Information Resources, Retrieval and Utilization for Effective Research in Tertiary and Research Institutions

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Abstract

Over the years, researchers have been confronted with inadequate information resources that will facilitate their Research and Development (R & D) activities in their various research interests. This paper presents a discourse on the concept of information resources, validity of information, cost and value of information, information storage and retrieval, characteristics of information, material resources, tangible/intangible resources, information utilization and web-based (Internet) Information. The paper concludes with the recommendation that acquaintance (on the part of librarians) and utilization (on the part researchers) of these invaluable resources would enhance effective research in tertiary institutions and research institutes.

Keywords: Information Resources; Information Retrieval; Utilization; Effective Research; Tertiary Institutions

I.Introduction

Information is the result of processing, manipulating and organizing data in a way that adds to the knowledge of the receiver. Information, which is a catalyst for change, has become as important as life itself. Information is substantially different from data in that data are raw unevaluated messages. Information is the increase in knowledge obtained by the recipient by matching proper data elements to the variables of a problem (Ochai, 2007). Information, being awareness on a given situation or phenomenon which propels one into action must be valid and usable. If valid but not usable it is (outdated or obsolete). If usable but not valid it is (gossip or grapevine).

With the current trend of globalization as one of the elements of ICT, there is a quantum of information available in libraries, resource centres and information systems. However, ability to identify and retrieve specific information needed for a particular situation requires an awareness of the source (availability) and the skill to retrieve it within a short time and at low cost (accessibility). Recall or retrieval of information is an operation which entails searching out and gaining access to specific data elements from the medium where it is stored. Retrieval is of two-stage process: first, a search of the appropriate address in the storage device; second recognition of the item when it is contacted. An item may not be contacted if the information search is at the wrong category, and also if the information is stored in such a disorganized and confused manner that time-cost of searching the retrieval system is prohibitive.

2.Validity of Information

Information validity is determined through a simple formula:

$$IV = \frac{ETC}{R}$$
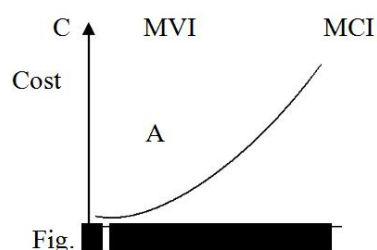
Where:

IV= Information Validity

ETC= Energy, Time & Cost of searching

R= Relevance of Information

That is to say, information is valid if the energy lost, time spent and cost of retrieval equals to its appropriateness or the usability. On the contrary if the sourcing variables are greater than its usability the information is said to be invalid.

3.Cost and Value of Information

The objective of the information system is to attain an optimum point where the marginal value of information equals marginal cost of providing that information. The relationship is shown below in Fig.1.

Fig.

It must be noted that an excess quantity of information with a relative high cost can result in negative marginal value. The optimal level of information processing is attained where the MCI equals MVI. That is, point "A". Concerning the level of output, we can state that:

1.if MVI > MCI, increase output

2.if MVI < MCI reduce output

3.if MVI = MCI, output is optimum

4.Information resources

The term 'resource' means a source of supply, usually in large quantity. A person is said to be 'resourceful' when he or she is capable of handling difficult situations. Generally, resources are aids to the researcher. They are those materials, strategies, manipulations, apparatuses or consultations that help the researcher to enhance research and development. Information resources therefore include all forms of information carriers that can be used to promote and encourage effective research activities and developmental projects.

5.Information Storage and Retrieval

Information storage and retrieval are the operations performed by the hardware and software used in indexing and storing a file of machine-readable records whenever a user queries the system for information relevant to a specific topic. For records to be retrieved, the search statement must be expressed in syntax

executable by the computer. According to Reitz, (2004) information retrieval (IR) is the process, methods, and procedures used to selectively recall recorded information from a file of data. In libraries and archives, searches are typically for a known item or for information on a specific subject, and the file is usually a human-readable catalog or index, or a computer-based information storage and retrieval system, such as an online catalog or bibliographic database. In designing such systems, balance must be attained between speed, accuracy, cost, convenience, and effectiveness (Reitz, 2004).

6.Characteristics of Information

The value of information is based on ten attributes as identified by (Imeremba, 2003) which are listed as follows:

1.Accessibility – the ease and speed with which an information output can be obtained.

2.Comprehensiveness – the completeness of the information content.

3.Accuracy – the degree of freedom from error of the information output.

4.Appropriateness – how well the information output relates to the user's request. The information content must be relevant to the matter on hand.

5.Timeliness – it is related to a shorter elapsed time of cycle: input, processing and reporting of output to the users. Normally, for information to be timely, the duration of this cycle must be reduced.

6.Clarity – the degree an information output is free from ambiguity. Ambiguous terms or equations should be avoided.

7.Flexibility – the adaptability of an information output not only to more than one decision, but to more than one decision maker.

8.Verifiability – the ability of several users examining an information output and arriving at the same conclusion.

9.Unbiasness – the absence of intent to alter or modify information in order to produce conceived conclusion. In other words, it must be free from bias.

10.Quantifiable – the nature of information produced from a formal information system.

7.Material Resources

Material resources are classified into tangible and intangible resources. Tangible resources are visual aids, aural aids and audiovisual aids. Dike (1999) gives examples:

Visual aids – research materials and devices that appeal to the sense of sight and touch such as books, journals, pamphlets, newsletters and reference sources that are in printed format. They also include projected aids, pictorial aids, three-dimensional aids, laboratory equipment, chemicals and apparatuses and non-projected aids.

Aural aids – research materials that appeal to the senses of hearing and touch too such as records and record players, tapes and tape recorders, language laboratories, radio, etc.

Audiovisual aids – resources that appeal to the senses of sight, hearing and touch such as sound film, filmstrip projector, television, video tape recorder and tapes, VCD, DVD, etc.

Intangible resources – consist of methods and technique of research. It includes methodologies, strategies or manipulations which the researcher uses in the laboratory or at field work to effect or facilitate

research and development (R&D); such as: questioning, explanation, experimentation, exemplifying, sampling, modeling, designing, construction, field trips, illustration, characterization, measurement, analysis of data, monitoring, installation, computation, systems optimization, metallization, fabrication, testing, blending, additive property studying, distillation, dissemination demonstration and exhibition.

Uhegbu (2007) asserts that "information utilization is the actual putting into appropriate use of acquired information. Utilization of information differs from person to person and from one corporate organization to the other according to their information needs and other socio-economic imperatives. It can be viewed within the context of need, accessibility and function performed. Alegbeleye (1987) posits that utilization of information by any clientele is influenced by the kind of job done, profession or function one performs.

Neelamegham (1981) has identified accessibility as one of the prerequisites of information utilization. Since there is growing concern in the need for equal access to information, he argues that information generation, collection, organization, recording and distribution, accessing and utilization operate imperfectly. Thus, the purpose, user characteristics, environment or situation involved, medium of communication, quality, infrastructural facility, cost and time of availability all condition the use of information.

Itoga (1992) identifies three basic categories of understanding in the context of information utilization of a person:

i.Perceptional understanding: In which provision and accessibility of information to a user is anchored on the seeker's demand within the purview of his behaviour, gesture, words and writing, etc.

ii.Normative or Objective understanding: In which provision and utilization of information is viewed within the context of a user's objectives and purpose of seeking it.

iii.Contextual or subjective understanding: in which utilization of information is a function of the subjective meaning given to it. Availability and accessibility of information in whatever medium and quality is meaningless if it does not meet the complex behaviour needs of the people be it economic, social, political, cultural and technological. Need satisfaction becomes more understandable by the fact that contemporary information users are becoming increasingly more complex and sophisticated in their demand for survival. The efficacy of the principle of information utilization therefore is anchored on its ability to satisfy the needs of seekers.

This principle of use based on four broad premises:

1.Goal – every use of data and information is goal-oriented. It must aim at solving a problem or enhancing a better understanding of an already known situation. The purpose of seeking information is central to its demand and use.

2.Availability – entails not only that information is provided but its accessibility. It must be accessible and devoid of socio-economic and environmental impediments.

3.Process (channel of communication) – whatever medium is used, effective information utilization is possible if the processes of accessibility are cheap, unambiguous, relevant, nearer to people, and in line with their level of sophistication, literacy and understanding. User satisfaction – the ultimate purpose of utilizing information is to satisfy the seeker's need. Because user's needs are varied, their satisfaction amounts to a high level achievement for them.
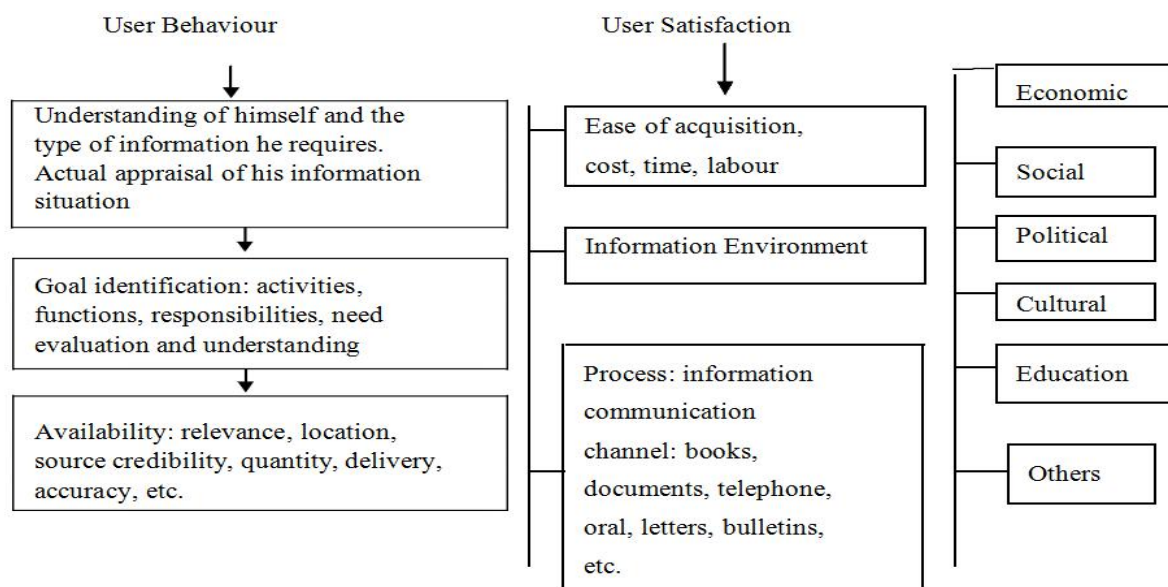
The diagram below demonstrates these elements and their interaction to enhance utilization of information.

User

Goal → Availability → Communication Channel → User → Satisfaction

User　　　　　　　　　Information Environment
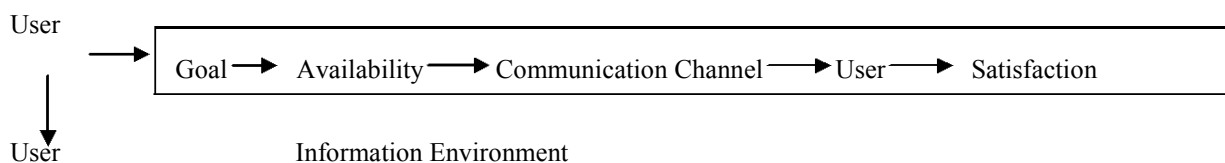
Understanding

User satisfaction is influenced by the means of accessing information. Without good information communication channels, accessibility will be difficult and its utilization impaired. Therefore effective channel of communication is paramount in the utilization of information for user satisfaction. Below is a diagram showing the principles (conditions) that govern information utilization by any information user.

Process of Information flow and user satisfaction

User Behaviour

Understanding of himself and the type of information he requires. Actual appraisal of his information situation

Goal identification: activities, functions, responsibilities, need evaluation and understanding

Availability: relevance, location, source credibility, quantity, delivery, accuracy, etc.

User Satisfaction

Ease of acquisition, cost, time, labour

Information Environment

Process: information communication channel: books, documents, telephone, oral, letters, bulletins, etc.

Economic

Social

Political

Cultural

Education

Others

8.Return on Investment

Always in the forefront of special librarianship is the term 'Return on Investment' (ROI). The concept provides a framework for establishing a value for the work, services, and expertise of information professionals. It examines the resources (money, time, personnel, etc.) committed to providing information services compared with the value of the ultimate outcomes achieved by users of the information, using support from those information services.

Information on the Internet

Information is available on the Internet; however, skills are required in order to be able to gather information on the web. Apart from going directly to the URL, there are four major ways to source for information on the web. There are search engines and meta-search engines, information gateways, subject directories, directory portals, and online databases (Aina, Mutula and Tiamiyu (2008).

Search engines are huge databases containing web page files that have been assembled automatically by machine. There are two types: individual and meta-search. Individual search engines compile their own searchable databases on the web. Examples are:

(i)All the Web: http//alltheweb.com

(ii)Alta Vista:www.altavista.com (iii)Google:www.google.com

Meta-searchers do no compile their own databases. Instead, they search the databases of multiple sets of individual engines simultaneously. This could result in a multiple lists or a single list. Multiple lists display search results in separate lists, as they are received from each engine. Duplicate entries may appear. Single lists displays multiple-engine search results in a single merged lists, from which duplicate entries have been removed. Examples are:

(i)vivisimo: http://vivisimo.com

(ii)surfWax: http://surfwax.com

(iii)ixquick: http://www.ixquick.com

Searches engines and meta-search engines are good for precise searches, using named people; or for organizations and for searching quickly; and widely topics that are difficult to classify. They are not good for browsing through a subject area.

Information Gateways

There are two kinds of gateways: Library gateways and Subject directory/Portals. Library gateways are collections of databases and informational sites, arranged by subject that have been assembled, reviewed and recommended by specialists, usually librarians. These gateway collections support researched and reference needs by identifying and pointing to recommended, academically-oriented pages on the Web. They include subject directories and virtual libraries gateways. Examples are:

ELDIS the gateway to Development Information: http://www.eldis.org

Development Gateway: http://www.developmentgateways.org

WWW Virtual Library: http://www.vlib.org

SOSIG (Social Science Information Gateway): http://www.sosig.ac.uk

Ask ERIC (educational information): www.eduref.org

SearchEdu (college & university sites): http://www.searchedu.com

Invisible Web

There is a large portion of the web that search engine spiders cannot, or may not, index. It has been dubbed the "Invisible Web" or the "Deep Web", and includes, among other things, password protected sites, documents behind firewalls, archived material, the contents of certain databases, and information that is not static, but assembled dynamically in response to specific queries. Web profilers agree that the "Invisible Web", which is made up of thousands of documents and databases, accounts for 60 to 80 percent of existing web material. This is information one probably assumes one could access by using standard search engines, but that is not always the case. According to the Invisible Web Catalogue, these resources may or may not be visible to search engine spiders, although today's search engines are getting better and better at finding and indexing the contents of "Invisible Web" pages.

In order to access so-called "Invisible Web" sites, one needs to point one's browser directly at them. That is what many library gateways and subject-specific databases do. They are good sources for direct links to database information stored on the "Invisible Web". Examples are:

University of Botswana Library: Medupe http://medupe.ub.bw

University of Botswana online databases: http://medupe.ub.bw/screens/databaselist.html, e.g. EBSCO host.

Subject Directories/Portals

Subject directories, unlike search engines, are created and maintained by human editors, not electronic spiders or robots. The editors review and select sites for inclusion in their directories on the basis of previously determined selection criteria. The resources they list are usually annotated. Directories tend to be smaller that search engine databases, typically indexing only the home page or top level pages of a site. They may also have a search engine for searching their own directly (Chamberlain, 2006). Examples are:

(i)Excite: http://www.excite.com

(ii)Microsoft Network (MSN): http://www.msn.com (iii)Netscape: http://www.netscape.com

(iv)Yahoo! http://www.yahoo.com

Information gateways are good for topics that fall into a thematic area that has a subject directory for guided browsing in a subject area; they are not good for quickly finding information on widely varying themes.

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