

INFORMATION NEEDS AND INFORMATION SEEKING BEHAVIOUR OF USERS IN ORGANIZATIONS

*D.C. Kuruppu**

Understanding the information needs and information seeking behaviour of workers in an organization is the basis for designing and developing information systems and services to adequately satisfy their needs. However, there are conflicting views regarding the information needs and information seeking behaviour of users of information services. This paper discusses briefly: information needs, information seeking behaviour, methods used in studying information needs and seeking behaviour, especially in research organizations, and the importance of such studies. The use of the findings of the studies in making decisions relating to the design of information systems and services is also touched upon. The impact of emerging information technology on information users and their information seeking behaviour is mentioned.

1 INTRODUCTION

With the view to re-iterating the importance of understanding the information needs and information seeking behaviour of workers in an organization, this paper briefly and selectively reviews the literature on these aspects of user studies.

Information needs of individuals in an organization differ depending upon their respective functions and tasks, the level of their knowledge and experience (in the specific field of specialization and in the use of information systems and services), their particular interest and need to satisfy which they seek information, on the breadth and depth of their interest profiles, and on the nature of the subject or field of specialization or interest.

* Science Library, University of Colombo, P.O. Box 1698, Colombo 3, Sri Lanka.
E-mail: kuruppu@vidya.cmb.ac.lk

Information needs — the type, coverage, depth - of a user may differ considerably depending upon the his/her activity at the moment — for instance, when entering a new field of research as compared to when seeking a solution to a specific problem in a field already familiar to the person. An information seeking behaviour of a user may result from the recognition of some information need. Fig. 1 shows the interrelation among the areas usually covered in user studies [1].

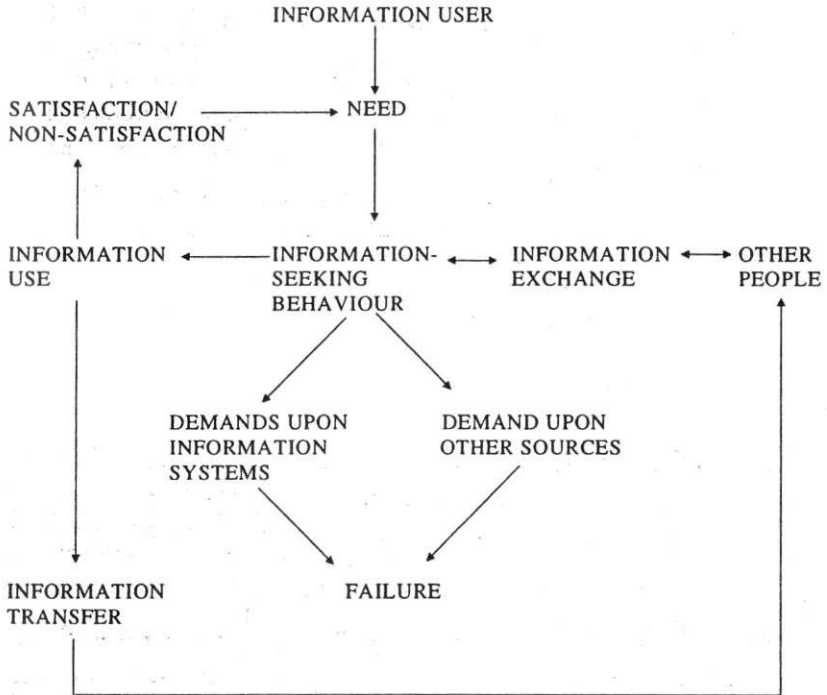


Fig. 1.
Interrelationships among areas in the fields of user studies
(Wilson, 1981:4)

2 INFORMATION NEEDS

Dervin and Nilan [2] point out that several authors have assessed the utility of studies of information needs of users and they agree that the research has provided little guidance for practical application. Information systems could serve users better, they assert, if their needs and uses become 'a central focus of system operation,' but this 'may require implementation of a system redesign mandate.' They further proposed that user-oriented changes should, among other things, include:

- Treating documents in various ways to make the system more meaningful to users.
- Devising new indexes on user-relevant criteria to supplement subject indexes.
- Including emotionally-oriented indexes that address emotional dimensions of experience among the ways to access materials/information.
- Changing the procedures by which user needs are assessed in practice, from keyword, symbol-matching and subject orientations to user-problematic situations.

Dervin and Nilan called for a paradigm shift in information need and use research. The alternative paradigm, as differentiated from the traditional, is one in which information is seen as something constructed by human beings. Three different approaches are suggested which include most of the elements of the alternative paradigm:

- The user values approach, which focuses on perceptions of utility and value of information systems.
- The sense-making approach, which examines the way people make sense of their worlds and how information is used in this process.
- The anomalous status of knowledge (ASK) approach which examines how people seek information concerning situations about which their knowledge is incomplete.

These approaches focus on identifying use characteristics, that is, user modeling, in order to design user-interfaces for information retrieval systems.

Paisley [3] who was one of the contributors to this paradigm, points out the dangers of shallow conceptualizations when studying information needs and use patterns. The failure may arise from not taking into consideration one or more of the following factors:

- the full array of information sources that are available to users (within the organization and accessible from outside sources);
- the different uses to which the information will be put;
- individual characteristics of users, for example, motivation, professional orientation, etc.;
- the social, cultural, political and economic factors that may effect the work of the user, and his/her information needs, information seeking behaviour and use patterns;
- the consequence and impact of information use, for example, increase in work productivity.

The result might be lack of validity checks and qualifying variable.

Information needs can be difficult to quantify. It can be best measured through information seeking or information use situations. 'Information need' is an abstract concept, used to answer the query why people seek, gather and use information. Researchers do not often describe their information need directly or precisely, but through the context in which they address information needs [1].

3 INFORMATION SEEKING BEHAVIOUR

In an organization the search for information by a person is seldom an end in itself, but part of a the process of decision making, problem solving, planning, resource allocation, etc. in other words, it is one aspect of the overall process of system management [4]. This implies that information seeking has to be studied within an organizational context or a particular process. The methods of seeking information, the criteria for selection, and the information itself all tend to vary with the time and context, and therefore make it a complex process.

Paisley [3] proposed a conceptual framework of the information seeking behaviour of the user. It provides a model and theoretical approach which placed the user at the centre of a system of concentric circles. Thus, the user being within:

- a cultural context;
- a political system;
- a membership group, that is, the system that controls the "official" information channels of his/her field (membership in a society or professional organization);
- a reference group, that is a group within which the user finds models of behaviour etc.;
- an "invisible college" of informal communication;
- a formal organizational setup, that is the system which emphasizes roles, lines of responsibility, and products, rather than people themselves;
- a work team; this is perhaps the most important information flow system; and
- his own head, that is the user being influenced by his own personality, and the system of perceived relevance of information inputs and uses of information outputs.

In this system of concentric circles, the closer one moves to the centre starting from the outermost circle, the greater is the influence of the factor on the user's information seeking and use behaviour. For instance, the cultural system has less influence than the reference group, which has less influence than the work team. Cutting across these eight systems are the legal/economic and the formal information system within which the user is placed.

Paisley's system provides a framework to view the user as an information processor through his/her behaviour in different environments, and within a formal information system. It thus presents a more holistic perspective.

Allen [5] simplified Paisley's model by reducing the number of concentric circles, given each one a different name, and also introducing a new one: the user:

- as an information processor;
- in connection with the work team;
- as an individual in an organization;
- as a member of a professional society;
- as a member of an invisible college; and
- as part of a formal information system.

Wilson [1] suggests that the phrase 'information seeking towards the satisfaction of needs' be used instead of the term 'information needs.' He feels that personal need is the basis of the motivation to seek information and also affects the information seeking behaviour of user. Personal needs are categorized by psychologists as:

- Physiological needs, such as the need for food, water, clothing, shelter, etc.
- Affective needs, such as the need for attainment, for domination, etc.
- Cognitive needs, that is, the need to learn a skill, take decisions, etc.

These categories are obviously inter-related. The view is that in order to find ways and means to satisfy these needs the individual would seek information about them.

Olaisen [6] supports Wilson's conceptual framework in his analysis of how business managers perceive information quality. From his framework, he derives a model of determinants for information quality in information seeking behaviour, and another model for the information quality process as perceived by the user. Olaisen divides the quality factors into two main groups. They are:

- 'Cognitive authority' quality factors for the user dependent on how the information is perceived; and
- 'Technical user-friendliness' quality factors dependent on what the user is offered.

Accessability, form, flexibility and actual value are considered the more important factors for technical user-friendliness; and credibility,

reliability and relevance are the more important of the cognitive authority factors [6].

Reading is perhaps one of the commonest ways of gathering information; yet studies on the reading habits of scientists indicate that a very low percentage of their time is allocated to reading. A study by Garevey, Lin and Nelson, quoted by Olisen [6], compared the different uses of formal information systems by technologists, scientists in the natural sciences, and social sciences, and found that all groups used articles in periodicals as their basic communication link, while the physical scientists used, in addition, pre-prints as a major source.

4 USER-FOCUSED STUDIES

The method of determining information needs and use is usually an essential part of user studies. The first user study was reported in the surveys undertaken for the Royal Society Committee on scientific information. Dervin and Nilan [6] noted that such studies examine the extent to which the respondent had used one or more facilities provided by the services, and the perceived barriers to the use of and satisfaction provided by, the information services.

Mote, cited in Wilson [7], sought to characterize users at Shell Research in an attempt to understand their differences in information use. He identified three groups of scientists according to the character of their field of specialization:

- those working in fields with well-developed underlying principles, well organized literature, and a well defined subject area;
- those concerned with a wider subject area with less organized information; and
- those who cover several subjects, the problem involving greater variation, and the literature being little organized.

Mote suggested that information services be planned accordingly: self-service libraries for the first category, and more intensive information worker support for the other two categories.

Palmer [8] used semi-structured, in-depth interviews to explore the influence of personality, discipline and organizational structure on the information seeking behaviour of biochemists, entomologists, and statisticians engaged in agricultural research. Cluster analysis of the data collected revealed five groups. Palmer called one of them 'hunters' (all biochemists) who maintained regular routines to make sure that nothing relevant escaped them. Discipline, work role, time spent in the subject field and organization are considered to be the more important determinants of the nature of information seeking behaviour. There are also some indications of male/female differences.

Bichteler and Ward, who studied the information seeking behaviour of geochemists, found that journals and personal contacts were ranked highest. Geologists showed little interest in end-user searching and required additional orientation or training regarding information services, sources, and procedures.

Ellis [9] derived six generic characteristics from the information seeking patterns of social scientists that could make up a user behavioural model for designing information retrieval systems. The six major characteristics or activities are:

starting,	differentiating,
chaining,	monitoring, and
browsing,	extracting.

Subsequently, Ellis [10] has extended his work to the fields of physics and chemistry and found that the original model he had proposed was applicable with very little modification to user behaviour in these fields as well.

5 USER SATISFACTION

Applegate, reported in Wilson [7], proposed three models of user satisfaction. The performance of the information 'product' in terms of relevance (pertinence), recall and precision, is believed to lead to 'use', which is a measure of 'material satisfaction.' Material satisfaction is seen to lead to 'emotional satisfaction,' which in turn leads either repeated use and/or complaint about lack of satisfaction. The most complex of the three models is the one in which emotional satisfaction

depends upon material satisfaction, the 'product setting' and 'disconfirmation' – the extent to which user's expectations are confirmed or not confirmed.

6 METHODS OF USER STUDIES

6.1 Types of Studies

Menzel's [11] presents results of a direct analysis of the use of information sources and tools by personnel and their information gathering patterns. Some indirect studies by Herner and Herner [12] involve analysis of records and products of user activities. Wood [13] reviewed and classified the methods used in studies on information use and needs. The five main methods are:

1. Questionnaire;
2. Interviews;
3. Diary analysis;
4. Observation; and
5. Analysis of existing data.

6.2 Direct Studies

Direct studies include: Questionnaire, Interview, and Observation methods.

6.2.1 Questionnaire

The Questionnaire method is perhaps the most traditional and frequently used in empirical user research. It has the advantages of being relatively easy to manage and geographically scattered population can be surveyed in a short period of time. Also, if the sample size of the total population to be surveyed is large, this procedure offers substantial savings in terms of expenditure compared with other data collection techniques. A disadvantage of the method is that the rate and percentage of returns of the questionnaires distributed is often slow and small respectively. Hence, the method is often applied in combination with other recording and analysis procedures [14].

6.2.2 Interview

The Interview method is also a fairly frequently used technique in conventional empirical user research. Flynn [15] identified five steps for the preparation of an interview. These are:

- reading background material;
- establishing interview objectives;
- deciding on the population to be interviewed;
- preparing the interview; and
- deciding on the types of questions and structure of the interview.

'Structure' of interview means that the interview has a set of pre-designed questions about needs and behaviour of interviewees. The questions asked depend on the spontaneity of the dialogue between the interviewer and the interviewees and also on the capabilities of the interviewer. Compared with questionnaire surveys, interviews are deemed to have the advantage of being more direct, precise, spontaneous and flexible [14].

6.2.3 Observation

Observation is a more 'objective' procedure in the sense that the results are independent of the observer [14]. However, different techniques can be adopted in carrying out the observation. It can be systematic or unsystematic depending on whether it is based on predetermined precise categories or it is participatory or non-participatory observation.

The observation method can provide more precise and specific results. In general, however, the method entails higher investigation cost compared with that of the questionnaire method. The technique may also cause a series of methodological problems which could restrict its applicability to user studies.

6.3 Indirect Studies

Indirect methods of user studies include all the procedures which contribute to the collection of data and information on information

needs and seeking behaviour, without directly questioning or observing users. Evaluation of existing data, and collection of third hand data are indirect methods. However, such studies are not common in user needs and behaviour research, partly because the procedure involves deriving reliable inferences from the verbal level expressions to the 'conceptual level' [14].

Methods other than those mentioned above include meetings and oral communications. Wilson [16] notes that 'Walking the organization' is a widely practised management strategy for finding out what is going on. With the growth in telecommunications, electronic mail has been used for collecting information on information needs and information seeking behaviour. E-mail provides a level of social presence and information richness [17].

6.4 Digital Library Environment

Advances in information technologies (ITs) — computers, communications and information access technologies, together with global inter-connectivity of computers and computer networks with Internet as the backbone —, are enabling desktop, single window access to a wide variety of free (public domain) and commercial information sources and databases distributed on computers (servers) around the world. These are being updated and added to frequently. The information sources include bibliographies and fulltext databases, table of contents of periodicals, electronic serials, discussion fora, preprints, technical reports, directories, teaching and training materials, data archives (software, numeric data, documents, images), library catalogues, campus wide information systems, etc. New tools for accessing these information sources are being developed and becoming available at a rapid pace. In the context of these emerging ITs, the way we seek and access information is changing in quite significant and revolutionary ways. [21]

Levy and Marshall [22] take a work-oriented perspective of libraries — study of the way in which information is sought and used by people at work (research, teaching etc.) This information is used to critique and guide the development information search technologies and user interfaces. They argue that digital libraries designed based on

the assumptions and findings of information seeking and use behaviour in traditional library environments are restrictive and new approaches to the study of information seeking is needed taking into consideration the impact of ITs.

7 USEFULNESS OF USER STUDIES

The brief literature survey presented in the preceding sections indicatges that the identification of users' needs and information seeking behaviour can help in reducing the marginality of information services as well improve the effectiveness of information services in terms of their meeting user needs and satisfaction and improvements in user-friendliness [2,16]. User studies also help in understanding how people actually use information in their respective work and in the process of planning and decision making which are the principal generators of cognitive needs [18].

Information systems are designed to aid decsion making and problem solving in a given context or organizational environment. Understanding the attributes of the context that affect information needs and information seeking behaviour of users will also help in the choice of appropriate information processing technologies.

Martyn [19] pointed out that all information systems have necessarily to compromise between the desirable and the possible; and information system designers would acknowledge the necessity of studying users in some detail in order to discover, before designing a possible system, the characteristics that an ideal system should possess. If designers have no previous knowledge of the nature of users within a given population, the design of an adequate but viable system becomes difficult.

The usual methods employed in user studies have proved inadequate in completely discovering the nature and needs of information users. On the other hand, it is clear that, even if the requirements and behaviour of users were investigated fully, it would be impracticable to provide information to all users in all circumstances. In this situation,

system design has to be based on understanding rather on gathering and analyzing detailed data on user needs and behaviour. The ranking of information needs of users in an organization can help in prioritizing the development of various types of information systems and services that will be appropriate and cost efficient, given the limited resources available to many libraries and information centres, especially in developing countries.

Wilson [20] has indicated, taking into account the evolutionary nature of the design and delivery of information services, they should be planned based on the needs of users - actual and potential —, and the developments in information systems and services, especially in IT.

Rouse and Rouse [4] rightly point out that information needs of a person change over time and depend on the developments in the user's field of specialization, type of work he/she is engaged in from time to time, impact of emerging ITs, and other factors.

Therefore, information systems should be sufficiently flexible to develop new and user-friendly products and services, essentially guided by users current requirements.

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