Introduction to Information Retrieval Tools of Users of Pharmacy Colleges Special Reference to Rajasthan

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Introduction

Libraries have been considered as a first environment for longer tradition of organizing information for the purpose of retrieval and for posterity. Information organization is a prerequisite for retrieval. Finding or retrieving anything that isn't organized can be challenging or impossible. As a result, we have a variety of tools that are structured to help us find the information we need: books, directories, dictionaries, encyclopaedias, bibliographies, indexes, catalogues, museum registers, archival findings aids, and databases, among others. Recorded information, however, in itself is of no use unless it is stored in such a way that is can be retrieved easily and made readily available for use it. Hence, The act of choosing information from a storage is known as information retrieval. The design of information-retrieval systems based on these physical devices has developed into a significant area of applied information technology as the process becomes more and more dependent on physical processes, particularly on information transmission and technology.[1]

Getting information for one's tasks, such as study, problem solving, decision-making, production, or service, is the main benefit of information retrieval. There are four main categories of information retrieval. These include text retrieval, query retrieval, document retrieval, and reference retrieval. Reference retrieval, in which the records represent books, documents, and other library materials and the number of different attributes available for the identification of the information items is essentially limitless. Document retrieval, in which simple structured files are typically processed, using a small number of well-defined attributes to characterize each record, and a restricted set of pre-specified query types to access the database. In that situation, the enquiries frequently discuss the informational content of certain papers. In the most general scenario, a retrieval system may be built to handle any type of query and provide direct responses to such queries; in fact, retrieval may require a wide range of different types of information identifiers, and the answers may need to be based not only on a thorough analysis of each individual information item, but also on general knowledge and other extraneous factors. Text about a specific topic is retrieved in text retrieval rather than references, data, or substitutes for documents.

The following four primary system elements are considered while formulating the retrieval problem, regardless of the retrieval context.[2]

a) The physical items, papers, or records (which collectively make up the information files to be processed)

b) Information identifiers, phrases, index terms, keywords, attributes, etc. (which describe the records or documents and, in each instance, represent the information content)

c) The information requests that are to be compared (and enter the system)

d) Choosing information from a store is the process of information retrieval.

Information retrieval (IR) is the study of methods for categorizing and locating data from computer-stored text. Long-term information needs are taken into account by text categorization, text routing, and text filtering systems. Using a list of predetermined categories, text categorization automatically assigns labels to the text. For instance, abstracts in computer science could be categorized according to topics like operating systems, data structures, artificial intelligence, etc. This classification would undoubtedly be helpful to a large number of individuals interested in a certain area of computer science. Systems for text routing accept a list of profiles, or categories of interest, and automatically route texts to the appropriate individual when they fit a profile. Only specific texts are permitted to pass via text filters. Only topics that the user is interested in are passed on to them through the filter.[3]

Goals Of The Suggested Study

Informational resources in libraries are pricey. Additionally expensive in terms of organization and upkeep are the libraries' requirements to manage the materials and make them available.4 These factors took into consideration the necessity of the proposed study on Pharmacy colleges in Rajasthan in order to achieve cost effectiveness in pharmacy library services of academic institutions and encourage the usage of library information resources. The following were the goals of the proposed study:

1.   To research the current state of information retrieval systems.

The Pharmacy Library, Users (faculty members, researchers, and students) of several colleges in Rajasthan provided the necessary data for the current study. The study's major foundation was a well-designed questionnaire that was used to gather both primary and secondary data from pharmacy customers. Academic pharmacy libraries have conducted in-person interviews with their patrons (faculty members, researchers, and students) to address any questions that were raised in the questionnaire. The secondary data was gathered from sources like college websites, national and international publications, magazines, reference books, textbooks, and reference books.

 The proposed study included random sampling approaches for the selection of pharmacy libraries and pharmacy users (faculty members, research scholars, and students) at pharmacy institutions in Rajasthan.

To gather data and pertinent information on many elements of Introduction to Information Retrieval A questionnaire was developed called Tools of Users of Pharmacy Colleges with Particular Reference to Rajasthan.

The Rajasthan Pharmacy Colleges and its clients (staff, researchers, and students) were issued the questionnaires. When the questionnaires weren't answered within a month, respondents were reminded to deliver their answers and also pursued. In the end, according to the instructions, 835 correctly completed questionnaires from users at 31 pharmacy institutions were returned. When necessary for the proposed study, these questionnaires have been carefully examined and altered for tabulation and statistical analysis.

Table No.1 Pharmacy College in Rajasthan (Respondents of Questionnaire)

S.No.	Name of Pharmacy College	Year of Foundation	Affiliated with	Approved	Type of College
	ACP, Alwar	1998	RUHS	PCI/AICTE	Private
	ACP, Jaipur	2005	RUHS	PCI/AICTE	Private
	AIP, Jaipur	1998	RUHS	AICTE	Private
	ACP, Jaipur	2004	RUHS	PCI/AICTE	Private
	BU, Niwai	1935	Deemed	PCI	Deemed
	BIPS, Srigananagar	2007	RUHS	AICTE	Private
	BITS,Pilani	1964	Deemed	PCI/AICTE	Deemed
	BNIP,Udaipur	1984	RUHS	PCI/AICTE	Private
	GIP, Udaipur	2006	RUHS	AICTE	Private
.	GCP,Suratgarh	1994	RUHS	AICTE	Private
.	JCP,Jaipur	2003	RUHS	PCI/AICTE	Private
.	JNU,Jaipur	2002	Self	PCI/AICTE	Private
.	JVWU,Jaipur	2008	Self	PCI/AICTE	Private
.	JPC,Jodhpur	2003	UOR	PCI/AICTE	
.	KCP,Kota	2004	RUHS	PCI/AICTE	Private
.	KCPS, Nagapur	2006	RUHS	PCI/AICTE	Private
.	LMCST,Jodhpur	1965	UOR	PCI/AICTE	Private
.	L.B.S,Jaipur	1988	RUHS	PCI/AICTE	Private

.	MACP, Jaipur	2004	RUHS	PCI/AICTE	Private
.	MACP, Jaipur	1990	RUHS	PCI/AICTE	Private
.	MGCPS,Jaipur	2003	RUHS	PCI/AICTE	Private
.	NIMS,Jaipur	2006	NIMS	PCI/AICTE	Private
.	PCP	1997	Self	PCI/AICTE	Private
.	SMS,Jaipur	1947	RUHS	PCI/AICTE	GOVT.
.	RPC,Jaipur	2006	RUHS	PCI/AICTE	Private
.	SCP,Dausa	2004	RUHS	PCI/AICTE	Private
.	SBCP,Jaipur	2003	RUHS	PCI/AICTE	Private
.	SGVU,Jaipur	2003	Self	AICTE	Private
.	SKIP,Bikaner	2005	RUHS	PCI/AICTE	Private
.	SKIP, Jaipur	2006	RUHS	PCI/AICTE	Private
.	VIP,Jaipur	2006	RUHS	PCI/AICTE	Private

Information Retrieval Basic Concepts

There are certain characteristics that all information retrieval systems share. In systems where a big number of users, each with a distinct background, may explore a database, interface design is very crucial. The terms or codes that could be utilized as index access points are known as indexing languages. Natural, regulated, and free indexing languages are available. The process of determining word combinations that must match for a successful retrieval is known as search logic. In most systems, boolean search logic is employed. Weighted-term search logic is an option. The most important search tools include those that support the following: selection of search terms, entry of search terms, combination of search terms, specification of fields to be searched, truncation, use of phrases, adjacency and proximity operators, range searching and limiting, display of records, search management, advanced display options, multi-file searching, display of thesaurus, and hypertext. Research aimed at enhancing the effectiveness and efficiency of systems, better retrieval facilities and tactics, and more advanced conversation design may result in better systems.[5]

Information Retrieval's Nature:

Although manual methods still exist and undoubtedly were in use prior to the invention of computers, information retrieval systems have nearly become synonymous with computers. There are three stages that can be seen in any information retrieval systems:

Indexing >>> Storage >> Retrieval

In order to discuss the computer in each of these three stages it will be helpful to review these three stages in manual or card-based information retrieval systems, and to make use of the three-stage model as a framework in which various different types of systems can be compared.

In such systems, human indexers assign index terms to a document or item of information. They select the topics to be represented by the index terms on the basis of a subjective, but mostly consistent, judgment of the subjects to index terms, which they believe is likely to be sought by a subsequent searcher. These two, three or more index terms for each document may be drawn form an indexing language which is controlled (i.e. there is an accepted list of terms that are to be used in the index) or uncontrolled(i.e. the indexers use any terms that they deem to be suitable). With the index terms selected, a record is made of these assigned terms and an inverted file is compiled, such as a card index or a printed index. This index constitutes the store. Retrieval is the process of locating documents and items of information that have been committed to store. In retrieval, searchers describe their subject of interest in concise terms, which they think are terms likely to have been used in the index. If the initial search terms are not present in the index, searchers may try alternative search terms until their imagination and patience are exhausted. A well- constructed index will prompt and give guidance on the selection of terms.

The assignment of indexing terms in a computerized system may be intellectual, as in a manual system, or computer-based. According to a set of guidelines, a computer chooses the index terms. Selection will now be based on word frequency rather than on a subjective evaluation of the content or the assignment of "sought" phrases. The index terms that could be allocated will be chosen from a predetermined list based on the frequency of a word in a record. Computers may also be enlisted to arrange humanly assigned index terms. The computers act as a reliable work-horse for arranging index entries in alphabetical order for display on the screen or for the printing of an index.

The computer itself may be used by information retrieval systems to store the index files or inverted files and to keep databases current.

The indexing and storage phases heavily influence the retrieval process and, in turn, the best approach for searching an information retrieval system. However, a different component that affects the retrieval process is constant regardless of the system design. In general, neither the system user nor the queries that are sent to the system change with the system. Although the ability to search a computer-based system does not affect the user's needs, those needs may change as the user gains more expertise using computer-based systems.

In theory, printed indexes created by computers can be consulted in the same manner as printed indexes created by humans. However, the characteristics of computer-produced indexes vary widely, and searchers will succeed more if they are aware of some of their drawbacks. Some indexes, especially those based on intellectually assigned strings of terms,

are likely to include very specific entries, several access points per item, and plenty of guidance. Other indexes, notably crude computer-assigned indexes, are helpful annotation and may scatter items under different terms.

Retrieval from a computer database is usually by online interrogation of the database. Online searching introduces a flexibility of search not possible with manual systems. The systems offer a wider range of search facilities than manual systems, and it is necessary for the user to become acquainted with these facilities and their potential if the user is to optimize his/her use of the systems.

One of the key features of computer-based information retrieval systems is that the database at their core can serve as the foundation for a wide range of products, from printed indexes and current-awareness bulletins to CD-ROMs and online access on external hosts.[6]

Standard retrieval facilities are available in most text-retrieval or information retrieval applications. These facilities have been developed to cater for a text-based environment, where the user does not know what documents are available and /or does not know the terms by which records can be retrieved. In many database applications, where records can be retrieved through pre-assigned codes, many of the facilities listed below. These facilities cater for the uncertainty in text- retrieval systems, such as those of the external online hosts, in house text management systems, many CD-ROM applications and online public access catalogues.[7]

Table No. 2 Text-retrieval Process

S.No.	Facility	Function
1.	Basic facilities	Sets up the environment
2.	Selecting Search terms	Allows the searcher to identify possible search terms, by viewing index lists or thesauri
3.	Entering search terms	Allows the searcher to enter search terms
4.	Combining search terms	Allows the development of search strategies using search logic
5.	Specifying fields to be searched	Allows choice of the fields in which search terms appear
6.	Truncation	Allows searching on text strings that are not complete words
7.	Phrases, adjacency and proximity	Requires words to appear in a specified context
8.	Range searching and	Searches for values within a range

	limiting	
9.	Displaying records	Displays records on the screen
10.	Search management	Reviews the search
11.	Advanced display options	To accommodate records in full-text databases
12.	Multi-file searching	Repeats searches in other databases
13.	Displaying the thesaurus	Displays controlled indexing terms and relationships between terms
14.	Hypertext	Allows user to move between occurrences of term in different records or between concepts linked by hypertext links

The items that will be saved and retrieved

A retrieval system stores information as "messages," which are physical recordings with graphic markers (numbers, text, drawings, etc.) that convey information that the recipient can understand. Records in retrieval systems can be of various types, including:

• Information regarding relevant variables, both quantitatively and qualitatively

• Texts (with images) on a wide range of subjects;

• Graphics such as drawings, charts, graphs, and maps;

• Computer applications;

• Object descriptions, such as those of minerals, laboratory instruments, and machinery;

• The names and locations of individuals, organizations, and manufacturers;

• Bibliographic references, which serve as markers for the names and locations of texts containing any of the information kinds mentioned above.

• Information retrieval is typically a lengthy, multi-step procedure. For instance, the following steps would be performed to obtain some quantitative data on a manufactured material's characteristics:

• Look up relevant text references in the bibliography;

• Track down the texts and identify the ones that mention a manufacturer by name and a computer databank that might include information on the item;

• Lookup the manufacturer and the databank in directories;

• Speak with the manufacturer to obtain a pamphlet providing the necessary information;

Access extra data by using a database.

The effective structure of message stores and the selection and manipulation of search keys are the technological issues with information retrieval. With the advancement of computer-based retrieval methods, the variety and complexity of these issues have grown.[8]

Tools

In the majority of libraries, traditional information retrieval technologies are used in printed form. They come in the following various varieties:

- Books with indexes and chapter headings;

- Handbooks and manuals with indexes and section headers;

- Book and other printed material catalogs and bibliographies;

- Abstracting and indexing publications that include references to journal articles, technical reports, patents, and other works, organized by topic and with indexes;

- Printed directories of individuals, organizations, businesses, etc.

However, in the age of information era, the basic retrieval tools that have been using for retrieval of information in libraries. These are:

1 Bibliographies

2 Pathfinders

3 Catalogs

4 Indexes

5 Getting help

6 Records

7 Search Engines

8 Both databases and bibliographic networks house retrieval tools, yet they serve different purposes.

Information Retrieval Tool Used In Pharmacy Libraries

Pharmacy libraries are known for use of specialized and modern tools and techniques for access to information and retrieval. As such, classification, cataloguing, Indexing and application of information and communication technologies are some of the common features in Pharmacy libraries. In addition, the emphasis on subject areas keeps on changing in the

concerned organization. Thereby resulting in modification of classification, cataloguing, indexing and information retrieval tools and techniques takes place. Substantial part of computerization and online access of databases are being done by Pharmacy libraries.

In order to make a study on information retrieval tools facilitated by Pharmacy College and used by the users for access to information and retrieval of information. For the purpose, a survey was made through questionnaire.

The questionnaires have been sent to 31 Pharmacy colleges and the data received from respondents have been depicted in Table No. 3

Table No. 3.1 Statistical Analysis of Information Retrieval Tool used in Pharmacy Library

	Statistical Analysis Information Retrieval Tool	
Inforamtion Retrieval Tool	**Frequency out of 31 College**	**Percentage**
Bibliographies	12	38.71
Catalogue	19	61.29
Indexes	14	45.16
Finding Aids	3	9.68
COM	27	87.10
OPAC	11	35.48
Search Engine and Directories	20	64.52

Figure 1 Statistical Analysis Information Retrieval Tool used in Pharmacy Library
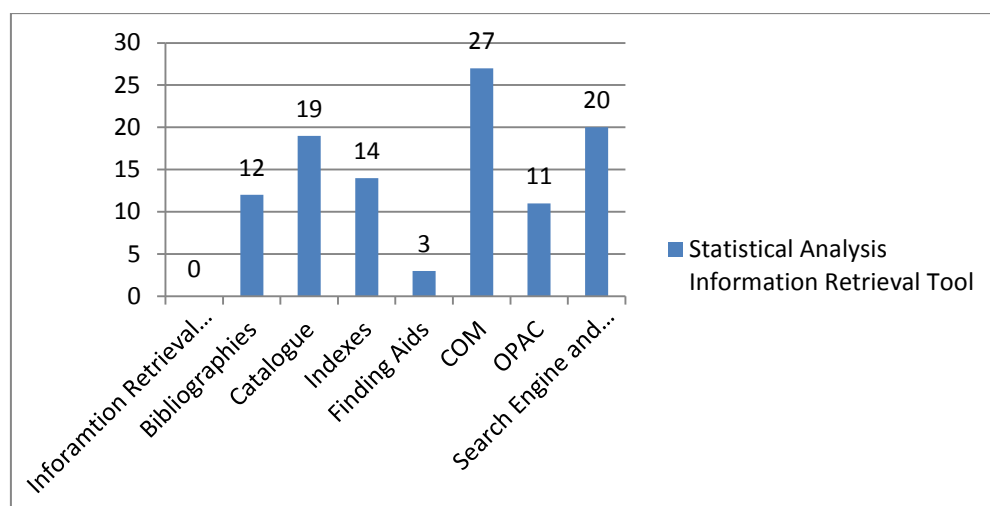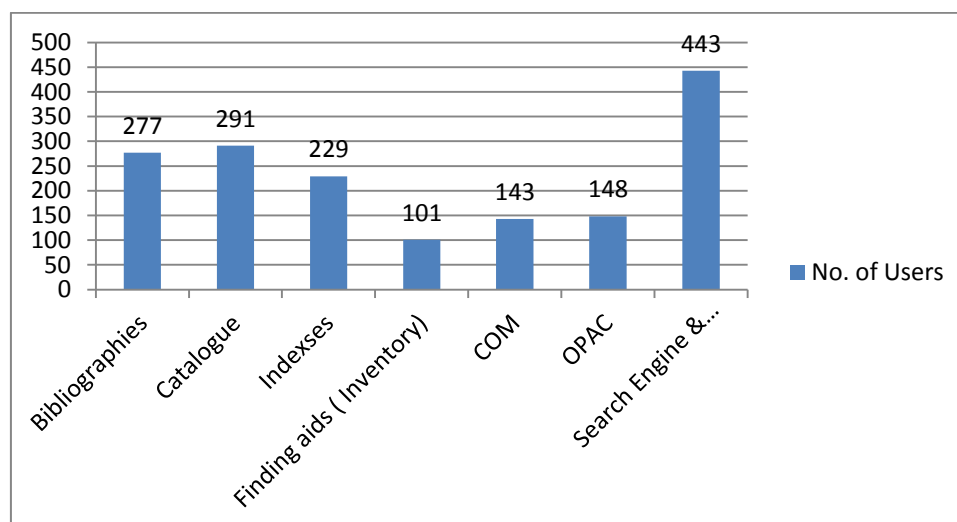
It can be revealed from Table 3 that information retrieval tools used in pharmacy libraries are varying. 12 (38.31%) pharmacy college libraries maintain bibliographies, 19 (61.29%) pharmacy college libraries maintain catalogue, 14 (45.16%) pharmacy college libraries maintain indexes , 03 (9.68%) pharmacy college libraries maintain finding aids, 27(87.10%) pharmacy college libraries maintain COM, 11 (35.48%) pharmacy college libraries maintain OPAC and 20 (64.52%) %) pharmacy college libraries maintain search engine and directories. (Figure 1)

Information retrieval tools used by users to retrieve the information, the users were asked to specify the information retrieval tool in questionnaire. Such data has been analyzed and depicted in Table No.3.2

Table No.3.2 Information Retrieval Tool used by Users

Name of Information Retrieval Tool	No.	%
Bibliographies	277	17.0
Catalogue	291	17.8
Indexses	229	14.0
Finding aids (Inventory)	101	6.2
COM	143	8.8
OPAC	148	9.1
Search Engine & Directories	443	27.1
Total	**1632**	100.0

Figure 2 Information Retrieval Tool used by Users

From the data of Table 3, it can be revealed that the users were asked to indicate the information retrieval tools which are used by them to retrieve the information. 277 (17.0%) users use bibliographies, 291(17.8%) users use catalogue, 229(14.0%) users use indexes, 101(6.2%) users use finding aids (inventory), 143(8.8%) users use COM, 148(9.1%) users use OPAC and 443(27.1%) users use search engine & directories.

Information Retrieval Tool Used To Retrieve The Information:

The users indicated the information retrieval tools to retrieve the information. On account of analysis, it has been found that 277(17.0%) users use bibliographies, 291(17.8%) use catalogue, 229(14.0%) use indexes, 101(6.2%) use finding aids (inventory), 143(8.8%) use COM, 148(9.1%) use OPAC and 443(27.1%) use search engine & directories. Data is given in Table 4 Table 4.2 and Figure 3.

**Table 4 Information retrieval tool use to retrieve the information**

S.No.	Name of the Pharmacy College	I	II	III	IV	V	VI	VII
1.	ACP, Alwar	0	0	0	0	0	0	0
2.	ACP, Jaipur	6	7	4	2	7	1	10
3.	AIP, Jaipur	22	41	40	33	17	17	20
4.	ACP, Jaipur	23	13	17	3	0	7	27
5.	BU, Niwai	0	0	0	0	0	0	0
6.	BIPS, Srigananagar	9	2	5	0	0	0	9
7.	BITS,Pilani	0	0	0	0	0	0	0
8.	BNIP,Udaipur	12	8	7	0	1	7	9
9.	GIP, Udaipur	6	6	3	6	1	5	17
10.	GCP,Suratgarh	2	4	1	0	1	3	12
11.	JCP,Jaipur	3	5	5	0	3	4	1
12.	JNU,Jaipur	34	5	1	0	3	30	32
13.	JVWU,Jaipur	0	4	4	0	0	4	5
14.	JPC,Jodhpur	0	0	0	0	0	0	0

15.	KCP,Kota	11	21	8	9	23	15	15
16.	KCPS, Nagapur	3	1	3	1	1	0	1
17.	LMCST,Jodhpur	0	0	0	0	0	0	0
18.	L.B.S,Jaipur	9	6	8	1	3	0	35
19.	MACP, Jaipur	13	5	3	3	6	1	18
20.	MACP, Jaipur	1	0	0	0	0	0	47
21.	MGCPS,Jaipur	14	15	9	3	15	0	26
22.	NIMS,Jaipur	29	36	29	12	17	24	20
23.	PCP, Udaipur	11	13	3	2	1	6	17
24.	SMS,Jaipur	0	0	0	0	0	0	0
25.	RPC,Jaipur	20	8	21	3	0	4	17
26.	SCP,Dausa	4	4	1	4	3	0	15
27.	SBCP,Jaipur	6	11	13	7	5	5	11
28.	SGVU,Jaipur	8	34	23	2	10	6	22
29.	SKIP,Bikaner	3	20	1	0	0	1	12
30.	SKIP, Jaipur	6	8	7	4	3	0	16
31.	VIP,Jaipur	22	14	13	6	23	8	29
	Total	**277**	**291**	**229**	**101**	**143**	**148**	**443**

Table 4.1 Information retrieval tool use to retrieve the information

S.No.	Information retrieval tool do you use to retrieve the information	No. of Users	%
1	Bibliographies	277	17.0
2	Catalogue	291	17.8
3	Indexes	229	14.0
4	Finding aids (Inventory)	101	6.2
5	COM	143	8.8

6	OPAC	148	9.1
7	Search Engine & Directories	443	27.1
	Total	**1632**	100.0

Figure 3 Information retrieval tool use to retrieve the information
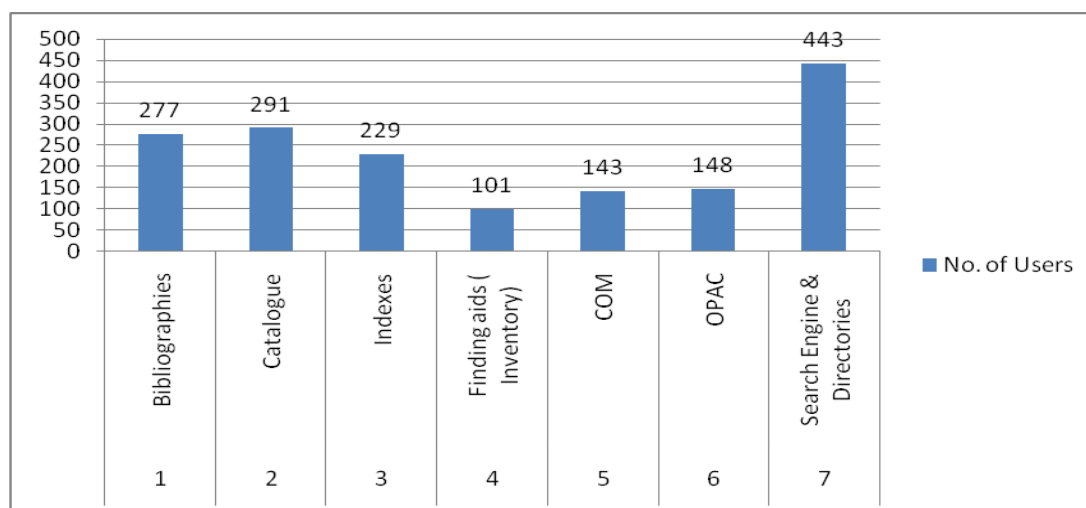
Information Storage and Retrieval Service

Information retrieval' was first used by Calvin Moores in 1952.9 By "searching and retrieving of information from storage according to specifications by subject," Moores defines the term "information retrieval."10 It is the "process of locating and selecting data, relevant to a given requirement," according to J.H. Shera. According to 11 B. C. Vickery, information retrieval is primarily concerned with the design and operation of tools that choose documents from a "stored collection of documents in response to search questions. [12] An information storage and retrieval system consists of several components, including (i) a storage device; (ii) the organization of the information; (iii) the representation or form which the information takes; and (iv) a searching mechanism to permit retrieval.

In traditional libraries, the storage device is usually the book or journal, located on shelves within the physical structure of the library building. The information is organized according to some classification scheme, e.g., DDC or UDC, CC, etc. Most of the information is in printed form, and is usually complete in it; that is, the entire document (e.g. book or journal article) is present. The common searching mechanisms include the card catalogue bibliography and indexes to journal literature.[13] In computerized information storage and retrieval systems, the storage device is the computer itself. Both documents and their locations are stored within the computer. The representation of information in a computerized system is not only likely to be a reference but the complete text itself, although there are many databases which do contain complete information within them.[14]

Information retrieval is done using both conventional and cutting-edge techniques. However, mechanized or automated systems for information retrieval are being adopted more and more in response to the information explosion and proliferation of topics. Currently, a retrieval system's activities can involve anything from straightforward indexing to digital computers.

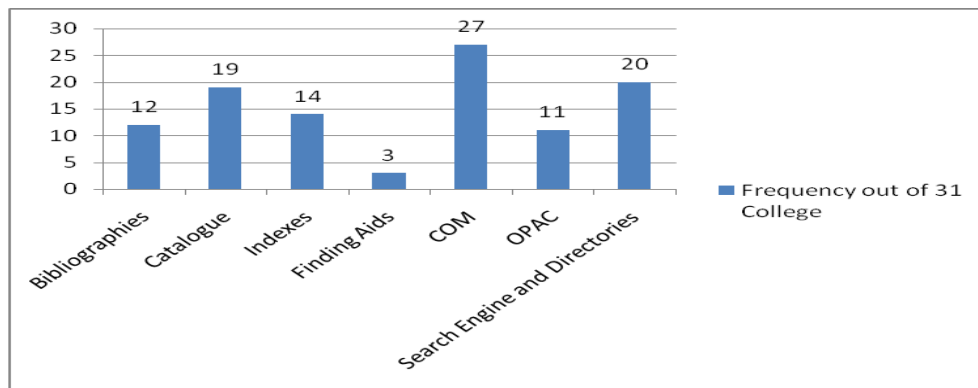An information retrieval system's primary duties include:

(i)   To find information (sources) pertinent to the community of target users' interests,

(i)   Examining the sources' (documents') substance

(ii) To depict the information in the examined sources in a way that will be appropriate for corresponding with users' inquiries,

(iii) Examining user queries and presenting them in a way that will be compatible with the database,

(iv) To match the search query with the database that has been stored, and to locate the pertinent information.

Depending on user feedback, to make the necessary system improvements.

Table 5.1 Statistical Analysis Information Retrieval Tool used in Pharmacy Library

	Statistical Analysis Information Retrieval Tool	
Inforamtion Retrieval Tool	**Frequency out of 31 College**	**Percentage**
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Catalogue	19	61.29
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COM	27	87.10
OPAC	11	35.48
Search Engine and Directories	20	64.52

Figure 4 Information Retrieval Tool

Information Retrieval's Future

The researcher is concerned to develop the best retrieval system, and strives to develop new systems and evaluate these systems. System providers are concerned with providing a software package or a service that is better than that of rivals in order to maintain a competitive edge. Improved systems can be attained by:

1. Better system design, which aims to increase the system's efficacy and efficiency by taking into account factors like the amount of storage needed, the speed of information retrieval, and other factors. Through the development of quick ways for scanning a database's contents, research in this area aims to get around the inverted file's constraint. Investigations have been done along two development lines. To increase the efficiency of searching in serial data, the first of them is text scanning methods. The alternative is to use hardware-based solutions, which for the most part use parallel processors to run numerous tasks at once to expedite text scanning.

2. Improved retrieval facilities and strategies, to improve methods for matching document descriptions with query descriptions. One major lime of enquiry has been the search for an alternative to Boolean search logic. Based on statistical analysis of the frequency of occurrence of terms in records, work in this area has been done.

Hypertext is a very different approach. Hypertext moves away from linear text and supports association between related concepts throughout a document. The essential components of a hypertext database are the items of information which are to be linked and the links between those items. Hypermedia systems, that integrate text, data, images and sound into a single database, also have these same two components.

Retrieval may also be improved by better dialogue design, and attention to the quality of the human-computer interface. Work in this area has focused on front-end or intermediary computer systems that are has focused on front-end or intermediary computer systems that are interposed between the system and the user. Microcomputer based software packages that provide pre-search query formulation and storage, automatic log-on, downloading and menu-based interfaces are well established. More recent work has looked at front-ends that simulate

best-match searching, or model the actions of a human intermediary. This research uses knowledge- based techniques from the field of artificial intelligence.[15]

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