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CHAPTER FOUR
INFORMATION LITERACY SKILLS AND INFORMATION RETRIEVAL

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Introduction

Information literacy is a complicated subject. On the surface, it may seem a fairly simple and straight forward business of acquiring a set of skills and technologies that help guide one through today's information landscape. Just as a cook needs an oven, utensils and recipe to bake a cake, so also does a researcher, scientist or student need equipment, an internet connection and a search, particularly to find the right information for particular inquiry. In addition, a good cook will also bring to the kitchen an ability to make judgement about the suitability and proportion of certain ingredients, and so too does information literacy involve the ability to weigh information from a range of sources and make judgements about its credibility, perspective and possible biases.

The field of information literacy is further complicated by the fact that building information literacy skills among individuals will hardly have any significant impact by itself. In order for significant impact to come about, individual skills are only one piece of the puzzle, along with a range of others, including availability of online material, increased awareness, institutional incentives, ICT management and strong organizational support. So from simply being a skill set, information literacy is a concept charged with values,

judgements and power dynamics, and thus subject to controversy and debate.

The phrase information literacy just appeared in print in the 1974 report by Paul, G. Zurkowski, written on behalf of the National Commission on Libraries and Information Science. Zurkowski (1974), used the phrase to describe the "techniques and skills" known by the information literate for utilizing the wide range of information tools as well as primary sources in molding information solution to the problems. In 1989, the American Library Association settled on a definition for information literacy that has became widely used and accepted among library and information science professionals. "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (Institute of Development Studies (IDS), 2010:7). The UK's Chartered Institute of Library and Information Professionals (CILIP) similarly defines information literacy as "knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner" (Institute of Development Studies (IDS), 2010:7 - 8). These succinct and seemingly simple definitions of information literacy have been unpacked by various institutions into different sets of skills, criteria and indicators, but however the concept is elaborated, at heart information literacy is about being competent and confident in making one's way through today's information landscape. Clearly then information literacy is central to the mission of any institution and individual engaged in education and research, and not just a matter for the librarian. Because of the library's position close to technological advances around information, it has historically been the library that has been most aware of the benefits that information literacy can confer on individuals and the institutions in which they work.

Although information literacy encompasses a wide range of skills, it has always been closely tied to technological changes, how they impact the information landscape, and how information users can benefit from them. The rapid and widespread acceptance of the concept of information literacy since the release of the ALA's 1989 final report has led to the renewed emphasis on information literacy in all communities. Hence information literacy now remains a principal concern for librarians. This is so for information professionals because of the equity in information accessibility and utilization imperative of librarianship, which other professions are not known for promoting. Information literacy, both formally and informally, therefore has to be a pervasive concern of librarianship in this pregnant age. Today the meaning of information literacy has broadened considerably and it represents a resource of interest in the need to educate those who must live and work in our information society. Hence information literacy now remains a principal concern for librarians.

The Basics of Information Retrieval

Information retrieval systems have become almost synonymous with computers, but paper-based systems, such as card and document filing systems, do still exist, and certainly were in evidence before the advent of computers. Basically, all information-retrieval systems may be viewed as comprising three stages:

- Indexing
- Storage
- Retrieval

Indexing

According to Srinivasan (1996) indexing is a process of allocating an index term or key to a record on document: these index terms or keys assist in the retrieval of the document or record. The assignment of indexing terms may be intellectual (i.e. conducted by a human) or computer-based. A computer can only select index terms in accordance with a set of instructions. Selection will depend upon word occurance and the index terms that may be assigned will be drawn from a standard list or computer thesaurus, on the basis of word occurance in a record or document. Alternatively computers may also be enlisted to arrange humanly assigned index terms. Such terms will be selected and assigned by indexers on the basis of the indexer's subjective assessment of the content or the assignment of terms that are likely to be sought by a subsequent searcher. The terms may be drawn from a controlled list or may be uncontrolled. Many systems incorporate elements of both controlled and uncontrolled indexing languages. The computer acts as a reliable workhorse for arranging index entries in alphabetical order for display on the screen or for the printing of an index.

Storage

Information retrieval systems may use the computer itself to store both the document files and the index files, and to maintain databases. Beside computer as an information storage system, other storage devices exist. They include magnetic disks, optical disks, videodisks, computer disk (CD) etc.

Magnetic Disk

Magnetic disks are, without doubt, the most important medium for bulk data storage in microcomputer. Magnetic disk is a film of magnetic material on a disk substrate. The whole disk is rotated, and read/write heads are used to read data from the disk and to write data onto it. It can be any type of storage medium that utilizes magnetic patterns to represent information. Example of magnetic storage are:
Magnetic disk such as:

- A floppy disk, used for off-line storage
- Hard disk, used for secondary storage

Magnetic tape such as:

- Video cassette
- Audio storage reel-to-reel tape

Optical Medium

Optical Medium is a non-volatile storage media; it holds content in digital form that are written and read by laser. These media include various types of CDs and DVDs. These following forms are commonly used.

Table I

Optical Media	Description
CD, CD-ROM, and DVD	Read only storage, used for distribution of digital information such as music, video and computer programs.
CD-R	Write once storage, the data cannot be erased or written over once it is saved.
CD-RW, DVD-RW, and DVD-RAM	Slow to write but fast reading storage; it allows data that have been saved to be erased and rewritten.

Optical media has advantages over magnetic media such as:

- Disk Capacity: One optical disk holds about the equivalent of 500 floppy disks worth of data.
- Durability: They are able to last for up to seven times as long as traditional storage media.

Flash Memory

Flash Memory is a solid-state, non-volatile, rewritable memory that functions like RAM and a hard disk drive. Flash memory store bits of electronic data in memory cells just like DRAM (Dynamic RAM) but it also works like a hard disk drive that when the power is turned off, the data remains in the memory. Flash memory cards and flash memory sticks are examples of flash memory.

Flash memory cards are also used with digital cellular phones, MP3 players, digital video cameras and other portable digital devices.

Flash memory is also called USB drive, thumb drib, pen drive or flash drive, are the up and coming players in the portable storage market.

The Advantages of Flash Memory are:

- Offers fast reading access times among the secondary storage devices (though not as fast as RAM)
- Durable and requires low voltage
- Light and small.

The disadvantage is, it is more expensive than the magnetic disk of the same capacity.

Retrieval

Basically, retrieval process is dependent upon the indexing and storage stages; to a large extent they determine the optimum strategy for searching an information retrieval system. But another factor which influences the retrieval process remains constant, irrespective of the system design. The system user and the queries that are submitted to the system do not, in general, change with the system. The user's needs also do not change with the availability of specific systems, although they may become more sophisticated as the user's experience with those systems develops (Emeaton, 1991).

The nature of computer-produced indexes varies greatly, and searchers will have more success if they recognize some of the inherent limitations. Retrieval from a computer database is usually by online interrogation of the database; online searching introduces a flexibility of search not possible with printed based system. Accordingly, it is necessary for the user to become acquainted with a wide range of search facilities and their potentials if the user is to optimize use of the system.

Retrieval involves three key stages:

a. Accepting as input a query (as a representation of information need) formulated by the user.

b. Carrying out a comparison of the query with each of the records (representation of document) in a database.

c. Producing an output, for consideration by the user, a retrieval set (sometimes an empty one) of records identified on the basic of this comparison.

Information retrieval process begins when a user enters a query into the system. Queries are formed statements of information needs, for example, search string in web search engine. In information retrieval, a query does not uniquely identify a single object in a collection. Instead several objects may match the query, perhaps with different degrees of relevance.

Most IR systems compute a numeric score on how well each object in the database matches the query and rank the objects according to this value. The top ranking objects are then shown to the user. The process may then be iterated if the user wishes to refine the query. Many searchers will pass these three stages several times before completing search.

Table 2: Different types of Information Retrieval Systems

	User Characteristics	Environment	Tasks	Technology
Online services	Expert users and information mangers	Office, academic literary, corporate information centre	Retrieval of information, downloading information and integrating into other documents	Range of different workstations: earlier configurations with direct link to service; more state-of-the-art applications links through the internet.
CD-ROM	Depends on database – can include children, general public literary users, professional users and others	Library, airport, home, office	Retrieval of information, downloading information and integrating information into other documents	Often multimedia, GUI, mouse
Internet	Internet prepondence of academics, students and males	Study/work place, home	E-mail communication, shopping, file transfer screen and mouse	Desktop and portable PCs, with keyboard.
OPACs	Library users – profile depends on type of library	Library, office/home other public venues	Narrowly defined – identifying book availability, searching for information	Sometimes large screens, touch screen, special-purpose keyboard, but also accessed through standard office equipment; remote and local access may use different workstations.
Document management systems	Corporate users with some shared experience of the system, and shared objectives and tasks	Office-based, but may also extend to mobile operation and use in production units and in, say, trains and cars	Consultation of corporate archive in the pursuit of work-based tasks	Workstations linked to a powerful central computing resource; some applications will be state-of-the-art.

Information Literacy Skills

Within the context of every discipline and subject, a successful information literacy programme requires an individual to posses some skills to be able to define problem, initiate a plan to find information, locate and access resources, use the information, synthesize information and carry out some form of evaluation. This activity requires six basic tasks as follows: Task definition, information seeking strategy, location and access, use of information, synthesis and evaluation (Elsenberg and Johnson, 2002). These are steps for solving information problems and are described below:

Task definition

This is the first step in information problem-solving processes. It requires an individual to recognize that an information need exists, to define the problem and to identify the types and amount of information needed.

Information seeking strategies

This is the second step in information problem solving procedure; once the information task has been defined, it is expected that individual should identify all possible information sources and develop a plan for searching. Various sources of information – print and non-print – would be evaluated using specific criteria. The searchers thereafter would need to ascertain what information is needed through a series of sub-questions e.g. keywords, concepts, subject headings, descriptors etc. Understanding the importance of using more than one source of information is beneficial.

Location and Access

The need for location and access arises after the searcher has identified his/her priorities for information-seeking activities. This requires the use of information location and access tools including indexes, abstracts, bibliographies, catalogues, web search tools, and gatekeepers.

Using Information

The use of information would require the searcher to scan the potentially useful resources accessed to ascertain their relevance or otherwise, differentiate among fact, opinion, point of view, and bias, error in logic etc. The searcher must be able to summarize the useful, current and relevant information in his/her own words, paraphrase, quote important facts and details, where necessary, for accuracy and clarity.

Synthesis

The researcher must be able to combine the sep elements of the information located accessed and retriev form a complete whole. It involves the skill to re-desi version in a clear interface with instructive search functiona

Evaluation

The researcher must be able to determine the v merit, worth and significance of the work in relation tc objective/purpose for which information is sought. This require one to be able to determine the extent to which conclusion meets the defined information needs and/or sat the assignment; re-assess one's understanding of the pr(and identify steps that need further understanding, development or practice. The evaluation can be done by s(somebody else (e.g. classmate, teacher, parents etc.).

Search Logic

Search logic is the means of specifying a combinati terms which must be matched for successful retrieval. Bo(search logic is employed in searching most systems. It m(used to link terms from either controlled or natural ind(languages or both. The logic is used to link the terms describe the concepts present in the statement of the se Search logic permits the inclusion in the search statement synonyms and related terms, and also specific acceptable unacceptable search terms combination.

The Boolean logic operators AND, OR and NO1 demonstrated on the figure 1 below.

Fig. 1: …………………

Operator:	search type:	Venn diagram:	Meaning
AND	Conjunction product symbolized by	A B (overlapping circles)	Logical A AND B, A X B all (A) (B). Implies that all of the above terms must be assign a document for a match.
OR	Additive symbolized by A OR	A B (overlapping circles)	Logical sum, B. only one of the two index terms A OR B need to be associated with document for a match. This is used when A and B can be regarded as equivalent for the purpose of the search. E.g. Defreezer + fridge.
NOT	Subtractive difference i.e. A NOT B or	A B (overlapping circles)	Logical A – B. This implies that under term A must be assigned in the absence of B to get a match. E.g. grain – rice requires all documents on grain except those of rice.

Note that Boolean is subject to some volitions. Some use symbols like +, OR and = for AND

The Boolean operators AND, OR and NOT are subject to some variation. For example, some systems use and NOT. Also, they may often be abbreviated, so that, for example, can be used to represent AND and + for OR. It is common to use more than one operator in a search statement.

In most search statements, it is possible to designate certain concepts as being more significant than their neighbours. In its role of formulating search profile, weighted term logic may be introduced either as a search logic in its own right, or as a means of reducing or ranking (relevancy of ranking) the search output from a search whose basic logic is Boolean. In so doing, the information literate person keeps up to date with information sources, information technologies, information access tools and investigative methods (Wang, Bruce and Hughes, 2011).

Conclusion

Information literacy has been the genuine interest in academic circle, but the circles have been somewhat small, mostly within libraries in higher education institutions and research institutes. Because of libraries' support for students' and researchers' information needs, university libraries in particular have had strong incentive to stay up to date with changes in the information landscape and know how to find and use information within it, and by extension guide users on how to find out information themselves. This paper therefore has discussed information literacy as the basis for adequate information accessibility and utilization.

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