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Studies in Information Seeking Behaviour and use: Need for Paradigm Change

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Reviews the concept, characteristics, types and scope of information needs and information seeking behavior along with some significant findings of the earlier studies. Considers that the findings of the past users' studies have not been able to achieve the objectives. Users' information seeking behavior is not only unpredictable but also unascertainable mainly due to varied and changing needs conditioned by innumerable factors discussed in the paper. Makes the comparative study of some of the important models of information-seeking behaviors, which are not congruent and conclusive but at the same time none of them, is challengeable. These models hardly have general applicability in different environment. Considers that every study is a model in itself. Therefore, it is difficult to conceive a single model applicable in different environment. Realizes that methodological model can be more workable than the cognitive. Combining the two could still be better. Suggests that when cognitive approach is not ascertainable, a methodological model by conditioning user to fit into any of the model may be more effective which need orientation to the systems and user education program to seek information on a set/prescribed principles with which user are comfortable as well as familiar. Therefore, in the modern context there is again a need for paradigm change from cognitive to methodological. .

1 INTRODUCTION

It is considered that identification of information needs is a pre-requisite to design and develop any information system to provide need-based information services to its clientele. It has been a topic of great concern and interest to information professionals that how people seek, retrieve and prefer to use information. Producer should always produce his commodities matching to the needs of the consumers. At the same time, the commodity, which is produced, should get

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its consumers without any barriers. Information user is happy when he gets what he/she has been looking for. However, this is not always the case. Information professionals' obligation is to provide maximum satisfaction to their respective user groups and minimize time and drudgery of literature search. To achieve this, information requirement has to be first identified before planning such services. According to Wilson (1980) perfect knowledge of inquirer is predictions and perfect knowledge of all texts, which could possibly be used by an inquirer, would be necessary before that ideal set could be identified. Needs, demands/requirements of user group have to be predicted or investigated to develop need-based information system.

Planning any functional and effective information system requires study of user behavior, which is difficult to determine and measure. John Martyn (1974) while endorsing the opinions of many others, agrees that ultimate value of any information communication system should be thought of in terms of user, that are made of information and subsequent impact of information on users' scientific and technical behavior. The very purpose of information science is to meet the information needs of user.

11 WHAT OF INFORMATION NEEDS

According to Derr (1983) information need is a condition in which certain information contributes to the achievement of genuine or legitimate information purpose whereas Marquis and Allen suggest that information use is a behavior and data are collected on any behavior by asking people about it by observing its occurrence, or examining its artifacts (e.g., documents). Brooks (1979) considers information needs as anomalous state of knowledge (ASK), and it is often difficult to articulate ASK of user. Shineborne (1980) affirms that what even an individual needs or asks for, it is impossible to know in advance which text or set of text will in fact (fulfill the requirement of the person) suit the task of an individual. Defining needs, Debons (1986) states that it is 'psychological statement which seeks to be relinquished through commodities which can be object or being'. In fact, need, demand, wants and requirements are psychological concepts. Therefore, for better conceptual clarity, these need to be properly comprehended. Crawford (1978) states that it involves cognitive process, which may operate on different levels of consciousness and hence may not be clear to the inquirer. In the present context, information is a commodity, which is used to satisfy the need, therefore, the concept of needs should be properly conceptualized and understood before further discussion on the subject:

Maslow has given the following hierarchy of need from lowest to the highest priority:

Physiology:	Food, clothing shelter
Safety & Security:	Protection against danger and loss of jobs

Social :	Being able to identify with individual and groups
Egoistic:	Recognition, status and importance
Self-fulfillment:	Realising one's full potential in creativity and self development. .

Other psychologists have divided need into three categories; physiological, affective and cognitive. All these categories are inter-related. 'One type of need may trigger another and as a part of search for satisfaction of needs, an individual may seek information, Rohde (1986).

From the description given above, it seems quite evident that assessing information needs is not a simple task. Instead its identification is a complex problem. No one could be sure what the user want because they themselves on many occasions may not be able to express their actual demands/requirements. Some of their needs remain unexpressed or even unfelt.. Therefore, it could be concluded that the concept of information use is too broad, elusive, amorphous and variant in its nature, 'it is less definable but definitely palpable', Eager and Oppenheim (1996).

2 OBJECTIVES OF ASCERTAINING OF INFORMATION NEEDS

Hale (1986) summarised the purpose of identifying information needs for:

- Optimizing the allocation of operating resources by customizing services to selected clientele;
- Fine tuning the delivery of information within existing systems.

A panel was constituted by NAL (National Agriculture Library USA) in 1982 to assess the information needs of its users which realised that 'only through the eyes of its user could be a true picture be derived of what NAL should and could be' and recommended survey of user needs, French (1990). By ascertaining the information needs of the community, it becomes justified and rational ,to modify or improve the acquisition policy to match the exact needs and to avoid adding collection/databases, which may not find the clientele. However, French (1990) states that user generally accept what is offered to them. Therefore, this statement cannot be accepted as such. This may be true for that group of user which docs not have specific problem at hand. Nevertheless, it remains the fact that majority of the user are hardly demanding. The capacities of purchasing reading material all over the world has declined and would continue to get worsen in time to come. In this context, Richard De Gennaro (1981) realizes that the present time is forcing librarian and scholars alike to reexamine the conventional view of nature and extent of collection and services that libraries need and can afford to provide to support the instructional and research need of user. However, the importance of user studies cannot be undermined. In view of the reducing financial support to

libraries and information services, such studies play their own role. In spite of this, the matter remains still debatable whether the results of these studies have given the desired output.. Most of these studies could not have follow-up actions to implement the findings. However, it remains a fact that in every information organization, user is the main focus and all information activities revolve around him. Therefore, study of each organization with special reference to its environment, characteristics etc. can give meaningful results to improve upon existing services.

3 TYPES OF INFORMATION

Orr (1970) made an extensive study on types of information needs. He investigated why of information needs based upon input and output functions and has given the following types:

31 'INPUT FUNCTIONS' LEADING TO SEARCH FOR INFORMATION BY SCIENTIST

311 REGULAR NEEDS

- *Current Awareness:*	To keep abreast of new developments
- *Everyday Reference:*	To obtain specific items of information essential for the day-to day conduct of ongoing project
- *Personal:*	Such as, food, drinks, etc.
- *Stimulation:*	To suggest new, ideas, approaches, and problems
- *Feedback:*	To obtain reactions to own work and refine problem definitions and solutions.

312 EPISODIC NEEDS

- *Retrospective:*	Search to learn of past work possibly relevant to and useful for a current or prospective project
- *Exhaustive:*	All relevant work
- *Limited:*	Sample of relevant work limited by size or by criteria other than relevance (e.g. less than 10 years old, published in journals of high standards or by certain authors etc.)
- *Instruction:*	To acquire new competencies or to 'brush up' in areas where competency has declined.
- *Consultation:*	To obtain tailor-made 'solutions' to, or expert opinion on specific problems recqgnized as outside areas of special competence.

32 OUTPUT FUNCTIONS LEADING TO PROVISION OF INFORMATION BY SCIENTIST

321 RESPONDING

To Serving input needs of others in response to their explicit or implied request, such as,

Informing

Alerting (current awareness)

Answering (everyday reference)

Referring (retrospective search)

Teaching (instruction)

Advising (consultation)

Reacting: to meet others 'personal' needs for stimulation and feedback.

Reporting: to meet sponsors' supervisors', or co-workers' requirements for information on own work.

322 REQUESTING

To solicit input from others by explicit or implied requests aimed at meeting own needs for current awareness, everyday reference, retrospective search, instruction, and consultation, as well as for stimulation and feedback.

323 PROMOTING

to advance own ideas, projects, career, or reputation, namely,

Proposing: to obtain support from sponsors, or collaboration cooperation from other workers

Preempting: to establish a proprietary 'claim' for a contribution pending definitive disclosure or 'registration'

Registering: to make a contribution part of the permanent record esteemed by reference groups and sponsors.

Reinforcing: to improve chance of achieving desired end by citing own contributions, employing multiple channels for same contribution, presenting citing own retrospective syntheses of own work etc.

Defending: to refute criticism

This is quite evident from the above description that there are various purposes and backgrounds to seek information. Considering all these types of information needs it seems to be impossible to ascertain what actually the user would need at a given time. However, Whittaker (1993) reduced the above classification into the following:

i) *Regular:* Such as current awareness, browsing of subject! journals.

ii) *General:* General reading according to the interests hobbies etc.

iii) *Quick reference:* Fact-finding, statistical information

iv) *Relating to personal problems:* Travel, diagnosis of diseases, finding a job etc.

v) *Personal development:* Study abroad, qualifying competitive examination, and improving professional competence

vi) *Research:* Writing thesis, project report, dissertation, literature survey and review etc.

Gorman (1995) identified following types of information needs:

i) *Unrecognized:* not aware of information or knowledge

ii) *Recognized:* aware that information needed mayor may not be pursued

iii) *Pursued:* information seeking occurs, mayor may not be pursued

iv) *Satisfied:* information seeking succeeds

4 SCOPE OF INFORMATION NEEDS

'Range and complexity of information needs and habits proved to be more varied than had been expected', Martyn (1974). Wersing (1973) divides user studies into four areas:

1. Channels of communications
2. Information receivers (users)
3. Data sources, and
4. Information senders

In fact, scope of information needs is much wide inclusive of all interactions

between user and their information products such as information seeking behavior, information sources and services, communication, dissemination, information use, needs, demand, wants and requirements and information searching and retrieval processes including all barriers and intervening variables in information access. According to Eithel (1981) the field is composed of studies that are concerned with who needs what; and how these needs can be identified and satisfied.

5 CHARACTERISTIC FACTORS OF INFORMATION NEEDS & USE

- Main characteristics of information needs are given below:
- Information needs is subjective as welI as objective with inter-relationship between the two.
- Needs differ from: individual-to-individual, group to group, institution to institution, society to society, environment to environment, and from time to time.

The main factors for such variations are caused because the group or the individual has to perform various roles and functions in different environment. . In addition to this, personal characteristics, aptitude, knowledge structure also influence individual behavior of information seeking. Availability of information resources, physical facilities and environment within the library or information center, service aptitude of the library staff and user own orientation also make difference. If farmers' information needs are taken into account, one may observe that their needs differs from one geographical/ecological zone to another and also from one season to another in a year e.g. they need different information during sowing, harvesting, post harvesting and marketing times. Sometimes they may need advisory service about insect-pest management, soil tests, latest high yielding crop varieties etc. There are many other factors which influence information use and affect information seeking behavior. Parsely (1981) observed the following dependant factors:

- The range of information available
- The use to which information wilI be put
- The background, motivation, professional orientation.

51 BEHAVIOURAL ASPECTS

It is this area of users' studies where a lot of research has taken place without any specific findings with general applicability. According to Marchinonini (1995) 'information seeking is a process in which human purposefulIy engage in order to change their state of knowledge'. User's anomalous state of knowledge (ASK) is stilI unresolved because information seeking behaviors of user are so unpredictable that it is difficult. to know who would need what in a given time living in a particular environment. .

Toliber & Langford (1987) have identified user behavior as:

- User don't know what they want
- User keep changing their mind
- User want everything yesterday
- User react emotionally and illogically
- User resist change
- User are stupid

Besides above, authors of this paper feel that user also seem to possess the following additional attributes:

- Invariably impatient and casual
- Does not know how to use resources effectively (lacks information searching and seeking skills)
- Non-participative (non-interactive, does'nt give feedback)
- Prefer to miss information if not readily available
- Their needs are short-lived, and changing
- Get satisfied with alternative/substitute source or information
- Inhibition to learn new technology for accessing and retrieval of information
- Lack aptitude for regular browsing of latest literature
- Lack inquisitiveness to know new developments
- Unable to express and translate their actual needs.

Mick (1980) confirmed that individuals use information through process of awareness, comprehension, evaluation and assimilation according to their personal histories. This also confirms that such behavior pattern differs from person to person which conditions the information seeking behavior of user.. Mick et al. (1980) also state that information behaviour is the product of complex interaction. Interventions aimed at changing behaviour should be based on variables that can be controlled, such as a task, job, work role and institutional environment.. In such situation, assessing information need is not only difficult. to determine but also seems to be of least value. If individual is the target (who is different fro'TI another) not the group or the community, generalization does not seem to be possible. Dervin (1996) establishes that information seeking mirrors elements of context.. Truly, the contextual aspect may bring changes in search pattern of the user. Personal characteristics such as subject knowledge, past experience in using libraries, personal attributes of personality such as introvert or extravert patient or impatient etc. are some of the influencing factors in behavioural studies. Therefore, due to these variations and complexities in information-seek-

ing, it may not be possible to assess the exact information seeking behaviours of an individual or a group of individuals and fit them in a general model or theory.

6 RETROSPECTION

According to Wilson (1994), information user study dates back to 1916. During 1965, 676 user studies were published in one of the Bibliographies of User studies. Siatri (1999) traces the evolution of user studies from late 1940's. More studies started after 1948 when Royal Society Scientific Information Conference was held which subsequently made several surveys on information seeking behaviors. One of the important studies conducted in 1967 which deserves mention is INFROSS Study (Information Requirements of Social Sciences) based on survey Questionnaire at Bath University, Line (1971). It is important because it laid down foundation for further research. Need for conducting user studies was also felt by S R Ranganathan in his Second Law of Library Science *(Every Reader his or her Book)* conceived in 1928 (Girja Kumar, 1991) and published in his fundamental book *Five Laws of Library Science* in 1931. His philosophy of librarianship centers on the user and his book/information. The direction for conducting users' studies was quite explicit in some of his laws oflibrary science. Crawford (1978) estimated in 1978 that more than 1000 studies might have been conducted so far. There had been more than 200 studies on 'information seeking behaviour' and more than 1800 studies on 'information needs' from 1989-97 However, the pertinent question is whether these studies have given the desired results and future directions or it has only formed knowledge base of empirical data. The reasons for not arriving at some theoretical understanding of the concept is mainly due to complex nature of information needs which is unpredictable and difficult to define and investigate as discussed earlier. The studies conducted, and models developed, therefore, lack comparability and conclusive conclusions to form basis for wider application. Comparing the results of 13 scientific user studies with those of INFROSS, Skelton (1973) found that most important method used by Physical scientists to retrieve information were respectively: *Citation, Abstracting and Indexing Journal, personal recommendations and chance.* He concludes that physical scientists often found information by chance rather than by formal use of bibliographical sources. American physicists relied on informal sources whereas British physicists on formal channels. This marked difference is between the same types of user having same subject interest.. In view of such variations, the utility of research in this area becomes questionable. How far the findings of the past studies have relevance in the present changed scenario is also debatable and questionable?

7 METHODOLOGIES

The common methodologies used in these studies are: observation, analysis of documentary sources survey techniques, analysis of library statistics, case studies, citation analysis, re-shelving studies, non-use of material, inter-library loan

photocopy requests, maintenance of diary etc. These methodologies had been used separately and as well as in combination of two or more. Survey research methodologies have always been criticized but are not replicable by more scientific methodology. The article entitled 'With Our Eye on User' by Douglas Zweizig (1976) emphasized the need to study the library use and its users. Seizing and Dervin (1977) concluded that 'The important question ... is not library use, not library user, but library uses which come under the purview of behavioural sciences'. Thus, not only user became the unit of analysis but what and how they use information is equally important to ascertain to provide need-based information services. It has been observed that due to complexities involved in identifying information use, sophisticated and accurate quantitative techniques capable of greater detail is yet to be evolved for wider application. Paisely (1968) had also argued for stronger theory and more eclectic methodology from understanding of information needs and uses that was primarily document-based to one that is rooted in behavioral sciences. Such methodology needs to be evolved. On the basis of review of information user needs conducted over 3 decades. Crawford (1978) concluded that:

> 'Sophisticated Social Science concepts combined with Quantitative techniques have produced both case report and field studies ...utilizing well designed survey instruments, carefully selected, stratified, random sampling, and appropriate techniques of statistical analysis ... slowly, valid and empirical data are being accumulated which in time will contribute to a unifying theory of information needs and uses. This accumulated finding and data after scientific analysis lead to directly or indirectly to improvement of systems'. It is the choice of the sample and methodology applied which matter significantly in such studies.

Needs of each homogeneous group has to be identified to provide need based services. Present methodologies being applied, no doubt, need further research and improvements. However, common methodology is still to be evolved and standardised. So far different methodologies have given different results. However, the study of human behaviour still remains inconclusive and would continue to be so. Therefore, even standardized and further improvement of methodologies may result in futile exercise. However, Indirect/informal methodologies if applied carefully, such as observation, citation and library statistics (analysis of documents) reference interview etc. may give better result.. Uses of several methods (triangulation) is one way to ensure validity in qualitative research, (Fidel, 1993). Fidel further states that information scientists have pointed out that individual, situational, historical and contextual factors which are essential in information seeking behaviour have not been taken into account.. Mick (1980) identified three human factors influencing information seeking behaviour - Cognitive, Individual (experiential) and environmental/situational. . Invariably main source of empirical data is the user who mostly is unwilling to cooperate and give

generally bias or ideal answer when formally asked or interviewed.

8 MODELS OF INFORMATION USE & SEEKING BEHAVIOUR

Research in user studies, information seeking behavior, and information retrieval process has no doubt accumulated large quantitative data and findings. However, most of these findings are not coherent and have failed to form theoretical foundation with genearlised applicability in various professions and disciplines due to innumerable intervening variables involved in the process already discussed in the preceding sections particularly relating to Information gathering/ seeking process. In fact information seeking behaviour and information needs are two separate components of users' studies. Identification of information needs have no doubt given meaningful results for meeting the information needs of users and developing information systems. However, scholarly contributions made towards developing various models of information seeking have failed to give desired results of general application. In view of this, Leckie and colleagues (1996) rightly say that successful model of information seeking must incorporate enough flexibility and unpredictability of information seeking process. Wilson (1999) describes a model of information behavior as framework for thinking about a problem and may evolve into statement of relat.ionship among theoretical proposition. So many models of information seeking behavior in various professions and disciplines have been developed. A few of them are being discussed for the purpose of generalization.

81 COMPARISON OF MODELS OF INFORMATION SEEKING BEHAVIOR

Kuhlthan : Initiation Selection ~ Identification ~ Exploration ~
~ Formulation ~ Collection ~ Presentation

Dervin: Situation in Time & Space ~ GAP ~
~ (Intervening factors) ~ Bridging ~ Outcome

Ellis: . Starting ~ Chaining ~ Browsing ~ Differentiating ~
~ Monitoring ~ Extracting ~ Verifying ~ Ending

Wilson: Context of needs ~ Activating Mechanism ~
~ Intervening Variables

811 INFORMATION SEEKING BEHAVIOR

Active search Ongoing Search ~ Information Processing & Use
Passive search

Leckie & others : Works Roles → Tasks

812 CHARACTERISTICS OF INFORMATION NEEDS

Sources of information + Awareness of information → Outcome → Feedback

Westbrook : Needing ~ Starting ~ Working ~ Deciding ~ Closing

Browsing Metadata

Peter Brophy: Formulate ~ Locate ~ Request ~ Authenticate ~ USE

Browse objects Return & Release

Brophy (2000) has given generic model of hybrid library describing the process of 'search and retrieve' of information system. User makes an inquiry, interact with secondary sources, discovers his information, identifies its location and then does the browsing of the actual object (container of information). This stage may not be applicable in all cases. If the information is not locally available, he makes a request to get it. Authenticate the user and delivering the item to the user is the function of the library or information center after which user makes use of the information he has gathered.

Kuhlthau's (1994) model of information search process is more in context of students who select their research topic after Initiation. This may not be applicable to other categories of user who normally begin their search with pre-conceived implicit or explicit need present in their cognitive state. However, the other stages may have the general applicability. Kuhlthau (1993) h~d also proposed a model of individual information search process identifying following 7 stages, namely:

1. Task initiation, 2. Topic selection, 3. Previous exploration, 4. Focus formulation, 5. Information collection, 6. Search closure and 7. Start writing.

Kuhlthau's model (1994) and Ellis's models have the similarity in successive search process. In view of this Wilson (1999) has attempted to merge them in one in the following sequence:

Activity Recognize ~ Identify/formulate ~ Gather ~ Complete

The stage of Browsing in Ellis's model may precede or follow Chaining. Similarly, Monitoring may not fit between Differentiating and Extracting. In Monitoring, user search for current awareness service, which he can find directly by browsing current journals and any other indexing and abstracting services, and may not need earlier stages of information search. Ellis (1989) has described these

stages as 'general characteristics' of model, therefore sequence of these elements/ characteristics are out of discussion. Even then, these elements are mostly in the sequence of users' approach. Dervin's and Wilson's models also have the similarity. Situation in time and space of Dervin's model is comparable with Context of needs of Wilson's model and Work Role of Leckie. The context of the problem and situation are the predominant factors in information seeking behaviour. Oddy et al. (1992) stated that 'situation in which user finds himself or herself is important factor in properly understanding the statement made by the user, and is an important determinant of relevance of judgement'. Gap of Dervin includes intervening factors confronting information search similar to intervening variables of Wilson. Since there are innumerable intervening variables/factors in information search process, constraining different user differently, therefore, Dervin and Wilson have kept them as open ended models. Leckie and colleagues also preferred to develop their model without the consideration to sequence of behaviour pattern of user, instead they have enumerated various factors involved in information searching such information sources/channels and their awareness and other characteristics of information - timeliness, availability and accessibi Iity, quality, reliability, cost effectiveness etc.

Though a lot of research input have gone into developing cognitive models by various experts in various disciplines and professions, however, their generic applicability can not be ensured due to various difficulties discussed earlier in this paper particularly relating to unpredictability of human behaviors in different situation, time and context.. Wood and his colleagues (1999) also confirmed that there are evidences that the actual information seeking strategies used by individual with different cognitive styles differ significantly. In such situation, it has not been possible to develop a standard cognitive model with generic applicability. In view of different models developed, it may be concluded that user can not be easily fitted in the cognitive models developed by various information scientists. Therefore, the following methodological model is being attempted and proposed combining cognitive as well as methodological approaches with the objective that user should be oriented to use the model with a system approach for better result in searching information.

Wilson (1999) has differentiated between information seeking and information searching behaviour. However, in the present model, both are being taken together. The process of finding information including behavioural aspect has been rightly denoted by new term - Information Foraging (1998) meaning activities associated with assessing, seeking and handling information sources. The approach to information seeking is different by different users' groups adopting their own strategies. The stages of information search as given in various models may not be adoptable in different environment as such.

91 METHODOLOGICAL MODEL

In view of some of important models developed, a generalised methodological model combining cognitive and system approaches could be proposed.

Genesis ~ Nature & types Conceptualization ~ Analysis & processing ~
~ Matching ~ Selecting ~ browsing & Filtering ~ Recycling/modifying ~
~ Packaging ~ Feedback

911 GENESIS

The genesis of information need is primarily from the 'person himself or herself' Wilson (1981) person's work or the environments in which he lives, Wilson (1999). Wilson has given sound foundation to the circumstances in which information need arises. Leckie and others (1996) have also given the characteristics of information needs which arise out of situation pertaining to specific task, professional duties and geographical location. Dervin (1983) in his Sense Making Theory has also concluded that situation in time and space is the main element in which information problems arise. Kuhlthau (1991) states that information seeking is a process of construction that begins with uncertainty and anxiety. Other factors in which information need arises have been elaborated in the preceding paragraphs.

912 NATURE OF INFORMATION NEED

Before actual process of information seeking begins, the nature and type of need conditions the behaviour of user. Its nature could be:

- Of urgent nature requiring immediate solution with an anxiety feeling
- May not be so immediate and can afford some time to wait without any time pressure or an anxiety
- May be of current nature or retrospective
- May be of exhaustive or limited in nature or only fact finding
- May not need systematic approach

The above factors and different types of information enumerated in para 3 above play their role in information foraging which can not fit in congruent model.. The purpose of inquiry or searching is also an important factor, which decides further course of action on the part of the user.

913 CONCEPTUALIZATION

This is actually the beginning of the search process where problem in hand is to be properly conceptualised. There could be structured or unstructured or even semi-structured written or verbal statement ofthe problem. Conceptualisation

of the same problem could be different by different user. This stage could be comparable to Starting of Ellis (1989). The problem is to be well interpreted in the context of 'users' problematic situation' Oddy et al. (1992). Unless the problematic situation and context of need is properly conceptualized, information retrieval process cannot yield desired result.. The anomalous state of knowledge process of users' cognitive state is to be explored and synthesized. Here, the role of pre-search interview invariably is required for effective information search.

914 ANALYSIS/ PROCESSING

Analysis of the needs (query) is a key factor in information search. Success or the failure in finding the information depends upon analysis and translation of the problem into retrievable language being used by possible databases or the information sources likely to be consulted to extract desired information. Meadow (1991) states that 'interpretation must exercise a great deal of judgement in order to be able to translate it accurately into the target command language. This is similar to Initiation of Kuhlithau (1994) and Activating Mechanism of Wilson (1999) and Formulation of query of Brophy (2000).This judgement is to be applied in manual as well as electronic search process, which would differ in different environment. . The user may handle this stage himself or may take assistance from intermediary resulting in different behaviour pattern. If the professionals are analyzing the query, they are supposed to refine the query by the help of relevant sources and their professional competence. Here, the ability of the user pertaining to his subject knowledge and familiarity with the resources are also going to make a difference. According to Oliver, Ron and Oliver Helen (1997) processing and analysis of information also depend upon purpose and context of information search. Therefore, uniform approach of user does not seem to be possible. Though this processing and analysis is key factor in information search yet is quite often missing on the part of the user. This may also be true that some queries need not under go the stages being enumerated. However, it is an established fact that the behaviour pattern of different individuals may vary under different conditions and also even under similar conditions. As such findings of users' studies with behavioural aspect and utility of various models developed have concluded with question mark.

915 MATCHING

According to Belkin (1982) information retrieval system depends on best match principle that assumes equality between the actual information need and expressed need. Information need expressed by the user is to matched with the sources of information available within the organisation or outside. Here, the knowledge and familiarity of information sources playa significant role. Wrong choice of sources and mismatching of the query with the sources are going to result in failure of search and consequently dissatiscation of the user. Consultation of secondary sources like indexes and citations etc. facilitate the process of

matching. Every user needs assistance of intermediary irrespective of his knowledge base. This process is similar to Chaining feature of Ellis's Model and selection/exploration of Kuhlthau.

916 SELECTING

The sources, that could be scanned to extract the desired information, are identified and selected for consultation or browsing in the order of their relevance. All possible sources in any form are listed. Leckie et al. (1996) say that direct knowledge of various information sources (whether a colleague, database or a handbook and the perception for about the process or the information retrieved, playa crucial role in information seeking process. Selection of sources invariably depend upon the availability and awareness of sources. This is comparable to the features/stage of Extracting given by Ellis denoting selectivity in identifying relevant material.. In an electronic environment, the choice of search engine and websites are going to affect the efficiency of retrieval..

917 BROWSING AND FILTERING

After the user makes the choice of the sources in his cognitive state, he may list them in order of their relevance. He begins browsing the database(s) or collection to find out relevant records/sources which could satisfy his cognitive need: The relevant records are marked for further perusal and study. The process includes selection and rejection of information simultaneously. Therefore, browsing and filtering activities go together. In fact, it appears to be Extracting process, in which right information is extracted by rejecting remaining not fulfil1ing the purpose. In case the requisite information is not retrieved, the process is repeated from the beginning or from AnalysislProcessing or matching stage. Professional guidance was reported to be significant at this stage.

918 PACKAGING

If the relevant information has been retrieved, and the same is gathered, systematized and edited it definitely increases the utility of the product.. Of course, user himself is not able to do this job of packaging. The participation of professional in order to produce the output in a most convenient format gives better results. However, information providers may not do this job to help end user.

919 FEEDBACK AND VALIDATION

Interaction between the user and the information system or information provider is impor tant and may lead to improve the process of information retrieval.. User's reaction to the system can give useful feedback to modify and improve the query formulation and subsequent process of information retrieval.. Efforts could be taken to bridge the gap between end user and the system(s) and correcting the user to follow right path to get his information. Gap bridging can be accom-

plished by thinking up an answer, asking for help, looking for useful information or by any other functional method that enables the individual to continue moving, Jacobson, (1991).

92 CONCLUSION

An attempt to workout the stages involved in information search has been made. This model emerged as consequent of working with M. Sc. and Ph. D students studying horticulture and Forestry preparing for their dissertations and Ph. D theses where international databases on CD-ROM were available for search in addition to Internet facility. These stages are also explicit in many models discussed above and may not vary too much from other models. Great deal of efforts were made to educate the users to acquaint them with system and make them independent in their information seekingbehaviours. But their dependence on library staff continued. Proper search formulation based upon controlled vocabulary or subject terminology was found lacking. However, in the present model, cognitive and methodological approaches have been combined which seems to be more workable than cognitive approach alone.

During the last 20 years or so concentration of research has been on conceptual models and many models have also been developed which don't have general applicability. How user perceive his information need is a subject of an individual psychology which can not be similar in different environment. . Could there be a 'common universal process through which all user pass in adoptation to particular information activity' as observed by Diane Nahl (1993)? This statement may not prove true in all cases. Morris (1994) rightly argues that 'how user-centered information services could be that useful when information needs are ambiguous and users' information gathering situations are in constant influx'. Tuominen (1997) also supports the view stating that "user-centered discourse does not necessarily liberate the user from the constraints of the system, and for both librarians and users, there is no easy way out of the web of discursive power and subject positions of an expert and a client that user centered discourse offers to them".

In such situation, it becomes more important to ascertain what user need rather than how they perceive and use information. What of information need is ascertainable and has given useful results for backup services. It is only the behavioural studies which could not yield good results. Therefore, definite sequence/order of these stages cannot be authoritatively predicted due to varied approaches to information seeking as elaborated in this paper. Different types of information needs and level of cognitive needs and styles result in different behaviour pattern. For example if query pertains to fact 'finding' the searcher may not need to go through the stages instead he can directly access the source and get his information. The intervening variables may not at all come on his way. If the query is of complex nature, the methodological approach would give consid-

erable assistance in finding the information. It can safely be said that every single study in itself is a model and is not strictly comparable with others and are not applicable in other situation and environment. . Environmental factors condition the conceptual process to a great extent..

If we look at the findings of past users' studies relating to behavioural aspects, their relevance for the present and future is questionable. What seems to be more important is to study the particular community with reference to its activities, environment, situation, work role etc. without any consideration to theoretical foundation. Theoretical foundation could not be laid down, though continuous efforts have been put for decades for conducting these studies. Studies conducted on this topic has resulted in 'much ado about nothing or may be much ado about something' but it is a fact that these studies certainly have given diminishing return as compared to the input.. The latest literature review contained in ARITS of 1986 and 1990 had shown the declining trend and changing interest in these studies. The main objective of these studies invariably has been to provide need-based information service. The experienced professionals could have conducted such studies through informal methodologies which would have given better results with the provision of updating the finding with the changing time, situation and factors.

In the present technological environment, it is the system concerned which is more important and its knowledge is essential for the user in his information search pursuit.. Local Library System should be made user-friendly tmd responsive to their needs. Morris (1994) felt that 'user tend to operate under the system-centered paradigm in their own view of what information is and what process of finding it is like and information professional should be understanding and clarifying ambiguous information need.' Thereby role of the professionals have increased to acquaint the user with the system. If any model is to be made workable, it would be worthwhile to condition or orient the users' group to follow the model by changing their different behavioral pattern and unifying into a single pattern. User have been using various library systems like cataloguing and classification from time to time and by the passage of time they became used to the prevalent systems and got familiarity in using them with convenience. Methodological model with holistic approach can give better results than the cognitive one.

The ultimate objective of these models is to assist the user in accessing the desired information. In case proper orientation is given to any of the models or system, and information searching skill is reinforced better results could be expected as suggested by Eisenberg and Berkowitz (1990) in their model of Big Six Skills which are -Task definition, information seeking strategies, Location and access, use of information, synthesis and Evaluation. Kuhlthau (1993) also recommends counseling approach to user stating that 'In technological age, people

require services that counsel them in understanding information and guide them in the process of seeking meaning'. Therefore, acquaintance of user with their resources and developing their ability and skill in finding their information may de-emphasize the user-centered studies that have failed to give desired results. Ellis et al. (1993) also concluded that the various studies of information seeking behavior differ so widely in aims, objectives and methods that genuine comparison (or finding) of these results is virtually impossible. Skelton (1973) also endorses the same opinion that each study stands in isolation with no obvious links that enables it to be compared with the other studies. Therefore, the need is to find alternative(s) to achieve the objective to provide need-based information services and meet their information needs to the utmost satisfaction of users which could be done without further investigations into theoretical foundation and cognitive models. Information professionals with good experience and professional competence and knowledge with sharp observation may achieve the objective by adopting simple informal methodologies or adapting the user to any logical and user-friendly methodological model avoiding all intricacies and complexities associated with assessing information needs. However, profession has done voluminous work on the subject which now does not need further investigation into discovering theoretical foundation. Dalrymple (2001) also considers that 'a user-centered approach helps to explain how individuals use information, what constitutes information, and what difference information makes in people's lives. To address these problems adequately, there may well be a greater emphasis in future on discovered, rational, objective, and document-based approach in LIS away from user centered, constructivist approach'. It is time to concentrate more on to bridge the gap between information users and the information system(s) and overcome the intervening variables and barriers obstructing their way in meeting each other by shifting the emphasis from present user-centered approach to information system or follow methodological model with holistic approach still keeping the user always in focus.

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