

Full Length Research Paper

Role of technological innovations in improving library services

Har kaur^{1*} and Preeti Sharda²

¹Government Medical College and Hospital, Sector 32-B, Chandigarh, India.

²Regional Institute of English Sector 32-C, Chandigarh, India.

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This paper elaborates on how technological innovations have led to the improved information management and library services. Information technology (IT) and Information Communication Technology (ICT) have changed the information seeking behavior of the users and services being provided by the librarians. Journey from print phase to the era of Electronics (E) has been discussed. How information needs have been changed from asking for a book or a journal to an article or a topic with the provision of E-resources has also been discussed. A survey has been conducted to know the changes in the information-seeking behavior and needs of the medical professionals and librarians in this era of "E". Increase in the demand of E-resources by the users as well as librarians have been observed with the growth of knowledge to use these resources. In spite of some problem in using E-resources almost every user need E-resources in one or the other form. Provision of E-resources has shown a rapid growth in research. This information explosion, increasing needs of users, lack of self sufficiency and financial crunch has led to the formation of consortia all over the world.

Key words: Changing information needs, electronic databases.

INTRODUCTION

Once librarians were considered only the custodians of the library collection, but the change in information media from print to electronic has shown the new sunrise in the life of librarians. The basic aim of a library is to meet the teaching, learning, scholarly-research and other information needs of its faculty, students and research scholars and that too effectively and with efficiency. Medical library and information professionals ensures that health care providers have access to reliable, relevant, accurate, up to date and timely information that enhances the quality of health care. The migration of information from paper to electronic media has changed the whole nature of research. With the easy availability of office computers and the transformation of media, the popularity and usage of digital and virtual libraries has been increased. World Wide Web has totally changed the meaning of a library. Physical presence has been decreased rapidly with the invention of virtual library. There is a universal assumption that man was born innocent or ignorant and should actively seek

knowledge. "Information seeking is thus a natural and necessary mechanism of human existence" (Marchionini, 1995). Information seeking behavior is the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer-based systems (such as the Web) (Wilson, 2000).

Information seeking behavior involves personal reasons for seeking information, the kinds of information which are being sought and the ways and sources with which needed information is being sought (Leckie et al., 1996). Information seeking behavior is expressed in various forms, from reading printed material to research and experimentation. Scholars, students and faculties actively seek current information from the various media available in libraries, e.g. encyclopedias, journals and more currently, electronic media.

In this era of 'E', a sea change can be seen in the information-seeking behavior of the users of library. In the phase of print media, users had no choice except going to the library and search for the material in books, journals and archives for hours. Search was very time consuming in print phase. Changing needs of users have changed the

*Corresponding author. E-mail: harkaur@rediffmail.com. Tel: 9417868371.

role of a librarian, which has transformed a librarian into information professional. Librarians have always acted as a link between knowledge source and its users. In this era of 'E', librarians are playing the role of an electronic middleman. They are now helping the readers in the best possible way by using the latest technology and searching techniques. Users are being connected to the information resources via Internet for hyper-links and for many more options and choices for advance search.

The change in the information-seeking behavior is the result of the invention of E-resources. Readers felt relaxed with this invention and inclination towards these resources was natural. There are many types of E-resources like E-books, E-journals, various open sources, gateways and databases. Chronologically we can divide these resources specifically journals as, in-print journals, on-line journals free with print, only on-line journals, on-line databases (which provide cross-links to related articles and other websites/gateways etc). In the era of 'E', readers demand has become significant as they ask for an article or topic in place of a book or journal and at the same time they prefer to search online databases to fulfill their needs. With the invention E-resources quantity and quality of research both have been affected. Different search techniques are undertaken by library users to search and locate relevant information. To understand how users of libraries search and locate relevant documents, we librarians, need to understand the search techniques and what resources and sources of information they generally use and require.

Information professionals and users both suffer from the problem of exhaustive information, from a wide range of sources and shortage of time to find, manage and evaluate. Sometimes users search internet indiscriminately without knowing the facts. Here librarian plays an important role by making the users aware of the importance of the evaluation of the retrieved information by guiding them, how to retrieve, what to retrieve and how to further use that retrieved information, which is called evaluation of information. The challenge posed by the information explosion is being successfully met by electronic information sources. Further this information explosion, diversity of user need, financial crunch and impossibility of self-sufficiency has led to the formation of consortia at local, regional, national and international level.

Review of related literature

The literature of understanding and meeting information needs of library users available is greatly broad ranging. An attempt has been made to cover number of works that go beyond discussions of the information seeking behavior itself and its direct applications to closely related topics such as information seeking.

Rafiq and Ameen (2009) have investigated information-seeking behavior and satisfaction level of teachers at the National Textile University, Pakistan. According to authors respondents heavily rely on Google, yahoo and MSN, while hotmail and yahoo are preferred email servers, followed

by Gmail. NTU webmail is less preferred.

According to Callen et al. (2008) satisfying the clinical information needs of doctors in less developed countries is particularly challenging and even though improvements in IT can facilitate access to knowledge, there still exist barriers.

Jackson et al. (2007) have conducted a study to identify the sources of information currently received, information-seeking behaviors, information requirements and preferences for future information provision amongst health and social care professionals. Authors assumed that print and online both formats of resources of information can prove effective in meeting information needs.

In a paper Urquhart et al. (2005) has reported a research conducted under the JISC User Behaviour Monitoring and Evaluation Framework. Work was conducted in two strands, by two project teams, JUSTEIS and JUBILEE. It was found that information skills and experience develop across work, home and study. There is a growing use of EIS in curriculum, but practice varies between institutions and disciplines. Tutors express concern about students' ability to evaluate and use the information that they find. Assignments can promote EIS use.

Ziming (2005) found that with an increasing amount of time spent reading electronic documents, a screen-based reading behavior is emerging. The screen-based reading behavior is characterized by more time spent on browsing and scanning, keyword spotting, one-time reading, non-linear reading and reading more selectively, while less time is spent on in-depth reading and concentrated reading.

Suriya et al. (2004) carried out a research work to investigate how faculty members seek information from the library. Authors have concluded that that most of the respondents visited the library several times a week to meet their information needs. Regarding the type of search made by the respondents the majority of the respondents made their search by subject.

Shokeen and Kushik (2002) studied about information seeking behavior of social scientists working in the universities located in Haryana. They reported that most of the social scientists visited the library daily. Authors further reported that social scientists of Haryana universities most frequently used current journals, textbooks and reference books.

Challener (1999) investigated artists and art historians teaching in five liberal arts colleges and three universities. It was found that they need information for teaching. The participants visit libraries frequently, usually more than one library and unlike previous reports, the majority of them are willing to ask the librarian for help.

The present study is an attempt to fill some gap in literature on information-seeking behavior in the local context.

OBJECTIVE

The main objective of this study is to know the changing needs and information-seeking behavior of the users and further various methods and resources being adopted by

the librarians to fulfill these needs, which is the result of various technological innovations. Information seeking is a fluid and situation dependent activity where a seeker's actions are influenced by access to information, perceived quality and trust in the information source (Boyd, 2004). This reminds the necessity of regular study and development of information system and management information services in North Indian Medical Institutes. This work intends to study followings in libraries as a prototype of North Indian Medical Institutes:

- (1) To examine information seeking behavior of library users of North Indian Medical Institutes.
- (2) To study the problems faced by the library users of North Indian Medical Institutes while seeking and using information.
- (3) To explore the role of the library consortia's for providing service to the library users.
- (3) To review the use of E-databases in this era of information explosion.

HYPOTHESIS

In this study it is hypothesized that:

- (1) Physical visit to the libraries has been declined.
- (2) Preference of users has been shifted to online documents from print one.
- (3) Lack of knowledge about IT is the main problem the user face in the information searching process.

METHODOLOGY AND SCOPE

There are many ways to get information. The most common research methods are: literature searches, talking with people, focus groups, personal interviews, telephone surveys, mail surveys, email surveys and internet surveys. A survey has been conducted on North Indian Medical Libraries through a questionnaire to know the changes in the information-seeking behavior and needs of the users in this era of 'E'. So the medical professionals who were enrolled as member in the various medical libraries of Chandigarh and adjoining areas were considered for the study in hand. Further it can be stated that there were about 720 active library users of these libraries, so these users were taken as the subject for the study. Through the stratified random sampling technique 72 (10% of the total active users of libraries which were considered for this study was taken into consideration). Questionnaire (a list of written questions) method was used as it can be completed in one of the two basic ways. Firstly, respondents were asked to complete the questionnaire with the researcher not present and thus data was collected from 72 medical professionals, out of which 33 were students and 39 were senior residents, Assistant professor and professors. Secondly, respondents were asked to complete the questionnaire by verbally responding to questions in the presence of the researcher. This variation is called a structured interview and this method was applied on 28 librarians to know their observations.

FINDINGS (USERS)

Visits to the library

Twenty-nine respondents (40%) reported frequently visiting

a medical library, 18 (25%) rarely visited and 24 (33%) never visited; one respondent did not answer this question.

Respondents (Students) in their first year reported frequent visits to the library (18/33, 54%) more often than those did in their second year (8/33, 24%).

In the overall group, those who never or rarely visited a library (42/72, 58%) indicated that E-resources are not sufficient (27/72, 38%); documents that they needed were not available (18/72, 25%) or libraries were not needed because of the Internet (11/72, 15%).

So the main observation regarding visit to the library is that students visit library more frequently in their initial years of college / institute. Overall group of users prefer to search Internet as they are not satisfied with the available E-resources in their library. They only visit the library after making sure that this required information is available in the library. This service is being provided through WEB OPAC in most of the libraries today. So hypothesis 1 (Physical visit to library has been declined) stands proved.

Preference of information sources

Most respondents reported performing database searches independently (58/72, 81%). Among those who did their own searches, MEDLINE and PUBMED was the best-known and most frequently used database (51/72, 71%); only 1 of 72 respondents did not know of MEDLINE. HINARI is being used by some users but the main problem with this database is that site is very slow.

When asked about criteria for selecting references, the most important feature was free full-text availability (56/72, 78%) with the demand of online database and formation of consortia.

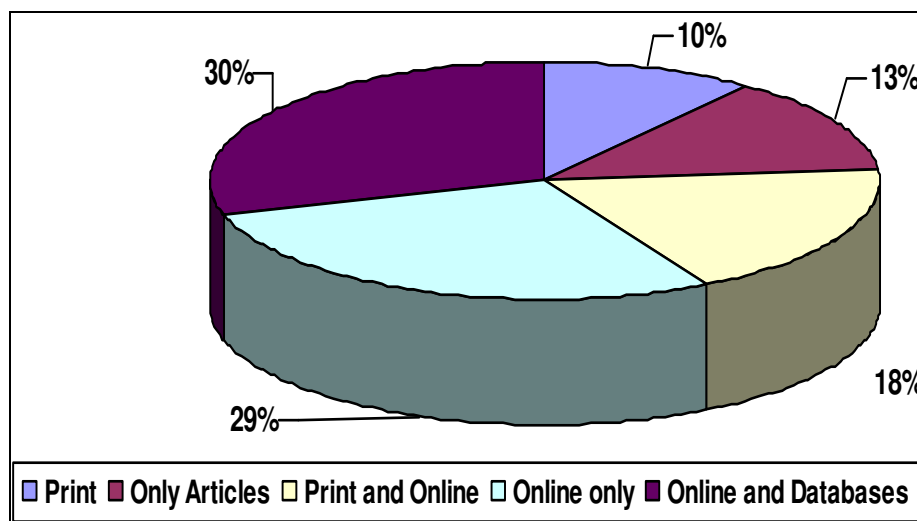
Regarding access to the full text, few respondents said they visited a library to check document availability (18/72, 25%) and ordered articles through a library (under resource sharing) (12/72, 17%). More than half of respondents preferred electronic tools for literature searching (40/72, 56%). Yet most indicated they preferred to print documents (67/72, 93%) rather than read them online (9/72, 13%).

Respondents were further asked about their preferences about the form of the document. As indicated in Table 1 (Figure 1) online databases is the most preferred format (39%) in contrast to the print only format that is the least preferred one (10%).

This observation directly shows the shift of the preferences of the users from print to the online formats. It is strongly supported by the findings in which online journals and databases have become the most preferred form of document as 75% users need only online resources in form or the other. Further users prefer taking print of the required information as they feel discomfort in reading directly from the screen. So hypothesis 2 (Preference of users has been shifted to online documents from print one) stands proved.

Table 1. Preference of form of the document.

S. No.	Form of documents	Percentage
1.	Print	10
2.	Only Articles	13
3.	Print and Online	18
4.	Online only	28
5.	Online and Databases	29

**Figure 1.** Preference of form of the document.

Problems in information seeking

Several problems were identified in the information searching process. Many respondents found difficulties in choosing among the large number of documents retrieved in searches (41/72, 57%) and lack of time was also noted as a problem (32/72, 44%).

Common obstacles in the information-seeking process identified by respondents include lack of time, doubt about the existence of relevant information, retrieval of too much information and difficulties with navigation and searching. Since latest innovations have made the search easier with the latest options like E-mail alerts, send articles etc., but problem in information searching still persists due to the lack of knowledge of I.T. So the hypothesis no. 3 (Lack of knowledge of I.T is the main problem faced by readers in searching information) also stands proved.

OBSERVATIONS (LIBRARIANS)

According to the librarians, Internet search engines, E-print services, author Websites, full-text databases, electronic journals and print resources are all used to some extent by most of the users. Convenience remains the single most important factor for information retrieval. Speed of

access, ability to download, print and send articles are top advantages of electronic journals for all groups. All these services and facilities are possible with the application of IT.

These observations reaffirm that important opportunities remain for librarians and libraries in providing both access to information resources and educating clinicians in how to effectively utilize such tools. Determining the relevance of a document or source is solely an individual's perspective, so the library or librarian is not a determining factor in differentiating sources. It would, however, be advantageous for a library to know and have the relevant material available for use. Library users expect their libraries to obtain new electronic resources while simultaneously maintaining or growing traditional print collections until the electronic resources are fully stable. Libraries are expecting to do this with no additional funding. Research has also concluded that information sources like electronic databases are of fundamental importance in a clinical environment giving their direct contribution to decision making in health issues, often making the difference in patient survival. Increasing demand of E-databases can be met with the formation of consortia (membership of one or more consortia) only, as E-databases are the main feature of consortia these days. Important observation is that these databases have become addiction for the users.

Library consortia

Information explosion, diversity of user need, financial crunch and impossibility of self-sufficiency has led to the formation of consortia at local, regional, national and international level. A library consortium is an association of a group of libraries to achieve mutually the common objective. Working in an atmosphere, which is fully affected by Information Communication Technology (ICT), librarians are mastering the use of electronic resources to better understand and meet the information needs of the users and further train them in using new searching tools for better search. Consortia provide the following common benefits to the libraries involved:

- (1) Access to otherwise un-subscribed reading materials.
- (2) Scope for electronic archives.
- (3) Getting deep discounts through joint pricing negotiations.
- (4) Developing common resources databases.
- (5) Effective document delivery system.
- (6) Enhanced search facilities
- (7) Better scope for developing a union catalogue among participating libraries.
- (8) By forming consortia, librarians are contributing to the economy of their country by saving Government revenue to a great extent. Following are some of the big and successful consortia's of India.

CSIR Library Consortium
 FORSA Consortium
 HELINET
 INDEST
 UGC-INFONET
 ISRO Library Consortium
 IIM Library Consortium
 ICMR Library Consortium
 ERMED consortium

E-DATABASE

Understanding the user needs play an important role in growing the libraries and librarians; otherwise the library profession may grey in future. To meet the increasing and advanced demands of the user, consortia are playing an important role. Secondly to avail full fruit of consortia a very sincere suggestion to library professionals is to be in touch with whole of the new technology (Technological Innovations), bridging the libraries through I.T and ICT. One should know the inside out of all the E-databases and involved I.T application. An E-database is an organized collection of information, of a particular subject or multi-disciplinary subject areas; Information within an E-database can be searched and retrieved electronically. E-database can be full-text or bibliographic. Full-text databases contain the whole content of an article such as citation information, text, illustrations, diagrams and tables.

Bibliographic databases contain only citation information of an article, such as author name, journal title and publication date and page numbers. There are many E-databases and all these databases have various features of searching techniques and tools, which are being used by the librarians to help the users in finding best information in less time. Some of the popular medical E-databases are mentioned below:

Academic Search Premier
 BMJ
 MEDLINE
 OVID
 PROQUEST
 PUBMED
 SCOPUS
 WEB OF SCIENCE
 HINARI

Almost all the reputed publishers have come up with the E-databases like Oxford University Press, American academy of Pediatrics, Cambridge University press and many more. All these e-databases can be considered as the latest technological innovation in the field of information.

Conclusion

The successful operation of any library depends to a large extent on the choice of library collections. The choice of the collection should meet the need and requirements of the end users. Consequently, librarians must be aware of how the user community connected to that library seeks information. Survey revealed that 40% of respondents reported frequently visiting a medical library, while in the overall group, those who never or rarely visited a library indicated that E-resources are not sufficient. Most respondents reported performing database searches independently. Regarding access to the full text, few respondents said they visited a library to check document availability and more than half of respondents preferred electronic tools for literature searching. Online databases are the most preferred form in contrast to the print only format that is the least preferred one. This observation directly shows the shift of the preferences of the users from print to the online formats which is again the result of technological innovations.

Among the problems identified in the information searching process difficulties in choosing among the large number of documents retrieved in searches was the basic one. Common obstacles in the information-seeking process identified by respondents include lack of time, doubt about the existence of relevant information, retrieval of too much information and difficulties with navigation and searching.

According to the librarians, internet search engines, E-print services, author websites, full-text databases,

electronic journals and print resources are all used to some extent by most of the users. Convenience remains the single most important factor for information retrieval. Speed of access, ability to download, print and send articles are top advantages of electronic journals and databases for all groups. It can be further concluded that consortia are playing an important role in meeting the increasing needs of the users and E-databases help them to achieve their objectives.

Suggestions

In the end we would like to remind information professionals that users no longer visit the most trusted and tested path of a library these days. This decline in the physical visit to the library is sometimes depressing but virtual and digital library has replaced the physical ones, which is again a creation of information professionals. Users prefer to do the search in their own comfort zone at their preferred time and place. Library professionals should see this trend in a positive way. With maximum sources available to scholars without the time and place constraints, they are producing more research. This in turn has rapidly increased the further research work, which should be further analyzed through citation databases.

So with better understanding of user needs, the profession of librarianship is growing and the credit goes to the E-resources, IT, ICT and ultimately consortia. In regard to information seeking behavior of users in medical libraries, it is recommended that library staff or reference librarians could use their time in a better way by focusing on assisting users. Librarians should also assist users in learning the use of OPAC, search engine, e-mail and CD-ROM techniques and inform them of the web sites available through the various networks. Hence, the library must provide adequate ICT facilities for reference librarians, such as Internet, laser printers, scanners, fax machine, telephone, etc to offer various services in the library.

To know the available resources properly, orientation programs is necessary. Hence, it is suggested that advanced training for users at different levels should be started. Content of training programs should be (a) Basic introduction to library services and facilities; (b) Using OPAC; (c) Methods and tools for searching information resources; (d) Using the Internet; (e) Using online and CD-ROM databases; (f) Using electronic journals; (g) Introducing reference books; (h) Introducing audio/video materials; and (i) Introducing appropriate indexes and abstracts.

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