the content wide and varied. Just 22 of the respondents have replied the scope is not enough for them where as only 2.5 percent i.e. almost negligible have found the scope of the collection drastically few.

### 5.1.6 Availability of updated contents

A question was asked to users how often they have received updated digital contents.

Table 5.1.6 availability of updated digital content

Sn.	LIBRARY	AVAILABILITY OF UPDATED DIGITAL CONTENT				TOTAL
		Always	Sometimes	Never	No response	
1	BCLCL	-	2	-	8	10
2	ICIMODL	-	1	-	9	10
3	MFSL	-	2	-	8	10
4	TUCL	-	3	-	7	10
	Total	-	8	-	32	40
	Percent	0	20	0	80	100

Source: Field survey 2008

The users' reply is fantastic because 80 percent have replied that they do not know about this. Only 20 percent have replied sometimes contents are updated. Why they are unable to decide—the reason, they have given, is that they have used the digital library for short period of time.

### 5.1.7 Abundance of digital content

A question to elicit the information on abundance of digital contents was asked to the users. They have replied that the digital content available is abundant for 80 percent

Table 5.1.7 Abundance of digital content

Sn.	LIBRARY	ABUNDANCE OF DIGITAL CONTENT			TOTAL
		Abundant	Need to acquire more	Drastically few	
1	BCLCL	9	1	-	10
2	ICIMODL	8	2	-	10
3	MFSL	8	2	-	10
4	TUCL	7	3	-	10
	Total	32	8	-	40
	Percent	80	20	0	100

Source: Field survey 2008

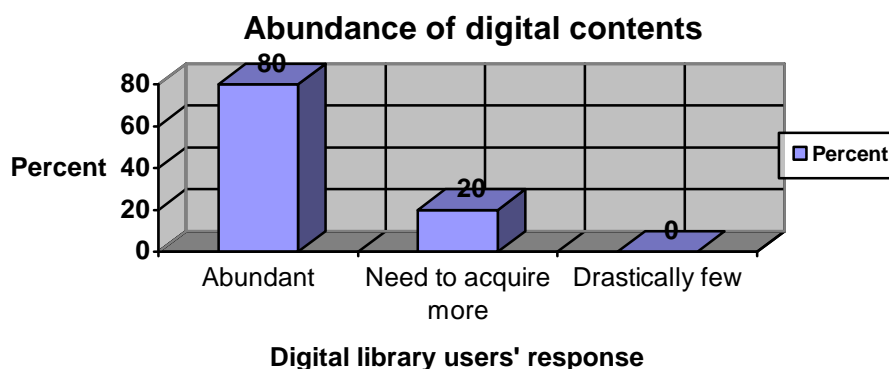


Fig.3

where as only 20 percent have responded the digital resource is rather few so needed to acquire more. Users in BCLCL, ICIMODL and MFSL replied the digital collection is admirable. But the users in TUCL about 33 percent have opined TUCL needs to acquire more digital contents.

### 5.1.8 Address on user's demand

Users were asked with a question to elicit whether their demand on digital contents

Table 5.1.8 Content availability

Sn.	LIBRARY	CONTENT AVAILABILITY (in rank)			TOTAL
		Yes, exactly	Yes, sometimes	No	
1	BCLCL	6	4	-	10
2	ICIMODL	5	3	2	10
3	MFSL	6	3	1	10
4	TUCL	3	4	3	10
	Total	20	14	6	40
	Percent	50	35	15	100

Source: Field survey 2008

was addressed. The users reply shows that—50 percent of them have responded their demands are exactly met. However, 35 percent have replied sometimes their demand is addressed; only 15 percent, which is not negligible, replied their demand is not addressed.

### 5.1.9 Visits to other libraries

The penultimate question to the users was whether they have gone to other libraries to get the exactly same information that they have searched for in the library. Most of

Table 5.1.9 Visits to other libraries

Sn.	LIBRARY	VISITS TO OTHER LIBRARIES			TOTAL
		Yes, often	Yes,	No	
1	BCLCL	-	2	8	5
2	ICIMODL	-	4	6	5
3	MFSL	-	3	7	5
4	TUCL	2	4	4	5
	Total	2	13	25	20
	Percent	5	32.5	62.5	100

Source: Field survey 2008

the users in each library have responded they have not gone to other libraries exactly for the same purpose their percentage is 62.5. And 32.5 percent have replied they rarely have gone to other libraries and only 5 percent (solely from TUCL) duly replied that they have gone into other libraries to find exactly the same information.

The users of TUCL visited other libraries because its target users vary.

#### 5.1.10 Suggestions from users

Most of the users have suggested to increase the number of computers and their efficient performance including fast internet. Some of the users suggested the library should provide digital contents of library to access from their personal computers after certain procedures i.e. membership, subscription. Their list of suggestion includes: library should use good library software; library should promote digital library system and services

### 5.2 Response from Library

#### 5.2.1 Type of library

A question was asked to know the type of library. The libraries have provided their

Table 5.2.1 Type of library

Sn.	LIBRARY	TYPE OF LIBRARY (In ranks)			TOTAL
		Digital	Hybrid	Traditional	
1	BCLCL	5	-	-	5
2	ICIMODL	-	5	-	5
3	MFSL	5	-	-	5
4	TUCL		5	-	5
	Total	10	10	0	20
	Percent	50	50	0	100

Source: Field survey 2008

response in ranks. The reply of library shows that BCLCL and MFSL are fully digital libraries, where as ICIMODL and TUCL are hybrid libraries. It means BCLCL and MFSL do not have physical / hard copies. But ICIMODL and TUCL have resources both in physical and digital form.

#### 5.2.2 Targeted users

A question to the librarians was asked about their targeted users they have replied

Table 5.2.2 Targeted users

Sn.	LIBRARY	TARGETED USERS			Total
		Researchers	Academicians	Policy makers	
1	BCLCL	0	2	0	2
2	ICIMODL	2	1	1	4
3	MFSL	2	1	1	3
4	TUCL	2	2	1	5
Total		6	6	3	15
Percent		40	40	20	100

Source: Field survey 2008

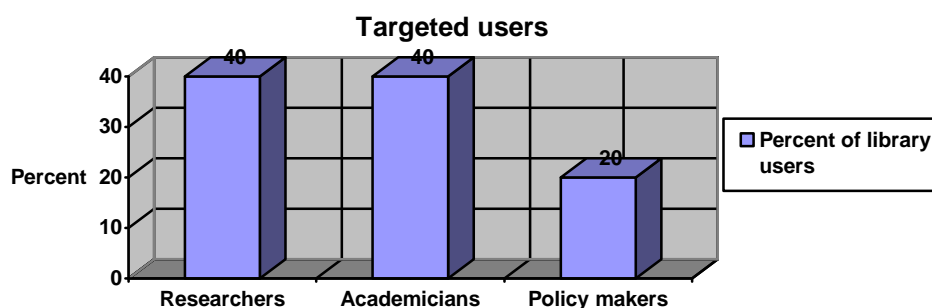


Fig. 4

that BCLCL has targeted for academicians (i.e. students, teachers), ICIMODL has targeted for researchers and MFSL had also targeted for the researchers where as TUCL has targeted all types of users. The target user of library and user's purpose is mostly correlated.

### 5.2.3 Demand on digital content with library

A question was also asked with librarians whether the digital library receives any

Table 5.2.3 Demands from users

Sn.	LIBRARY	DEMANDS FROM USERS (in rank)	Percent
1	BCLCL	1	14
2	ICIMODL	2	29
3	MFSL	1	14
4	TUCL	3	43
Total		7	100

Source: Field survey 2008



demand from the users on digital contents. The response of three libraries show that those have received the users' demand on specific digital contents sometimes. But TUCL has received it in fairly good amount.

#### 5.2.4 Address on users' demand of digital content

To support the above question another question was also put to the libraries whether the library has addressed the users' demand.

Table 5.2.4 Address on users' demand

Sn.	LIBRARY	ADDRESS ON USERS' DEMAND (in rank)	Percent
1	BCLCL	1	20
2	ICIMODL	1	20
3	MFSL	1	20
4	TUCL	2	40
	Total	5	100

Source: Field survey 2008

All the libraries have responded sometimes they have decided on the suggestions put by the users. Except TUCL because this is a rare case since TUCL collects suggestions from users and other related stakeholders.

#### 5.2.5 Influencing factor for digital content selection policy

The question about the influencing factor for digital content selection policy was asked. The response shows the decision of the library authority (65%) is ultimate

Table 5.2.5 Content selection policy depends on

Sn	LIBRARY	CONTENT SELECTION POLICY (in ranks)			TOTAL
		Users	Free	Library	
1	BCLCL	1	-	4	5
2	ICIMODL	1	1	3	5
3	MFSL	1	-	4	5
4	TUCL	2	1	2	5
	Total	5	2	13	20
	Percent	25	10	65	100

Source: Field survey 2008

All the libraries responded they select the digital contents to acquire through the decision of library authority i.e. 65% means they often prioritize. TUCL has replied users' suggestions survey and free availability are focused in the decision of library authority. It shows TUCL has valued for users' suggestions and free availability of the digital contents. . If we compare these two tables about 16 percent (7+5 from table 5.2.4 and 5.2.5) user's demand are not addressed. This is associated with the library's policy on acquisition of contents.

### 5.2.6 Acquisition of digital content in library

The method and policy to acquire digital library also helps to quench the need of the digital library users. So in order to know the policy of digital content acquisition a question was asked to the library authority. Their reply shows that the user's purpose

Table 5.2.6 Acquisition of digital contents by

Sn.	LIBRARY	ACQUISITION OF DIGITAL CONTENTS BY			TOTAL
		Subscription	Gift/donation/ collaboration	Self- development	
1	BCLCL	4	0	0	5
2	ICIMODL	2	1	2	5
3	MFSL	1	1	3	5
4	TUCL	1	3	1	5
	Total	8	5	7	20
	Percent	40	25	35	100

Source: Field survey 2008

is exactly met by the libraries, which specified their specialized targeted users. The libraries have ranked 40 percent for subscription, 35 percent for self-development and 25 percent for gift/donation/collaboration etc. to develop digital content in their digital library. This signifies that the libraries that subscribe digital contents are able to quench with relevant information for users' demand.

### 5.2.7 Pattern of digital content in library

The pattern of digital content also heavily influences in the relevance of digital content to users. Let's see the pattern of digital contents in the digital libraries.

Table 5.2.7 Pattern of digital content

Sn.	LIBRARY	PATTERN OF DIGITAL CONTENT (in ranks)		TOTAL
		digital journals/ proceedings/e-books	digitized materials (surrogated)	
1	BCLCL	4	-	4
2	ICIMODL	4	1	5
3	MFSL	4	1	5
4	TUCL	4	1	5
	Total	16	3	19
	Percent	84	16	100

Source: Field survey 2008

Most of the resource is born digital (84%). However digitized and surrogated resources are not in negligible amount. In each library the ratio of digital journal proceedings, e-books and digitized or surrogated materials is 4:1.

### 5.2.8 Nature of digital content housed and served through a library

A question was asked with librarians about the nature of digital content they house and serve to associate with the user's demand. The librarians' reply show that those

Table 5.2.8 Nature of digital content

Sn.	LIBRARY	NATURE OF DIGITAL CONTENT (in ranks)			TOTAL
		Full-text	Abstracts	Bibliographic	
1	BCLCL	2	1	1	4
2	ICIMODL	2	1	2	5
3	MFSL	2	1	1	4
4	TUCL	2	1	2	5
	Total	8	4	6	18
	Percent	44	22	34	100

Source: Field survey 2008

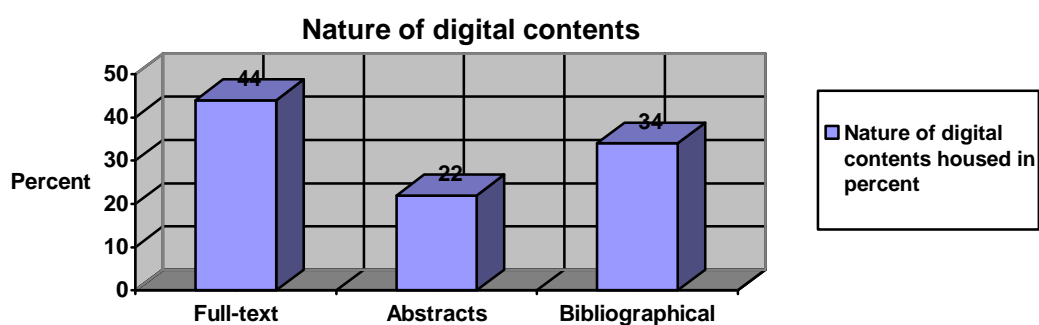


Fig.5

have all the four types of digital contents. It reveals that the users' want of various nature of digital contents are fulfilled. However, the weight of rank and its total shows TUCL and ICIMODL have equal priority in both full-text and bibliographical aspect. The total service of full-text (however librarians' response has shown fairly good) and abstracts are lesser than the demand of the users. Where as bibliographic aspect is good. Library's response is 12% more than that of users demands (see 5.1.2).

### 5.2.9 Service of updated contents

A question was asked to librarians on how often the updated digital contents are served to digital library users.

Table 5.2.9 Service of updated contents

Sn.	LIBRARY	SERVICE OF UPDATED CONTENTS (in ranks)			TOTAL
		Immediately after the publisher updates	Sometimes	Never	
1	BCLCL	4	1	-	5
2	ICIMODL	4	1	-	5
3	MFSL	4	1	-	5
4	TUCL	4	1	-	5
	Total	16	4	-	20
	Percent	80	20	0	100

Source: Field survey 2008

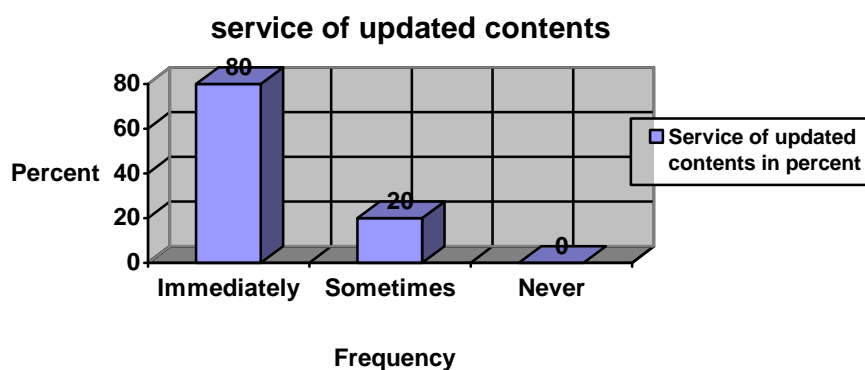


Fig. 6

Among the four participated libraries 80 percent libraries have replied they have provided users with updated contents immediately after the publisher updates. Where as sometimes (the response is 20%) they become late to serve with updated digital contents to users. This implies the users have received updated contents

### 5.2.10 Problems of digital library

The abundance in amount is also affected by the various problems encountered by the library. TUCL replied that that encountered all the problems. TUCL and ICIMODL are facing the problem of legal issues in the process of increasing information stock by digitizing etc. Monetary to purchase according to the users demand, technological

Table 5.2.10 Problems for digital library

Sn.	LIBRARY	PROBLEMS FOR DIGITAL LIBRARY (in ranks)				TOTAL
		Legal	Human resource	Monetary	Technological	
1	BCLCL	0	0	0	0	0
2	ICIMODL	1	0	1	0	2
3	MFSL	0	0	0	0	0
4	TUCL	1	1	2	1	5
	Total	2	1	3	1	7
	Percent	28.57	14.28	42.85	14.30	100

Source: Field survey 2008

to process the digital contents and skilled librarian to manage, preserve and propagate are the problems for TUCL.

### 5.2.11 Back volume storage

The libraries which had back volumes of digital contents have shown they are able to

Table 5.2.11 Back volume stored

Sn.	LIBRARY	BACK VOLUME STORED (in ranks)			TOTAL
		Yes	Yes, few	No	
1	BCLCL	4	1	-	5
2	ICIMODL	4	1	-	5
3	MFSL	4	1	-	5
4	TUCL	4	1	-	5
	Total	16	4	0	5
	Percent	80	20	0	100

Source: Field survey 2008

quench the users' demand. The response from libraries shows that they have stored back volumes except the back volumes which they can access via the archive of the publisher/ supplier e.g. INASP/PERI and Ebsco Host.

### 5.2.12 Growth rate of digital content in a library

Digital resource is growing in a massive speed. But due to various reasons our digital libraries can not reap this advantage. So the growth rate of digital content of a library

Table 5.2.12 Growth rate of digital content.

Sn.	LIBRARY	GROWTH RATE OF DIGITAL CONTENT /year			TOTAL
		0-5%	5-10%	10% more	
1	BCLCL	1	-	-	1
2	ICIMODL	-	1	-	1
3	MFSL	-	-	1	1
4	TUCL	-	-	1	1
	Total	1	1	2	4
	Percent	25	25	50	100

Source: Field survey 2008

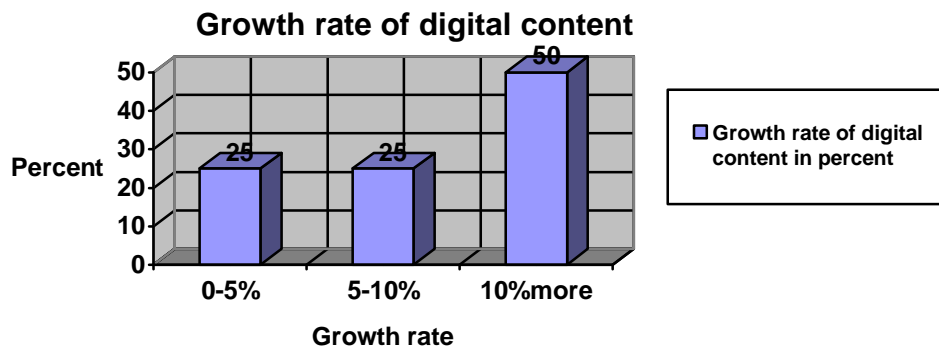


Fig. 7

was asked. In response 50 percent of the libraries have replied that the growth in digital content is more than 10 percent where as 25 percent libraries have replied the growth rate is 6-10 percent growth and again 25 percent libraries have replied the growth rate is 0-5 percent. It also reflects that most of the users have received an abundant amount of digital information.

### 5.3 Response from Librarian

#### 5.3.1 Qualification of librarian

The first question demanded the academic qualification of librarian to know their competence of digital library devices and systems.

Table: 5.3.1 Academic qualifications

Sn.	LIBRARY	QUALIFICATIONS			TOTAL
		B. LIS	B. Computer	Other/Trained	
1	BCLCL	-	-	2	2
2	ICIMODL	2	-	-	2
3	KMCL	2	-	-	2
4	MPP	-	2	1	3
5	MFSL	-	-	1	1
6	NJAL	1	-	-	1
7	SSBL	2	-	-	2
8	TUCL	3	-	1	4
	Total	10	2	5	17
	Percent	59	11	30	100

Source: Field survey 2008

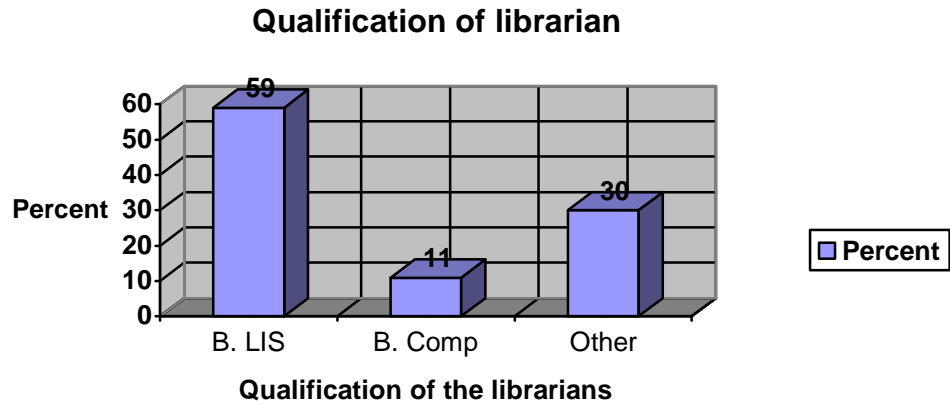


Fig. 8

The above data shows that 59 percent of librarians have received bachelor or more in library and information science and 30 percent have just received trained and/ or from other disciplines than LIS where as 11% librarians have received computer science degree. But the good online and digital library had librarian other than LIS. It shows, they have received training and they are working in digital library. No hard and fast rules have been found to have LIS degree to be a librarian in a digital library.

### 5.3.2 Experience in digital library

Experience also helps to develop competence on the technological skill. The

Table: 5.3.2 Experience of librarian

Sn.	LIBRARY	EXPERIENCE			TOTAL
		0-2 years	2-5years	5-7/above	
1	BCLCL	2	-	-	2
2	ICIMODL	-	-	2	2
3	KMCL	2	-	-	2
4	MPP	-	3	-	3
5	MFSL	1	-	-	1
6	NJAL	1	-	-	1
7	SSBL	1	1	-	2
8	TUCL	-	1	3	4
	Total	7	5	5	17
	Percent	42	29	29	100

Source: Field survey 2008



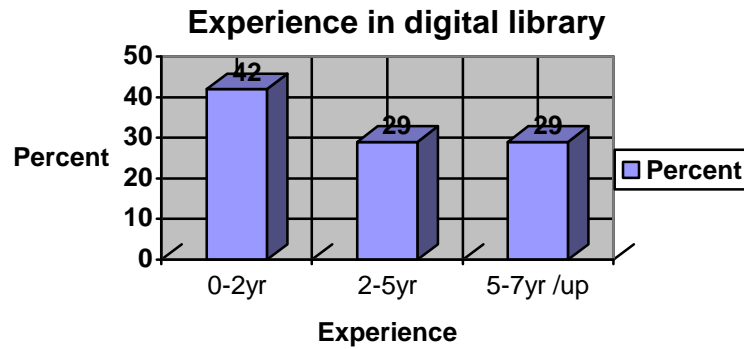


Fig. 9

question on the experience is responded as given below. Most of the librarians are experienced only for up to two years or so, the percent is 42, whereas 29 percent are 2-5 years experienced. Exactly the same percentage is 5-7 and above experienced. This shows that 58 percent is more than 2 years experienced this means the librarians are able to handle the job.

### 5.3.3 Abreast of new technology

Technology leaps quickly so a question to know whether the librarians have kept them abreast of new technology related to digital library was asked. The response has

Table: 5.3.3 Opportunity to keep abreast of new technology

OPPORTUNITY TO KEEP ABREAST OF NEW TECHNOLOGY			TOTAL
	Yes	No	
	12	5	17
Total	12	5	17
Percent	70.58	29.42	100

Source: Field survey 2008

shown that 70.58 percent of the librarians have kept themselves abreast of new technology with that which is implanted in their digital library where they are working. Most of them (70.58) have received in-service training / refresher course and workshops. Where as 29.42 have not received such opportunity to keep abreast of new technology.

### 5.3.4 Librarians choice for the course to increase technological competence

Almost all chose refreshment course because academic course can not pace with new technological innovations.

Table: 5.3.4 Librarians' choice to be abreast of new technology

LIBRARIANS' CHOICE			
In service training		Academic course	Workshop/ seminar etc
11		2	4
Total	11	2	4
Percent	64	12	24

Source: Field survey 2008

Most of the librarians (64%) have opted for in service training and refresher course and 24% have opted for workshops, conferences etc. because academic course can not pace with new technological innovations therefore only 12% have opted for academic course have not received library science degree.

### 5.3.5 Operation of functions of digital library

All functions of digital library can be carried out by digital library software if it is

Table: 5.3.5 Operations of functions of digital library

Sn.	LIBRARY	OPERATIONS OF FUNCTIONS OF DIGITAL LIBRARY (in ranks)		TOTAL
		Library software	Word processor or no software is used	
1	BCLCL	-	5	5
2	ICIMODL	2	3	5
3	KMCL	1	4	5
4	MPP	-	5	5
5	MFSL	2	3	5
6	NJAL	1	4	5
7	SSBL	1	4	5
8	TUCL	2	3	5
	Total	9	31	40
	Percent	22.5	77.5	100

Source: Field survey 2008

sophisticated. Most of the libraries (77.5) have computers and word processor to provide digital library service by downloading the digital contents i.e. journals, databases etc in whatever forms formats (i.e. html or pdf) they are available. They have also provided service through CDs. TUCL has started to use, in addition to that, Green Stone Digital Library (GSDL) and Open Journal System (OJS) software, and Madan Puraskar Pustakalaya has used the self-developed software. Other libraries have used library software only for bibliographical control.

### 5.3.6 Difficulties in the job of digital library

Various difficulties arise in the digital library environment. A question was asked to know exactly what made the librarian difficult in their job. Their response

Table: 5.3.6 Difficulties in the digital library

Sn.	LIBRARY	DIFFICULTIES IN THE DIGITAL LIBRARY (in ranks)			TOTAL
		Software/hardware	Databases/digital materials	Other	
1	BCLCL	1	1	1	3
2	ICIMODL	2	1	2	5
3	KMCL	2	1	2	5
4	MPP	2	1	1	4
5	MFSL	2	1	2	5
6	NJAL	2	1	2	5
7	SSBL	3	1	3	5
8	TUCL	2	1	2	5
	Total	16	8	13	37
	Percent	44	21	35	100

Source: Field survey 2008

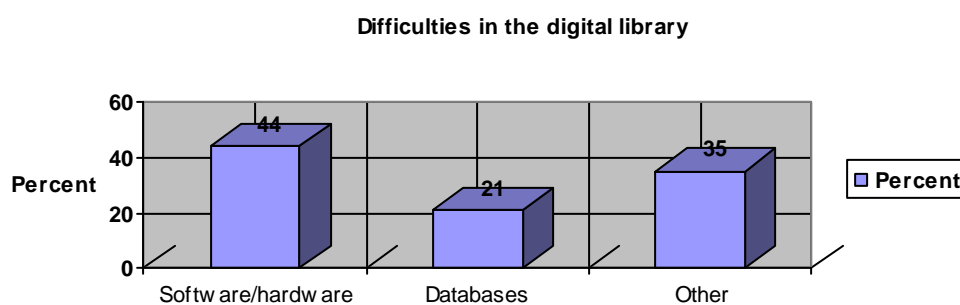


Fig. 10

show that 44 percent difficulty is due to software / hardware where as 21% difficulty is due to various nature of database and 35 percent difficulty is encountered due to other reasons. The 'other' reasons are assigning key words, assigning value added information, time and cost, money, alienation to the digital section of the library over book/paper based library and gap between software / database developer and library systems / principles.

### 5.3.7 Encountered problem solution

This question was asked to find out the strategic method of problem solution when

Table: 5.3.7 Problem solution strategies by:

Sn.	LIBRARY	PROBLEM SOLUTION (in ranks)			TOTAL
		Hiring	After getting training	Leave unsolved	
1	BCLCL	4	1	-	5
2	ICIMODL	2	3	-	5
3	KMCL	2	3	-	5
4	MPP	1	4	-	5
5	MFSL	4	1	-	5
6	NJAL	2	3	-	5
7	SSBL	2	3	-	5
8	TUCL	1	4	-	5
	Total	18	22	0	40
	Percent	45	55	0	100

Source: Field survey 2008

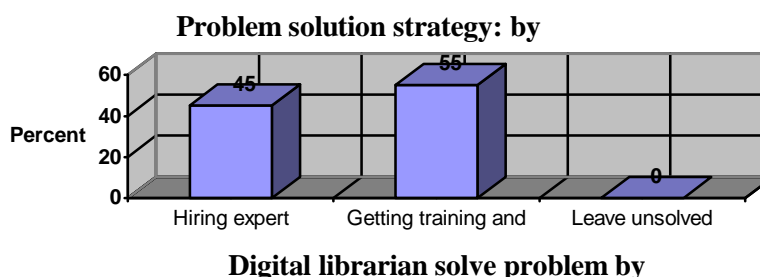


Fig. 11

the librarians have encountered them. Most of the librarians reply is, as the table shows that 45 percent of them have solved the problem by hiring expert or help from any other and 55 percent replied to solve the problem after they have received

training/refreshment course or workshops etc. But almost all of them have provided the phrase "s/he tried her/his best to solve". This shows the librarian is conscious of developing own competence.

### 5.3.8 Skill of LAN installation

This question tried to measure the general skill of installing LAN in the digital library

Table: 5.3.8 Skill of LAN installation

Sn.	LIBRARY	SKILL OF LAN INSTALLATION		TOTAL
		Yes	No	
1	BCLCL	-	2	2
2	ICIMODL	1	1	2
3	KMCL	1	1	2
4	MPP	3	-	3
5	MFSL	-	1	1
6	NJAL	-	1	1
7	SSBL	-	2	2
8	TUCL	1	3	4
	Total	6	11	17
	Percent	35	65	100

Source: Field survey 2008

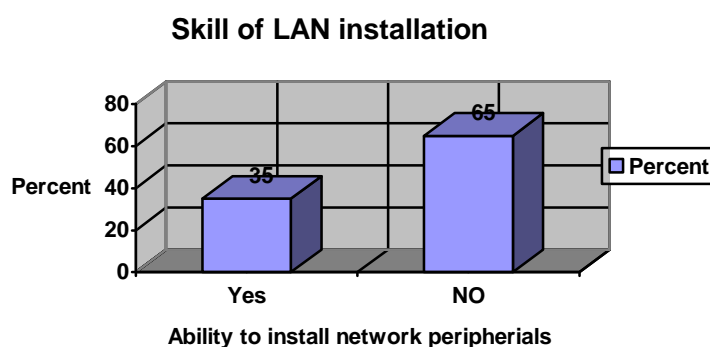


Fig. 12

environment they have replied that most of the librarian i.e. 65 percent is not skilled in LAN peripherals installation using switch / hub. Only 35 percent is skilled in this. Skill at modem installation and connection with an ISP is responded by all the librarians.

### 5.3.9 Reasons for inability

Another question to support the above question was asked to elicit the reason of their inability to carryout the network related task. Many of the librarians reply shows they have lacked training so they are not skilled in networking. But 24 percent have replied

Table: 5.3.9 Reasons for inability

Sn.	LIBRARY	REASONS FOR INABILITY			TOTAL
		Lack of training	I don't need to do	No response	
1	BCLCL	-	2	-	2
2	ICIMODL	-	1	1	2
3	KMCL	1	-	1	2
4	MPP	-	-	3	3
5	MFSL	-	1	-	1
6	NJAL	1	-	-	1
7	SSBL	2	-	-	2
8	TUCL	3	-	1	4
	Total	7	4	6	17
	Percent	41	24	35	100

Source: Field survey 2008

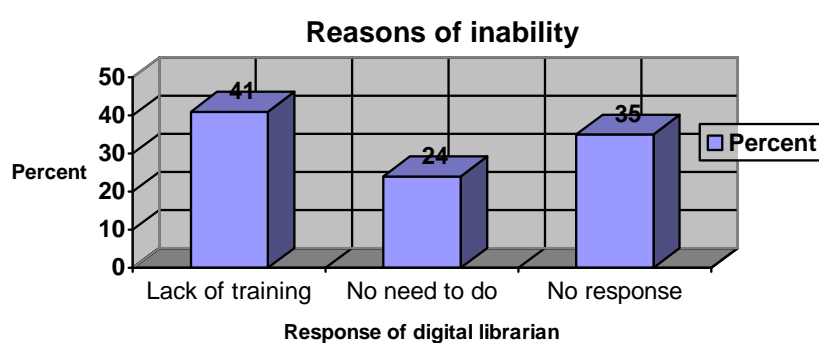


Fig. 13

they do not need to do the task because they have computer technician. And 35 percent did not respond because they are competent at.

### 5.3.10 Ability to update digital library

The ability of updating digital library contents, web page and bibliographical aspects etc. was tried to measure. The competence of the task simply, to update digital library shows, from the table, that all the respondents are capable of updating their digital library.

Table: 5.3.10 Ability to update digital library

Sn.	LIBRARY	ABILITY TO UPDATE DIGITAL LIBRARY		TOTAL
		Yes	No	
1	BCLCL	2	-	2
2	ICIMODL	2	-	2
3	KMCL	2	-	2
4	MPP	3	-	3
5	MFSL	1	-	1
6	NJAL	1	-	1
7	SSBL	2	-	2
8	TUCL	4	-	4
	Total	17	-	17
	Percent	100	0	100

Source: Field survey 2008

The chores like uploading, downloading, subscribing, dealing with the contents of the digital library where they are working have successfully been carried out. Why and how they are able to carry on the tasks was asked. Because every librarian has responded s/he has ability and no one has concerned for q. no. 11. They have responded they do not need to do the complex tasks, whatever they need to do they receive orientation and/or training related to the task.

### 5.3.11 Major tasks of librarians in digital library environment

What responsibilities have been carrying out, as the part of librarian's job was asked. Most of them (82.5%) have replied that they have been doing digital content downloading. Only 15% have replied they have been developing database i.e. bibliography. Response from MPP shows it has been developing its own library

Table: 5.3.11 Major tasks of the librarians

Sn.	LIBRARY	MAJOR TASKS OF LIBRARIANS (in ranks)			TOTAL
		Content downloading/	Database development	Computer programming	
1	BCLCL	5	-		5
2	ICIMODL	4	1		5
3	KMCL	4	1		5
4	MPP	3	1	1	5
5	MFSL	5	-		5
6	NJAL	4	1		5
7	SSBL	4	1		5
8	TUCL	4	1		5
	Total	33	6	1	40
	Percent	82.5	15	2.5	100

Source: Field survey 2008

software for specific purpose and database in MARC 21 format where as other libraries have been developing database in CDS/ISIS and WIN/ISIS.

### 5.3.12 Important ingredient for digital library development

A question was asked to find out the librarians opinion for the development of a

Table 5.3.12 Ingredients for digital library development

Sn.	LIBRARY	INGREDIENT FOR DIGITAL LIBRARY DEVELOPMENT (in rank)		TOTAL
		Education/training	Parent organization	
1	BCLCL	3	2	5
2	ICIMODL	3	2	5
3	KMCL	2	3	5
4	MPP	3	2	5
5	MFSL	3	2	5
6	NJAL	2	3	5
7	SSBL	2	3	5
8	TUCL	3	2	5
	Total	21	19	40
	Percent	52.5	47.5	100

Source: Field survey 2008



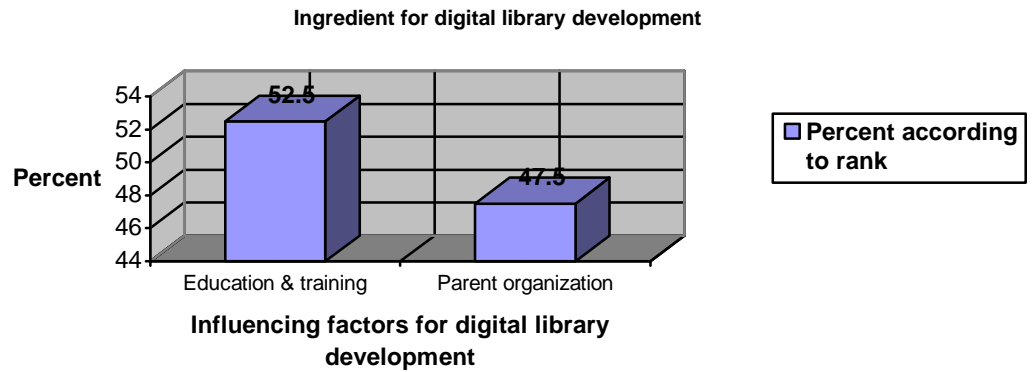


Fig. 14

digital library, a rank was given to prioritize. The table shows that 55.5 percent weight is given to better education and training where as 47.5 percent is allotted for parent organizations role. Most of the respondents have replied if education and training is imparted to the librarians they will be encouraged to develop digital library. Technological know-how of operability is important for the efficient function of digital library. Where as the role of parent organization is also crucial. If parent organization recognizes and feels the rising need of digital library its development occurs in healthy way.

### 5.3.13 Resource being lacked for sound development of digital library

We believe money is needed to purchase digital library infrastructure, including technology and content; train the librarians and promote the activities of the library. A survey question was asked to test whether the monetary aspect is panacea or there is still other factors such as technology, efficient librarian, culture to assimilate with the change etc., are being lacked for the sound development of digital library system in

Table: 5.3.13 Resource being lacked

NO. OF LIBRARIES	RESOURCE BEING LACKED (in ranks)		TOTAL
	Monetary	Other (Technology, librarian, culture)	
5 (62.5%)	17	9	26
3 (37.5)	6	8	14
Total	23	17	40
Percent	57.5	42.5	100

Source: Field survey 2008

various libraries or places. Their response shows that 57.5% of the weight is given that the librarians believe monetary factor is the main which has a significant role in the digital library development. Because money is being lacked to buy digital library infrastructure and to train the librarians. Where as 37.5% weight is given that money is only means. Therefore the gap in technology, low level of competence of librarian, culture to stick in traditional library system are responsible for the digital library system to be paralyzed.

#### **5.3.14 Suggestions from librarians**

The suggestions received from the respondents are presented below:

Most of the respondents have shown concern on the availability of trainings, workshops and conferences which develop their level of competence. At least senior librarian should get training on latest digital library technology. So that s/he can help to his/ her subordinates or colleagues. Experience sharing opportunity with other librarian by study visits should available. Technology based training, as the new technology comes, should be received. Digital library should be established by every library, whenever and wherever possible. Library should encourage digital / online informational resources by reducing the traditional printed format to meet the speed of 21<sup>st</sup> century. The academic and training packages should be updated regularly.

Library science and computer science should be correlated.

Digital library should use strong and versatile library software. Latest infrastructure should be implanted in the digital library. Software driven technology should be used to be able to handle diversified resources, such as multimedia e.g. video-clips, audio-clips, photo-library, digitized documents which are rare and hard to find e.g. scrolls in Buddhist manuscripts.

## CHAPTER 6

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Library, essentially the digital library, is serving various types of users. Digital library has made the functions and services of library vary easy. The library can select, acquire and disseminate information in networked environment. This has fascinated the service providers and users. Many of the libraries want to have digital library environment. But these do not dare to be practical because of economic constraints, and lack of skilled librarian. Those which can manage monetary resource and librarian have started, though through a section of, digital library service.

On another hand, users are riveted on digital library environment for its ability of quick service and search ability with relevant information. Users are always engrossed in navigating world's information either latest or archived in the digital library.

Understanding the fact and need, digital library service is being practiced. Digital library development, though it is in nascent stage in Nepal, is speeding up with the availability of computer peripherals and connectivity to ISP in cheap price.

After analyzing the collected data from various digital libraries and their comparison. The following major findings are drawn.

#### 6.1 Summary of the findings

##### 6.1.1 On the relevance of digital contents

- a. Most of the users are using library for research purpose that has met with the target of digital library. The targeted user (researchers 40%, academicians 40% and policy makers and other 20%) of library and the user's purposes (research 62.5%, academic 37.5%) to visit library are mostly correlated.
- b. User's want of various nature of digital contents are fulfilled. Full-text and abstracts service are less than the demand of users where as bibliographical aspect (i.e. catalogue) is praiseworthy. The demand (Table 5.1.2 shows) of full-text is 50%, abstract is 28% and bibliography is 22% where as librarians response (table 5.2.9) of full-text is 44%, abstracts 22% and bibliography is 34%.
- c. The libraries are fairly able to provide qualitative and quantitative information to the users, 75% of the respondents have replied the quality is fairly good.

- d. The method of digital content collection was by subscription is 40 percent, which means the digital libraries those subscribe the information has helped to meet the need the target users.
- e. The digital content, that is available, is wide and varied in scope.
- f. The growth of digital content is, as the 50 percent digital libraries replied, more than 10 percent in a year.
- g. Users are served with updated contents (the response is 80 percent) immediately after the publisher.
- h. Users have received abundant amount of digital contents (the response is 80 percent), though the digital libraries faced various problems (legal 28.57%, librarian 14.28%, monetary 42.87% and technological 14.28%). The abundance was possible with the help of back volumes that are stored in or accessed via, the digital library.
- i. Users demand on information via digital library is addressed by 75% that has contributed that most of the users (62.5 responses) not to visit other digital libraries to get the information that is exactly on same subject.
- j. The relevance of digital contents housed and / or served through the digital library, after testing the hypothesis shows, are positive and null hypothesis is accepted

### **6.1.2 On technological competence of librarian**

- k. Academically 59% librarian have received degree (Bachelor or above) in library and information science, but 11% have received degree in computer science, 30% have been providing service though they are from other than library and information science and computer science, it reveals simply trained are also handling digital libraries.
- l. All the librarians are abreast of the new technology with that what is implanted in their digital library. Most of them have received in-service/ refreshment course. Most of the librarians tasks are completed by using word processor, and downloading the contents.
- m. Most of the librarians have faced difficulties in handling hardware / software. Various natures of database, digital materials, key words assigning, value-added information assigning, and etc.have made their job difficult.

- n. Almost all the librarians reply they have tried their best to solve the encountered problem, they (55%) have received training and 45% have hired experts pertinent to the problems. Most of them are able to implant modem and connect with an ISP; but contradictorily 65% of them are unable to do hardware related tasks. This is because librarians (47%) do not need to do hardware related tasks most of them (14%) have lacked training.
- o. All the librarians are able to update their digital libraries. Downloading, uploading, subscribing, dealing with contents of digital library are successfully carried out.
- p. The reasons for the underdevelopment of digital library system in Nepal, as the test of hypothesis commands to accept alternate hypothesis, are due to various reasons including the non-availability of sophisticated technological infrastructure, efficient librarians and traditional library culture.
- q. 57.5% of the librarians believe monetary factor is the main which has a significant role in the digital library development. Because money is being lacked to buy digital library infrastructure and to train the librarians. Where as 37.5 have responded money is only means the gap in technology, low level of competence of librarian, culture to stick in traditional library system are responsible for the digital library to be paralyzed.

## **6.2 Comparison of the scenario of digital content and technological competence of the selected libraries**

The types of libraries (table 5.2.1) which are about fully digital have no / less problem in digital content enhancement for example BCLCL and MFSL have similar condition. Hybrid libraries have also similar condition between them for example ICIMODL and TUCL (table 5.2.10). The same condition applies to the relevance of digital content (table 5.1.4).

Almost all libraries have stored back volumes (table 5.2.11) they also provide updated digital contents immediately after the publisher (table 5.2.9) and these have similar status of various natures and pattern of resource see table 5.2.8 and table 5.2.7 respectively.

The response of users and library authority on similar issues are nearly correlated. All the respondents are competent to update and carry out daily works in their digital library (table 5.3.10). This is because most of them are limited to downloading the digital contents through specific vendors /

publishers (table 5.3.11). Almost all libraries have similar condition on use of software for the operations of functions of digital library (table 5.3.5) and the areas of difficulties (table 5.3.6) which demand librarians competence to carry out the task in their digital library (table 5.3.6)

### **6.3 Contrast between the scenario of digital content and technological competence of the selected libraries**

The digital libraries which have targeted for specific users are able to quench users with relevant and specialized information in time for example BCLCL has targeted for academicians (table 5.2.2) which is nearly a complete digital library (table 5.2.1) has housed full text (ranked 2) and abstract (ranked 1) see table 5.2.8, is able to satisfy users i.e. 80% of the users do not go other digital libraries to find information on the same issue / topic (table 5.1.9). It is technologically sound and it has replied it does not face any problems (table 5.2.10) where as TUCL has just the opposite case except table 5.2.8. It can be generalized for other (almost) digital libraries to compare with hybrid i.e. MFSL and ICIMODL. The librarians and libraries which replied monetary problem is less significant for their particular libraries have been receiving training and sophisticated technology than those that are facing monetary problem. Most of the librarians are facing difficulty in software / hardware i.e. 44% where as few of them i.e. 21% are facing difficulty in the areas of database / digital materials (table 5.3.6)

### **6.4 Conclusion:**

Up-to-a-minute information, backed-up by its archive is the demand of this time. No user of a library tends to reject digital resource and their global access rather dusty and bulky physical books. The abundance, relevance, precision and up-to-date ness of information is mostly valued for knowledge and decision making process.

Five laws of library science, devised by S. R. Ranganathan, sometimes designated as five laws of library and information science respectfully, as well as canons, principles etc. are dually fulfilled by digital libraries when these are compared with traditional libraries.

Library is possible in civilized and educated society; digital library is easy to manage spatially and economically. The technological innovations and convergence of information technology has made the information generation, communication and consumption with more standardized or controlled—sometimes through free-text approach vocabularies. The gap between information generator / publisher (offline or online) and the ultimate user is narrowed by the digital library system. The processing, evaluation, preservation and packaging of generated information is one aspect, communication and propagation of pinpointed exhaustive and expeditious information to the scientists, specialists, decision makers and other consumers is another aspect most importantly this is the motto of a digital library.

The basic functions to build a digital library—feeding every thing, text, multimedia, graphics, programs, into computer system in digital form, server-client connection via an ISP, the information of the existence of digital libraries, searching and retrieval of pinpointed information exhaustively are the key to digital library. For this when digital libraries register their presence and content before being granted a uniform resource locator (URL) web address helps to make a real digital library for all.

The librarian or information scientists have to develop their skills and competence (knowledge) in accordance with the changing situation of information explosion and scientific innovations in the electronic technology to keep them pace with. Its appeal oblige all the concerned ones (for university, higher education degree and training or workshop packages) to update the course of study frequently.

### **6.5 Recommendations**

On the basis of the findings following recommendations have been made to enrich the field of digital library in Nepal.

1. Training, seminar, workshops, refresher course should be organized at the free of cost; if not, at the minimal cost.
2. Full-text and abstracts service should be made strong.
3. For the access of historical knowledge, digitization should be prioritized to make them available in digital form.
4. The libraries should use digital library software.

5. Digital library should address user's suggestion and demands and the libraries should be specific in their target users.
6. Existence and presence of digital library and their facilities should be known to the potential users.
7. Union of digital library should be made.
8. Digital libraries should collaborate with various national and international organizations related to them such as DLF, D-Lib magazine.
9. User education should be imparted.
10. All the digital libraries should recruit professional librarian who have received bachelor or above in LIS.
11. Every library and / or parent organization should encourage digital library project/section economically, institutionally and morally.
12. Environment for experience sharing with other digital libraries, visiting there, or via seminar should be created.
13. Knowledge on new technology and innovations should be imparted irrespective of their implantation in the library.
14. A librarian, by the nature of job, should learn various skills of computer (hardware / software, programming, database development and management system, networks / communication channels and protocols) library (all the functions of library) societal (manner, attitude, ethics, responsibility, helpfulness), academic and of course managerial.



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**Appendix 1**  
**QUESTIONNAIRE**

**“Digital Libraries in Nepal: Contents and Technological Competence”**

Dear Respondents!

On the above topic the researcher is going to write a thesis for master’s degree in Library and Information Science, TU. The researcher, with due respect to you and your organization, expects to get exact information. Information provided is not used otherwise except for the thesis and is confidential. Your help is highly acknowledged.

Thanking you

Gautam, Bishwa Raj  
Researcher

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**Part I**

Your Name:  
Organization/Library  
Designation

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**Part-II**

**1. For library users on digital content**

Please tick [ ] any of the correct points/provide information.

- 1) Why do you use the digital content of this library?
  - a) For research purpose
  - b) For pleasure reading
  - c. For academic purpose
  - d. Any other (please specify)\_\_\_\_\_
- 2) What nature of digital content you want to go through?
  - a) Full-text
  - b) Abstracts
  - c. bibliographic databases
  - d. any other (please specify)\_\_\_\_\_
- 3) Do you get the content that exactly cater/meet your purpose that you stated above?
  - a) Yes, always
  - b) Yes, sometimes
  - c. No
  - d. Any other (please specify)\_\_\_\_\_
- 4) Are the available digital content relevant and worth exploiting for your purpose?
  - a) Yes, very good
  - b) Yes, but not sufficient
  - c. No
  - d. Any other (please specify)\_\_\_\_\_
- 5) Is the scope of digital content wide and varied to meet your purpose?
  - a) Yes, very good
  - b) Yes, but not sufficient
  - c. No
  - d. Any other (please specify)\_\_\_\_\_
- 6) How often the upgraded/updated/revised contents are available to users?
  - a) Immediately after the publisher update
  - b) Some contents are not updated
  - c. No updated contents are provided
  - d. Any other (please specify)\_\_\_\_\_
- 7) Is the available resource abundant for your purpose?
  - a) Yes, abundant
  - b) No, need to acquire more
  - c. No, it is drastically few
  - d. Any other (please specify)\_\_\_\_\_
- 8) Has this library addressed your demand on digital collection
  - a) Yes, exactly
  - b) Yes, sometimes
  - c. No, never
  - d. Any other (please specify)\_\_\_\_\_



12. What is the growth rate of digital content?
- a. Up to 5%
  - b. 6-10%
  - c. Not systematic
  - d. Any other (please specify)\_\_\_\_\_

Please provide broacher, reports of your library/resources; if any

Rank:

	Meaning	Rank	In percent
)	Highest degrees	5	i.e. 100-81% (only prioritized)
)	Often	4	i.e. 80-61%
)	Fairly good	3	i.e. 60-41%)
)	Good	2	i.e. 40-21%)
)	Least prioritized	1	i.e. 20-01%)
)	Absolutely no	0	i.e. 0%)

Note: For the rank the degree fluctuated consistently by 20 for uniformity.

### 3. For librarian on the technological competence

- 1) What is your maximum qualification for the staff or of the digital librarian?
  - a) Bachelor/above in Computer Science
  - b) Bachelor/above in Library Science
  - c. Simply trained
  - d. Any other (please specify)\_\_\_\_\_
  
- 2) For how long have you been handling this job?
  - a) 0-2 years
  - b) 2-5 years
  - c. 5-7 years or above
  - d. Any other (please specify)\_\_\_\_\_
  
- 3) Have you got chance to keep yourself abreast of new technology which is implanted in this library?
  - a) Yes
  - b. No
  
- 4) To be abreast of, which of the following do you opt for? (in rank)
  - a) In service training/refresher course
  - b) Further academic course
  - c. workshops
  - d. Any other (please specify)\_\_\_\_\_
  
- 5) How this library does operate the functions of library? (in rank)  
With the help of
  - a) Library software (which? \_\_\_\_\_)
  - b) Word processor
  - c. No software is being used
  - d. Any other (please specify)\_\_\_\_\_
  
- 6) What makes you difficult in your job? (in rank)
  - a) Software
  - b) B. Hardware devices (scanner, networking...)
  - c. Varied nature of database
  - d. Any other (please specify)\_\_\_\_\_

*E.g. Hardware/software migration cycle*
  
- 7) How do you solve the problem that you encounter or ticked above? (in rank)
  - a) Hiring expert
  - b) Getting training/course and solve
  - c. Leave unsolved
  - d. Any other (please specify)\_\_\_\_\_
  
- 8) Can you install LAN using switch /hub
  - a) Yes
  - b. No
  
- 9) If no, why
  - a. Lack of training
  - b. Technician does (i.e. I don't need to do)
  
- 10) Can you update your digital library (contents, web page etc.)?
  - a) Yes
  - b. No
  
- 11) If no, which of the following you can not do?
  - a) Uploading the digital contents
  - b) Downloading the digital contents
  - c. Pre-works e.g. Digitizing, scanning etc
  - d. Any other (please specify)\_\_\_\_\_
  
- 12) Which of the following are you doing to operate your digital library? (in rank)
  - a) Content uploading/downloading
  - b) Database development (bibliography)
  - c. Computer programming
  - d. Web designing
  - e. Any other (please specify)\_\_\_\_\_
  
- 13) What, in your experience, is the best ingredient to enhance the technological skill for digital librarianship? (in rank)
  - a) Training/Education
  - b) Priority from parent organization and similar
  
- 14) Which of the following factor is being lacked for the sound development of digital library system?
  - a. Money to invest for digital library infrastructure
  - b) Other (i.e. Technology, efficient librarian, culture)
  
- 15) Do you have any suggestions on human resource development in digital library field or related to your job? Please write  

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Please provide broacher, reports of library/trainings; if any

## Appendix 2

Checklist for the evaluation of the digital contents (based on the best of conspectus method of collection evaluation)

- ) Type and scope of collection (databases, metadata, multimedia)
- ) Stock availability and accessibility (physically, virtually)
- ) Chronological development
- ) Growth rate
- ) Storage (intensity of collection)
- ) Quality of collection
- ) User study (target group's suggestion, demand, utility of the collection)



**Appendix 3**  
**Test of the hypothesis**  
**Test of relevance of the digital contents housed or served through digital library.**

RELEVANCE OF DIGITAL CONTENT

Sn.	LIBRARY	RELEVANCE OF DIGITAL CONTENT		TOTAL
		very good	Not sufficient	
1	BCLCL	8	2	10
2	ICIMODL	7	3	10
3	MFSL	8	2	10
4	TUCL	4	6	10
	Total	27	13	40
	Percent	67.5	32.5	100

**Statistical hypothesis:**

$H_0$  = The digital content being served to the targeted users was relevant to their need and purpose.

$H_1$  = The digital content was not relevant to the users need and purpose.

The expected frequencies are calculated below

$$E_{(8)} = 27 \times 10 / 40 = 6.75$$

$$E_{(2)} = 13 \times 10 / 40 = 3.25$$

$$E_{(7)} = 27 \times 10 / 40 = 6.75$$

$$E_{(3)} = 13 \times 10 / 40 = 3.25$$

$$E_{(8)} = 27 \times 10 / 40 = 6.75$$

$$E_{(2)} = 13 \times 10 / 40 = 3.25$$

$$E_{(4)} = 27 \times 10 / 40 = 6.75$$

$$E_{(6)} = 13 \times 10 / 40 = 3.25$$

Degree of freedom: since the degree of freedom for 2 x K contingency table are (r-1) (c-1).  
= (4-1) (2-1),

$$3 \times 1 = 3$$

Critical value: calculated value of the  $X^2$  for 3 degree of freedom in 5% significance is 7.815 in table.

**Acceptance region:** If value of  $X^2_{obs}$  less than 7.815

**Rejection region:** If value of  $X^2_{obs}$  equal to or greater than 7.815

**Calculation:**

O	E	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
8	6.75	1.25	1.5625	0.23148
2	3.25	-1.25	1.5625	0.48076
7	6.75	0.25	0.0625	0.00925
3	3.25	-0.25	0.625	0.01923
8	6.75	1.25	1.5625	0.23148
2	3.25	-1.25	1.5625	0.48076
4	6.75	-2.75	7.5625	1.1203
6	3.25	2.75	7.5625	2.3269
40	40	0		4.90016

$$X^2_{obs} = [(O-E_{rc})^2/E_{rc}]$$

$$\text{Or } X^2 = 4.90016$$

**Decision**

The calculated value of  $X^2$  for 3 d. f. at 5% level of significance is 7.815. Since calculated  $X^2$  is less than tabulated  $X^2$ , it is not significant. Hence, null hypothesis is accepted at 5% level of significance and we may conclude that the digital content being served to the targeted users was relevant to their need and purpose.

## Appendix 4

### Test of reasons for underdevelopment of digital libraries

NO OF LIBRARIES	Reasons for underdevelopment		TOTAL
	Monetary	Other Technology, Librarian, Culture	
5 (62.5)	17	9	26
3 (37.5)	6	8	14
Total	23	17	40
Percent	57.5	47.5	100

**Statistical hypothesis:**

H<sub>0</sub> = Most of the librarians believe monetary deficit is being lacked for the sound development of digital library or monetary resource is main factor to develop digital library system

H<sub>1</sub> = lack of modern technology, efficient librarian, digital library culture etc. are responsible for digital library to be lagged behind.

The expected frequencies are calculated below

$$E_{(17)} = 23 \times 26 / 40 = 14.59$$

$$E_{(9)} = 17 \times 26 / 40 = 11.05$$

$$E_{(6)} = 23 \times 14 / 40 = 14.59$$

$$E_{(8)} = 17 \times 14 / 40 = 11.05$$

Degree of freedom: since the degree of freedom for 2 x 2 contingency table are (r-1) (c-1) = (2-1) (2-1),

$$1 \times 1 = 1$$

**Critical value:** Calculated value of the X<sup>2</sup> for 1 degree of freedom in 5% and 1% significance 3.841 and 6.635 respectively in table.

**Acceptance region:** If value of X<sup>2</sup><sub>obs</sub> in 5% and 1% less 3.841 and 6.635 respectively as in table.

**Rejection region:** value of X<sup>2</sup><sub>obs</sub> equal to or greater than in 5% and 1% less 3.841 and 6.635 respectively as in table.

**Calculation:**

O	E	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
17	14.59	2.41	5.8081	0.39808
9	11.05	-2.05	4.2025	0.38.31
6	14.59	-8.59	73.7881	5.05744
8	11.05	-3.05	9.3025	0.84185

$$= 6.67768$$

$$X^2_{obs} = [(O-E_{rc})^2/E_{rc}]$$

$$\text{Or } X^2 = 6.67768$$

**Decision**

The calculated value of X<sup>2</sup> for 1 d. f. at 5% and 1% level of significance are 3.841 and 6.635 respectively in table. Since calculated X<sup>2</sup> is much greater than tabulated X<sup>2</sup>, it is more significant. Hence, H<sub>1</sub> i.e. alternate hypothesis is accepted at both 5% and 1% level of significance and we may conclude that the underdevelopment of digital library system is due to the lack in the approach to technological infrastructure, efficient librarian, and traditional library cultural.