KEYWORD ASSIGNING: ITS APPLICATION IN

INFORMATION RETRIEVAL IN LIBRARY AND

INFORMATION SCIENCE

A thesis
Submitted to the
CENTRAL DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
IN
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THE MASTER DEGREE

IN

LIBRARY AND INFORMATION SCIENCE

Submitted by
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LETTER OF RECOMMENDATION

This is to certify that Mr. Tulasi Bhattarai has prepared this dissertation entitled "KEYWORD ASSIGNING: ITS APPLICATION IN INFORMATION RETRIEVAL IN LIBRARY AND INFORMATION SCIENCE", under my supervision and guidance. I recommend this dissertation for final approval and acceptance.

Date: September 2007

……………………
Rudra Prasad Dulal
Thesis Supervisor

LETTER OF ACCEPTANCE

The thesis here to attached, entitled "KEYWORD ASSIGNING: ITS APPLICATION IN INFORMATION RETRIEVAL IN LIBRARY AND INFORMATION SCIENCE", prepared and submitted by Mr. Tulasi Bhattarai in partial fulfillment of the requirements for the MASTER'S DEGREE OF LIBRARY AND INFORMATION SCIENCE is hereby accepted and approved.

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ACKNOWLEDGEMENT

ABSTRACT

The present study is about keyword assigning and its application in information retrieval. The study has covered more than 125 respondents which include 105 users and 20 librarians. Altogether 200 questionnaires were distributed in which 180 for users and 20 for professionals. Responses have shown that either member or non member, habitual or potential visitors of the library use keywords to search and retrieve the exact information from the myriad of information collection. They do not prefer other systems. It was found that more than two keywords/sufficiently assigned keywords for the document was far better than single or two keywords to represent the document and to retrieve the exact information from the collection, and keywords assigned on the basis of controlled vocabulary using subject heading lists, thesauri and authority list were helpful to match users' demand and documents and were users friendly. Most of the libraries were yet to update tools. NNL, Kaiser and DKRML have not facility of computer for users to search and retrieve the documents. Therefore the help of staff was needed to search the information from computer. All libraries are having their own bibliographic data entry worksheet and bibliographical databases. Databases are also posted in web/OPAC. Population were selected from four libraries, an academic library, Tribhuvan University Central Library, Kirtipur, Nepal National Library, Pulchowk, Public as well government libraries, Kaiser Library, Kaiser Mahal and Dilliraman Kalyani Regmi Memorial Library , Lazimpat. Keywords assigned by those libraries were also collected from all four libraries on the subject of library and information science only. All professionals' views about rendering of keywords were found same and positive as the most important information retrieval tool to retrieve the exact information pinpointed, exhaustively, expeditiously and promptly. The users' views also resemble with professionals. A demonstration regarding the recall value from manual and computer was tested using a random sampling method. This experiment also proved that the later has the high rate of recall.

DEDICATION

To,

My parents and Madam Parbati Nepal's well wisher mights

Their blessings, visionary dream and...……………..insights!

For my prodigious expedition…………………….to destination

To whom, I earnestly offered it's...………eternal dedication!!

PREFACE

This study is in a partial fulfillment to the requirement of Master Degree of Library and Information Science under the ninth paper of second year.

The first chapter has described about the background of the study, objective, hypothesis, scope and limitation of the study and need and importance of keywords. The second chapter has dealt with the literature review on subject headings, subject indexing and keywords. The third chapter has focused on subject headings, subject indexing, subject heading lists, and key words used in library databases. The fourth chapter is about research methodology. The research has done by case studies, structured and closed type questionnaire, interview and observation. The fifth chapter has dealt with the analysis and presentation of collected data. The sixth chapter dealt with the summary, conclusion and recommendations of the study.

How much effective are the keywords in information retrieval tool is its specificity among the different tools and systems to access and retrieve the exact information from the collection of documents. It highlights keyword is the most important information retrieval tool even for a piece of important information rather than other tools from the document in the myriad of information collection. It also saves the time of users and staffs.

This study in detail is indeed a clue scenario from the service point of view. It is hoped that it will give a glory of attention, alarm, vision and reason in assigning keywords for professionals and route to the users in its application to retrieve the exact information from the ocean of knowledge.

It is hoped that the study will assist to apply and to uplift the slogan of 'right information to the right person at the right time' not limiting in words and principles only but also in practical aspects in the coming days.

September,2007   **Tulasi Bhattarai**

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LIST OF ACRONYMS

AACR 2 →   Anglo American Cataloging Rules. – 2nd edition

CCC→   Classified Catalog Code

CDS/ISIS→   Computerized Documentation System/Integrated Set for Information System

DKRML →   Dilliraman Kalyani Regmi Memorial Library

KLIC →   Key Letter in Context

KWAC →   Keyword Augmented in Context

KWIC →   Keywords in Context

KWOC →   Keyword out of Context

KWWC →   Keywords With Context

LCSH →   Library of Congress Subject Headings

NNL →   Nepal National Library

OPAC →   Online Public Access Catalogue

PMEST →   Personality, Matter, Energy, Space, Time

POPSI →   Postulate-based Permuted Subject Indexing

PRECIS →   Preserved Context Indexing System

SLSH →   Sears List of Subject Heading

TUCL →   Tribhuvan University Central Library

SWIFT →   Selected Words in Full Titles

WIN/ISIS →   Windows Version for Integrated set For Information System

CHAPTER ONE

Introduction

1.1   Background of the study

1.1.1   Library and Society

Libraries are synonyms of civilization where intellectual thirst is quenched of the intel hunger i.e. reader, user and researcher of the library. It has shown its proof from the beginning of civilization up to onwards as the changing time and age with the modern advent of technology.

They are regarded as the collective development or the civilization of a country. They reflect the collection of literature and the national development of a country and also the national wisdom. They are social institutions, the ocean of the knowledge which is also called service institutions. Although they have changed significantly over the course of history, they remain always responsible for acquiring or providing access to books, documents, and other media that meet educational, recreational, cultural and informational needs of their users. They continue to keep the business, legal, historical and religious records of a civilization.

The history starts from the temples and archives. In the first half of third millennium BC, the well known society, Babylonian town Nippur was found to have a number of rooms filled with clay tablets, suggesting a well stocked archive as library. In Greece, the country of scholars, got libraries with perishable materials such as papyrus and parchment. In other places cloth, silk and skin, leaf and bark of trees, wooden strips and

metal plates were library materials. Rome and rulers on the other were fascinated to collect books in shelves. The innovation of printing press had really brought revolution on the production of documents, its dissemination and use. Monasteries of western world found books as an essential thing for the spiritual life. After 11[th]century when universities were established, the collection of information carrier grew steadily.[1]

To collect and preserve the materials (library documents) to build the collection was the trend of that time and the persons for such work were scholars or great kings, emperors or rulers. Those documents were considered as valuable property to be preserved well because of the hardship to acquire them. Librarians of that time believed to collect and store books were their sole duty. It was not exception in 15th and 16th century to have books actually chained to the shelves. That's why S.R. Ranganathan was the first person to declare an amnesty for the books and set them free from their chain.[2]

As the time changing, the status of library services also changed. As said Ranganathan, open access also started. The duty of a librarian also changed. Many historic steps took place for the result of changing services of library. The difficulties of library management grew in the 19th century. Libraries had increased in size, but their growth had been haphazard, administration had become weak, standards of service almost non existent, funds for acquisition tended to be inadequate, the post of librarian was often worked as a part time position and technical processing works were frequently arrears and lacked proper method. So,

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[1] "The new encyclopedia Britannica: micropedia knowledge in depth v. 22". -15th ed. - Chicago: Encyclopedia Britannica Inc, 1990 p.968.

[2] Ranganathan, S.R. "The five laws of library science". - 2nd ed. – Banglore: Sarada Ranganathan Endowment for Library Science, 1988.p.27.

S.R. Ranganathan conceived the five principles of library science, which are 1. Books are for use 2. Every reader his/her book 3. Every book it's reader 4. Save the time of the reader/staff 5. Library is a growing organism.[3]

With the status of changing society that started from stone age society, agricultural society, industrial society to present informational age society, world has changed into a globalizes village and more and more information is needed. Due to the explosion of knowledge, information has become additional but utmost necessity after food, shelter and clothes. Moreover, today, right and prompt information has become everything for overall development of individual personality, society and country.

Along with the change in society, the library sector as well, proceeded towards ups and downs. Contribution from mere storing to dissemination of information was due to valuable contributions made by different personalities like Antonio Panizzi, Charles Amni Cutter, Charles C. Jewett, Melvil Dewey, S.R. Ranganathan and so on. In such a way libraries have developed in present condition. Their contribution as chronological development is given below.

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[3] Ranganathan, S.R. "The five laws of library science". - 2nd ed. – Banglore: Sarada Ranganathan Endowment for Library Science, 1988.p.287.

Table 1   **Chronological history of library cataloging development[4]**

S.N	DATE	PERSON/ INSTITUTE	SIGNIFICANCE	REMARK
1.	1787		First British Museum Catalog	
2	1800-1801		Establishment of Library of Congress	
3	1841	Panizzi, Antonio in British Museum	Rules for compiling the catalogue of printed books, maps and music in the British museum	The first of the modern codes great influence
4	1852	Jewett, Charle C.	Catalog Codes with 39 Rules	Expounded the principle of corporate body
5	1876	Cutter, Charlse Ammi	Rules for dictionary catalog	Tremendous influence
6	1876	Dewey, Melvil as the first president	Formation of International Federation of Library Association and Institution	
7	1876	Dewey, Melvil	Formation of DDC Scheme with relative index	
8	1885	Paul Otlet and Henri La Fontaine	Derivation of UDC	
9	1899	Putnam Herbert	New Chief librarian of LC	Distribution of catalogue card
10	1899 - 1942		Devised LC classification scheme	

11		Cutter, Charles Amni	Devised Cutter number	Made possible to form book number
12	1908	ALA and LA	Published Anglo American Code	In two separate publication
13	1911	Kaiser, J.	Published systematic indexing	
14	1923	Sears	Sears list of subject heading	Still in practice
15	1934	Ranganathan , S.R.	Classification cataloging code	For classified catalog
16	1950	Luhn, H.P.	Organized Computerized Index	
17	1960	American Chemical Society	Published its "Chemical titles" through computers	
18	1960	British Museum and LC	Development of Machine Readable Cataloging MARCI	
19	1960	Coates, E.J.	Subject cataloging	Based on Cuter and Kaiser
20	1961	IFLA	Made International conference on Cataloging Principle at Paris	
21	1963 - 1966		Started MARC I project and completed	
22	1967	ALA, LA, Canadian Library Association	Published AACR 1	

23	1978	ALA, LA, Canadian Library Association	Published AACR 2	Chief editor was Gorman, Michael [4]
24	1988	ALA, LA, Canadian Library Association	Published AACR 2 revised edition	Editors were Gorman, Michael and paul W. Winkler.

So, library and society are inter-linked and inter-dependent. Society without libraries has no significance and libraries without society have no origin. If the society has an obligation to feed, clothe and house the people comfortably, it has a similar moral obligation to educate them and to feed them with mental food through educational institutions and libraries, respectively. This twin obligation is the sine qua non of a modern society which flourishes when it nourishes the belly, brawn and brain of its entire populace. Education and library are therefore, two most important factors of social metamorphosis. Libraries have rightly been called the roots and fruits of great civilization. They show light to enable people to become better citizens. Library, thus, affects society and is an acknowledged agency with which society must be concerned.[5]

1.1.2 Library Catalogue:

Of course, it is difficult to retrieve the desired information as and when needed from the myriad of information. So, those collections should be processed in a retrieval manner. Worksheets which are filled up and

[4] Nyaichyai, Lila "Manual Vs. Computerized Cataloging". – Kirtipur : The Department of Library and Information Science, 2006. P. 4-5.
[5] Khanna, J.K. "Library and society ". – 2nd rev. ed. – New Delhi: ESS ESS, 1994. P 7-19.

inputted in bibliographical databases should be made for which classification, cataloguing, indexing of the documents are necessary processes. These processes help to arrange the documents in a systematic way and can be retrieved quickly and easily.

Among many other form of bibliography, library catalogue in general is the one which is generally defined as the register of all bibliographic items founding a particular library or group of libraries, either they are spread out over several geographic locations. Library catalogue is a list of library materials contained in a collection of a library or a group of libraries arranged according to some definite plan in order to provide access.

Access represents subjects, keywords, authors, title and series. These terms are known as access points. These help to find out the reprint of information. It is also replaced by heading and keywords.

So, it is an inevitable information tool to retrieve the information and indeed it is information service that generates life and value of library holdings, bridges information carriers and information users, reflects the present strength of library.

The purpose of library catalogue, which everyone has agreed, that given by Cutter, Charles Ammi goes like this.

1.   To enable a person to find a book of which

a.   the author or

b.   the title or

c.   the subject is known.

2.   To show what the library has

a.   by a given author

b.   on a given subject

c.   in a given kind of literature

3.   To assist in the choice of a book

a.   as to its edition (bibliographically)

b.   as to its character (literary or topically)[6]

Analysis is the process of preparing a bibliographic record that describes a part or parts of an item for which a comprehensive entry has been made.

Though the analytic part or entry of a catalogue help to retrieve the information of a larger work, all the users will not understand that analytical part of the catalogue and it is time consuming too. It also does not cover to show all the information of the document in one card. So, instead of that sufficiently assigned keywords in worksheet easily help to understand the information that the document bore and to retrieve the information promptly and saves the time of user.[7]

1.1.3 Subject headings and keywords

Classification helps to arrange like documents together and to separate unlike where as cataloguing provides subject heading and other elements for the documents. But most of the documents comprise more than one subject. In such situation, the users can't find his needed information through the broad subject. Many documents may be there in the same subject where he will be lost. So, efficient keywords are necessary to

[6] Kumar, Girja and Kumar, Krishan "Theory of cataloguing " . _5[th] rev. ed. _ New Delhi: Vikas Publishing House,1986.P.4

[7] Anglo American Cataloguing Rules/ edited by Michael Gorman and Paul W. Winkler. – 2nd rev. ed. – Chicago: American Library Association, 1988. P.299-302.

support that subject which the document bears. In bearing the information, the documents may differ even if they lie in the same broad subject heading. In such condition, the user should loss his time in searching the information. To save the time of user, the main key is sufficient keywords about the document. Those keywords help to the user to find out his needed document. Those keywords should be assigned by following the rules and tools under the controlled vocabulary to match the users' need.

Melvil Dewey's Relative index by introducing the practice of qualifying any index term sought by such terms as were indicative of any phrase or aspect of it in the class schedules, laid the foundation of modern subject indexing.

Two systems are used for assigning subject headings and keywords. One is derived and another is assigned. In the derived term system, all index terms are taken from the document itself. Author indexes, title indexes, citation indexes and natural language indexes are derived term systems. These systems are almost clerical and can be easily mechanized.

In the assigned term system, the indexer creates the index terms or descriptors. It is an intellectual method involving the finding out of specific subject of the document and assigning an appropriate subject heading or keyword. All indexing languages with vocabulary control devices/ tools, such as subject headings lists, thesauri, and classification schemes are assigned term systems. These systems are intellectual and therefore require more time and money at the input stage.[8]

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[8] Prasher, R.G. "Index and indexing systems". – New Delhi: Medallion Press 1989. P.37.

Today, in the United States, LCSH is used for large libraries and SLSH is used for small libraries. Even in other countries. We can say that the first principle of subject headings and keywords is to learn and know the policies followed by these two lists. The whole chain of headings is organized from the general to the specific. If the subject heading is numismatics other keywords as see and see also references will be medals and seals. The cataloguer is constantly following up such pattern as new books and new subject have to be fitted into the scheme.[9]

For this, Ranganathan developed 'chain procedure', which systematizes the method of preparing the subject index entries for the classified catalogue by analyzing each component part of the chosen class mark into a series of terms describing the specific subject, and the successive containing classes from which it descends in the classification hierarchy. Each term in the 'chain' qualifies the context for index entry.[10]

The very existence of written records demands that they should be listed somewhere and thus their existence acknowledged. And if this listing is done in a systematic way, we can have some bibliographical control over the ever expanding and multi-dimensional graphic knowledge and put it in use for further human development.

Information generated by producers is ultimately to be communicated to the users for use. Socio-economic development depends on it. A librarian or an information scientist occupies a pivotal position in communication triangle. He acts as a middle man between the producer and the users of information. Keyword is an important tool which this middleman uses in

[9] Mann, Margart, "Introduction to cataloguing and the classification of books". – 2nd ed. – Chicago: ALA, 1943. P.136.
[10] Quigg, P.J., "Theory of cataloguing on examination guide book". – Bombay: Asia Publishing House, 1966.

discharging his responsibility of information storage and retrieval and its dissemination.[11]

Thesauri in different subjects are published. Nowadays, they are used for assigning subject headings and keywords. LCSH is the most popular subject headings in the world. "The first edition of the Library of Congress List, called subject headings used in the Dictionary Catalogues of the Library of Congress, was printed in parts between 1909 and 1914. Supplementary lists were issued as required, followed by a second edition in 1919. Later editions were published at irregular intervals. The title changed to Library of Congress Subject Headings when the eighth edition was published in 1975[12]. Now the 30th edition (2007) is published containing over 280,000 total headings and references.

Another popular subject headings list is SLSH which was the work by Minnie Earl Sears. "Published in 1923, the List for Subject Headings for Small Libraries was based on the headings used by nine small libraries that were known to be well catalogued. However Minnie Sears early recognized the need for uniformity, and she followed the form of the LCSH with few exceptions."[13] Now the 19th edition of this list is used.

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[11] Prasher, R.G. "Index and indexing systems". – New Delhi: Medallion Press, 1989. P. 1-4.
[12] Library of Congress Subject Headings. – 27th ed. – Washington DC: LOC, cataloguing Distribution Service, 2004.P.viii.
[13] 'Sears List of Subject Headings. – 18th ed. – New York: The H.W. Wilson Company, 2004. P. vii.

1.1.4 Indexing:

Previously Libraries were simply like a storehouse of documents and the role of librarians was just to preserve the collections. There was no idea of index and indexing them. For many years, in the library simply title and afterwards author indexing existed. Later on Melvil Dewey and C. A. Cutter started subject indexing in 1876.

Most of the documents are of composite subjects. So it was required to provide subject approach of an information. Melvil Dewey's Relative Index of DDC (1876) brought all the scattered terms together under an approach term.

Ranganathan has provided different abbreviations for this purpose such as 'defined' by 'def', 'in relation to' by 'irt', 'referred in relation to' by 'rirt' and so on. Continuous refinement in indexing system has brought important improvement in the field of indexing techniques.

Cutter was the first to discuss the concept of direct entry in his Rules for Dictionary Catalog in 1876. He advocated the entry should be under its subject heading not under the heading of the class which includes that subject. He also suggested that subject having two or more themes should be provided accordingly composite subject with place, firm, name. This brought in some uncertainty in fixing the order of various components in the subject heading.

Kaiser tried to reduce this uncertainty by fixing the order of significance of the components as 'concrete' and 'process' ('systematic indexing'- 1911).

Coates brought in further improvement. The 'concrete' and 'process' of Kaiser were renamed as 'thing' and 'action' by Coates. He developed his ideas further and introduced such categories, as 'part' and 'material'. The order was 'thing', 'part', 'material' and 'action'.

These were ad-hoc solutions without any sound theoretical base. It was Ranganathan who advocated that the order of component should be based on the clear understanding of the concept of specific subject and the vision to formulate it on scientific basis. For this purpose chain indexing and the use of fundamental categories PMEST was developed.

After chain indexing, Derek Austin developed PRECIS (Preserved Context Indexing System) in 1968. Then G. Bhattacharya propounded POPSI (Postulate-based Permuted Subject Indexing). After that Post Coordinate Indexing System, Keyword Indexing System, Citation Indexing Systems were developed[14].

1.1.5 Pre and Post Coordinate Indexing:

Every indexing is coordinate indexing. The difference is that whether it is done in the input stage or output stage.

The one which is coordinated in the input stage is known as pro-coordinate indexing system.

Chain indexing, PRECIS and POPSI are pre-coordinate indexing systems because in them the coordination of index terms is done at input stage in anticipation of user's approach.

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[14]Prasher, R.G. "Index and indexing systems". – New Delhi: Medallion Press, 1989. P. 27-43.

Kaiser, Coates, Ranganathan, Farradane, Sharp, Austin, Neelameghan, Bhattacharya are the contributors of pre-coordinate indexing.

The indexing system which is coordinated at the stage of searching is known as post-coordinate indexing system. It means, it is done at the output or retrieval stage by searcher.

Post-coordinate indexing system is started to overcome the limitations of the pre-coordinate indexing systems.

The information seeker has unrestricted freedom for the free manipulation of the subject at the time of searching in order to achieve whatever logical operations are required. It is designated as manipulative because it permits a greater degree of search manipulation and the index terms can be coordinated almost in any combination.

Four persons W.E. Batten of U.K., G. Cordonnier of France, Calvin Mooers and Mortimer Taube of United States (USA) have contributed towards the development of post-coordinate indexing. Each one of them has devised a system but Taube's system has been the most popular. Nevertheless, they all are based on the same principle.

The post-coordinate indexing system is of two types.

1.   Term entry system, and

2.   Item entry system.

In term entry system, term cards are posted with relevant document numbers. Uniterm, optical coincidence methods and Zato coding systems are examples of this kind.

In item entry system, one card is maintained for a document. Edge-notched cards system is the example of this system.

Post-coordinate indexing systems are more advanced in information retrieval as compared to pre-coordinate indexing systems but they are not far from the limitations such as

-              it is difficult to remember the location number/ accession number/ information location,

-              it is difficult to arrange as alphabetical order from the user's point of view.

So, these also are not so helpful and satisfactory to retrieve the exact information promptly that the user sought as compared to the keywords. In information retrieval, only the sufficiently assigned keywords for the document are the most useful devices.[15]

To access and retrieve the desired information, the users seek the document through the bibliographical databases where, they need the subject heading and keywords about the document. To prior such facility, different subject heading lists and thesauri have been developed to assign keywords. In Nepal, no study was done about keywords, its assigning method to represent the document to retrieve the exact information. So, this study endeavors to highlight the need of sufficient keywords to represent the document in the worksheet and bibliographical databases to retrieve the information using user friendly and approachable keywords.

1.2 Statement of the problem

Just to collect the documents whatever comes in the market is not the purpose of library. As a service institution, it serves its users. User may face many problems while browsing the information from the

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[15] Prasher, R.G. "Index and indexing systems". – New Delhi: Medallion Press, 1989. P. 26-116

databases. They should lose their time in searching the document what they need. Subject approach is the most important in browsing the information but the main subject of the related document doesn't cover all the information that found in that document.

Keywords should be assigned to represent the document under the subject only then each item of information may retrieve. Otherwise, important information will not be retrieved. So, the actual problem of libraries is not about the collection but browsing the information over the existing collection.

Keyword is the most approachable tool to search and browse the information. Without sufficient keywords to represent the document and to support the subject headings, it is impossible to serve its users properly to find the information. So librarians are bound to use uniform, consistent and user friendly keywords and subject heading lists based upon some principles as far as possible.

This study will help to obtain answer for the following questions about key word assigning in the subject of Library and Information Science used by various libraries in Nepal.

1) What are the existing conditions of keyword assigning?

2) How well do the keywords help to users to retrieve information?

3) How much uniformity and consistency is there in the key terms used by various libraries?

4) Whether these key terms are users friendly or not?

5) Have the librarians used the tools to assign the keywords?

6) Are those key terms matched with the document and the users need?

7) Are those key terms under the controlled vocabulary?

1.3. Objectives of the Study

❖ To examine the information retrieval facility on the basis of one, two and more than two keywords.

❖ To examine the key terms whether they are matched with users demand and documents or not.

❖ To make comparative study of assigning keywords among libraries.

❖ To find out the friendliness of user to retrieve the document /information through the keywords assigned on the basis of using thesaurus/subject heading list and authority list.

❖ To examine the existing condition of uses of keywords in libraries.

❖ To make more careful and conscious to assign more and more keywords so that all the related information be retrieved.

1.4. Research Hypothesis

❖ Efficiently assigned keywords greatly support in information retrieval and save the time of users.

❖ More keywords assigned for the document represent all the information in databases which helps to retrieve the information promptly.

1.5. Scope and Limitation of the Study

This study was limited within four libraries which had collection and were using worksheet for the record of information on the subject of Library and Information Science to retrieve it. It had covered keywords assigning method by those libraries for the document and their ways to

assign the keywords either by using the tools or by using their own way. It had aimed to highlight the need of sufficient keywords. The work was limited to the keywords assigning aspect to support in information retrieval.

This study was limited to the subject of Library and Information Science. The work had compared the keywords assigning among the libraries in the context of users' friendliness to match the users' need and document for uniformity and consistency in the terms. 20 library professionals were consulted. This study would be completed within three months.

1.6. Significance of the Study

Library is a growing organization. Once the bibliographical data entry worksheet prepared for input in the database, can't be inputted time and again for the same document later and it is impossible too. So, to retrieve the information from that document, sufficient keywords should have been assigned to cover the information that the document bore. Only the subject heading doesn't cover all the information of the document. Sufficient keywords support the subject. Keywords are approachable tools to retrieve the exact information from the myriad of documents / information. This study will help to assign the keywords through the vocabulary control to match the users' demand to retrieve the desired information promptly. It will reveal the past condition of assigning keywords and will suggest to pay attention in keywords assigning for information retrieval.

1.7. Definition of the Terms[16]

Authority list: - A list of the headings which are selected for use in a catalogue and compiled as an official work of reference by the cataloguers for use in the cataloguing department.

Bibliographic database:- It refers to data entered systematically in a defined structure. In a given framework of software, bibliographic elements of bibliographic items, defined by ISBD like title and statement of responsibility, edition, material designation, place and publisher, pagination, series, note, ISBN/ISSN are fed in computer. The programming of such software make possible to retrieve and disseminate the information systematically when required. It can be said as metadata, the data about data. Meta data are structured data provide a short summary about any information resources.[17]

Catalogue:- Refers to a list of books, maps or other items, arranged in some definite order. It records, describes and indexes (usually completely) the resources of a collection, a library or a group of libraries.

Catalogue code:- A set of rules for guidance of cataloguers in preparing entries for catalogers so as to ensure uniformity in treatment. Such code may include rules for subject cataloguing, and for filing and arranging entries.

Cataloguing:- Refers to the process of compiling a catalogue or constructing entries for insertion into a catalogue. In a broad sense, it refers to all the processes connected with the preparation and maintaining

[16] Encyclopaedic dictionary of library and information science (vols. 1-4)/ edited by P.P. Parmer, B. Bhuta. – New Delhi: Anmol Publications, 1989. P.62.
[17] Pradhan, Mohan Raj, "Developing digital libraries: technologies and challenges" in "Library herald" vol.42, no.2, june 2004,p.105.

of a catalogue, including classification and assignment of subject headings.

Classified catalogue:- A catalogue of subject entries which are arranged in systematic order according to scheme of classification.

Controlled Vocabulary:- A listing of words or terms which must be used as subject heading of descriptors in a particular database.[18]

Index:- A detailed alphabetical list or table of topics, names of persons, places, etc., treated or mentioned in a book or series of books, pointing out their exact positions in the volume, usually by page number (sometimes with an additional symbol indicating a portion of a page) but often by section, or entry, number.

Indexing:- In information retrieval is that which specifies, indicates or designates the information, contents or topics of a document or a group of documents. Also a list of the names or subjects referring to a document or group of documents (IBM).

Index language:- The language that is used in the subject index which is part of an information retrieval system. it may be an alphabetical or classified arrangement of terms, or a variation of these. Each term or heading actual used in the index language, of whatever kind, is called an index term. Also is called 'Descriptor Language'. Its 'vocabulary' is the complete collection of sought terms in the natural language.

Information retrieval:- Finding documents, or the information contained in documents, in a library or other collection, selectively recalling recorded information. Methods of retrieval vary from a simple index or catalogue to the documents, to some kind of punched card or microfilm

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[18] http://www.library.ncat.edu

record which required large or expensive equipment for mechanically selecting the material required. Classification, indexing and machine searching are all systems of information retrieval.

Keyword:- In information retrieval systems, it refers to the significant word in a phrase; used for significant word in a title which is describing a document.

Library:- The term used for a collection of books and other library materials which have been kept for reading, study and consultation.

Library service:- Refers to the facilities which are provided by a library for the use of the books and the dissemination of information.

Relative index:- Refers to an alphabetical index to a classification scheme in which all relationship and aspects of the subject have been brought together under each entry.

Subject:- Refers to the theme or themes of book, whether stated in the title or not.

Subject (indexing):- Refers to a unit of concept which is found in or derived from manuscript or published library materials.

Subject cataloguing:- Refers to that part of cataloguing which involves the allocation of subject headings to entries for specific book or other documents.

Subject headings:- Refers to the word or group of words under which books and other materials on a subject have been entered in a catalogue in which the entries have been arranged in alphabetical order.

Subject headings language:- The terms used as subject headings and under which entries have been made, as well as these form, which references have been merely made to other subject terms.

Thesaurus:- A list of all subject headings descriptors used in a particular database, catalogue or index[19]

Worksheet:- It is just a rearranged sheet for entering data. It is also called data sheet. Without FDT it is impossible to be prepared.

1.8. Organization of the Study:

The research study has been set up according to the given format from the department.

The first chapter deals with introduction which includes background, statement of the problem, objectives, scopes and limitations, significant of the study, definition of the terms and this heading itself falls.

The second chapter deals with relevant studies of the literature i.e. literature review.

The third chapter deals with the subject heading and keywords, subject indexing, subject headings list, their development, subject headings and keywords of the subject of library and information science and their application in different libraries for information retrieval.

The fourth chapter deals with research methodology, research design, population, sampling procedure, data collection procedure and data analysis procedure.

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[19] http: //www.library.ncat.edu

The fifth chapter deals with analysis and presentation of study which evaluates either the set objectives and hypothesis is positively met or not.

The final chapter deals with summaries and recommendations.

CHAPTER TWO

Review of related Literature

Past literature is the mirror of present and future which helps to develop a thorough understanding and insight into previous research works that relates to the present study. Hence, literature related to the research topic has been quoted here. It will make the study authentic, stronger and finds the foundation for.

Subject headings are also keywords, as well subject indexing, for information retrieval. So, studies done in assigning subject headings and keywords for information retrieval is presented here.

Charles Amni Cutter[20] published his "Rules for dictionary catalogue" in 1876. It brought out some principles to assign subject headings and keywords. He has described his views in various topics. They are:

1. Choice between different subjects

2. Choice between subject or country

3. Choice between different names

4. Number of subject entries

5. Form entries, etc.

Within the four editions of the publication of Cutter's rules, Library of Congress published another book on rules in 1899-1901. The difference between these rules and those adopted by the Library of Congress were at two classes. The first class of difference was in trifles of punctuation,

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[20] Cutter, Charles Amni. "Rules for a dictionary catalogue". – 4th ed. – Washington: Government Printing Office, 1904. P.2.

capitalization, the place of certain item on the cards and the like.[21] In the second class of differences, those relating to place of entry of the card in the catalogue, or of choice of headings, we must note that it was very easy to alter the entry of Library of Congress card.[22]

The cataloguer selects appropriate subject headings and keywords for the bibliographic item and a unique classification number, called call number which is used not only for identification but also for the purpose of shelving, placing items with similar subjects near one another, which aids in browsing by library users, who are thus often able to take advantage of serendipity in their search process.[23]

Manual catalogue here means the 3"×5" cards that are produced either by manual typing or by stencil duplication in libraries of Nepal. Basically card catalogue makes documents accessible through broad subject, title and name of authors only. But, constraint of card catalogue is that it can not display explicitly the sought information by the users. Showing what you mean being explicit, if part of book discusses a certain subject, and if you describe the book using terms applicable only to the whole book, you have not being explicit about a part due to the lack of keywords to support the part. Cutter himself did have a rule requiring analytic entry for any part of book that also appeared as a separate, we have forgotten

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[21] Cutter, Charles Amni. "Rules for a dictionary catalogue". – 4th ed. – Washington: Government Printing Office, 1904. P.5.

[22] Ibid p.6.

[23] Nayaichyai, Lila "Manual Vs computerized cataloging". – Kirtipur: The Department of Library and Information Science, 2006 P.6.

rule[24] or many of the time analytical entry is not preferred because of limited space and time as well.

Second revised edition of Anglo American Cataloguing Rules (AACR2 rev. ed.)[25] appeared in 1988. It is based more or less on the principles accepted at the Paris conference. It prefers subject heading lists for subject entries.

Much has been written about AACR2 since its publication with few exceptions, the discussion in the literature thus has centered largely on the rules for the description of non print materials and on the rules for the forms of headings for personal and corporate names. Nevertheless, chapter 21 represents the latest stage on a continuum which began with Panizzi, Jewett and Cutter. The principles that underline the choice of access points remain as important today as they were in the nineteenth century.[26]

S.R. Ranganathan[27] in his Classified Catalogue Code (CCC) has given the rules for chain indexing code. This code is based on normative principles. To derive the subject entries, only the sought headings are accepted for subject headings and keywords.

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[24] Wilson, Patrick. "The catalog as access mechanism background and concepts" in " International encyclopedia of library development". – New Delhi: Cosmo Publication, 1998. P.92.

[25] Anglo American Cataloguing Rules/ edited Michael Gorman and Paul W. Winkler. – 2nd rev. ed. – Chicago: American Library Association, 1988. P.v-x.

[26] "International Encyclopedia of Library Development (vol. 4)"/ edited by M.A. Khan. – New Delhi: Cosmo Publications, 1998. P.258

[27] Ranganathan, S.R., "Classified Catalogue Code: with additional rules for dictionary catalogue code". – 5th ed. – Bangalore: Sarada Ranganathan Endowment for Library Science, 1964. P.44-46.

For example:

2:55m   *periodical on cataloging.*

Chain break

2   =   library science

     ↓

 2:55   =   cataloguing

     ↓

 2:55m   =   periodical, cataloguing[28]

LCSH is the most popular and widely used subject heading list for large libraries all over the world. The 27th edition of LCSH has contained subject headings and keywords created by cataloguer and are used in the cataloguing at the Library of Congress since 1898.It has given principles for additional subject and keywords and is commonly used sub division.[29]

SLSH[30] is another popular subject heading list made for small and medium size library.

In the 16th edition, the process of reformulating the headings in tune with the literary warrant and user approach to the subject indexes has taken the step further. The latest edition has listed 7196 established headings and keywords of subjects including 55 personnel, 68 corporate names, and 38 uniform titles. There were total of 7043 topical headings, a few geographic names given as key headings.[31]

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[28] Ibid p.321
[29] "Library of Congress Subject Heading". – 27th. – Washington DC: Library of Congress, Cataloguing Distribution Service, 2004. P. VIII.
[30] "Sears List of Subject Headings". – 18th ed. – New York: The H.W. Wilson Company, 2004. P.VII.
[31] Satija, M.P.SLSH: a practical introduction for Indian students. – New Delhi: Concept Publishing, 2000. P. 3.

SLSH has also followed some principles. It has given rules for subdivision and for coordinating the key words. It is not so big volume but it has contained more subject entries and keywords with controlled vocabulary.

The basic tasks involved in indexing are to analyze the content of the given document and the representation of this analysis by some content identifiers or keywords.[32] In subject indexing, however, the basic objective is to match the contents of documents with the users' queries, and thus the product of the conceptual analysis of the subject is represented in natural language form. A number of systems, viz. chain, PRECIS, POPSI, relational indexing, etc., have been developed over the ages for preparing subject index entries of documents. One basic problem involved in the process of subject indexing relates to the choice of appropriate keywords or descriptors through which the index entry is to be represented. The indexer prefers to use such keywords which not only represent the subject clearly, but also are likely to be used by the user while looking for the same subject. In order to standardize the task of choosing appropriate keywords for generation of index entries, a number of vocabulary control devices have been developed. Such devices include thesauri, classaurus, thesaurofacet, etc.[33]

Indexing systems have been designed to assist in the retrieval of documents. It is operated by assigning index terms and keywords to the analyzed subject of each document either manually or automatically. Subject indexing systems have been classified broadly as pre-coordinate

[32] Chowdhury G.G. "Information retrieval system". – Calcutta: IASLIC, [199-?]. P. 14.
[33] Lancaster, F.W., "Information retrieval system: characteristics, testing, and evaluation". – 2nd ed. – New York: John Wiley and Sons, 1979. P. 34-36.

and post-coordinate systems. Any indexing system is to represent the contents of documents through keywords or descriptors.[34]

An exhaustive indexing system is supposed to represent the contents of the input documents fully. However, to attain this objective, the system has to select as many keywords as possible to represent the idea put forward in the document. In a non exhaustive system, only a few keywords are chosen which represent the subject grossly. Term specificity refers to how broad or how specific are the terms or keywords chosen under a given situation. The more specific are the terms and keywords; the better is the representation of the subject through the index entry.[35]

A good indexing system is to isolate all the documents in a collection from the others in the same collection which do not discuss the desired topic. In other words, one has to choose such words for indexing which can differentiate a given document or a group of documents from all the others in the same collection. Sometimes this is denoted by the term discrimination. In this connection Harter[36] has mentioned:

1. The keywords selected for representing a document should name the subject that is treated in the document.

2. Keywords selected for the index record of a document should name the subjects that are most heavily treated in the document.

[34] Lancaster, F.W. "Indexing and abstracting in theory and practice". – London: Library Association, 1991. P. 18-42.

[35] Blair, D.C. "Indeterminacy in the subject access to documents, information processing and management. 22(3), 1986. P.229-234.

[36] Harter, S.P. "Statistical approaches to automatic indexing, in P. Willett, ed. Document retrieval system. – London: Taylor Graham, 1988. P.81-98.

3. The keywords selected for the documents should maximize the probability of retrieving the document.

Lancaster[37] has mentioned that the process of subject indexing involves two quite distinct intellectual steps: the 'conceptual analysis' of the documents and 'translation' of the conceptual analysis into a particular vocabulary. The second step in any information retrieval environment involves a 'controlled vocabulary' that is a limited set of terms that must be used to represent the subject matter of documents.

Aryal[38] has mentioned that keywords are the most essential things to browse the information by the subject approach.

The indexer after scanning a document assigns one or more descriptors or keywords to identify the subject content of document. How efficient is the authority list being used and how competently is it used, determines the quality of the index as a subject and document retrieval tool. It is simply communication link between the user and collection. Searcher will waste his precious time by going through documents page by page without sufficient key terms. Keywords provide guide to material that the user may wish to recall or want to discover. Past dissatisfaction with subject retrieval has suggested that indexing should be as full as possible.[39]

Index terms or keywords indicate the main information in the source (document).[40]

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[37] Lancaster, F.W. "Vocabulary control for information retrieval". – 2nd ed. – Arlington, V.A: Information Resources, 1986.
[38] Aryal, Bishnu Prasad "Subject heading, its application for consistent and uniform subject entries for literature published in Nepali language". – Kirtipur: The Department of Library and Science, 2005.P.46.
[39] Dawra, Manisha "Library science and theories of management". – New Delhi: Rajat Publications, 2004. P. 29-42.
[40] The World Book Encyclopedia, vol. 10. P. (I:232-233).

In Nepal, though the librarians who had completed their library education from foreign countries and had started their professional odyssey, they could not have made subject headings list for assigning the subject headings and keywords as to use proudly as of own. So, there was not a clear way to assign subject headings and keywords to represent the information of the document. There was no doubt not to be inconsistent and not uniformity of the assigning subject headings and keywords. So, TUCL has prepared one Nepali Subject Headings List with English equivalent subject headings and keywords and Dewey Decimal Number based on other subject headings lists published from other countries and of foreign languages.[41]

Krishna Mani Bhandary[42] has mentioned that by the committee of some expert persons prepared the list taking "the Hindi List of Subject Headings by P.N. Gaur as the basic source and consulting the following sources as reference sources.

a.   Sears List of Subject Headings 13th ed. – New York: The H.W. Wilson.

b.   Nepali Subject Catalogue of T.U. Central Library.

c.   Dewey Decimal Classification 20th ed.

The included terms in this list are in alphabetical order with English translation and classification number. Subject areas of the list are broader, but they are not sufficient for assigning subject headings and keywords. See and see also references are used. See references are for synonyms and see also references are for similar subjects. It was prepared

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[41] TUCL, "Nepali Subject Heading". – Kathmandu: TUCL, 1996.
[42] Ibid (preface)

by the team of library specialists and subject experts. It is used as of authority list.

Though they have adopted the pattern of the sears list, there is lack of any principles and guidelines to be followed. It was prepared for assigning the consistent and uniform subject entries and keywords. This list has not followed any rules to join the subdivision of the subject and geographical subdivision. Sometimes entries are followed by geographical area and sometimes the geographical areas are used as their subdivision.

TUCL, the largest library of Nepal has the total collection of more than 300,000 volumes of documents. Most of the documents are catalogued in AACR format. These are also put in database. TUCL[43] had started its database from 1993.

CDS/ISIS and WIN/ISIS software are used for the database. Previously they had put Nepali in Romanized form but now, in Unicode software. They have used subject heading list and thesauri for assigning subject and keywords. Because of the use of list database has become more uniformity and consistency. The fields of database are:

-Call no.   -Input date

-type of material   -Personal author

-Accession no.   -Title

-Edition   -ISBN

-Place and Publisher   -Date of publication

-Pages   -Language

-Price   -Note

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43 TUCL database.

-Bibliography	-Broad subject heading
-Keywords	-Geographical area
-Local descriptor	-Thesis
-Name of meetings	-Series
-Content note	

The sample of bibliographical data entry worksheet is included in appendix 2.

Users are allowed to search the information from the computer. Database with sufficient subject headings and keywords have made easier to retrieve the exact document through the myriad of information. Database of 39081 documents are available in web/Online Public Access Catalogue (OPAC) too. [44]

Nepal National Library (NNL) has the total collection of 86,000 volumes of documents in English, Nepali, Sanskrit, Hindi, Newari, Bangali, Maithili, Urdu and Marathi languages. It had catalogue, previously. Now, only bibliographical database is used for the documents, firstly filling up the worksheet and later inputting in the computer. NNL has used CDS/ISIS software for Windows for English literature and Unicode based software (developed by Madan Puraskar Pustakalaya) for Devnagari Script. Database is available in web/ OPAC too.[45] The fields that are included in the bibliographical data entry worksheet are:

- Database Name	-Language
- Input Date	-Call No.

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[44] TUCL Database (up to 2064-4-28)
[45] [45] NNL databases- (2064-4-29)

-	Personal Author	-Corporate Body
-	Title	-Edition
-	Place	-Publisher
-	Year of Publication	-Physical description
-	Series Statement	-Note
-	Broad Subject Heading	-Keywords
-	Geographical Descriptors	-ISBN
-	ISSN	-Location (Holding Library)
-	Country of Origin	-Language of Text
-	Conference/Meeting	-National Union Catalogue No.
-	Copyright No.	-Type of Material
-	Accession No.	

The sample of bibliographical data entry worksheet of this library is included in appendix 3.

Kaiser Library has the total collection of 55,000 volumes of documents. It has no catalogue card. Only computer databases are used. 3070 record of database is of old collection and rest is of new collection of English literature. CDS/ISIS software for windows for English and Unicode based software for Devnagari Script are used. Fields for the database entry of Kaiser Library[46] are:

-	Database Name	-Language
-	Input Date	-Call No.
-	Personal Author	-Corporate Body
-	Title	-Edition

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[46] Kaiser Library database.

-	Place	-Publisher	
-	Year of Publication	-Physical description	
-	Series Statement	-Note	
-	Broad Subject Heading	-Keywords	
-	Geographical Descriptors	-ISBN	
-	ISSN	-Location (Holding Library)	
-	Country of Origin	-Language of Text	
-	Conference/Meeting	-Type of Material	
-	A.C.N.		

Databases are available in web (OPAC) from the beginning of 2064 B.S. The sample of bibliographical data entry worksheet of this library is included in appendix 4.

Finally the term of the above reviewed literature are seriously taken into consideration are included in the appropriate place to make the study more authentic.

Dilliraman-Kalyani Regmi Memorial Library (DKRML) has a total collection of 30,000 volumes of documents. It has no card catalogue. It has used CDS/ISIS software for Windows for English and Unicode based software for Devanagari Script. Only computer database are used. Fields for database entry of this library[47] are:

-	Database Name	-Language
-	Input Date	-Class No.

[47] DKRML database (2064-4-29).

- Book No.	-Personal Author
- Corporate Body	-Title
- Edition	-Place
- Publisher	-Year of Publication
- Physical description	-Series Statement
- Note	-Broad Subject Heading
- Keywords	-Geographical Descriptors
- Local Descriptor	-ISBN
- ISSN	-Location (Holding Library)
- Country of Origin	-Language of Text
- Conference/Meeting	-Thesis Descriptor
- National Union Catalogue No.	-Copyright No.
- Type of Material	-Accession No.

Databases are available in web/ OPAC too from 2004. The bibliographical data entry worksheet of this library is included in appendix 5.

Finally, the theme of the above reviewed literature is seriously taken into consideration and is included in the appropriate places to make the study more authentic.

3. Focus of the Study

3.1 subject headings

Today, explosion of knowledge and newly emerged subjects are in boundless scenario where, no doubt, keywords are the most important information retrieval tool as well subject headings. A subject can be expressed either through words chosen to describe the different subject or through notation based on a scheme of classification. In the first case it is called a subject heading and in the second case it is named a class number. [48]

Subject headings refer to the words or group of words under which books and other materials on a subject have been entered in a catalogue in which the entries have been arranged in alphabetic order. The heading may include punctuation to which an arranging significance may be assigned. In a classified catalogue the subject heading consists of a classification symbol with or without its variable meaning. It may also be included entries for all materials on the same subject in an index of bibliography, or arranged in a file.[49] The description of a document is needed for the cataloging and bibliographic databases. The description of the document includes the author, title, imprint, collation and various notes, but the subject analysis requires the cataloguer to examine its content and to assign subject headings properly reflecting these contents. Subject heading is the gist of the whole document in a single phrase and the keywords are supplementary to retrieve the important information of the document. This doesn't mean that the two operations are completely

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[48] Kumar, Girja and Kumar, Krishan "Theory of cataloging". – 5th rev. fd. –New delhi: Vikash publishing house, 1986. p. 79.
[49] Encyclopedia of library and information science edited by Ishvari Corea, Gad David Ojnando, Khalil Kamal Farugi. – New Delhi : Akashdeop Publishing house, 1993. p. 3043

separate, since certain descriptive notes may well reveal the subject interests of the volume. The collected literary works of a single author, for example would not ordinarily carry subject headings. Again the description of the collected plays of an author; as given in the title page indicates the nature of the content. Selected subject headings and keywords must truly represent the content of the book or a certain part of the book or document that is the most specific subject or subject possible.[50]

The document should be examined before assigning the subject headings and keywords for the accurate representation of the document.

A good library should provide adequate subject approach to all it's holding by means of catalogue and bibliographic database. This service is rendered by grouping the titles under subject headings which are arranged in alphabetical sequence. It was started from the very beginning of library service.[51]

3.2   Subject indexing

Newly emerged subject in the universe of knowledge are interrelated and form part of broader subject as also contain subjects within themselves when all the documents deal with numerous subjects and the majority of the users use the catalogues or indexes in search of material on a definite subject concerned with their study and research, it is important to provide the required subject entries in the catalogues or indexes in such a way that no significant part of any document remains unrevealed to the users. The choice of the terminology and

[50] Akers, Susan Grey, "simple Library cataloguing". – 5th ed. – N.J. : The scarecrew press, 1969. p. 39.
[51] Quigg, P.J. 'Theory of cataloging: an examination guide book'. – 1966. p. 26

language of the subject headings also need careful consideration so that only such terminology is used as is likely to be sought by the users.[52]

From time to time, the book indexes were made more and more specific. Specific aspects of a topic or subject were indicated in the form of subject headings and the location of each in the text was indicated. This also gave a display of the subject or the topic in its different contexts. Dewey's Decimal classification Relative Index is usually quoted as an example of such an index because it brings together scattered aspect of a topic in the schedules at a single approach point. Ranganathan introduced certain abbreviations to indicate the context, such as 'defined' by def 'in relation to' by irt, 'referred in relation to' by rirt and so on. He also indicated the context by using such devices as inversion, punctuation, in indention, etc. These abbreviations further refine relative index.

It is a rare phenomenon that the specific subject of a document is represented by a single term. Normally most of the documents these days deal with compound and complex subjects comprising of a number of concepts. These subjects can be represented by more than one term only. The formulation of appropriate subject headings and keywords representing the contents of a document is really a problem. Cutter, Kaiser and Coates have offered solution to solve these problems. Chain Procedure, PRECIS and POPSI are other successful efforts towards this end. Perfect solution, however, is still to be found out. The contributions of Cutter, Kaiser, Coates, Ranganathan, Farradane

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[52] Prasher, R.G. "Index and Indexing System:- New Delhi ": Medallion Press, 1989. p. 26.

and Sharp towards subject indexing trace the evolution of indexing techniques.[53]

C.A. Cutter started subject indexing in 1876. He was the first to discuss the concept of specific subject in his Rules for Dictionary Catalogue. He advocated the entry should be under specific subject not under the subject headings. He also suggested that subject having two or more themes should be provided accordingly composite subject with place, firm, name. This brought in some uncertainty in fixing the order of various components in the subject heading.

J. Kaiser tried to reduce this uncertainty by fixing the order of significance of the components as 'concrete' and 'process' in his systematic indexing.[54]

E.J. Coates[55] brought in further improvement. The 'concrete' and 'process' of Kaiser were renamed as 'thing' and 'action' by Coates. He developed his ideas further and introduced such categories as 'part' and 'material'. The order was 'thing', 'part', 'material' and 'action'.

The above mentioned were ad-hoc solution without any sound theoretical based. It was Ranganathan who advocated that the order of component should be based on the clear understanding of the concept of specific subject and the vision of formulate it on scientific basis. For this purpose chain indexing and use of fundamental categories Personality, Matter, Energy, Space and Time (PMEST) was developed. The components of a compound subject in chain indexing get automatically arranged in the order of these. [56]

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[53] Ibid p. 27
[54] Kaiser, J. Systematic Indexing,". – London : Pitman, 1911. p.
[55] Coates, E.J "Subject Catalogues: Headings and Structure". – London : Library association, 1960. p. 16
[56] Ranganathan, S.R. "Subject Heading and Facet analysis ". – Journal of documentation (vol.20). –Calcutta: 1954. p. 109-19.

3.2.1 Pre-coordinate Indexing

The indexing which is coordinated in the input stage is known as pre-coordinate indexing system. In such indexing system, the coordination of index term is done at input stage in anticipation of user approach. After chain indexing, PRECIS (Preserved Context Indexing System) developed by Derek Austin in 1968, POPSI (Postulate-based Permuted Subject Indexing) propounded by G. Bhattacharya were developed as pre coordinate indexing system.[57]

3.2.2 Post coordinate Indexing

The indexing system which is coordinated at the stage of searching is known as post-coordinate indexing system. It means, it is done at the output or retrieval stage by searcher. This system is started to overcome the limitations of the pre-coordinate indexing systems.

Four persons W.E. Batten of U.K., G. Cordonnier of France, Calvin Mooers and Mortimer Taube of United States (USA) have contributed towards the development of post coordinate indexing. Each one of them has devised a system but Toube's system has been the most popular. Nevertheless, they all are based on the same principle.

The post coordinate indexing system is of two types.

i.   Term entry system, and

ii.   Item entry system.

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[57] Lancaster, F.W. "Indexing and abstracting in theory and practice"- London: The library Association, 1990. p. 41-59.

In term entry system, term cards are posted with relevant documents numbers. Uniterm, optical coincidence methods and zato coding system are examples of this kind.

In item entry system, one card is maintained for a document. Edge-notched cards system is the example of this kind.

These systems are not far from the limitations as given below though they are more advanced in information retrieval as compared to pre-coordinate indexing systems.

→ It is difficult to remember the location number/accession number/information location,

→ It is difficult to arrange as alphabetical order from the users point of view. [58]

3.2.3. Keywords Indexing:

KWIC is a keyword indexing system / title index. It was introduced by Andrea Crestadoro in 1856 under the name 'Keyword in titles' for the catalogue of the Manchester public library. She also included it in his author catalogue in 1864 as a 'Concordance of titles' to provide a quasi-subject approach.

Hans P. Luhn of IBM revived this system under the name of 'keyword in context' (KWIC) in 1958. Later, KWIC was adopted by the American Chemical Society in 1960 for its publication of chemical titles. [59]

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[58] Prasher, R.G. "Index and Indexing system". – New Delhi : medallion Press, 1989. p. 26-116.
[59] Chakrabortty, A.R. and Chakrabarti, Bhubaneswar "Indexing : Principles, processes and products. " –Calcutta: world press, 1984. p. 123-33

Some variations of keyword indexing system / KWIC are

→ Keyword out of context (KWOC)

→ Keywords Augmented in context (KWAC)

→ Keywords with context (KWWC)

→ Double KWIC

→ Key letter in Context (KLIC)

→ Selected Words in Full Titles (SWIFT)[60]

3.2.4 Indexing Language

Indexing language refers to the keywords / key terms / subject index as an information retrieval system. It may be arranged by alphabetically or class / classified. The term used in the indexing language is called index term. Its vocabulary controlling mechanism should be maintained.

Information should be ascertained to record in some indexing languages. Indexing language is of two types.

i.   Derived term

In the derived term system, all index terms are taken from the document itself. Author indexes, title indexes, citation indexes and natural language indexes are derived term systems. Their systems are almost clerical and can be easily mechanized.

ii.   Assigned term

In the assigned term system, the indexer himself / herself creates/constructs the index terms or descriptors. It is an intellectual method involving the finding out

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[60] Ghosh, S.B. Keyword indexing'. – Calcutta: IASLIC, 1981. p. 187-189.

of specific subject of the document and assigning an appropriate subject heading.

All indexing languages with vocabulary control devices / tools, such as subject heading lists, thesauri and classification schemes are assigned term systems. These systems are intellectual, and therefore, required more time and money at the input stage. A lack of structuring logic or sense in indexing will produce irrelevant output or what is popularly known as 'garbage in garbage out'.

Indexing terms must be uniform and consistent. Control is necessary in respect of the terms used in an index because of the variety of natural language. Such control may involve in bearing certain terms from use as index headings or access points. Terms which are to be used are likely to be specified and synonyms recognized and possibly eliminated. [61]

3.2.5 Vocabulary Control

Vocabulary control is one of the most important components of an information organization and retrieval system. An information retrieval system tries to match the user queries with the stored documents (document surrogates) and retrieves those that match. For this purpose, we have to control the vocabulary to 'match' the users' concept with the concept provided by the indexer. Indexer has to use the vocabulary that is common both to the indexer and searcher.

Lancaster describes two quite distinct intellectual steps which involves in the process of subject indexing.

i.   Conceptual analysis of the documents.

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[61] Rowley, Jennifer Abstracting and indexing. – 2nd edition: Clive Bingley, 1988. p. 57.

ii.   Translation of the conceptual analysis into a particular vocabulary/ 'controlled vocabulary ' that is a limited set of terms that must be used to represent the subject matter of documents to retrieve.[62]

3.3   Subject Headings List

Subject headings list is the list on which the assigned terms are put as subject headings and keywords for assigning keywords for the document to retrieve. These lists follow some principles and guidelines. Such factors determine their values. LCSH and SLSH are most popular subject headings lists which have covered all the subjects of universe of knowledge with the timely new editions in the controlled vocabulary.

The library of congress began printing its subject headings in parts in 1909. However, a complete list covering all areas of knowledge was issued in 1911. The list records the practices of the library of congress. Each subject heading included in it was chosen for the dictionary catalogues of the library. The title changed to library of congress subject headings when the eighth edition was published in 1975. Now the 30th edition (2007) is published containing over 280,000 total headings and references.[63]

A list of subject headings is a small component in the complex information processing and retrieval system. The Sears list is an outstanding name in subject headings lists used all over the world in small and medium size libraries. It has consistently been revised to keep it up to date both in its methods and contents. It has continually incorporated new subjects coming out turbulently. Being handy, simple, inexpensive and always current, the sears has

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[62] Chowdhury, G.G. "introduction to modern information retrieval" – London : Library association, 1999. p. 118
[63] Library of Congress Subject Headings. – 27th ed. – Washing DC: LOC, cataloguing Distribution service, 2004. p. ix.

come as an obvious choice for teaching subject headings work in library schools especially in the third world countries. [64]

Sears list was first designed in 1923 by Minnie Earl Sears in deference to demands of small libraries for simple and broader subject headings for use in their dictionary catalogues. It was based on the survey of subject headings and keywords practices of nine small and well catalogued libraries. The milestone changes since the 15th edition is the thesaurus format display of headings. Now it is published in the 19th edition (2007) adding more 400 new subject headings and keywords than 18th edition.[65]

A printed list of subject headings and keywords can provide most of the terms required for all ordinary purposes but it doesn't cover up-to-date newly emerged subjects because it is not easy to add new subjects and keywords except next edition. For this purpose, librarian should make authority file/list for assigning subject headings and keywords that emerged with the changing time.

3.4. Keywords used in Library Database

For promptly and effective retrieval of information, computer and automation is essential. The libraries given below have their databases for bibliographical record of the documents they have and for effective services to users.

3.4.1. Tribhuvan University Central Library's Database

TUCL, the largest library of Nepal has total collection of more than 300,000 volumes of documents. It serves various types of users. Most of the documents are cataloged in AACR format. These are also put in database. TUCL has

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[64] Satija, M.P. Sears list of subject heading list: a practical introduction for Indian students. – New Delhi: concept publishing, 2000. p.7.
[65] http://www.hwwilson.com/print/searslst-19th.cfm

started its database from 1993. CDS/ISIS and WIN/ISIS software are used for the database. Previously, they had put Nepali, Sanskrit and Hindi in Romanized form but now, in Unicode software. A bibliographical data entry worksheet is included in appendix 2.

Keywords are the most important information retrieval tools to browse the exact information from the collection of documents. Among the total collection, it has 1240 volumes of documents on the subject of library and information science and the keywords assigned for these are 306.

The following examples that taken from academic library, TUCL database as well manual catalogue prove the focus of the study indeed.

Example. 1

Title: current problems and trends in library and information services.

Broad subject: Information science

Keywords: Library networks/information technology/library legislation/library professionals/information/Library systems

Example 2.

Title: Library and society

Broad subject: Library science

Keywords: Academic libraries/public libraries/National libraries/library associations/library law.

TUCL has used subject heading list (LCSH, 27th edition), Thesauri (spine, macro, Unesco, CAB) Authority list (TUCL; Nepali subject heading list.) DDC- (16th ed. to 22nd ed.) for assigning subject headings and keywords.

Users are allowed to search the information from the computer. Databases with sufficient subject headings and keywords have made easier to retrieve the exact document through the myriad of information. Databases of 39081 documents are available in web/ online Public Access Catalogue (OPAC) too.

3.4.2 . Nepal National Library's Database.

NNL is National Library of Nepal. It is considered as an apex body of the entire public library system in Nepal[66]. It serves various types of users. It has total collection of 86,000 volumes of documents in English, Nepali, Sanskrit, Hindi, Newari, Bangali, Maithili, Urdu and Marathi Languages. It had catalogued the books previously. Now only bibliographical database is used for the documents, firstly filling up the worksheet and later inputting in the computer. It has used CDS/ISIS software for windows for English literature and Unicode based software (developed by Madan Puraskar Pustaklaya) for Devnagari script. Database is available in web/OPAC too. A bibliographical data entry worksheet of the library is included in appendix 3.

Keywords are the most essential information retrieval tool. Among the total collection, it has 149 volumes of books on the subject of library and information science and the keyword assigned for these are 103.

As there were no books with same titles in TUCL and NNL to illustrate. Separate titles are selected as an example. This is illustrated respectively from

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[66] Karki, Madhusudan : National Library of Nepal : a critical review in Nepal Ristriya Pustakalaya Smarika. Lalitpur. : Nepal Ristriya Pustakalaya, 2062. p. 86.

the side of government libraries, NNL's database which also shows the keyword assigning methods of the library.

Example 1.

Title: Library science and theories of management.

Broad subject heading: Library science.

Keywords: Library management/personnel management.

Example 2.

Title: Need of library science graduates in libraries in Nepal.

Broad subject: Library science.

Keywords: Education/ personnel education

It has used subject heading list (LCSH, 24th ed.), (SLSH, 15th edition), Thesaurus (UNIVIS), DDC (22nd ed) for assigning subject headings and keywords. It had used TUCL's Nepali subject headings list, previously but now, it has not used. It has used its own keywords too but without its own any authority lists.

Computer searching facility has not provided separately but users can ask for the retrieval of document through the keywords by the help of library staff who has sat in inputting the data. 42,000 volumes of documents are inputted in the computer.

3.4.3 . Kaiser Library's Database

It is a government as well public library of Nepal. It serves various types of users. It has total collection of 55,000 volumes of documents. It has not catalogue card. Only computer database is used and all the documents are recorded in database. 3070 record of database is of old collection and rests are

of new collection of English literature and others. CDS/ISIS software for windows for English and Unicode based software for Devnagari scripts are used. Database is available in web (OPAC) too from the beginning of 2064 B.S. A bibliographical data entry worksheet is included in appendix 4.

To browse the exact information from the document, it has used the subject and keywords. Among the total collection, it has 61 volumes of books on the subject of library and information science and the keywords assigned for these are 80.

It has used SLSH (15th ed.), DDC (22nd.ed.) for assigning subject headings and keywords. It had used TUCL's Nepali subject heading lists, previously, but now, it has not used it. It has used its own keywords too but without its own any authority list.

A separate computer is not provided for searching the exact information through keywords from the collection of the document to the user for their needed time but they can ask for that by the help of the library staff who has sat in inputting the data.

3.4.4.   Dilliraman-Kalyani Regmi Memorial Library's Database

It is a government as well public library of Nepal. It serves various types of users. It has total collection of 30,000 volumes of documents. It has no card catalogue. Only computer database is used and all the documents are recorded. It has used CDS/ISIS software for windows for English and Unicode based software for Devnagari script. A bibliographical data entry worksheet of the library is included in appendix 5.

Keywords and subject headings are provided to browse the needed information by the users. Among the total collection, it has 22 volumes of books on the subject of library and information science and the keywords assigned for this are 26.

It has used SLSH (15th ed.), DDC-(22nd ed.) for assigning subject headings and keywords. It has used its own keywords too but without its own any developed and maintained authority list.

Users are allowed to search their needed information through keywords from the computer database. 20,000 volumes of documents are inputted in the computer. Database is available in web / OPAC too from 2004.

No doubt, keywords are the most important information retrieval tool to retrieve the information pinpointed, exhaustively and expeditiously. And it is the only tool for "right information to the right person at the right time with the right way in the right form on the right language". So, its assigning should be given priority by using the updated tools for the representation of the information to provide good services.

CHAPTER FOUR

4. Research Methodology

Research is the process of a systematic and in-depth study or search of any particular topic, subject or area of investigation backed by the collection, compilation, presentation and interpretation of relevant details or data. It is a careful search of inquiry into any subject matter which is an endeavor to discover or find out valuable fact, which will be useful for further application or utilization.[67]

4.1 Research Design

Research design is a plan and strategy of investigation conceived for the collection and analysis of data. It presents a series of guide posts to enable the researcher to progress in right direction in order to achieve the goal. The design may be a specific presentation of the various steps in the research process. For this research work, user and librarian of the related libraries were studied and were taken for case studies so that it could reveal practical need for sufficient keywords assigning in information retrieval for bibliographical databases. As well questionnaire, interview and observation methods were taken.

4.2 Population

The population of study was libraries which have used bibliographical data entry worksheet. Libraries were of either academic or public or government types. They were TUCL, NNL, Kaiser Library and DKRML. All the subject

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[67] Wolff, Howard K. and Pant, Prem R. "Social science research and thesis writing ."-4th ed. – Kathmandu: Buddha AcademicPublisher, 2005.p.4.

headings and keywords on the subject of library and information science were collected.

4.3. Sampling Procedure

It was planned to study over 20% of total population. Subject headings and keywords of TUCL, NNL, Kaiser Library and DKRML were collected. CD and USB data traveler were used to collect the data. Among 20 professional librarians 10 were interviewed.

4.4. Data Collection Procedure

Data were collected from the following methods

i. Questionnaire

Two separate types of questions for users and professionals were distributed. The questionnaires were given hand-to-hand to users and professionals. The questionnaires were structured and close ended type.

Altogether 200 questionnaires (180 for users and 20 for professionals) were distributed. 80 questionnaires were distributed to users of TUCL by researcher. Only 50 respondents were returned back. 40 questionnaires were distributed to the NNL, among them only 20 respondents were returned. 40 questionnaires were distributed to the user of Kaiser Library and 23 respondents were returned. In DKRML, because of not getting users at any certain time, 20 questionnaires were distributed by the help of librarian. Among them only 12 were returned. Users of each library of three days' visit were 615, 123, 119 and 47 respectively.

Questions distributed to librarians and users both are attached in appendix 6-7.

ii. Interview

In this step, the researcher had met 10 librarians who were directly related with this subject matter and used to assign subject headings and keywords for bibliographical data entry worksheet. By this, researcher had found historical background and present scenario of the uses of keywords in information retrieval. As well some users of all four libraries were interviewed to know their views to use keywords in information retrieval.

iii. Observation

After observing these libraries which are using bibliographical data entry worksheet, the researcher had found the present using scenario of subject headings and keywords for the representation of the document and to retrieve it. Keywords and subject headings used in databases and manual catalogue on the subject of library and information science were collected by using CD and USB data traveler (pen drive) as well manually.

4.5. Data Analysis Procedure

The data in the form of questionnaire have been collected, edited, coded, tabulated and classified for data analysis. All those collected data was aggregated into a form that presented the summary of answers from respondents. Primary data taken from various libraries are also analyzed. Processed data are interpreted in the form of tabulation. The result of analysis could be found in tables and figures making references relevant to the research relations studied, and drawing conclusion about them.

CHAPTER FIVE

Analysis and Presentation of findings

Data are collected from four libraries: TUCL, NNL, Kaiser and DRKML. How much effective are the keywords in information retrieval are presented below on the basis of the responses of users and professionals. Their responses are shown in following tables. It is hoped that the tables sufficiently and correctly represent those all responses which are classified on the basis of the questions given in the questionnaire with their relevancy.

Responses of users are illustrated in the following tables and figures.

The question no. one was to know the type of the users as either they were member or non member of the related library. So, it is shown in table no.2.

Table no. 2 *Types of users*

Name of library	*Questions*		*Member*		*Non Members*		Total	
	Distributed	Returned	No.	%	No.	%	No.	%
TUCL	80	50	44	88	6	12	50	100
NNL	40	20	-	-	20	100	20	100
Kaiser	40	23	-	-	23	100	23	100
DRKML	20	12	-	-	12	100	12	100
Total	180	105	44	42	61	58	105	100

Source: Field survey
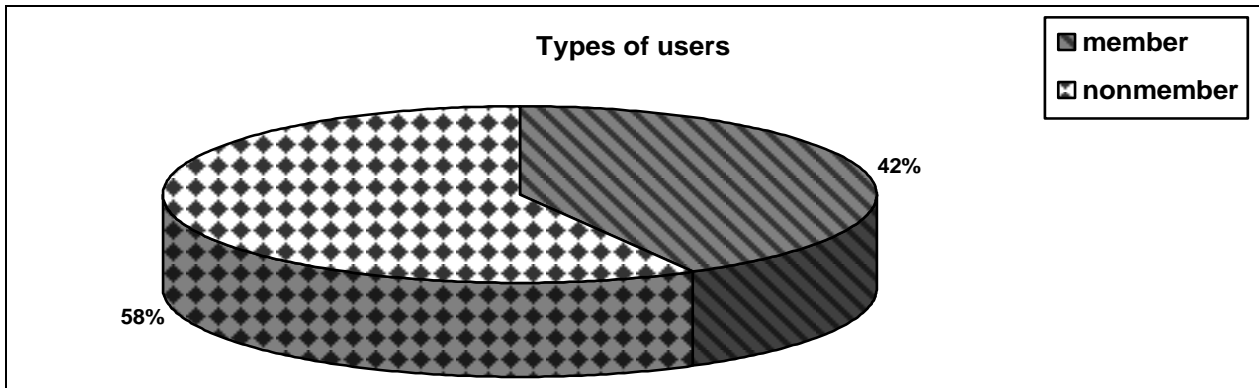
Figure 1

The table no. 2 shows that 44 users (88%) were member of library and 6 users (12%) were not member users out of 50 in TUCL. In NNL all 20 users (100%) were non member. In Kaiser Library too, all 23 users (100%) were non member of the library. Like wise all 12 users (100%) were non member in DKRML Library too.

So, in total, 44 users (42%) were member of the library and 61 users (58%) were non member users. Figure 1 shows it clearly.

Question no. 2 was developed to know visiting frequency of the users in the library. It is shown in table no 3.

Table no.3   *Frequency of library use by users*

Name of Library	Frequency									
	Daily		Once a week		Once a month		Sometimes		Total	
	No.	%	No.	%	No.	%	NO.	%	No.	%
TUCL	16	32	12	24	6	12	16	32	50	100
NNL	10	50	6	30	-	-	4	20	20	100
Kaiser	4	17	10	44	3	13	6	26	23	100
DKRML	8	67	-	-	-	-	4	33	12	100
Total	38	36	28	27	9	9	30	28	105	100

Source: Field survey

Frequency of library visit of users
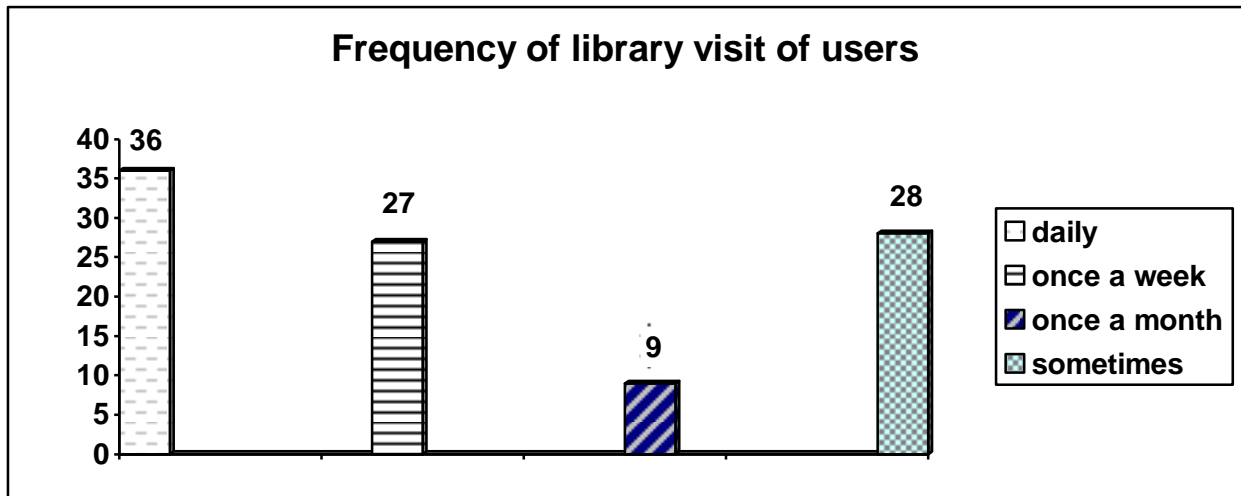
Figure 2

The table no. 3 shows that 16 (32%) users were daily users, 12(14%) users were once a week users, 6 (12%) users were once a month users and 16 (32%) users were sometimes users out of 50 users in TUCL.

10 (50%) users were daily users, 6 (30%) users were once a week users and 4(20%) users were sometimes users out of 20 users in NNL.

4 (17%) users were daily users, 10 (44%) users were once a week users, 3 (13%) users were once a month users and 6 (26%) users were sometimes users out of 23 in Kaiser library.

8 (67%) users were daily users and 4 (33%) users were sometimes users out of 12 users in DKRML.

 In total 38 (36%) users were daily users, 28 (27%) users were once a week users, 9 (9%) users were once a month users and 30 (28%) users were sometimes users out of 105 users. Figure 2 shows it more clearly.

Question no. 3 was to know the problems found by the users in getting the document from the database which is shown in table no.4.

Table no. 4 *Problems in getting the document from the collection*

*N*ame of library	Problems in database search					
	Yes		No		Total	
	No.	%	No.	%	No.	%
TUCL	38	76	12	24	50	100
NNL	14	70	6	30	20	100
Kaiser	8	35	15	65	23	100
DRKML	8	67	4	33	12	100
total	68	65	37	35	105	100

Source: Field survey
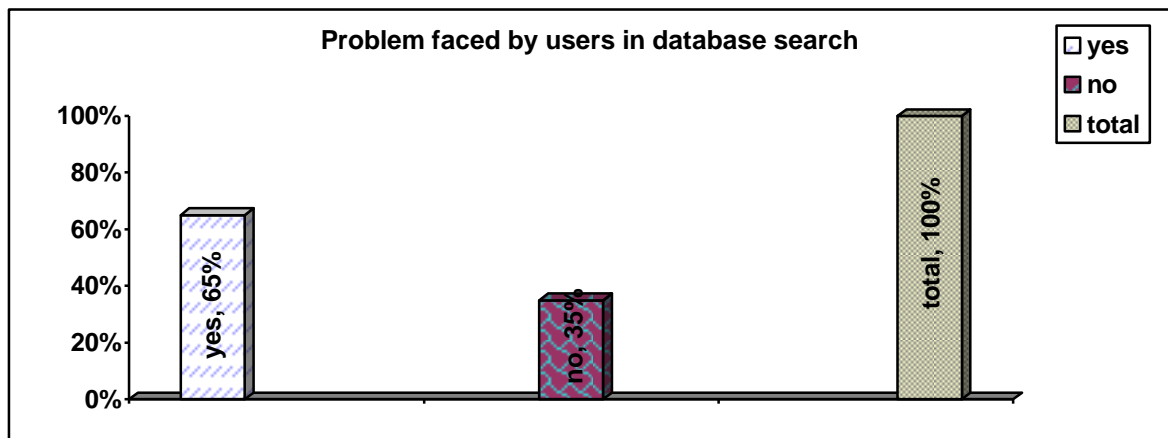
Figure 3

This table shows that 38 (76%) users were faced problems and 12 (24%) users were not faced problems in database search to retrieve the document in TUCL. In NNL, 14(70%) users were faced problems and 6 (30%) users were not faced problems in database search to retrieve the document. In Kaiser library, 8 (35%) users were faced problems and 15 (65%) users were not faced problems in database search. Like wise, 8 (67%) users were faced problems and 4 (33%) users were not faced problems in database search in DRKML.

In total, 68(65%) users were faced and 37(35%) users were not faced problems in database search and to retrieve the document. It is showed more clearly in figure no.3

Question No 5 was to know user's views about information retrieval through the subject only which has shown in table no 5.

Table No 5. Information retrieval through the subject only

Name of library	Information retrieval trough the subject only					
	Yes		No		Total	
	No	%	No	%	No	%
TUCL	16	32	34	68	50	100
NNL	6	30	14	70	20	100
Kaiser	10	43	13	57	23	100
DKRML	2	17	10	83	12	100
Total	34	32	71	68	105	100

Source: Field Survey

This table shows that 16 (32%) users had retrieved and 34 (68%) users had not retrieved the information through this subject only in TUCL. In NNL 6 (30%) users had retrieved and 14 (70%) users had not retrieved the information through the subject only. 10 (43%) users had retrieved and 13 (57%) users had not retrieved in Kaiser Library. 2 (17%) had retrieved and 10 (83%) users had not retrieved through the subject only in DKRML .

In total 34 (32%) users had retrieved and 71 (68%) users had not retrieved the information through the subject only. It is clearly shown in figure no 4.

Information retrieval through the subject only

Yes
No
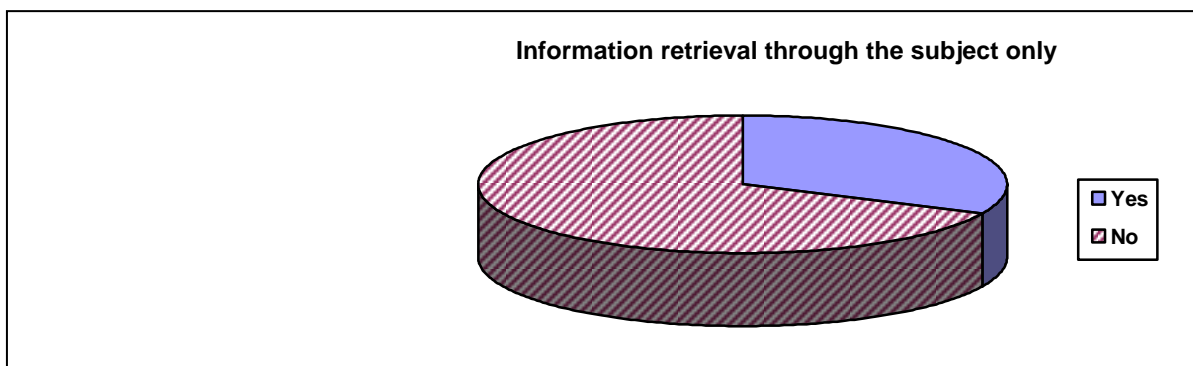
Figure No4

Question no. 6 and 7 were to know the users' view to search and retrieve the document by using keywords which is shown in table no 6.

Table no.6   *Use of keywords to search and retrieve the document*

Name of library	Use of Keywords					
	Yes		No		Total	
	No.	%	No.	%	No.	%
TUCL	42	84	8	16	50	100
NNL	12	60	8	40	20	100
Kaiser	16	70	7	30	23	100
DRKML	10	83	2	17	12	100
total	80	76	25	24	105	100

Source: Field survey

Use of Keywords to search and retrieve the document
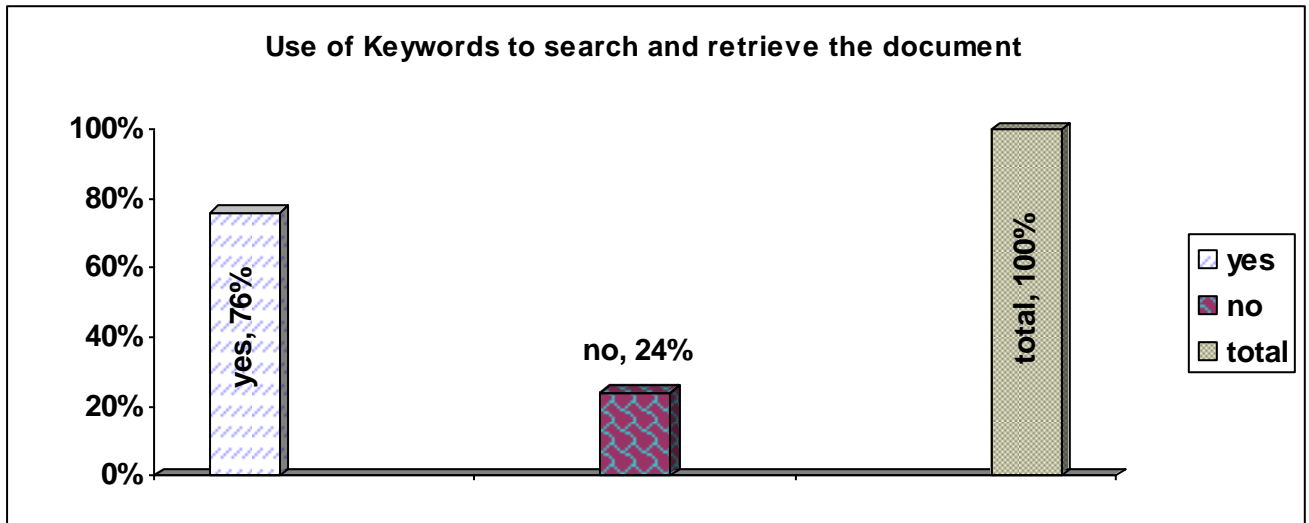
Figure 5

This table indicates that keywords were used by 42(84%) users to search and retrieve the document and were not used by 8 (16%) users in TUCL.

In NNL, keywords were used by 12(60%) users and were not used by 8 (40%) users to search and retrieve the document. Keywords were used by 16 (70%) users and were not used by 7 (30%) users to search and retrieve the document through the database in Kaiser Library. In DKRML, keywords were used by 10 (83%) users and were not used by 2 (17%) users to search and retrieve the document through the database.

In total, keywords were used by 80(76%) users and were not used by 25 (24%) users to search and retrieve the document through the database. Figure no. 4 has concluded it.

Question no 8 was to know the matching of keywords in the databases with the users' demand which is shown in table no 7.

Table no 7: Matching of keywords used in the data basis with users' demand

Name of library	Matching of key words					
	Yes		No		Total	
	No	%	No	%	No	%
TUCL	32	64	18	36	50	100
NNL	14	70	6	30	20	100
Kaiser	14	61	9	39	23	100
DKRML	6	50	6	50	12	100
Total	66	63	39	37	105	100

Source: Field Survey

This table shows that keyword used in the databases of TUCL were matched with 32 (64%) users' demand and were not matched with 18 (36%) users' demand. likewise of NNL databases keywords with 14 (70%) users' demand and were not matched 20 (30%) users' demand. Keywords of Kaiser Library databases were matched with 14 (61%) users' demand and were not matched with 9(39%) users' demand. Likewise of DKRML's database keywords were method with 6 (50%) and were not matched with 6 (50%) users' demand.

In total, keywords used in the databases of the libraries were matched with 66 (63%) users' demand and were not matched with 39 (37%) user's demand. Figure no 6 has shown it clearly.

Matching of key words

Yes
No
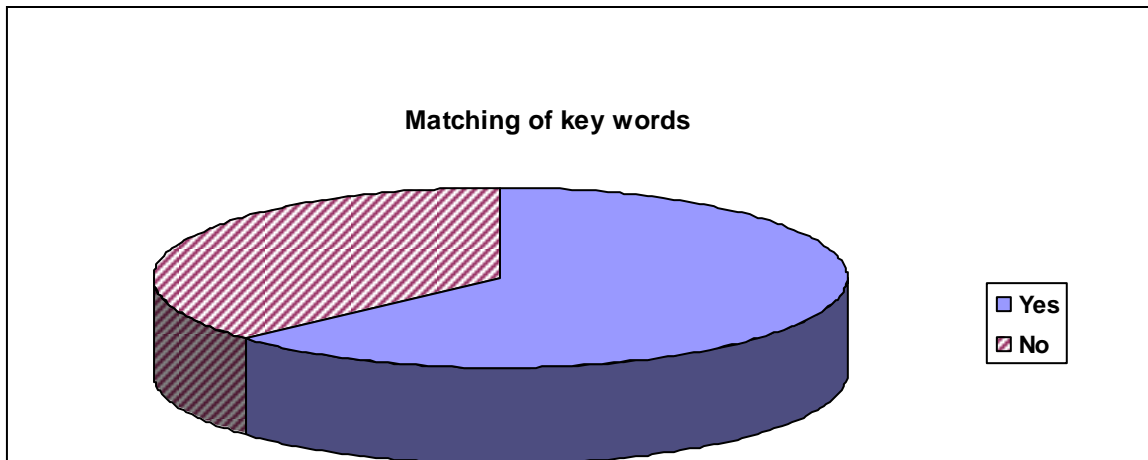
Figure no 6

Question no. 9 was developed to know the users' view either they have retrieved the exact information through the keywords that used in the databases or not. Which in showed in table no 8.

Table no 8 : Exact information retrieval through the keywords that used in the databases

Name of library	Information Retrieval					
	Yes		No		Total	
	No	%	No	%	No	%
TUCL	20	40	30	60	50	100
NNL	10	50	10	50	20	100
Kaiser	11	48	12	52	23	100
DKRML	6	50	6	50	12	100
Total	47	45	58	55	105	100

Source: Field survey

This table shows that 20 (40%) users had retrieved and 30 (60%) users had not retrieved the exact information through the keywords that used in the database of TUCL. Likewise, 10(50%) users' had retrieved and 10 (50%) users

had not retrieved the exact information through the keywords that used in the databases of NNL. 11 (18%) users had retrieved and 12 (52%) users had not retrieved the exact information through the keywords that used in the database of Kaiser library. In DKRML, it seemed equal member.

In total, 47 (45%) users had retrieved and 58 (55%) users had not retrieved the exact information through the keywords that used in the database of libraries. Figure no 7 shows it clearly.

Information Retrieval
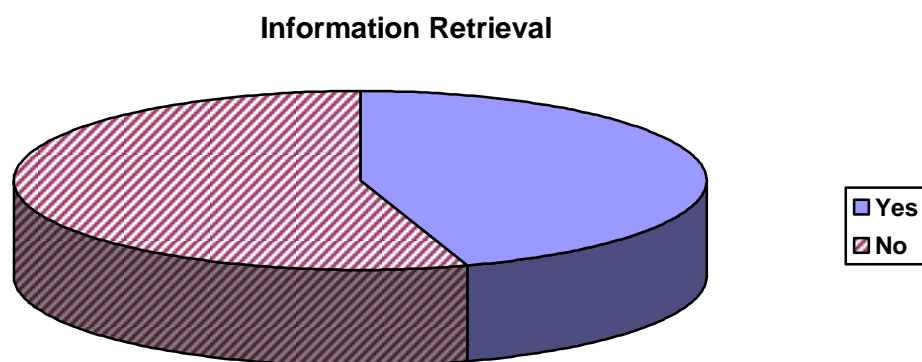
Figure No.7

Question no. 10 was to find out the user friendliness of keywords to match users' demand and the document in the retrieval of document which is shown in table no.9.

Table no.9 *User friendliness of keywords*

Name of library	Use of Keywords					
	Yes		No		Total	
	No.	%	No.	%	No.	%
TUCL	24	48	26	52	50	100
NNL	14	70	6	30	20	100
Kaiser	14	61	9	39	23	100
DRKML	4	33	8	67	12	100
total	56	53	49	47	105	100

Source: Field survey
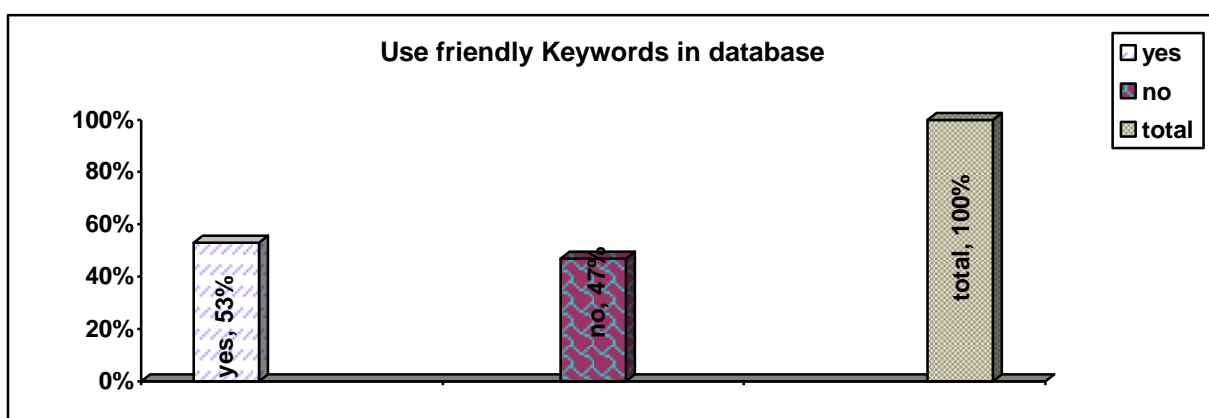
Figure 8

According to this table, 24 (48%) users were found friendliness of keywords and 26(52%) users were not found the friendliness of keywords in TUCL. 14 (70%) users were found friendliness of keywords and 6 (30%) users were not found friendliness of keywords in NNL. 14 (67%) users were found friendliness and 9 (39%) users were not found the friendliness of keywords in Kaiser library. Likewise 4 (33%) users were found friendliness and 8 (67%) users were not found the friendliness of keywords in DKRML.

In total, 56 (53%) users were found friendliness of Keywords and 49(47%) users were not found the friendliness of keywords out of 105 users. Figure no. 5 has made it clear.

Question no 11 was to show the users' views about matched keywords with their desired document to retrieve which is shown in table no 10. It has also helped to examine the key terms whether they are matched with users' demand and document or not.

Table no 10 : Matched keywords with user's desired document to retrieve

Name of library	Matched keywords					
	Yes		No		Total	
	No	%	No	%	No	%
TUCL	26	52	24	48	50	100
NNL	14	70	6	30	20	100
Kaiser	8	35	15	65	23	100
DKRML	6	50	6	50	12	100
Total	54	51	51	49	105	100

Source: field survey

This table shows that 26 ((52%) users had got matched keywords with their desired document to retrieve and 24 (48%) had not got in TUCL. 14 (70%) users had got and 6 (30%) users had not got matched keywords with their desired document to retrieve in NNL. 8 (35%) users had got and 15 (65%) users had not got in Kaiser Library. Equal number was there incase of DKRML.

In total, 54 (51%) users had got 51 (49%) users had not got matched keywords with their desired document to retrieve. It is shown clearly in figure no 9.

Matched keywords
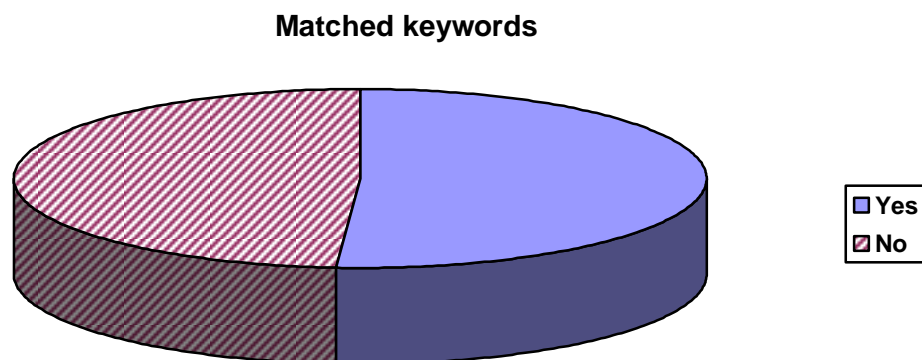
Figure no 9

Question no. 12 was developed to know either the keywords are covered all the impotent information of users' desired document to retrieve or not

Table no 11: Covering of all the important information from the keywords of user's desired document to retrieve.

Name of library	Covering of all important information from the keywords					
	Yes		No		Total	
	No	%	No	%	No	%
TUCL	10	20	40	80	50	100
NNL	8	40	12	60	20	100
Kaiser	13	57	10	43	23	100
DKRML	6	50	6	50	12	100
Total	37	35	68	65	105	100

Source : field survey.

This table indicates that keywords had covered all the important information of 10 (20%) users' desired document to retrieve and 40 (80%) users' had not covered in TUCL. 8 (40%) users' desired document to retrieve had covered and 12 (60%) users had not covered in NNL13 (57%) users'

desired document to retrieve had covered and 10 (43%) users' had not covered in Kaiser Library. But in DKRML, the number was found same.

In total, Keywords had covered all the important information of 37 (35%) users' desired document to retrieve and 68 (65%) users' had not covered. Figure no 10 shows it clearly.

Covering of all important information from the keywords

☐ Yes
☒ No
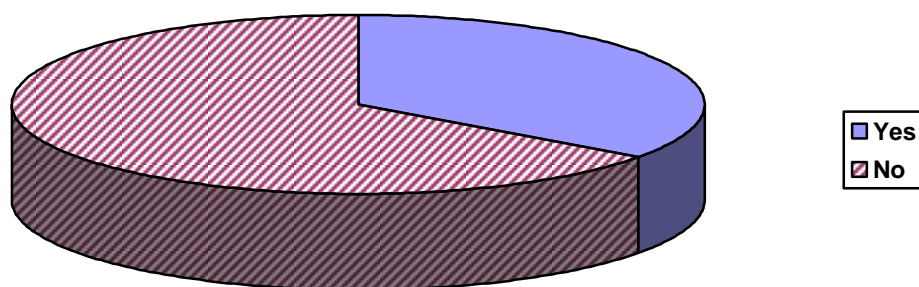
Figure no 10

Question no 13 was to find out the covered of the information by the single keyword excluding subject which is shown in table no. 12

Table no. 12. *Information retrieval through a single keyword.*

Name of library	Use of Keywords					
	Yes		No		Total	
	No.	%	No.	%	No.	%
TUCL	20	40	30	60	50	100
NNL	6	30	14	70	20	100
Kaiser	5	22	18	78	23	100
DRKML	-	-	12	100	12	100
total	31	30	74	70	105	100

Source: Field survey
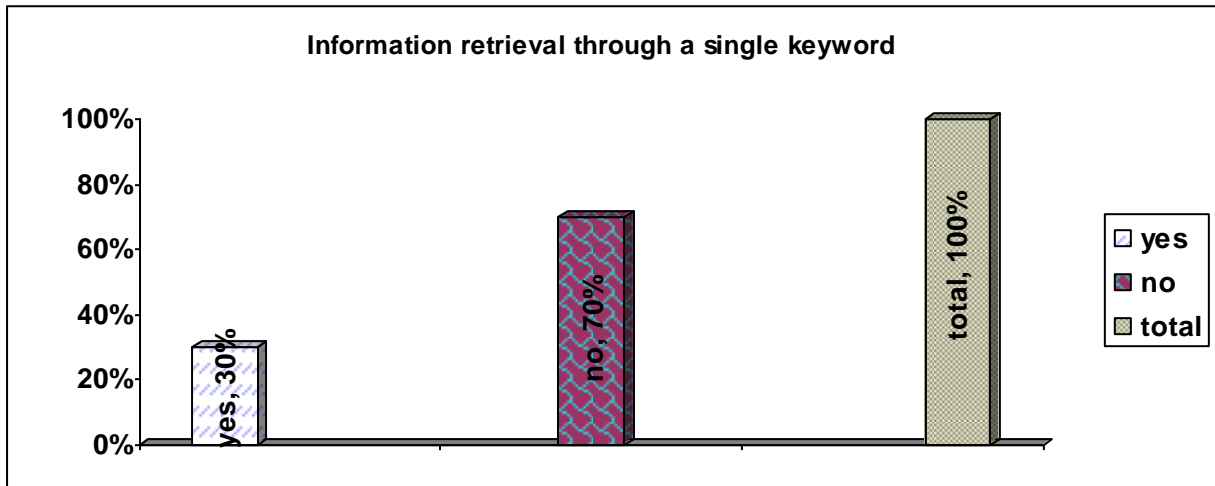
Figure11

This table show that 20 (40%) users had retrieved their desired information through the single keyword and 30 (60%) users had not retrieved in TUCL. 6 (30%) users had retrieved and 14 (70%) users had not retrieved their desired document through the single keyword in NNL. In Kaiser Library, 5 (22%) users had retrieved and 18 (78%) users had not retrieved their needed document through the single keyword. Likewise 12 (100%) users had not retrieved the document through the single keyword in DRKML.

In total, only 31 (30%) users had retrieved their desired document through single keyword and 74 (70%) users had not retrieved. Figure no. 12 has concluded it.

Question no 14 was developed to know the view about the number of keywords in betterment of information retrieval which is shown in table no.13. It has helped to examine the information retrieval facility on the basis of one, two and more than two keywords.

Table no. 13   *Better for information retrieval*

Name of Library	Number of keywords							
	Only one		Two		More than two		Total	
	No.	%	No.	%	No.	%	No.	%
TUCL	12	24	4	8	34	68	50	100
NNL	6	30	2	10	12	60	20	100
Kaiser	6	26	4	17	13	57	23	100
DKRML	2	17	3	25	7	58	12	100
Total	26	25	13	12	66	63	105	100

Source: Field survey
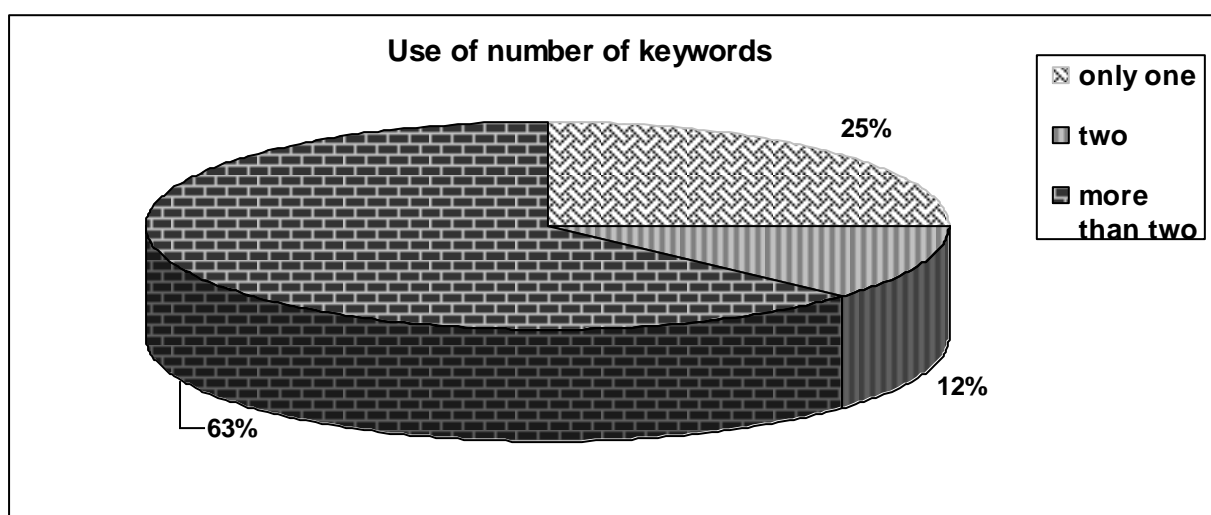
Figure 12

From the table, 12 (24%) users were in favor of only one keyword, 4 (8%) users were of two keywords and 34 (68%) users were in favor of more than two keywords for the betterment of information retrieval in TUCL. In NNL, 6 (30%) users were in favor of only one keyword, 2 (10%) users were of two keywords and 12 (60%) users were in favor of more than two keywords. 6 (26%) users were in favor of only one keyword, 4 (17%) users were of two

keywords and 13 (57%) users were in favor of more than two keywords in Kaiser library. Likewise, in DKRML, 2 (17%) users were in favor of only one keyword, 3 (25%) were of two keywords and 7 (58%) users were in favor of more than two keywords.

In total, 26 (25%) users were in favor of only one keyword, 13 (12%) users were of two keywords and 66 (63%) users were in favor of more than two keywords for the betterment of information retrieval. Figure no.12 shows it clearly.

Question no. 15 was developed to find out the system that the users used to retrieve the exact information from the collection of document which is shown in table no 14.

Table no 14. *Systems for information retrieval*

Name of Library	Systems									
	Keywords		Subjects		Catalogue		All		Total	
	No.	%	No.	%	No.	%	NO.	%	No.	%
TUCL	24	48	2	4	18	36	6	12	50	100
NNL	12	60	2	10	-	-	6	30	20	100
Kaiser	10	43	3	13	5	22	5	22	23	100
DKRML	5	42	2	17	1	8	4	33	12	100
Total	51	48	9	9	24	23	21	20	105	100

Source: Field survey

System of Information Retrieval
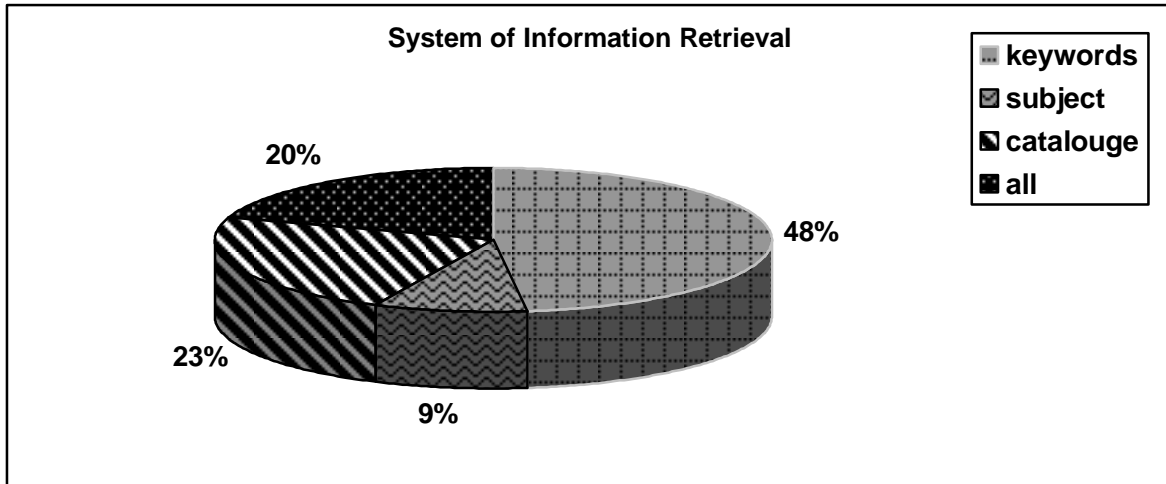
Figure 13

From the table, keyword system was used by 24 (48%) users, subject was used by 2 (4%) users, catalogue was used by 18(36%) users and all three systems were used by 6 (12%) users of TUCL.

Keywords were used by 12(60%) users, subject was used by 2 (10%) users, both systems were used by 6 (30%) users of NNL.

Keywords were used by 10 (43%) users, subject was used by 5 (22%) users and all the systems were used by 5 (22%) users of Kaiser library.

Keywords was used by 5 (42%) users, subject was used by 2 (17%) users, catalogue was used by 1 (8%) user and all the systems were used by 4 33%) users of DKRML.

In total, the outcome seems that keywords are used by 51 (48%) users, subject by 9 (9%) users, catalogue by 24(23%) users, and all the systems by 21 (20%) users for information retrieval. Figure no. 13 represents it clearly.

Suggestions given by users that for and against about keywords as information retrieval tool are given below.

Keywords should be taken from everyday use under the guidance of flexible rules. More direct forms of keyword should be preferred. Keywords should be taken seriously as a strong tool for information retrieval.

Keywords are the most important information retrieval tool among others.

Keywords should cover important information of users' desired document to retrieve.

Keyword search is better way than subject base search because the former is faster and more to the point to retrieve desired information.

The exact information from the collection of document is possible to retrieve only through the keywords.

Keywords cover all the information to point the document.

Librarians' (Professionals') response

Librarians' responses for the keywords assigning and the keywords as information retrieval tools was found similar views. It was found from interviews with them and their responses of the questionnaires. But how much are they serious in updating the used tools for uniformity and consistency in work are given below as comparison in one glance.

Table no 15 *Tools used for assigning the keywords in the libraries*

Name of Library	DDC. Ed.	Subject heading list		Thesauri	Authority list	Software
		LCSH	SLSH			
TUCL	16th ed. to 22nd ed	27th ed.	-	Spine macro Unesco CAB ERIC	Descriptors (subject used in TUCL data base), 2003. TUCL "Nepali subject heading" 1996.	CDS/ISIS WIN/ISIS
NNL	22nd ed.	24th ed.	15th ed.	Unesco	-	WIN/ISIS & Unicode
Kaiser	22nd ed.	-	15th ed.	-	-	WIN/ISIS Unicode
DKRML	22nd ed	-	15th ed	UNBIS	-	WIN/ISIS & Unicode

Source: Field survey

This table shows that all the tools used in the mentioned four libraries for keywords assigning and its application to update the service scenario in information retrieval.

In present LCSH is published in 30th edition (2007) and SLSH is published in 19th edition (2007).

Total subject headings and keywords assigned by these libraries on the subject of Library and information science were collected from their data bases as well manual which are shown below in the given table as comparison.

Table no. 16 *Subject heading and keywords used by those libraries*

Name of Library	Total volume books of library and information science	Keywords used excluding the same terms	Percentage (%)
TUCL	1240	306	59
NNL	149	103	20
Kaiser	61	80	16
DRKML	22	26	5
Total	1472	515	100

Source: field survey

This table shows that out of total number assigned keywords 59 percent from TUCL, 20 percent from NNL, 16 percent from Kaiser and 5 percent from DKRML library. It shows more uniformity and consistency terms are used in TUCL than other libraries.

Though some keywords that assigned by libraries were found incorrect, inconsistent, and not uniformity to each other libraries, they are modified according to controlled vocabulary which are included in appendix 1. the source of appendix 1 was databases of all four libraries and basis for it is SLSH (18th ed.). These terms are uniform, consistent and controlled vocabulary even for the coming days to assign keywords and subject headings.

CHAPTER SIX

Summary, Conclusion and Recommendations

6.1.   Summary and Conclusion

Library is considered as "a Universe of knowledge, treasure of human civilization, seed of research and development, bud of science, flower of technology and fruit of new knowledge."

As well it is social institution cum service institution and is responsible for acquiring or providing access to books, documents, information and other media that meet educational, recreational, educational and informational need of its users. To provide right information to the right person at the right time with the right way in the right form on a right language is its motto.

So, keywords are the most important information retrieval tool by which each and every important piece of information can be retrieved and can be represented the document from each and every corner. It is the keyword which covers the important information of the book where the subject covers the broad area only.

So, the librarian should assign sufficient keywords to represent all the important piece of information of the document to save the time of users as well as of staffs to retrieve the exact information from the myriad of information collection.

For this subject headings list, thesauri give uniform, consistent, user friendly keywords as controlled vocabulary to match the document and users' need/desire and library has to have an own authority list to update the new emerging keywords and subjects which are lacked in the subject heading lists and thesauri as the time changing.

Sufficiently assigned keywords for the document and that inputted in the bibliographical database of computer have helped to users to retrieve the exact information pinpointed, exhaustively, expeditiously and promptly but those libraries which don't have computer also should put the computer for the users to search the document through the database and keywords.

This study found the keywords is the most important information retrieval tool. Based upon the responses given by users and librarians, observations of libraries, interviews with the librarians, the researcher has found the following findings and conclusion.

1. Either member or non member, habitual or potential users have used keywords to retrieve the document.

2. keywords assigned using subject headings list, thesauri, authority list are more users friendly, matched with users' demand and the document.

3. Single keyword has not supported to retrieve the exact information from the document.

4. More than two keywords have proved to be better in information retrieval than only one keyword or two keywords.

5. Keyword system has become the most important system to retrieve a piece of information among subject, catalogue, keywords and all.

6. Three libraries don't have their own authority list for assigning the newly emerged keywords and subjects.

7. All librarians are not serious to update the tools according to the new edition.

8. No library has uniform uses of keywords in its own databases due to the lack of their own authority list.

9. For maintaining consistency and uniformity these libraries do not have any coordination among them.

10. Consistency, uniformity and controlled vocabulary in the use of terms are not always realized.

11. Users have faced problems in database search.

12. 68% users have not retrieved the information through the subject.

13. Keywords used in the databases of the libraries are matched with 63% users demand and are not matched with 37% users' demand.

14. 45% users have retrieved and 55% users have not retrieved the exact information through the keywords that used in the databases of the libraries.

15. 51% users have got and 49% users have not got matched keywords with their desired document to retrieve.

16. Keywords have covered all the important information of 35% users desired document to retrieve and have not covered of 65% users' desired document.

17. Keywords are used by 76% users to search and retrieve the document through the database.

6.2. Recommendations

The aim of keywords assigning is to cover and represent all the important information of the document to retrieve promptly among the myriad of information collection as and when needed where the subject heading covers only the broad area. So, in this scenario, some recommendations may be fruitful to suggest.

1. Every library should make authority list for assigning keywords and subject headings for uniformity, consistency and up-to-date.

2. Every library should purchase the updated tools for controlled vocabulary.

3. Every library should provide the computer to users to search and retrieve the information from the bibliographical databases.

4. Library users' orientation should be given for searching the database through the computer to retrieve the information.

5. Cooperation among the libraries is must.

6. librarians should be sincere while assigning the keywords and subject headings.

7. Keywords should be assigned to match users' demand and document.

8. Assigned keywords should cover all the important information of the document.

9. Users friendly keywords should be assigned for the document to retrieve.

10. Appendix 1 can be used to assign the keywords and subject headings as controlled vocabulary for the documents related to library and information science discipline. By analogy of this example other keywords also could be constructed and used in other disciplines as well.

11. It is suggested to the concerned librarians to be more careful and conscious to assign more and more keywords so that all the related information be retrieved.

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The new encyclopedia Britannica: micropedia knowledge in depth v. 22". -15th ed. - Chicago: Encyclopedia Britannica Inc, 1990 p.968.

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APPENDIX-1

Keywords assigned by four libraries in the discipline of library and information science.

- Abstracting
- Abstracts
- Academic libraries
- Archives
- Audio books
- Audio visual materials
- Automated cataloguing
- Best sellers (books)
- Bibliographic control
- Bibliographic databases
- Bibliographic description
- Bibliographic instructions
- Bibliographic services
- Bibliographic standards
- Bibliographies
- Book catalogues
- Book reviewing
- Book reviews
- Book selection
- Book talks
- Bookbinding
- Book mobiles
- Book lets
- Books and reading
- Books -Censorship
- Business libraries
- Card catalogues
- Catalogues
- Cataloguing
- Cataloguing of music
- Cataloguing rules
- Children's libraries
- Classification
- Classification systems
- Classified catalogues

- Clippings (books, newspapers, etc.)
- Colon classification
- Communication
- Corporate libraries
- Databases
- Dewey Decimal classification
- Digital Libraries
- Documentation
- Files and filing
- Government aid libraries
- Government libraries
- Government publications
- High school libraries
- Hospital libraries
- Index numbers
- Index terms
- Indexes
- Indexing
- Indexing languages
- Indexing services
- Information
- Information analysis
- Information and development
- Information campaigns
- Information centers
- Information dissemination
- Information industry
- Information management
- Information materials
- Information networks
- Information policy
- Information processing
- Information recording
- Information resources

- Information retrieval
- Information science education
- Information sciences
- Information society
- Information sources
- Information systems
- Information systems-Management
- Information technology
- Information theory
- Information transfer
- Information user needs
- Information user studies
- Information users
- Information/ library development
- Information/library legislation
- Instructional materials centers
- Interlibrary loans
- International standard bibliographic description
- Internet addresses-Directories
- Internet searching
- Large print books
- Librarians
- Librarianship
- Librarians-Ethics
- Librarians-In service training
- Librarians-Rating
- Librarians-Recruiting
- Libraries
- Libraries-Acquisitions
- Libraries-Administrations
- Libraries and community
- Libraries and labor
- Libraries and motion pictures
- Libraries and pictures
- Libraries and schools
- Libraries and students
- Libraries and elderly
- Libraries associations
- Libraries-Automation
- Library-Censorship
- Libraries-Centralization
- Libraries-Collection development
- Libraries-Equipment and supplies
- Libraries-Government policies
- Libraries-Lighting
- Libraries-public relations
- Libraries-Special collections
- Libraries-Statistics
- Libraries-United states
- Library architecture
- Library associations
- Library buildings
- Library catalogues
- Library circulation
- Library classification
- Library collections
- Library cooperation
- Library development
- Library education
- Library education-Audiovisual aids
- Library education-Curricula
- Library equipment
- Library extension
- Library finance
- Library information networks
- Library information service
- Library law
- Library legislation
- Library management
- Library networks
- Library operations
- Library organizations
- Library personnel
- Library planning

- Library policy
- Library profession
- Library resources
- Library resources-Conservation and restoration
- Library schools
- Library science
- Library science education
- Library services
- Library statistics
- Library surveys
- Library systems
- Library technical processes
- Library technicians
- Library trusties
- Library users
- MARC formats
- Music libraries
- National libraries
- Periodicals
- Public libraries
- Publishers and publishing
- Reference books
- Reference books-Reviews
- Reference services
- Regional libraries
- School libraries
- Special libraries
- State libraries
- Subject catalogues
- Subject headings

List of subdivisions/form headings

- Administration
- Archives
- Audio visual aids
- Automation
- Book reviews

- Books and readings
- Case studies
- Censorship
- Classification
- Collection and preservation
- Collections
- Computer networks
- Computer software
- Conservation and restoration
- Databases
- Dictionaries
- Directories
- Documentation
- Encyclopedias
- Environmental aspects
- Ethics
- Exhibitions
- Guide books
- Hand books, manuals
- Heating and ventilation
- History
- Indexes
- Information resources
- Information services
- Internet resources
- Library resources
- Manuscripts
- Maps
- Materials
- Personnel management
- Preservation
- Publishing
- Purchasing
- Reading materials
- Research
- Reservations
- Services for sources

APPENDIX-2

Tribhuvan University Central Library
BIBLIOGRAPHICAL DATA ENTRY WORK SHEET

Call Number (610) (Class No)^a................................. **(Book No.)^b**...................... **^c**......

Input Date (22) .... **Type of Material (60)** ....

Accession No. (1) ....

....

Personal Author (300) ....

....

Title (200) ....

....

....

Edition Statement (260) .... **ISBN (100)** ....

Place & Publisher (400) (Place)^a...

(Publishsher)^b.. **(Country)^d** ......

Date of Pub.(440) .... **Pages (460)^a** .... **^b**.................**Language (31)** ....

Price (465) .... **Note (500)** ....

....

(501) Bibliography : p. ....

Broad Subject (30) ....

Keywords (620) ....

....

....

Geographical Area (630) ....

....

Local Descriptors (640) ....

....

Thesis Description (650)^a ....^b ....

.... ^c..

Name of Corporate Body (310) (Name)^a ....

....

(Other Name)^b ....

(Address)^d .... (Country)^e ....

Name of Meeting (320) (Name)^a ....

....

(Country)^e.. (Loc. of Meeting)^g........................

(Date)^i.. (No. of Meeting)^j ....

Series Statement (480) Name)^a..

.... (Number)^b ....

Content Note (530) ....

...:..

....

Data Transfer   **Data Entry**   **Data Verification**

APPENDIX-3

Nepal National Library
Bibliographical Data Entry worksheet
for
National Union Catalogue on Nepal Publications

Databas Name: _____ → Worksheet: _____ Language (31): _____

Inpute Date (22): _____ Call No. (610): _____

Personal Author (300): _____

Corporate Body (310): _____

_____

Title (200): _____

Edition (260): _____ place (400): ^a _____

Publisher: ^b _____

Year of Publication (440): _____

Physical description (460): ^a _____ ^b _____

Series Statement (480): _____

Note (500): _____

_____

Broad Subject Heading (30): _____

Keywords (620): _____

_____

Geographical Descriptors (630): _____

ISBN (100): _____ ISSN (101): _____

Location (Holding Library) _____

Country of Origion: _____ Language of Text: _____

Conference/Meeting (320): _____

_____

National Union Catalogue No (110): _____

Copyright No.: _____

Type of Material (060): _____

Accession No.: (1) _____

Kaiser Library, Kaiser Mahal
— Bibliographical Data Entry Worksheet —

Database Name: ....Worksheet ....Language (31) ....

Input Data (22) :...................................Call No.(610).........................

Personal Author (300)...
....

Corporate Body (310):..
....

Tital (200):...
....

Edition(260):.........................place (400):^a ....

Publisher:^b...

Year of Pubication (440):..

Physical description (460):^a............................^b.........................

Series Statement (480):..

Note (500):..
....

Broad Subject Heading (30):..

Keywords (620):...
....

Geographical Descriptors (630):..

ISBN (100)..................................ISBN(101)..............................

Location(Holding Library)...

Country of Origin:.........................Language of Text.......................

Conference/Meeting (320):...
....

Type of Material (060)..

A. C. N...

Dilliraman-Kalyani Regmi Memorial Library
Bibliographical Data Entry Worksheet

Databas Name: _____ Worksheet: _____ Language (31): _____

Input Date (22): _____ Call No: (610): ^a Class No. _____

                ^b Book No. _____

Personal Author (300): _____

_____

Corporate Body (310): _____

_____

Title (200): _____

_____

Edition (260): _____ place (400):^a _____

Publisher: ^b _____

Year of Publication (440): _____

Physical description (460): ^a _____ ^b _____

Series Statement (480): _____

_____

Note (500): _____

_____

Broad Subject Heading (30): _____

Keywords (620): _____

_____

Geographical Descriptor (630): _____

Local Descriptor (640): _____

ISBN (100): _____ ISSN (101): _____

Location (Holding Library): _____

Country of Origin: _____ Language of Text: _____

Conference /Meeting (320): _____

_____

Thesis Descriptor (650): _____

National Union Catalogue No (110): _____

Copyright No.: _____

Type of Material (060): _____

Accession No.(1): _____

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