CHAPTER - IV

INFORMATION SEEKING BEHAVIOUR IN CHANGING ENVIRONMENT

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4.0 Introduction

Information is the product of the human brain in action. It may be abstract or concrete. When a teacher begins to think on some subject to teach, a variety of images and sensations flash across his/her mind and memory retains some peace of knowledge. This peace of knowledge is the teaching information. When the student begins to think on a particular lecture in classroom his/her mind also begins to retain part of the lecture. This peace of knowledge (accumulated information together) is the learning information. In this process, information is generated, gathered, transferred and used for some purpose.

Information is the physical representation of abstractions that can cause a change in a person's state of knowledge. It can be a word, a printed page, a museum object, a diagram, or a whole book, article or audio-visual material. It is useful in decision-making.

The word Information is used to identify many different concepts. But it is difficult to define it precisely. In the generic sense meaning of information is that which can be communicated or received through any media of communication.

Information seeking is a basic activity indulged in by all people and manifested through a particular behaviour. It is also an aspect of scholarly work of most of the academic librarians who strive to develop collections, services, and organizational structures that facilitate information seeking.

The Information seeking behaviour refers to the way people search for and utilize information. Most of the times students' information seeking
behaviour involves active or purposeful information seeking as a result of the need to complete course assignments, prepare for class discussions, seminars, workshops, conferences, or write examinations.

The Information need is one of the cognitive needs of humankind. The Information need causes information seeking behaviour and these concepts complement one another. The Information need and information seeking behaviour are affected by many factors.

The traditional paradigms of information retrieval tend to over-simplify the information seeking process. Robertson in 1977 presents model in which the seeker simply enters a query and is given matching results (fig.4.1).

The Information seeking behaviour is expressed in various forms, from reading printed material to research and experimentation. The scholars, students and faculties actively seek current information from the various sources available in the libraries, e.g. encyclopedias, journals and, more currently, electronic media (David, 2001a).

It is essential for us to see the meaning of a digital information environment as the study is on information seeking behaviour in the contemporary environment. For example indexes are no longer in print but on CD-ROM, online or via the Internet. The library catalogues are now an online catalog i.e. OPAC or WEBOPAC.
ICT has caused changes in the representation of knowledge - from analog to digital. The shift has led to:

- **New information formats**: Multimedia information can be created, stored and distributed in digital format as CD-ROM or on hard disks, removable hard disks (external hard disk, pen drives) flash cards and other digital storage media.

- **New ways of distributing and accessing information**: Tools to access information, full text and multimedia information can be accessed from remote sites via telecommunication facilities.

- **New information services**: Tools to access information can be used even from remote sites via LANs and WANs

- **New knowledge and skills required of librarians.**

Information Resources now in

- Printed and electronic books (e-books)
- Printed and electronic journals (e-journals)
- Printed and electronic reference tools (e-dictionaries, e-abstracts and indexes, multimedia encyclopedias, etc.) (David, 2001b)

Numerous theoretical treatments have been proposed to characterize the information seeking behaviour, which is a complex cognitive process. This chapter presents the most commonly discussed theoretical models of the search process: the standard model, the cognitive model, the dynamic model, search as a sequence of stages, search as a strategic process, and sense making.
4.1 Information Seeking Behaviour

The origins of human information seeking behaviour are found in work on the users of libraries and in user studies in general. Modern modes of technology have changed the information environment in which social sciences and humanities researchers work. The pursuit of knowledge has been revolutionized, mainly through the vast expansion of data accessible via the Internet.

The Information seeking is a directed purposeful activity. It is different from information retrieval, because retrieval implies that the information has previously been stored. Searching is the behavioural manifestation of information seeking. Strategies can be formal (analytical strategies that require planning) or informal (browse strategies that proceed as cues arise during the search process).

- **Information seeking** is the process engaged in by the humans to change their state of knowledge. It is a high level cognitive process that is part of learning or problem solving. To seek information implies the need to change the state of one’s knowledge.

- **Information retrieval** is concerned with getting information from databases.

- **Searching** is the behavioural manifestation of information seeking.

4.1.1 Developments in Electronic Environments

The ICT has brought about the creation of new access tools. The developments in the hardware made computers affordable and useful to librarians.
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and the users of information. The developments in software and user interfaces
made the computer systems user friendly. Digitization led to new information
formats and new modes of information distribution. To improve efficiency of
operations and services, libraries have become automated, electronic and
networked for purposes of resource sharing.

The developments in electronic environments are;

- Hardware, data structuring and algorithms
- Interfaces - Human computer interaction, GUIs and WIMPS
- Hypermedia research
- Research in document representation and retrieval

The digital information environment has led to changes in the tools used to
identify and access information. The tools include OPACs, Web OPACs, search
engines, the World Wide Web, etc.

4.1.2 Information Searching Tools:

- Printed tools (Card catalog, printed bibliographies, printed abstracts and
  indexes, etc.)
- e-tools for library collections(OPAC, Web OPAC, Online databases -
  abstracts and indexes) Search engines for the Web collection (Google, Alta
  Vista Advanced Search, AllTheWeb), Meta-Search Engines—most of
  which are not recommended, others)
- Subject Directories
- Invisible Web (Searchable databases)
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The ranking and relevance feedback are very useful facilities found in many retrieval systems. The Internet search engines provide ranking and relevance information for searches. The user satisfaction can be improved by finding information within and outside the library. The recent and emerging developments in computing, telecommunications, networking and resource sharing have made access to information anytime, anywhere possible. The users’ need studies are usually conducted by libraries and information centres to determine the information requirements of their users.

4.1.3 Impact of ICT on the User

Because of the new formats of information resources and new information tools, the users often prefer digital information and ICT to access and organize that information. The shift from print to digital information had an impact on libraries, information centres and other institutions directly involved in processing information as well as on the user. The users are forced to acquire new knowledge and skill in information searching.

4.1.4 What is Information Seeking Behaviour?

The Information-seeking behaviour refers to the series of activities that a user performs when seeking for information. It is dependent on the reasons for seeking information and the starting knowledge of the individual.

Marchionini puts it as - “Information-seeking is a special case of problem solving. It includes recognizing and interpreting the information problem,
establishing a plan of search, conducting the search, evaluating the results, and if necessary, iterating through the process again.” (David, 2002)

4.1.5 The Schematic Model of Information seeking Process

Schematically, information seeking can be described by means of a chronological sequence as illustrated in Fig. 4.2.

The figure suggests that the information-seeking process is triggered by information need(s), possibly caused by a work task at hand or a problem to be solved. In the next phase, the information seeker considers and identifies sources and channels that are expected to provide useful information to meet the information need. The information seeker then makes attempts to access the selected information sources and judges the relevance of information extracted from these sources. In the final stage of the process, the information seeking overlaps with the information use when the information extracted from the information source(s) is interpreted. The interpretation may result in the judgments of two kinds: (i) the information need has been met sufficiently and information-seeking process may be stopped, or (ii) the information need has not been met or it is met partially. The latter judgment gives rise to a new or modified information need, and the information seeking process may continue.
Figure 4.2: The Schematic Model of Information seeking Process

- Problem or Task at Hand
  - Information Need(s)
    - Identifying Relevant Information Sources
      - Selecting and Accessing Information Sources
        - Judging the Relevance of Information
          - Using Information
            - (i) Information Need is met / Stopping Information Seeking
            - (ii) Information Need is not met / it is met partially
              - New / Modified Information Need
                - Information Seeking Process Continues

The Standard Model of Information Seeking can be put as in figure 4.3 which is adopted from Broder.
Figure 4.3: The standard model of the search process, adapted from Broder, 2002

Figure 4.3 (Broder, 2002) illustrates the process, in tandem with a sketch of the information access system that is used within the process. The Standard Web search engines support query specification, examination of retrieval results, and to some degree, query reformulation. The other steps are not supported well in today's Web search interfaces. This model is based primarily on the observations of people engaged in information seeking processes.

The Information-seeking behaviour includes the motivations or reasons for searching and the steps taken to acquire new knowledge about the subject matter or topic. A behaviour model by Chun Wei Choo, Brian Detlor, and Don Turnbull, indicates that motivations (strategies and reasons for viewing and searching) and moves (tactics used to find and use information) may be helpful in analyzing web
information seeking. The model was constructed by distinguishing between modes of organizational scanning and generic moves of information seeking.

Behavioural Model of Information Seeking or Literature Searching can be put with a formula as;

\[
Motivations + Moves = Information \text{ seeking behaviour}
\]

Motivations - Reasons for information seeking

Moves - Strategies used to find information.

4.1.6 Strategies in Information Seeking

The Information-seeking strategies can be examined in terms of Sources and Methods. Sources refer to the locations while Method refers to the manner of the information is being sought. Information might be recalled from the seeker’s own memory, gathered informally from friends or colleagues, or from personal formal sources of information such as books, journals and files. The seeker may also conduct a planned investigation to identify the sought information in the libraries, via electronic networks or by using a variety of information services. Information-seeking methods can be categorized into analytical strategies and browsing strategies.

Sources:

Recall

Asking friends, colleagues or experts

Consulting personal collections of books, periodicals and files

Conducting empirical investigations
Consulting libraries, research firms, electronic networks

Making use of information services

Methods:

Analytical strategies

Browsing strategies

4.2 Information Seeking Behaviour Models

Some definitions are needed to understand the concepts of Information Seeking Behaviour models. At this point, four terms are used: information behaviour, information seeking behaviour, information searching behaviour and information use behaviour. They are defined as follows:

The Information Behaviour is the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and the information use. Thus, it includes face to face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given.

The Information Seeking Behaviour 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 the manual information systems (such as a newspaper or a library), or with the computer-based systems (such as the World Wide Web).
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The Information Searching Behaviour is the ‘micro-level’ of behaviour employed by the searcher in interacting with information systems of all kinds. It consists of all the interactions with the system, whether at the level of human computer interaction (for example, use of the mouse and clicks on links) or at the intellectual level (for example, adopting a Boolean search strategy or determining the criteria for deciding which of two books selected from adjacent places on a library shelf is most useful), which will also involve mental acts, such as judging the relevance of data or the information retrieved.

The Information Use Behaviour consists of the physical and mental acts involved in incorporating the information found into the person's existing knowledge base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge.

4.2.1 Information Seeking Behaviour Models

The Information behaviour is a sub-discipline within the field of library and information science. It describes how the people need, seek, manage, give and use information in different contexts. (Savolainen, 2007) It may also be described as information-seeking behaviour or human information behaviour. By the strict definition of the word theory, the scholars of information behaviour acknowledge that there is no single theory of information seeking per se. the Information behaviour approaches are typically regarded as models because they focus on the specific problems (Case, 2007).
The selected research studies conducted by experts on Information seeking behaviour Models are considered to understand thoroughly. Following are some models selected to discuss.

- Eisenberg and Berkowitz (1996)
- Marchionini (1995)
- Wilson (1999)

Modes of Organizational Scanning (Aguilar, 1967; Weick and Daft, 1983; Daft and Weick, 1984)

*Undirected viewing* - Broad scanning

*Conditioned viewing* - Assessment of information gathered

*Informal search* - Search for more information to deepen knowledge

*Formal search* - Planned procedure to obtain information about a specific issue

The initial field work of Aguilar (1967) and the subsequent theoretical expansion by Weick and Daft (Weick and Daft, 1983; Daft and Weick, 1984) suggest that the organizations scan in four distinct modes: undirected viewing, conditioned viewing, informal search, and formal search.

The undirected viewing refers to the use of the Internet to broadly scan the resources without a specific topic in mind. The objective is to browse the
available information. The tactic is called “visioning,” an attempt to find something interesting that can be pursued further. The specific information need is thus identified after a number of resources have been browsed. In undirected viewing, the individual is exposed to information with no specific informational need in mind. The overall purpose is to scan broadly in order to detect the signals of change early. Many and varied sources of information are used, and large amounts of information are screened. The granularity of information is coarse, but large chunks of information are quickly dropped from attention. The goal of broad scanning implies the use of a large number of different sources and different types of sources.

In conditioned viewing, the user already has a topic in mind but would like to learn more about it. He, therefore, becomes more discriminating in searching and identifying useful information. In conditioned viewing, the individual directs viewing to information about the selected topics or to certain types of information. The overall purpose is to evaluate the significance of the information encountered in order to assess the general nature of the impact on the organization. The individual has isolated a number of areas of potential concern from undirected viewing, and is now sensitized to assess the significance of developments in those areas.

When the user is already focused on a topic, his information- searching behaviour becomes more directed. He becomes selective in his search and is able to formulate the queries to obtain satisfactory results. This step is called an informal search. During the informal search, the individual actively looks for
information to deepen the knowledge and understanding of a specific issue. It is informal in that it involves a relatively limited and unstructured effort. The overall purpose is to gather the information to elaborate an issue so as to determine the need for action by the organization.

As the search narrows down to a set of resources, the user executes a formal search and retrieves the relevant information on the specific topic in mind. As the need becomes more specific, the moves or tactics become more formal. The Information searching moves from browsing to the retrieving as the need becomes more specific. During the formal search, the individual makes a deliberate or planned effort to obtain specific information or type of information about a particular issue. The search is formal because it is structured according to some pre-established procedure or methodology. The granularity of information is fine, as search is relatively focused to find detailed information. The overall purpose is to systematically retrieve the information relevant to an issue in order to provide a basis for developing a decision or course of action. The four modes of scanning are summarized and compared in Table 4.1.

Table 4.1: Modes of Scanning

<table>
<thead>
<tr>
<th>Scanning Modes</th>
<th>Information Need</th>
<th>Information Seeking</th>
<th>Information Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undirected Viewing</td>
<td>General areas of interest; specific need to be revealed</td>
<td>&quot;Sweeping&quot;</td>
<td>&quot;Browsing&quot; Serendipitous discovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scan broadly a diversity of sources, taking advantage of what's easily accessible</td>
<td></td>
</tr>
<tr>
<td>Conditioned Viewing</td>
<td>Able to recognize topics of interest</td>
<td>&quot;Discriminating&quot;</td>
<td>&quot;Learning&quot; Increase knowledge about topics of interest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Browse in pre-selected sources on pre-specified topics of interest</td>
<td></td>
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</table>
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<table>
<thead>
<tr>
<th>Informal Search</th>
<th>Able to formulate simple queries</th>
<th>&quot;Satisfying&quot; Search is focused on area or topic, but a good-enough search is satisfactory</th>
<th>&quot;Selecting&quot; Increase knowledge on area within narrow boundaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Search</td>
<td>Able to specify targets in detail</td>
<td>&quot;Optimizing&quot; Systematic gathering of information about an entity, following some method or procedure</td>
<td>&quot;Retrieving&quot; Formal use of information for decision-, policy-making</td>
</tr>
</tbody>
</table>

**The Big6 (Eisenberg and Berkowitz, 1996)**

Task definition: Define the problem, identify the information needed

Information seeking strategies: Brainstorm all possible sources, select the best sources

Location and access: Locate sources, Find information within sources

Use of information: Engage, extract relevant information

Synthesis: Organize information, present the result

Evaluation: Judge the result and the process

**Information seeking behaviour model (Ellis, 1989; Ellis, et al., 1993; Ellis and Haugan, 1997)**

The model of Ellis begins with a broad scanning followed by systematically searching for information from the available resources. The steps in the model are:

**Starting** - Identifying sources of interest

**Chaining** - Pointers from an initial source are followed

**Browsing** - Semi-directed search in areas of potential search

**Differentiating** - Filtering and selecting

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Monitoring - Keeping abreast of developments

Extracting - Systematically going through the sources

Starting: Possible sources of relevant information

OPAC
Web OPAC
Abstracts and indexes on CD-ROM/Internet
Internet, using search engines

Chaining: Follow up leads

Cited references
Possible subject headings
Listed sources (Located by search engines)

Browsing: Scanning relevant documents

Retrieving and evaluating relevant documents

Differentiating: Selecting documents

Selecting from among relevant documents by book-marking, copying, etc.

Monitoring: Keeping abreast of developments

Regular scanning of possible sources of relevant documents
Receiving site updates through push technology, SDI profiles, etc.

Extracting: Reading a particular source and selecting information from it

The starting comprises those activities that form the initial search for information - identifying sources of interest that could serve as starting points of the search. The identified sources often include familiar sources that have been
used before as well as the less familiar sources that are expected to provide the relevant information. While searching the initial sources, these sources are likely to point to, suggest, or recommend the additional sources or references.

Following up on these new leads from an initial source is the activity of Chaining. Chaining can be backward or forward. The backward chaining takes place when pointers or references from an initial source are followed, and is a well established routine of information seeking among the scientists and researchers. In the reverse direction, forward chaining identifies and follows up on other sources that refer to an initial source or document. Although it can be an effective way of broadening a search, the forward chaining is much less commonly used.

Having located the sources and documents, browsing is the activity of a semi-directed search in the areas of potential search. The individual often simplifies browsing by looking through table of contents, list of titles, subject headings, names of organizations or persons, abstracts and summaries, and so on. Browsing takes place in many situations in which related information has been grouped together according to the subject affinity, as when the user views displays at an exhibition, or scans books on a shelf. ("Browsing" in Ellis' model is different from "viewing" in the previous section: browsing here describes looking for information at the micro-event level; whereas viewing earlier describes a broader context of looking at the information.)

During differentiating, the individual filters and selects from among the sources scanned by noticing differences between the nature and quality of the
information offered. For example, social scientists were found to prioritize sources and types of sources according to three main criteria: by substantive topic; by approach or perspective; and by level, quality, or type of treatment (Ellis, 1989). The differentiation process is likely to depend on the individual's prior or initial experiences with the sources, word-of-mouth recommendations from personal contacts, or reviews in published sources.

Monitoring is the activity of keeping abreast of developments in an area by regularly following particular sources. The individual monitors by concentrating on a small number of what are perceived to be the core sources. The core sources vary between professional groups, but usually include both key personal contacts and publications.

Extracting is the activity of systematically working through a particular source or sources in order to identify the material of interest. As a form of retrospective searching, extracting may be achieved by directly consulting the source, or by indirectly looking through bibliographies, indexes, or online databases. Retrospective searching tends to be labour intensive, and is more likely when there is a need for comprehensive or historical information on a topic.

Of the features, Ellis (1989) notes that, '...the detailed interrelation or interaction of the features in any individual information seeking pattern will depend on the unique circumstances of the information seeking activities of the person concerned at that particular point in time'. Wilson (1999) proposes how these features may relate to each other temporally, providing a partial order; (See in Wilson Proposal).
Browsing modes (Marchionini, 1995)

Directed browsing - Focused on a specific target and systematic
Semi directed browsing - less focused and systematic but still purposeful
Undirected browsing - No real target and not systematic

Marchionini describes browsing modes as directed, semi-directed and undirected. In directed browsing, the searcher has a specific topic in mind and the searching behaviour follows a predetermined path. In semi-directed browsing, the searcher has a vague idea about the topic and searches for information to gather information that will enable him/her to become more focused. In undirected browsing, the searcher has some interest on the topic and searches the resources to get a better view of the topic or to find another topic.

► Model of information seeking

Recognize and accept an information problem
Define and understand the problem
Choose a search system
Formulate a query
Execute search
Examine results
Extract information
Reflect/iterate/stop
Marchionini (1995) proposes another often-cited model of the information-seeking process, tuned perhaps to electronic environments. In his model, the information seeking process is composed of eight subprocesses which develop in parallel: (1) recognize and accept an information problem, (2) define and understand the problem, (3) choose a search system, (4) formulate a query, (5) execute search, (6) examine results, (7) extract information, and (8) reflect/iterate/stop (Marchionini, 1995; pp. 49-60).

The sub process of "extract information" bears the same name as Ellis' "extracting" activity but the two processes are different. Marchionini (1995) describes extracting thus: "There is an inextricable relationship between judging information to be relevant and extracting it for all or part of the problem's solution. To extract information, an information seeker applies skills such as reading, scanning, listening, classifying, copying, and storing information. As information is extracted, it is manipulated and integrated into the information seeker's knowledge of the domain" (pp.57-58). In Ellis' model, "browsing" and "differentiating" are activities separate from "extracting," which is "systematically working through a particular source or sources to identify material of interest" (Ellis, 1989; p. 242). On the Web, we expect extracting (in Ellis' sense) to mean systematically working through a selected Web site or set of Web pages (typically using search engines) in order to search and retrieve the material of interest.

Ellis (1989) thought that hypertext-based systems would have the capabilities to implement functions indicated by his behavioural model. If we visualize the World Wide Web as a hyperlinked information system distributed
over numerous networks, most of the information seeking behaviour categories in
Ellis' model are already being supported by capabilities available in common Web
browser software. Thus, an individual could begin surfing the Web from one of a
few favorite starting pages or sites (starting); follow hyper textual links to related
information resources - in both backward and forward linking directions
(chaining); scan the Web pages of the sources selected (browsing); bookmark
useful sources for future reference and visits (differentiating); subscribe to e-mail
based services that alert the user of new information or developments
(monitoring); and search a particular source or site for all information on that site
on a particular topic (extracting). Plausible extensions of the activities to Web
information seeking (labelled Web Moves), are compared with the original
formulations (Literature Search Moves) in Table 4.2 below.

Table 4.2: Information Seeking Behaviours and Web Moves

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Identifying sources of interest</td>
<td>Identifying Web sites/pages containing or pointing to information of interest</td>
<td>Following up references found in given material</td>
<td>Scanning tables of contents or headings</td>
<td>Assessing or restricting information according to their usefulness</td>
<td>Receiving regular reports or summaries from selected sources</td>
<td>Systematically working a source to identify material of interest</td>
<td></td>
</tr>
<tr>
<td>Following links on starting pages to other content-related sites</td>
<td>Scanning top-level pages: lists, headings, site maps</td>
<td>Selecting useful pages and sites by book-marking, printing, copying and pasting, etc.; Choosing differentiated, pre-selected site</td>
<td>Receiving site updates using e.g. push, agents, or profiles; Revisiting 'favorite' sites</td>
<td>Systematically searches a local site to extract information of interest at that site</td>
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<td></td>
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</tr>
</tbody>
</table>

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Wilson (1999)

Figure 4.4: Wilson’s Proposal of Information Seeking Behaviour

4.3 Behavioural Model of Information Seeking on the Web

Aguilar’s modes of scanning and Ellis’ seeking behaviours may be combined and extended in a new behavioural model of information seeking on the Web (Catledge and Pitkow, 1995). The table below identifies four main modes of information seeking on the Web: undirected viewing, conditioned viewing, informal search, and formal search. For each mode, the figure indicates which the information seeking activities or moves are likely to occur frequently, as suggested by the theory.

<p>| Table 4.3: Behavioural Modes and Moves of Information Seeking on the Web |
|-------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Starting</th>
<th>Chaining</th>
<th>Browsing</th>
<th>Differentiating</th>
<th>Monitoring</th>
<th>Extracting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undirected Viewing</td>
<td>Identifying, selecting, starting pages and sites</td>
<td>Following links on initial pages</td>
<td>Browsing entry pages, headings, site maps</td>
<td>Bookmarking, printing, copying; Going directly to known site</td>
<td>Revisiting 'favorite' or bookmarked sites for new information</td>
</tr>
</tbody>
</table>

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**Informal Search**
- Bookmarking, printing, copying; Going directly to known site
- Revisiting 'favorite' or bookmarked sites for new information
- Using (local) search engines to extract information

**Formal Search**
- Revisiting 'favorite' or bookmarked sites for new information
- Using search engines to extract information

### Undirected Viewing

In the undirected viewing mode on the Web, we expect to see many instances of starting and chaining. The starting occurs when the viewers begin their Web use on the pre-selected default home pages, or when they visit a favorite page or site to begin their viewing (such as news, newspaper, or magazine sites). The chaining occurs when the viewers notice the items of interest (often by chance), and then follow the hypertext links to more information on those items. The forward chaining of the sort just described is the most typical during undirected viewing. Backward chaining is also possible, since the search engines can be used to locate other Web pages that point to the site that the user is currently at.

### Conditioned Viewing

In the conditioned viewing mode on the Web, we expect browsing, differentiating, and monitoring to be common. The differentiating occurs as viewers select the Web sites or pages that they expect to provide relevant information. The sites may be differentiated based on prior personal visits, or
recommendations by others (such as word-of-mouth or published reviews). The differentiated sites are often bookmarked. When visiting the differentiated sites, the viewers browse the content by looking through the tables of contents, site maps, or list of items and categories. The viewers may also monitor highly differentiated sites by returning regularly to browse, or by keeping abreast of new content (through, for example subscribing to newsletters that report new material on the site).

**Informal Search**

During informal search on the Web, we expect differentiating, extracting, and monitoring to be typical. Again, the informal search is likely to be attempted at a small number of Web sites that have been differentiated by the individual, based on the individual's knowledge about these sites' information relevance, quality, affiliation, dependability, and so on. The extracting is relatively "informal" in the sense that searching would be localized to looking for information within the selected site(s). The extracting is also likely to make use of the basic, 'simple' search features or commands of the local search engine, in order to get at the most important or most recent information, without attempting to be comprehensive. The monitoring becomes more proactive if the individual sets up push channels or software agents that automatically find and deliver information based on the keywords or subject headings.
Formal Search

During formal search on the Web, one can expect primarily extracting operations, with some complementary monitoring activity. The formal search makes use of search engines that cover the Web relatively comprehensively, and that provide a powerful set of search features that can focus the retrieval. Because the individual wishes not to miss any important information, there is a willingness to spend more time in the search, to learn and use complex search features, and to evaluate the sources that are found in terms of quality or accuracy. The formal search may be in two-stages: multi-site searching that identifies significant sources and then followed by within-site searching. Within-site searching may involve fairly intensive foraging. The extracting may be supported by monitoring activity, again through services such as Web site alerts, push channels/agents, and e-mail announcements, in order to keep up with late-breaking information.

Faculty and Students may follow formal and/or informal channels of communication in order to acquire the desired information. The importance of Information and Communication Technology (ICT) and users' ability to use it is continually emphasized in the contemporary society. New ICT tools have not only changed our view of what is important to learn but also our views of the ways in which learning can be supported.

Because of the new formats of information resources and new information tools, the users often prefer ICT to access and organize that information. The shift from print to digital information had an impact on libraries, information centres and other institutions directly involved in processing information as well as on the
user. The users had to acquire new knowledge and skill in information searching. The Information-seeking behaviour includes the motivations or reasons for searching and the steps taken to acquire new knowledge about the subject matter or topic.

4.4 Other Models and Concepts of Information Seeking Behaviour

❖ Robert S. Taylor

Robert Taylor’s work focuses on the kind of formal information seeking activity that occurs at a library reference desk. His model has been instrumental for the training of the reference librarians. He identifies four levels of information seeking: (1) the identification of a visceral need, or “vague sort of dissatisfaction” that is unexpressed; (2) the formulation of a conscious need that is expressed as “an ambiguous and rambling statement” and which sometimes results in communicating the need to another person; (3) the construction of a formalized need, expressed as a “qualified and rational” statement of the need; and finally, (4) the establishment of a compromised need, which is a query that is expressed in terms that fit the organization of the information system (i.e., the library collection or database) (Taylor, 1968).

❖ Nicholas Belkin

Nicholas Belkin is the proponent of the Anomalous States of Knowledge (ASK) concept for explaining how the information needs arise. An information need arises when a human individual encounters an ASK; an ASK is a situation where “the user realizes that there is an anomaly in [their] state of knowledge with
respect to the problem faced.” The person may address the anomaly by seeking information. After obtaining the information, the person will evaluate again whether the anomaly still exists. If it does, and the person is still motivated to resolve it, more information may be sought (Belkin, 1980).

❖ Brenda Dervin

Brenda Dervin is prominent among the proponents of models that focus on the cognitive dimensions of information behaviour. Dervin’s sense-making metaphor describes humans as moving along through time and space until they reach a cognitive gap, where an information need is perceived. Such gaps must be bridged through the acquisition of new information before they can move forward again. The goal of a person’s information seeking endeavors is to make sense of a current situation (Dervin, 1992).

❖ Carol Kuhlthau

Carol Kuhlthau’s research is based on the work of psychologist George Kelly. Kelly theorized that learning is a process of testing constructs. Kuhlthau built on Kelly’s theory to develop a model called the Information Search Process (ISP) (Kuhlthau, 1993). Similar to Belkin and Dervin, Kuhlthau’s ISP model posits uncertainty reduction as the prime motivator for research, and like Taylor, Kuhlthau breaks the information seeking process into stages. However, Kuhlthau’s focal point is the emotional states that accompany the stages. Anxiety, for example, accompanies the recognition of uncertainty at the first stage, initiation. The next five stages and common affective states with which they are
associated (listed in parentheses) are: (2) selection (optimism), (3) exploration (confusion/frustration/doubt), (4) formulation (clarity), (5) collection (confidence) and (6) presentation (relief/satisfaction or disappointment) (Kuhlthau, 1991).

❖ T.D. Wilson

T.D. Wilson has put forth a series of models of information seeking (1981, 1996, 1997, and 1999). The last of these, like Dervin’s sensemaking metaphor, emphasizes the complexities of context for information seeking. Wilson’s 1996 model explains three aspects of information seeking: (1) Why information seeking is more likely to occur in response to some needs more than others; (2) why some information sources get more use than others; (3) why people’s perceptions of their own efficacy influences their success in meeting an information goal (Wilson, 1999). His 1999 model emphasizes “information process” and invokes a feedback loop wherein information seeking is thought of as iterative at various stages, rather than successive (Case, 2007).

4.5 Summing Up

With the rapid rise of the Internet, there is great uncertainty in how the users find, obtain, share and use information. The players in the search engine field that existed only a few years ago are gone or reduced in relevance with Google dominating that space. The users are reading online or downloading documents immediately rather than seeking out a print version. The social networking sites such as Face book and MySpace have replaced the old Internet discussion groups which in their time replaced face-to-face meetings and the
phone. Instant messaging is replacing e-mails among recent generations of users. Websites replace print telephone directories as the means of finding a business or customer.

The format and the mode of access to information resources have changed because of the electronic environment in the libraries and the industry brought about by ICT. The libraries, librarians and users have to cope up with the challenge and make use of the advantages brought about by ICT. ICT has affected the way the libraries operate and provide the services. The materials acquired are now combinations of print, digital and multimedia. The digital information environment has led to changes in the tools used to identify and access information. The tools include OPACs, Web OPACs, search engines, the World Wide Web, etc. Because of the new formats of information resources and new information tools, the users often prefer digital information and ICT to access and organize that information.

The shift from print to digital information had an impact on libraries, information centres and other institutions directly involved in processing information as well as on the user. The users had to acquire new knowledge and skill in information searching. The Information-seeking behaviour refers to the series of activities that a user performs when seeking for information. It is dependent on the reasons for seeking information and the starting knowledge of the individual.

The users community who use the Web as an information resource to support their daily work activities engage in a range of complementary modes of
information seeking, varying from undirected viewing that does not pursue a specific information need, to formal searching that retrieves focused information for action or decision making. Each mode of information seeking on the Web is distinguished by the nature of information needs, information seeking tactics, and the purpose of information use.

Furthermore, the rapid pace of technological changes as new players and emerging models defies easy prediction of what is next. Users behaviours are changing with every advance in technology. Everything in the Internet culture is setting up a new way of thinking about access to and delivery of information. The newly emerging information communication technologies underline the richness of new ideas in the library community to improve access to scholarly literature for users.
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