

The Evolution of User Studies

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User studies are one of the most researched areas in library and information science. These studies form a large body of literature in the discipline. Since user studies first appeared in the late 1940s their number has constantly increased. Menzel in the first *Annual Review of Information Science and Technology* (1966) refers to two comprehensive bibliographies of user studies in 1964 and 1965, each containing 438 and

676 studies respectively. This was just a first indication of the explosion that would take place a couple of decades later. This article recounts the evolution of user studies by exploring related key concepts of the field. It also discusses how research methods in other areas have influenced the work in this field. Finally, a literature review shows the diversity and plethora of topics explored by various studies.

Introduction and definitions

Many projects were involved with the information needs, the use of literature or the information seeking behaviour of a particular group of people or scientists. User studies are an area that combines some of the most used and the least precisely defined concepts of library and information science. These concepts such as information use or need, information seeking behaviour, channel of communication, exist in a system of complicated and interdependent relations. Wilson (1981) constructed a model in order to illustrate the co-existence of these notions within the context of user studies and furthermore to emphasise the dynamic relations among them. Wilson (1994) further enhanced his model by incorporating internal and external factors that are liable to influence the dynamics of the model.

The concept of information and its definition throughout the history of library science has been the centre of attention of the information community and the source of many opposing views. Wellisch (1972) investigates thoroughly the central topics of information science and looks at the evolution of concepts and ideas. The starting question is to consider whether or not there is a

need to produce a definition for the concept of information within the area of our discipline. Whittemore and Yovits (1973) argued for the necessity and the importance of a definition for information because by defining the basic elements that constitute a science only then can a science become effective.

Belkin is "not concerned with definitions of information, but rather with concepts of information. The distinction is that a definition presumably says what a phenomenon defined is, whereas a concept is always of looking at, or interpreting the phenomenon. ... by accepting the idea of a concept one becomes free to look for a useful concept rather than a universally true definition of information" (1978, 58).

Pao indicates that "information may be reasonably considered a primitive concept, as are energy, electricity, distance, power, and work. One understands each of them intuitively, but there are no adequate definitions for them. Their lack of precise definition has not prevented men and women from studying their properties, behaviours, and interrelationships within systems and organizations" (1989, 10). Because of the validity of the views of Belkin and Pao, this study will not attempt to redefine such concepts but rather

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it will explore their characteristics, status, and dependencies in relation to other concepts.

Information need is another term that has been discussed and approached from many different perspectives. Much of the discussion has been orientated towards the clarification of other related concepts such as “wants”, “requests”, “demands”, and so on. Belkin describes it as the state when a person “recognizes an anomaly in his/her state of knowledge ... and converts this anomalous state of knowledge (ASK) into some communicable structure (e.g. request) ...” (1978, 81).

Wilson places the existence of the controversy over the concept of information need in the failure to define the context within which information needs exists. Borrowing from psychology literature, he refers to the three categories into which human needs can fall: “physiological needs, such as the need for food, water, shelter, etc.; affective needs (sometimes called psychological or emotional needs), such as the need for attainment, for domination, etc.; cognitive needs, such as the need to plan to learn skill, etc.” (Wilson 1981, 7). Then he continues by describing how one kind of need can trigger another kind, e.g. an affective need (recognition) may trigger a cognitive need (research).

Information need is a term closely related to the concept of information seeking behaviour. A user recognising an information need, articulates it into a question, or, request which is conveyed through formal or/and informal channels of communication and information systems, in order to receive a response (verbal written, visual) which will satisfy that need. The decisions concerning which communication channels and information systems will be used, as well as in which way and how they constitute the information seeking behaviour of a user.

Such decisions are influenced by a number of variables. Paisley has identified a number of external and internal factors affecting the information seeking behaviour of a user:

- “1. The full array of information sources that are available.
2. The uses to which information will be put.
3. The background, motivation, professional orientation, and other individual characteristics of the user.
4. The social, political, economic and other systems that powerfully affect the user and his work.

5. The consequences of information use – e.g., productivity.” (1969, 2)

Due to the existence of many internal factors that are concerned with the individual user, the examination of the information seeking behaviour becomes very difficult and complicated

Historical background: late 1940s–1970s

The foundation for the user studies was laid down in 1948 in the Scientific Information Conference of the Royal Society, where Urquhart and Bernal reported their research findings. Urquhart (1948) conducted his study on the distribution and use of scientific and technical information. He was concerned with the sources of reference to the literature borrowed, the purpose of consulting the borrowed item, and the usefulness of the item in relation to factors like year of publication and its form.

Bernal describes the objectives of his study: as “... to find out directly from working scientists what they had read, why they read it and what use they made of the information” (1948, 589). The study was undertaken in eight educational and research establishments and a total of 208 participated in the research. A combination of a questionnaire and diary cards served as information gathering techniques for the study.

Unlike Urquhart’s (1948) study Bernal provided a general profile of his sample by using a questionnaire, including their professional background and status, as well as reading habits. However some of the information proved to be inconsistent when compared with the information gathered from the diaries. Also Bernal restricted his research to the use of journals, excluding other forms of literature. As Paisley comments “In spite of its small compass and ambiguous data, this study was important as a precedent for more satisfactory efforts of the early 50s” (1966, II: 3).

Earlier user studies were mainly related to scientists involved with biochemistry, medicine, engineering, physics etc. The high concentration of user studies in these sciences can be partially attributed to the fact that the publication of professional and scientific information in these disciplines was much more developed at the time in comparison with the humanities. This resulted in

the earlier development of information handling tools like abstracts, and indexes. Naturally the information providers wanted to acquire as much information as possible on reading and searching habits of their users as well as their preferences and channels of communication among them. Such projects were concerned with the flow of information and the role of informal and/or formal communication channels in scientific communities.

Fussler (1949a, 1949b) investigated the use of literature by American chemists and physicists by using the "reference counting" method. Tornudd (1953) undertook an analysis of the professional reading habits of 130 research scientists. Thorne (1954) conducted a quite similar research to Tornudd's investigating the reading habits of scientist at the Royal Aircraft Establishment. Shaw (1956) investigated the use of scientific literature by a group of scientists consisting of chemists, physicists, engineers and botanical scientists of the US Forest Service. He applied the same gathering techniques as Bernal (1948) by using a questionnaire and two diary cards.

Maizell (1957) examined the creativity and information gathering techniques used by chemists. A year later Ackoff and Halbert (1958) explored the day to day scientific activities of chemists at the Case Institute of Technology. The importance of this study rests with the introduction of participant observers, in the field of library science as methodological approach. Fishenden (1959) examined, by means of diaries and interviews, the information seeking techniques of scientists at the Atomic Energy Research Establishment in Harwell. Glass and Norwood (1959) attempted to reveal the ways in which scientists acquire scientific information related to their work and personal interest.

Some of the most representative examples, of user studies during the 1950s, regarding methodological issues and areas of interest are examined below. Herner (1954) examined the information gathering habits of 606 pure and applied scientists at the Johns Hopkins University with the use of personal interviews. Herner examined the reliance of scientists on technical information and the source of their origin.

Menzel (1958) as described by Paisley (1966), undertook a study for the Bureau of Applied Social Research at Columbia University, in order to

explore the problems of scientific information exchange. The study had three objectives. The first was to identify different types of information needs and to what extent they remain unsatisfied. The second aim was to explore the means that contribute to the flow of scientific information. Finally, the third goal was to provide a professional profile of scientists in order to examine how different characteristics influence their information needs and their information-seeking behaviour.

Paisley expressing his opinion on Menzel's work states: "It may be said that Menzel's study marked the end of the beginning of research on scientific information. Together with other studies of the mid-fifties it emphasised the importance of interpersonal information sources, showed low percentages of use of many esteemed formal systems and revealed the role that happenstance plays in the acquisition of information" (1966, III: 16) .

User studies in the 1960s

The early 1960s seem to be something of a take-off point for user studies. A look at the literature shows that the number of studies increased rapidly. There was a turn in the focus of the studies, which began to take more sophisticated forms, trying to answer more complicated questions, as well as in the choice of scientific communities examined. In 1963 the American Psychological Association (APA) conducted a series of studies concerning psychologists, which was one of the first and most important projects carried out in social and behavioural sciences (APA 1963-1969). This series was a breakthrough in the field of user studies that had been monopolised for quite a long time by scientists and technologists.

Social and behavioural sciences introduced their theoretical frameworks and principles and it was up to the information scientists to discover ways in which these theories could be assimilated and applied in the field of user studies. The community of information scientists became more and more aware of complications involved in methodological issues. Although, at the time, this was expressed only in the form of isolated scientific opinions. Menzel was one of the researchers who located these problems very early and saw the potential usage of alternative research meth-

ods. He indicated that “it is inevitable that the techniques available to date are not adequate to many of the complex tasks one would like to see performed in this intricate field ... it is therefore wasteful not to take advantage of the reservoir of relevant substantive theory as well as of research methods and techniques that are available primarily in communication behaviour research and other branches of sociology and psychology” (1966: 42).

The information community very quickly adopted Menzel’s 1966 article in the *Annual Review of Information Science and Technology* on information needs and uses. From then on, this particular chapter on ARIST served as a platform for the launching of new ideas, the adoption of alternative conceptual frameworks, the application of methodological approaches and regular reviews of user studies.

Mote (1962) investigated the reasons that cause the variations in the information requests of scientists. He created three categories of information needs of scientists that depended upon the task complexity and the existing organisation of literature on the subject area. Flowers (1965) investigated the information needs of physicists and chemists. He obtained data on the information sources, tools used for retrieving information and channels of communication used among scientists of physics and chemistry. Mullins (1967) examined the informal communications among scientists within the framework of the “invisible college” where a group of scientists known to each other creates a network that helps them to exchange and share information. Mullins used the snowball technique as a sampling method. The sample did not close on itself but continued to grow as respondents kept mentioning new names.

Allen (1964) examined the use of information sources during the preparation of research and development proposals for a government contract. There were a total of twenty-two proposal competitions in which 198 teams were involved. Questionnaires were sent to all the teams to determine the stages of preparation of such report and how quality could be related to variables like time spent for each stage, technical staff support, and effort. Berul et al. (1965) carried out a critical incident study for the U.S. Department of Defence in order to determine how research,

development, technical and evaluation personnel obtain and utilise technical and scientific information related to their work.

The John Hopkins Centre for Research in Scientific Communication (1967a, 1967b) and Garvey conducted a series of studies examining the exchange of information at scientific meetings of various organisations like the American Institute of Mining, Metallurgical and Petroleum Engineers, the American Geophysical Union, the Association of American Geographers, etc. In all these studies, the data collection and analysis were along the same lines, in terms of methodological techniques, a fact that makes comparisons among studies feasible.

Another important project was the Reports of the APA on the Scientific Information Exchange in Psychology (1963–1969). This project was conducted under the direction of Garvey and Griffith (1964). By 1967, there had been seventeen reports published. “The general objective of this study was to develop a description of the scientific information exchange environment in psychology, by determining the responsibilities of the persons and institutions associated with the origination, transmission, storage and use of scientific information” (Garvey and Griffith 1964: 258).

The importance of this series of studies lies in the consistency and the detailed information acquired giving researchers the opportunity for further comparison of the data for a more complete picture. Furthermore APA’s reports employed a variety of methodological approaches and information-gathering techniques, thereby introducing the theoretical and methodological frameworks used in the social sciences to the field of user studies.

INFROSS was a project conducted by Line (1971) on the information use and needs of social scientists in government employment. The project was carried out from 1967 to 1971. The scope of the study was to provide an answer to “the basic question: what information does this person require for what he/she is doing, in what form, with what speed of delivery, etc.?” (Line 1971: 415). Three methods of data collection were used: questionnaires, interviews, and day-to-day observation.

The very lengthy questionnaire and the large scale of INFROSS produced a mass of data that in many respects can be comparable with the find-

ings of other studies. The findings of the project indicated that satisfaction in library use among social scientists was low. Line considers the need for an organised effort on behalf of librarians to educate users, although he also expresses his concern over its effectiveness suggesting that maybe information providers should use bibliographic tools on behalf of their users.

User studies in the 1970s

Moving towards the 1970s, user studies flourished and introduced a diversity of target user groups like magistrates, urban citizens, personnel working in local authorities, university students, etc. The 1970s also mark the point that user studies examined the use of particular information systems, their efficiency and effectiveness and how this can be maximised. More scientists began to realise deficiencies in the use of methodological techniques and conceptualisation although no theoretical framework had been developed. The trends of user studies during this period are well documented in the three chapters of ARIST on information needs and uses (Crane 1971; Martyn 1974; Crawford 1978).

An important development in the history of user studies was the establishment of the Centre for Research on User Studies (CRUS) at Sheffield University in 1975. The British Library Research and Development Department (BLRDD) funded CRUS. It conducted a number of projects on various subjects (Corkill and Mann 1978), provided training courses and seminars in research methods and published occasional papers and guides on research methods for user studies. In 1985 CRUS lost a substantial amount of funding from the BLRDD and from 1988 was funded only from the university until it ceased operation in 1989.

Also, during this period, Warner et al. (1973) as described by Wilson (1994), carried out a study on the information needs of citizens in Baltimore. Although this project does not relate to researchers and scientific information, it does demonstrate a rare maturity in its conceptual framework for a study of such a large scale. The aim of the study was to identify the information needs of the community and the means by which they were satisfied at present and to determine whether or not these needs could be satisfied in a more

efficient and economical way. 1,615 households served as a sample from which 80 percent agreed to be interviewed. The important feature of this study was the attitude adopted by the researchers towards the concept of information need, which located it within a wider context of psychological, intellectual, institutional and socio-economic experiences of everyday life.

The British Library Research and Development Department funded the research project on information needs and information services in local authority social services departments (INISS) (Wilson et al. 1978). The project team began the study in 1975 and it continued until 1977. The aim of the study was to identify the information needs, use, and seeking behaviour of social workers and administrators in order to improve information provision in social services departments. The research was completed in three stages and followed a research action scheme. The first phase involved structured observation of twenty-two members of staff for a one-week period. The aim of the observation was to record events of formal or informal communication and exchange of information. The second stage used interviews to evaluate the reliability of the initial findings. The sample consisted of 159 persons from which 151 were interviewed. The last part of the project was to be the provision of solutions for the problems identified in the previous stages.

User studies 1980s

The 1980s were a decade that was characterised by an increasing awareness surrounding the conceptual framework and methodological issues of user studies. One of the first attempts at articulating this awareness was the publication, in the journal *Social Science Information Studies* of the papers presented in a symposium of qualitative approaches to the study of information problems. Hounsell and Winn commenting on the purpose of the symposium indicate that "there has been a growing interest in the application of qualitative approaches to the study of information problems and the symposium ... was an attempt to bring information researchers together with social scientists experienced in the use of qualitative methods to exchange ideas and experiences" (1981: 203). Belkin (1980) formulated the theory of the Anomalous State Knowledge for information

retrieval, which gave another dimension to the concept of information need and the origin of this need. Dervin (1983) developed a different research approach towards information needs the sense-making research. Also the 1980s was the decade when information technology “invaded” the area of user studies and established a permanent place within the interests of the field. More and more studies were undertaken in order to determine the needs of users in relation to different software and information retrieval systems like OPACs, databases, etc.

Price (1984) examined the information use and needs of advice centres in London. Trott (1986) carried out a project from Feb. 1984 to Feb. 1986 in order to explore the information needs of small firms in Suffolk County. Martyn (1987) investigated the information seeking techniques of researchers working in industrial, government and academic establishments. Borgman and Meadow (1989) conducted the Online Access to Knowledge (OAK) project which aimed to design a user interface in order to provide more efficient access to databases located on the information retrieval system of the Department of Energy. This project emphasised the need to concentrate first on users’ requirements before developing software and demonstrated the application of information science principles in the design and development of software that is user-centred.

Belkin (1982a, 1982b) undertook a study to investigate the application of the anomalous state of knowledge (ASK) theory in information retrieval. Information retrieval systems depend upon the best-match principle that assumes equality between the actual information need and the expressed need. In Belkin’s information retrieval system the need arose from the recognition of an anomaly in the user’s state of knowledge which makes the user unable to express verbally the precise information needed. Thus the hypothetical system should ask user to describe this anomaly rather than express it precisely such as by using subject keywords (Belkin 1982a: 62).

Ellis (1987, 1993) carried out a study in order to establish a pattern of information seeking behaviour among academic researchers. Semi-structured interviews were employed as data collection techniques. For the data analysis, he used the grounded theory of Glaser and Strauss (1967). This process of analysis resulted in a pattern of

information seeking behaviour that included six stages: starting, chaining, browsing, differentiating, monitoring and extracting. The patterns established in Ellis’ study were used later in other studies to examine patterns of physicist (Cox 1991), and chemists (Hall 1991) as well as comparing the information seeking behaviour of social and physical scientists (Ellis et al. 1993).

Kuhlthau (1988) conducted a study examining the application of library skill in assigned library research by high school seniors. The objectives of the project were “to explore the experience of students in the library search process, to reveal evidence supporting the hypothesis that there are a sequence of stages to an information search and to propose a model of the user’s stage within the search process” (Kuhlthau 1988: 232). A variety of qualitative methods like interviews, observations, journals and flowcharts, were used in order to meet the assigned objectives. The findings supported the initial hypothesis. Six stages of the search process were identified: initiation, selection, prefocus exploration, focus formulation, information collection, and search closure. Although the small scale of the project (26 students) does not provide the necessary external validity for the findings, it does demonstrate the suitability of qualitative methods for extracting information related to cognitive and affective issues of human behaviour.

User studies 1990s

In the nineties the implementation of conceptual theories, that flourished during the 1980s, grew stronger as an increasing number of researchers acknowledged the value of these theoretical frameworks and incorporated them into their research design along with more sophisticated qualitative research methods.

The 1990s also witnessed the tremendous growth and establishment of the Internet as an information provider in the information community. As a result a number of studies set out to investigate a plethora of issues concerning the impact of the Internet on the user and the information community. Tillman et al. (1993) carried out a survey and monitored four discussion lists over a period of six months in order to determine the use of the Internet as a reference tool by special librarians. Cromer and Johnson (1994) examined the impact

of electronic communication among reference librarians. Bane and Milheim (1995) conducted a large-scale survey in order to examine the use of the Internet by users in higher education establishments. Perry (1995) carried out a survey to gather information concerning the users of the Internet, the information required, the tools they were using and the problems they encountered.

Adams and Bonk (1995) conducted a survey at the SUNY University Center Libraries. The aim of the study was to assess the need of faculty members for electronic information resources and to "determine the readiness of faculty to utilize electronic networked information resources" (Adams et al. 1995: 121). Bruce (1995) reported on a set of studies carried out in 13 universities. The aim of the study was to examine the utilisation of the Internet by academics in order to enhance their teaching.

Reneker (1992) investigated the information seeking behaviour of academics. She adopted the naturalistic approach and employed qualitative techniques for the data collection using mainly personal interviews. She recorded a set of 2050 information incidents. Analysis of the incidents provided information regarding the types of information need, sources consulted, urgency of the information required, level of satisfaction as well as personal thoughts of the participants on the origin of the information need. The findings of the study indicated that the action of information seeking originated from a wide variety of needs like personal, professional, entertainment, etc.

The Information Access Project (Squires et al. 1995) aims to investigate the relation between IT-assisted information systems and academic research and more specifically it explores the impact of the systems on the information seeking communication and management of academic researchers. The study was designed to be carried out in two phases. The first phase (1992–1994) involved the establishment and refinement of the methodology and the identification of key concepts related to the study. The second phase (1995–1997) served as a period of implementing the methodology in order to acquire data on the concepts and issues of interest, identified at the previous stage. The element that distinguishes this project from others, seems to be the holistic view and the consistency with which the research

methodology was formulated. Data collection techniques involve the use of semi-structured interview, diary of information activities, group discussions, information access stories and research timing.

Eager and Oppenheim (1996) undertook a small case study examining the information needs of academics. The main purpose of the study was to test an alternative observation technique (shadowing), in which the participant's would be observed throughout the day.

A recent study (Abels et al. 1996; Liebscher et al. 1997) was published examining the factors that influence the use and adoption of electronic networks by science and engineering faculty at small institutions. The study identified a number of factors that are likely to influence use and adoption of electronic networks. These included perceived accessibility, proximity, workstation availability, experience, ease of use, academic discipline, task and perceived utility.

A case study at the Hebrew University of Jerusalem (Lazinger et al. 1997) examined the use of the Internet among faculty members. Factors that were taken into consideration included field and research interests, training on the use of the Internet, general use of computers and others. However certain factors such as level of access to networked computers among different faculties were not examined. Thus it is not clear, though there are strong suggestion by the findings, if the differences in use are due to the nature of the discipline rather than the availability and accessibility of networked computers.

Conclusion

This brief indicative historical background of user studies recounted the evolution of this field and demonstrated the plethora of issues involved. From theoretical frameworks, which have revolutionised the way in which the information community perceived the user and information, to studies that provided additional information regarding a specific group of users or the use of a system.

All studies gradually contributed, in one way or another, in establishing and expanding the field. In an era of continuous technological developments in conjunction with information overload, user studies continue to be a vital tool en-

abling information professionals to improve both their understanding of information use and hence information delivery.

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