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Source preferences in the context of seeking problem-specific information

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Abstract

The study focuses on the ways in which people define their source preferences in the context of seeking problem-specific information for non-work purposes. The conceptual framework draws on two major concepts, that is, information source horizon and information pathways. The former denotes the ways information sources are mapped in preference order in an imaginary field, while information pathways refers to the sequences in which sources placed on the information source horizon are actually used. The empirical part of the study draws on semi-structured interviews with 18 individuals active in environmental issues. Human sources and the Internet were preferred most strongly in seeking for problem-based information. The major source preferences were content of information, and availability and accessibility. Usability of information sources and user characteristics were mentioned less frequently as preference criteria. Typically, information pathways consisted of the use of 3–4 sources. On average, human and networked sources were favored in the early phases of information seeking. Printed media such as magazines and organizational sources were often used to complement information received from human sources and the Internet. However, the source preferences varied considerably, depending on the requirements of the problem at hand.

Keywords: Everyday life information seeking; Information source preference; Information source horizon; Information pathway

1. Introduction

Solving problems or making sense of problematic situations forms a major context for everyday life information seeking (ELIS). In short, ELIS denotes information seeking that is not directly connected to the performance of professional tasks or full-time study (Savolainen, 1995). The present study concentrates on a major aspect of ELIS, that is, seeking for problem-specific information. More specifically, the study focuses on criteria by which people prefer information sources when solving everyday problems.

This research topic is important for several reasons. First, the empirical research of source preference criteria is needed because this topic has largely been neglected in ELIS studies so far or it has been discussed at a

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general level only (see, for example, Chen & Hernon, 1982; Fisher, Naumer, Durrance, Stromski, & Christiansen, 2005). Second, the study of context-sensitive source preferences provides a novel viewpoint to understand how people perceive their daily information environments and how they evaluate the usefulness of alternative sources in these contexts. Thus, the examination of the criteria used for source selection provides a way to go beyond just a simple listing of used information sources. Third, the analysis of source preference criteria will deepen the picture provided by studies focusing on information horizons (Sonnenwald, Wildemuth, & Harmon, 2001). Fourth, the analysis of source preference criteria parallels other studies that have examined people's criteria for making relevance judgments about individual items (see, for example, Barry & Schamber, 1998; cf. Savolainen & Kari, 2006).

Even though the concepts of *source preference* and *relevance* are closely related, they are not synonymous. The study of source preferences focuses on criteria by which people select individual sources such as friends, newspapers and Web pages. In comparison, the study of relevance judgments concentrates on the criteria by which people assess the value of sources, for example, Web pages that have been selected in the above-mentioned process (see, for example, Barry, 1994; Barry & Schamber, 1998; Wang & Soergel, 1998; for an overview of relevance studies, see, for example, Borlund, 2003). Thus, people consider source preferences in the early phase of the information-seeking process, while relevance judgments are made in the later phase of that process, often in conjunction with the process of information use.

The present study will shed light on the issues of source preference criteria by drawing on the empirical analysis of the interviews of 18 environmental activists. Due to the novelty of the research approach, study is exploratory in nature and it draws on the qualitative content analysis of the interview data.

The article is structured as follows: The next section of the paper presents a literature review discussing the principal findings of studies on seeking problem-specific information. Thereafter, the major concepts used in the study of source preferences, that is, information source horizon and information pathways, will be introduced, and the empirical research setting will be specified. The main body of the paper provides a presentation of the empirical findings of a case study focusing on the ways in which environmental activists define their information source preferences in the context of seeking problem-specific information. The paper ends with a discussion and the conclusions drawn from the empirical study.

2. Literature review

ELIS studies provide a broad array of empirical findings concerning people's problem-specific information needs and the ways in which these needs are met by using diverse information sources. In fact, many of the basic issues of ELIS were already identified in the 1970s when extensive surveys were conducted to chart citizen information needs and seeking (Dervin et al., 1976; Warner, Murray, & Palmour, 1973). Importantly, Dervin (1973) developed the theoretical and methodological basis of ELIS studies by thematizing people as actors making sense of their daily world. In particular, she explored the ways in which people face problematic situations and try to make sense of them by posing questions and seeking answers from various sources.

Based on a survey conducted in Baltimore, Warner et al. (1973) identified almost 9000 questions or problems faced by residents in everyday contexts. These problems were condensed into broader problem areas indicating daily information needs (Warner et al., 1973, p. 96). The major problem areas included, for example, issues pertaining to consumption, health, education, employment, transportation, recreation, financial and legal matters. Later ELIS studies of problem-specific information needs have confirmed the heterogeneous nature of everyday information needs (Agosto & Hughes-Hassell, 2006a, 2006b; Chen & Hernon, 1982; Hersberger, 2001; Marcella & Baxter, 1999; Savolainen, 1995). The later ELIS studies confirm that the major problem areas identified in the Baltimore study are still valid. This suggests that the major areas of everyday problems are fairly universal and they tend to change slowly.

The Baltimore Study (Warner et al., 1973) was also pioneering in that it revealed the broad variety of information sources used in everyday life information seeking. It appeared, for example, that interpersonal sources such as friends and colleagues were conceived as the most accessible types of sources. Later surveys have indicated the importance of other sources such as doctors, lawyers, newspapers, magazines, books, companies and business organizations (Chen & Hernon, 1982; Marcella & Baxter, 1999). Most recent studies have shown the growing importance of the Internet as a source of problem-specific information (see, for example, Rieh, 2004;

Savolainen, 1999). These studies have also demonstrated that despite the growing popularity of the Internet, information seekers have not rejected traditional sources such as doctors or lawyers, but the new and traditional sources tend to be used in a complementary way. It is also apparent that source preferences do not depend solely on the availability of alternative sources; these preferences vary according to the specific requirements of the problem at hand. For example, homeless people tend to prefer organizational sources such as social service agency staff to meet information needs related, e.g., to child care (Hersberger, 2001), while individuals struggling with problems related to maintaining normal weight may favor diverse sources such as doctors, health magazines and net clinics (Bar-Ilan, Shalom, Shoham, Baruchson-Arbib, & Getz, 2006).

To a large extent, the major features of ELIS discussed above may be condensed into the principles of information seeking proposed by Harris and Dewdney (1994, pp. 20–27; cf. Wathen and Harris, 2006). Most importantly, these principles suggest that the needs for problem-specific information arise from the situations in which help-seekers find themselves; that is, any need for help or information is situationally-based and dependent on a particular context. People also tend to look for the information that is most accessible, sometimes referred to as the principle of the least effort.

Characterizations such as these provide a useful overall picture of the factors triggering ELIS. However, from the viewpoint of the present study, these crystallizations are wanting in that they do not discuss in more detail the criteria by which people prefer information sources in the context of seeking for problem-specific information. For example, Chen and Hernon (1982) approached the preference criteria in an extensive telephone survey and found that information seekers tend to favor information sources by drawing on criteria such as the accuracy and understandability of information. Overall, Chen and Hernon's (1982) findings indicated that in everyday life information seeking, people tend to favor familiar sources which have functioned reliably in earlier use contexts. Savolainen (1995) found that in problem-specific information seeking, teachers and industrial workers mainly drew on preference criteria such as availability and accessibility of the source, as well as the ease of use.

In a recent study Julien and Michels (2004) identified two major criteria of source selection in ELIS contexts, that is, ease and speed of use, and value of information. Fisher et al. (2005) and Fisher and Naumer (2006) drew similar conclusions in a study on information grounds; the participants were asked to explain the reasons for the source or information seeking habit. They identified preference criteria such as "gives reliable information/trustworthy", "quick to contact/access/convenient", "inexpensive", "easy to use or communicate with", and "knows me and understands my needs". However, due to the generality of the above research approaches, the source preference criteria of seeking problem-specific information were not discussed in sufficient detail.

3. The conceptual framework

3.1. Information source horizon

For the elaboration of the conceptual framework of the present study, two related concepts are particularly important, that is, *information source horizon* proposed by Savolainen and Kari (2004) (Section 3.1) and *information pathways* suggested by Johnson, Case, Andrews, Allard, and Johnson (2006) (Section 3.2). These concepts are significant since they provide conceptual tools to put the issues of source preference criteria in a broader context.

Initially, the concept of *information horizon* was introduced to information studies by Sonnenwald (1999). She proposed that within a context and situation there is an "information horizon" in which we can act (Sonnenwald, 1999, p. 184). According to her, an information horizon may consist of a variety of information resources such as colleagues, documents, libraries and Web pages. Based on this idea, Sonnenwald et al. (2001) developed a useful research method, that is, an information horizon map that graphically represents information resources and people's preferences for these resources.

Empirical illustrations of information horizons are discussed by Sonnenwald et al. (2001). Eleven undergraduate students participated in a study where they were interviewed about their ways of seeking information for the needs of university coursework. The students were also asked follow-up questions about the recent situation. These questions focused on issues such as the type of information needed, why that information was needed, which information resources they accessed, why and in what order, whether they were satisfied with

the outcomes, how the information was used, what they would do similarly or differently next time. After the interview, they were asked to draw a picture describing their information horizon. First, the informant located him- or herself on the map, and then drew in the people and other information sources they typically access when seeking information for the coursework or another task at hand. When drawing, the informants were asked to think aloud, explaining their source preferences (Sonnenwald et al., 2001, p. 70).

The study indicated that the students used 13 different information resources such as the Internet, university faculty, friends, "information places" (for example, doctor's office), experts and popular magazines (Sonnenwald et al., 2001, p. 73). The study also revealed relationships among students and information resources, indicating, for example, that 36% of the students had more than one first choice for information and that 73% of the informants mentioned the Internet as their first choice. Interestingly, the diverse first choices indicate the variety of the participants' information seeking preferences. However, the study did not discuss the preference criteria, for example, why an individual source drawn on the information source map would be accessed first.

Savolainen and Kari (2004) approached these issues somewhat differently from the phenomenological perspective. They claimed that material objects such as colleagues and libraries do not *per se* constitute an information horizon. Another difference is that the construct of information horizon proposed by Sonnenwald et al. (2001) include proactive provisioning of information, while Savolainen and Kari (2004) focused on information seeking only. They preferred the term *information source horizon*. Horizon is defined as an imaginary field which opens before the mind's eye of the onlooker, for example, the information seeker. A field of this kind opening towards the horizon provides the context for the definition of information source preferences. By drawing on diverse criteria such as easy availability, he or she may position information sources in this field so that sources deemed most significant are placed nearest to the onlooker, the less significant ones farther away, and the least important ones closest to the line of the horizon indicating the outmost boundary of his or her area of interest.

According to Savolainen and Kari (2004), information source horizons may be of two types: first, relatively stable horizons indicating the ways in which people tend to value information sources across situations and second, dynamic, that is, problem- or situation-specific horizons sensitive to the unique requirements of the task at hand. Thus, the horizons may change (broaden or narrow) when experiences of alternative sources are obtained. Similarly, the individual sources, for example, newspapers or the WWW may be located differently on the information source horizon, depending on the nature of information need at hand. Finally, there may be partly overlapping horizons with shared information sources.

Savolainen and Kari (2004) also proposed that information source horizons are created in a broader context which may be defined as a *perceived information environment*. This construct refers to a set of information sources of which the actor is aware and of which he or she may have obtained use experiences over years. Because the perceived information environment indicates a general picture of the sources available in the everyday world, it changes quite slowly. When construing an information source horizon, the actor judges the relevance of information sources available in the information environment and selects a set of sources, for example, to clarify a problematic issue at hand. Therefore, due to the selective approach to information sources, the horizon may cover only a part of the actual information environment.

3.2. Information pathways

The concept of information pathways proposed by Johnson et al. (2006) provides a useful approach to elaborate the above discussion about information source horizon, since information pathways indicate the sequences in which people use, intend to use, or have actually used information sources placed in the information source horizon. Also Sonnenwald et al. (2001, p. 72) included information pathway is a component of the information horizon when they studied the order in which the information sources were accessed. Thus, the concept of information pathways may complement the concept of information (source) horizon, and yield a more dynamic picture of the construction of source preferences.

The concept of information pathways stems from the elaboration of the concept of *information fields* proposed by Johnson (1996, pp. 33–43) (see also Johnson, 2003). According to Johnson (2003, pp. 748–753), information fields provide "rich infrastructure" and the starting point for information seeking. In short, information field represents the typical arrangement of information stimuli to which an individual is daily exposed

(Johnson, 2003, p. 750). Further, the information field within the individual is embedded may be one of the constraints affecting information seeking. Individuals are embedded in a physical world that involves recurring contacts with an interpersonal network of, for example, co-workers. On the one hand, physical context in organizations serves to stabilize an individual's information field; on the other hand, it largely determines the nature of information individuals are exposed to on a regular basis.

The picture of information fields is not necessarily deterministic since Johnson and his colleagues emphasize that people can, if they so desire, arrange the elements of their information fields to maximize their surveillance of information (Johnson et al., 2006). In a sense, individuals are embedded in a field that acts on them, but they also make choices about the nature of their fields, and the types of media they attend to. This assumption is a major characteristic of the concept of "information pathways" (Johnson et al., 2006, p. 572). Individuals can pursue their information seeking within information fields by using different kinds of pathways, for example, consulting a friend => using a search engine => checking a printed encyclopedia in a library. The concept of information pathways differs from that of information fields in that the former is more dynamic and active, focusing on an individual's actions in selecting of information sources over time. In brief, an information pathway may be understood as the route someone follows in the pursuit of answers to questions within an information field. The individual may choose whether he or she wants to be related to particular topics, which information to accept or reject and whether to continue the journey within an information field. However, not all pathways are necessarily unique because sometimes individuals may follow habitual pathways within the field.

The above framework was also studied empirically. Johnson et al. (2006, p. 573) conducted a statewide telephone general social survey resulting in 882 interviews. In the study, a battery of three questions was used to operationalize both fields and pathways. The questions reflected the carriers the informants would look as sources of information: "if you were trying to find information about inherited cancers, where would be the first place you would go or look?", "is there any other place you would go or look for information?", and "is there any place else you would go look for information?" This was a common approach to asking questions concerning general dispositions to source usage.

The study revealed that for their first choices for information, the respondents were most likely to first turn to the Internet (46.5% of respondents) for information about genetics, second to a doctor (18.4%) and third a library (14.1.%), followed by a family member (10.6.%), other medical sources and mass media sources (Johnson et al., 2006, p. 574). The authors also identified information pathways that embodied the respondents' sequential selection of information sources. Altogether 16 pathways shared by at least 23 respondents were found; in addition, 27% of the participants reported no or highly idiosyncratic patterns (Johnson et al., 2006, pp. 576–577). The findings revealed seven one-step patterns (for example, hospital only). There were also seven two-step paths, or example, doctor, then the Internet, or doctor, then library.

3.3. The framework of the study

By drawing on the above review, we may specify the conceptual framework of the present study (see Fig. 1).

Fig. 1 suggests that making sense of the problem or problematic situation triggers the process of information seeking; to simplify Fig. 1, the specific situation or a broader context of problem solving is not depicted. On the basis of the information requirements of the problem at hand, the information seeker considers the opportunities to access potentially useful information sources[1] in the perceived information environment. Then, based on diverse source preference criteria, for example, content of information or easy access to information source, the information seeker places the sources of which he or she is aware in an order of preference within the information source horizon. To simplify Fig. 1, only three major preference areas or zones of information source horizon are identified, that is, sources perceived as most significant (Zone 1), somewhat important (Zone 2) and marginal (Zone 3). Naturally, in individual information seeking situations, people may use

[1] In the empirical analysis of the source preferences, no distinction is made between information sources and information seeking channels; henceforth, both will be referred to as information sources. This is due to that the present study focuses on the preference criteria, not the ways in which sources and channels *per se* may be differentiated from each other in the context of seeking problem-specific information.

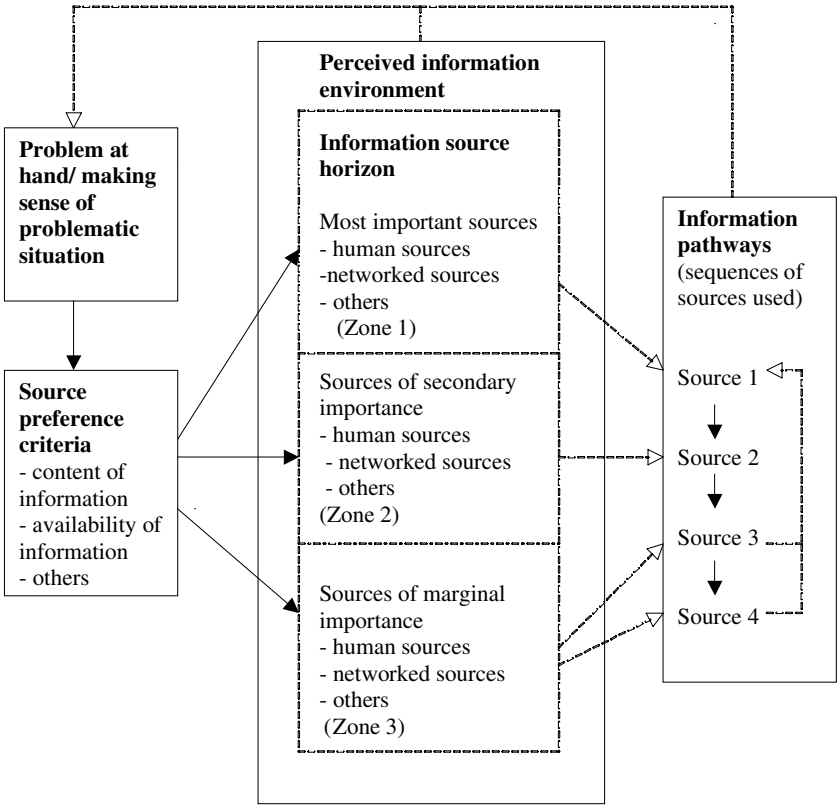

Fig. 1. Information source horizon and information pathways in the context of seeking problem-specific information.

more than three zones and some cases, all information sources may be located in two zones, for example. In addition, an individual may have no stated preference between two sources, for example, Internet and magazines, and they will equally accessed within a zone (cf. Sonnenwald et al., 2001, p. 72).

Both source preference criteria and sources placed in the various zones of information horizon will be characterized in more detail in the empirical study below. For the sake of illustration, only two source types (human sources and networked sources), and two preference criteria (content of information and availability of information) are included in Fig. 1.

Finally, Fig. 1 refers to information pathways that stand for the sequences of sources used during the information-seeking process. Again, to simplify Fig. 1, only four sources and four steps constituting the information pathway are included. More specifically, a step denotes here the consultation of an individual source within the pathway, for example, a friend who is asked for help in problem solving (cf. Johnson et al., 2006, pp. 576–577). Thus, a step does not refer to the act required to move from a source to another, for example, walking to the nearest computer terminal to access the Internet after having received a potentially useful URL from a friend. However, Fig. 1 provides a simplified picture because in real information seeking situations, the number of information sources consulted and thus, the steps constituting the information pathways may vary. Importantly, however, Fig. 1 suggests that the information seeker consults the sources by following the order of importance depicted on the information source horizon. To begin with, he or she consults first Source 1 deemed most important and thus located in Zone 1. Then, he or she continues by utilizing Source 2 perceived to be of some importance (placed in Zone 2). Finally, peripheral Sources 3 and 4 placed in Zone 3 will be consulted to obtain additional information.

On the other hand, the dashed lines on the right side of the source sequence suggest that if necessary, the information seeker may return to Source 1, for example, to check some facts from the Internet in more detail. Experiences obtained from the use of the above sources may also affect the perception of the problem at hand,

and lead to its redefinition, for example, the lowering of overly ambitious level of problem solving. Specifications such as these may affect the source preference criteria and result in (partial) reconstitution of the information source horizon.

The above examples illustrate the diverse ways in which information source horizons may be constructed. On the other hand, Fig. 1 provides a simplified picture since a considerable number of preference criteria may be used when assessing the significance of individual sources. The picture is also simplified because in reality these criteria may be emphasized differently with regard to sources of various types. Thus, the framework depicted in Fig. 1 primarily serves the needs of the specification of the empirical research setting. This means that no attempt will be made to test the above framework by systematically exploring the connections between the factors specified in Fig. 1. The main attention will be paid to the construction of information source horizons, more specifically, the identification of criteria by which diverse information sources are placed on the information source horizon. The information pathways will be discussed on a more general level to complement the analysis of source preferences. In this part of the study, attention will be paid to the order in which the information seekers consult the preferred sources during the problem-solving process.

4. The empirical study

4.1. Research questions

By drawing on the framework presented in Fig. 1, the present study will address the following research questions:

- What kinds of information sources do people include in their information source horizons in the context of seeking problem-specific information?
- According to what criteria do people prefer information sources when constructing their information source horizons in the above context?
- What kind of information pathways, that is, sequences of sources do people use when seeking problem-specific information?

Due to research economy, a few limitations appeared to be necessary in the empirical analysis. First, no attention was paid to the actual processes of seeking problem-specific information, for example, the ways in which the participants *de facto* checked specific Web pages as the problem-solving process evolved. Thus, the present study draws on *ex post facto* accounts of the ways in which information sources are selected for seeking problem-specific information. Second, the specific strategies of seeking problem-specific information were not studied. For example, no attention was paid to issues such as the selection of search terms used in Web searching. Third, the question of how the use of the preferred sources actually affected source preferences during the problem solving process was excluded. Closely related to this specification, in the study of information pathways, the sequences of sources were identified at a general level only. Therefore, no attempt was made, for example, to scrutinize the extent to which information sources were revisited as the journey along the information pathway continued.

4.2. The collection and analysis of the empirical data

The empirical data were gathered August–September 2005 in the city of Tampere, Finland by interviewing 18 environmental activists. Due to the exploratory nature of the study, a convenience sample was used. The participants were mainly recruited through the electronic mailing lists of the local associations for environmental issues. Overall, the environmental activists were recruited for the study because it was assumed that they are regular information seekers and motivated to articulate their ways of selecting diverse sources. This assumption appeared to be correct, and the interviews yielded rich empirical data.

Of the participants, 14 were females and 4 males. The ages of the informants varied between 21 and 59 years, averaging 34 years. Eight participants had university degrees, three had completed vocational education and seven were university undergraduates. Several occupations were represented among the informants, for

example, engineering and teaching. Of the participants, three had a permanent job and five temporary employments, whereas two were unemployed and one was on maternity leave.

The semi-structured interviews took about one hour on average. With one exception, all interviews were conducted in the office of the present author; one interview was made at the workplace of a participant. The participants were first asked to characterize their current way of life and the major hobbies. Then the issues of information seeking were discussed in more detail by discussing first the criteria by which the informants prefer or avoid information sources in ELIS contexts as they monitor everyday events or more generally, seek orienting information. The findings concerning the seeking of orienting information will be reported in a separate study (Savolainen, forthcoming). The latter part of the interview focused on the seeking for problem-specific information, that is, the topic of the present study.

In the interviews, the critical incident interview technique developed by Flanagan (1954) was utilized to gather data about problem-specific information seeking. In addition, the empirical study conducted by Sonnenwald et al. (2001, pp. 69–70) provided useful ideas of the ways in which the above technique may be used in the context of the semi-structured interview. The participants were encouraged to recall a critical incident, that is, a past situation which had required seeking of problem-specific information. The original intention was to elicit critical incidents related to their roles as environmental activists. Unfortunately, this intention failed since it appeared from the first interview that the participants are not motivated to discuss critical incidents related to this topic. In fact, only one of the participants preferred a topic related to her role as an activist, that is, organizing a trek. Other participants claimed that they find it difficult to recall individual problems worth reporting, as far as their activist roles are concerned. They felt that recent problems such as how to organize the separate gathering of bio garbage in the home would not be particularly interesting from the viewpoint of information seeking.

Thus the data gathering strategy had to be modified; those not willing to discuss critical incidents related to the activist roles were encouraged to choose another topic related to non-work problem solving. This strategy appeared to be successful to elicit critical incidents. On the other hand, the strict definition of the topic of the critical incident would have served the ends of obtaining a homogenous sample of information seeking situations. Since this goal was not attained, the sample reported only problems that could be relevant to any person.

The spectrum of everyday problems reported through the critical incidents appeared to be fairly broad. At first, nine interviewees out of 18 experienced difficulties in recalling an individual problem that had specifically required information seeking. As one of the interviewees put it,

> "In fact, my information seeking process tends to be fairly spontaneous. So I do not consider that now I'm going to find out that information. Some question just comes into my mind and then I go on to work it out. So it expands and expands until I find out what I really want." (P-4)[2]

However, somewhat later, when a problem suitable for the discussion of a critical incident was found, the participants were able to identify the major information sources used in problem solving. They were also able to specify the main criteria of source preferences, as well as the order in which the preferred sources were actually used. In addition, the informants described in detail the context and origin of their problem, as well as the phases of the problem-solving process, and the development of their approach to the problem. At the end of these stories they were asked to specify how well they had succeeded in problem solving so far, or whether the process was still going on.

Thematically, the critical incidents scattered over a broad area. They concerned preparation for a medical operation (three cases), purchase of a computer (three cases), finding new accommodation (two cases), renovation (two cases) and retirement issues (two cases). Other reports (one case each) concerned topics such as abandoning work-life; child care (in particular, breast feeding); finding a support person for a friend; health insurance; organizing a trek, purchase of a digital camera; and study grant application. Similar to the findings of earlier ELIS studies, the problem areas seem to be fairly heterogenous; however, consumer issues and health problems were mentioned more frequently than others (cf. Chen & Hernon, 1982, p. 48; Ellen, 2003).

[2] The code is used to identify the participants. In the code, P stands for Person and the number refers to an individual interviewee.

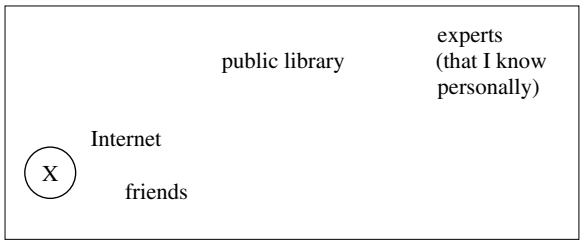

Fig. 2. An example of the mapping of information source horizon. (Legend: ⊙ represents the information seeker).

Most of the critical incidents were fairly recent; they had occurred within the last year. Of the above cases, five problems were still in the process of being solved at the time of the interviews, while 13 had been solved in some way. Typically, the problem-solving took 1–2 weeks. This time range was common, particularly in cases dealing with purchasing consumer goods such as computers. On the other hand, problem-solving processes related, e.g., to health issues tended to last longer, in some cases up to 3–4 years.

During the reporting of the critical incidents, the participants were asked to plot their information source horizons with regard to seeking problem-specific information. This is a method first introduced by Sonnenwald et al. (2001). First, the participant positioned him- or herself in the middle of the paper. Then he or she mapped the information sources used for the needs of the problem-solving process so that the most important sources were located closest to the mark symbolising the participant and less important ones farther away towards the horizon line of the imaginary field. When drawing the map, the interviewees were asked to specify the criteria by which diverse sources were preferred or seen to be peripheral in the seeking of problem-specific information. Fig. 2 provides an illustrative example of the mappings of information source horizons.

All interviewees were able to draw the information source horizons. Unfortunately, one of the participants failed to recall the exact order in which he had consulted the information sources, even though he specified the source preference criteria. Thus, the analysis of information pathways will draw on the reports of 17 interviewees. Although the elaborateness of the mappings of the information source horizons and the articulations of source preferences varied to some extent, the participants were able to explain their source preferences in sufficient detail. While interviews tend to have shortcomings in that the interviewees are not able to recall all details, it is apparent that the articulations of critical incidents provide reasonably valid data.

The empirical data were analyzed by means of qualitative content analysis by constantly comparing the articulations of information source preferences and information pathways (Lincoln & Guba, 1985). The transcribed interview data were compared to the maps of information source horizons in order to check for possible inconsistencies between the articulations and the maps. In addition, the maps were useful in counting the frequencies of the information sources mentioned in the interviews.

The maps were also used to identify the zones of the information source horizon. The maps were analyzed by placing the sources identified into concentric zones according to the distance between the information seeker placed at the center of the map and information sources of various types. Since the drawings were fairly well specified and the interview data could be used to support the interpretation, this research task appeared to be quite unambiguous. For example, in Fig. 2 above, the Internet and friends were placed in Zone 1, public library in Zone 2, and experts in Zone 3. Even though the participants were not asked to place the individual sources in two or three major groups, for example, or to delineate boundary lines between the groups of sources, most of them spontaneously located their sources in three major groups: most important, somewhat important, and marginal. However, three participants made an exception since they placed all sources in Zone 1.

5. Empirical findings

5.1. Information source horizons

Most interviewees felt that nowadays there is a sufficient variety of information sources available. However, the ease of identifying relevant sources varies. For example, it may be quite easy to identify major information

sources in the case of an acute health problem but finding relevant advice for financial issues may require a lot of effort. Similarly, finding useful information to support the decision to purchase a computer may be difficult due to the lack of objective information about the qualities of alternative products.

> "The main problem is to know where to begin with when searching for information. There is a lot of information if you just are able to locate it. This is the most difficult part of it. It depends so much on the case. Sometimes it (problem) may be so simple that you just go to the computer and the information can be found there. In other cases it may happen that you have to search for information in offices or libraries or elsewhere." (P-6)

The information source horizon maps included altogether 28 individual information sources. Since some of them were referred to several times, the total number of mentions of sources amounted to 64, that is, on average 3.5 sources per interviewee and per individual critical incident. The number of individual sources mentioned by participants varied between 1 and 6.

To compare the empirical findings, the sources placed on the information source horizons were classified into five major groups, as in earlier studies focusing on the information source horizons of Web searchers interested in self-development (Savolainen & Kari, 2004), and environmental activists seeking orienting information (Savolainen, forthcoming). However, the original classification of source types was slightly modified in that broadcast media (radio and television) was omitted because they were not referred to as sources of problem-specific information. In this way, the following source types were identified:

- human sources (examples of individual sources: colleagues; experts; friends and acquaintances);
- printed media (newspapers; magazines; newsletters; free newspapers; local leaflets; books; other printed material);
- networked sources (e-mail; mailing lists; WWW);
- organizational sources (for example, health centers and public libraries);
- other sources (miscellaneous sources other than the above source types, for example, regulations issued by the Study Grants Office).

The information source horizons may be characterized in more detail by specifying the ways in which the source types were preferred (see Table 1).

With regard to sources placed on Zones 1 and 2, human sources were preferred most strongly, followed by networked sources, printed media and organizational sources. Networked sources were also perceived as significant, and interestingly, they were never placed in the peripheral zone. Organizational and printed media were not seen particularly significant: also the role of sources of miscellaneous type sources remained marginal in Zones 1 and 2.

Interestingly, the source preferences differ markedly from those related to seeking orienting information (Savolainen, forthcoming). In that context, the same participants strongly preferred printed media and broadcast media. Networked sources were also perceived as relatively important in the context of seeking orienting information, but human sources and organizational sources were deemed fairly marginal. In general, the differing preferences seem to boil down to the expectations concerning the varying capacity of diverse information sources to meet the needs of monitoring of everyday events or finding information focused on a specific

Table 1
Distribution of source types in zones of information source horizons ($N = 64$)

	Zone 1 ($n = 37$)	Zone 2 ($n = 18$)	Zone 3 ($n = 9$)
Human sources	32.4	27.8	55.6
Networked sources	27.0	22.2.	0
Organizational sources	16.2	16.7	11.1
Printed media	10.8	27.8	33.3
Other sources	13.5	5.6	0
Total	99.9	100.1	100.0

problem at hand. For example, newspaper articles highly useful in the monitoring of everyday events may only occasionally be able to provide focused information about a specific health problem.

The findings presented in Table 1 also differ from the results of an earlier study focusing on the Web seeking practices of people interested in personal self-development (Savolainen & Kari, 2004). In that study, the number of sources mentioned was highest in the intermediate zone, while the participants were more selective in placing sources in Zones 1 and 3. People seeking for orienting information seem to have similar preferences (Savolainen, Savolainen, forthcoming). This suggests that people seeking for problem-specific information are more focused in that they favor relatively few sources that are expected to meet the information needs. Therefore, the number of sources of secondary or marginal importance tends to remain low.

5.2. Preference criteria of source types in different zones

In the following, the main findings will be discussed according to source types identified above. First, a quantitative overview of the preference criteria will be provided. Then, the findings will be elaborated by qualitative content analysis focusing on source types. Because other sources were mentioned very seldom, this source type will be excluded from the qualitative analysis.

5.2.1. Quantitative overview of source preferences

The interviewees mentioned altogether 39 unique source preference criteria; however, some of them were mentioned several times. In order to see the wood for the trees, the numerous criteria were collapsed into a few major groups. They were identified by drawing on qualitative content analysis, that is, by constantly comparing the source preferences articulated in the interviews. In order to enhance the reliability of the study, the original coding was meticulously checked by the present author at the end of the research process. Some specifications[3] were made, but as a whole, the original classification appeared to be valid. The preference criteria were grouped as follows:

- availability and accessibility of information (examples of individual criteria: source is easily accessible; provides quick access to information);
- content of information (for example, provides experience-based information; provides facts; provides comprehensive information; provides specific information; provides opinions);
- usability of information sources (for example, information is well-organized);
- user characteristics (for example, I am used to consulting the telephone catalog).

The above criteria may be compared with the "finite list" of relevance criteria identified by Barry and Schamber (1998). According to them, 10 major relevance criteria (other than the inherent topicality) include the following: depth/scope/specificity, accuracy/validity, clarity, currency, tangibility, quality of sources, accessibility, availability of information/sources of information, verification, and affectiveness. Overall, the criterion of content of information corresponds to topicality that is excluded from Barry and Schamber's list. Availability and accessibility also figure as relevance criteria as suggested by Barry and Schamber (1998). In contrast, it is more difficult to find how usability of information and user characteristics are related to the above list of relevance criteria. However, for example, clarity and usability of information seem to denote similar qualities, while user characteristics may refer to "affectiveness", among others.

Overall, the fact that the classifications of source preference criteria used in the present study and relevance criteria identified by Barry and Schamber (1998) differ to some extent stems not only from the different study populations but also the ways in which generic concepts such "depth", "specificity" and "quality" are inter-

[3] Except for a few boundary cases, the classification of the source preferences appeared to be a fairly unambiguous task. In the checking of the coding, difficulties were experienced with the interpretation of some preference criteria, for example, "provides immediate feedback" (in the case of consulting a human source). Originally, the above criterion was classified into the group of "availability and accessibility of information". It appeared, however, that in the specific context where the above criterion was mentioned, the "provision of immediate feedback" primarily referred to the way in which the information provided by the human source could be specified during the discussion. Therefore, the above criterion was reclassified into the group of "content of information".

Table 2
Source preference criteria by zones of information source horizons ($N = 68$)

	Zone 1 ($n = 39$)	Zone 2 ($n = 22$)	Zone 3 ($n = 7$)
Content of information	72.0	91.0	85.7
Availability and accessibility information	20.5	4.5	14.3
User characteristics	5.1	0	0
Usability of information	2.5	4.5	0
Total	100.1	100.0	100.0

Table 3
Source preference criteria by source type ($N = 68$)

	Human ($n = 18$)	Networked ($n = 22$)	Printed ($n = 11$)	Organizational ($n = 8$)	Other ($n = 9$)
Content of information	94.4	63.6	90.9	87.5	77.8
Availability and accessibility	5.6	27.3	9.1	12.5	0
User characteristics	0	4.5	0	0	11.1
Usability of information	0	4.5	0	0	11.1
Total	100.0	99.9	100.0	100.0	100.0

preted. In the present study, these qualities were not approached as separate preference criteria since they were understood as the qualifiers of the content of information, that it, the depth, specificity and quality of information provided by a source.

The above source preference criteria may be reviewed by zones of information source horizons (see Table 2).

As expected, the interviewees were most motivated to specify the preference criteria of the most important and somewhat important sources (Zones 1 and 2). In contrast, the motivation to consider the preference criteria of marginal sources (Zone 3) appeared to be low. The criteria pertaining to the content of information sources were reported to be most important in all zones, followed by criteria dealing with availability and accessibility. The criteria pertaining to user characteristics and usability of information were referred to very seldom.

To compare, the study focusing on seeking for orienting information showed that content of information was clearly the most important preference criteria, even though in a less dominant (about 40% of all mentions in Zone 1 and 75% in Zone 2) (Savolainen, forthcoming). Interestingly, the criteria pertaining to availability and accessibility of information and user characteristics such as media habits were emphasized more in the context of seeking for orienting information. In this comparative light it becomes even more evident that the selection of sources serving the needs of problem-specific information is primarily driven by expectations and beliefs concerning the information content provided by information sources. Compared to this criterion, other factors seem to be fairly insignificant. These assumptions will be discussed in more detail in the context of the qualitative analysis below.

Finally, the distribution of the preference criteria by information source types is presented in Table 3. Since the findings of the qualitative study will be reported by source type, Table 3 provides essential background to the following section.

Again, the criteria pertaining to the content of information were predominant in the selection of sources of all types. Availability and accessibility of information were of some importance in the selection of networked sources, but otherwise criteria other than content of information remained marginal. Overall, Table 3 suggests that people strongly prefer human and networked sources while seeking problem-specific information and that in the selection of sources of these types, the main attention will be devoted to the potential usefulness of the information content, as well as the availability of networked sources.

5.2.2. Information pathways

The quantitative picture may be specified further by providing an overview of the information pathways. Their analysis was based on the mapping of the information source horizons and the specifying comments

Table 4
Length of information pathways indicated by the number of steps

1 step	1
2 steps	3
3 steps	6
4 steps	6
5 steps	1

Table 5
Distribution of steps by source types (numbers indicate the mentions of sources of various types)

Step	Source type					Total
	Human	Networked	Printed	Organizational	Other	
1	6	8	1	5	1	21
2	5	4	1	5	1	16
3	2	1	4	4	2	13
4	4	1	1	1	0	7
5	1	0	0	0	0	1

articulated by the participants in the interviews. As noted above, 17 out of 18 interviewees described the order in which they consulted the information sources for the needs of the problem-solving process.

The sequences of sources were analyzed by devoting attention to the number of steps constituting the information pathway, the order of the use of the preferred sources, and the distribution of the above source types with regard to the steps. As specified in Section 3.3, a step denotes the consultation of an individual source within the pathway. The "lengths" of the pathways varied between one and five steps. However, only in one case did the pathway consist of one single step. Similarly, there was only one pathway consisting of five steps (see Table 4).

Thus, a typical pathway comprised 3–4 steps, for example, Friend ⇒ Internet ⇒ Magazine. The participants identified altogether 54 individual sources that were used in the construction of the pathways. Unsurprisingly, most of the sources (28 out of 54) were those placed on Zone 1 in the information source horizon, while 17 of the sources were placed in Zone 2 and 9 sources in Zone 3. Except for only one case, sources placed in Zone 1 were consulted first, that is, the information pathway was started by drawing on sources deemed most important, while the last steps were taken by consulting sources of lesser importance.

We may also review how the source types were used with regard to various steps. Table 5 specifies the findings.

In general, the first step taken in the information pathway tended to draw on the use of the Internet or human sources. Organizational sources such as health centers also figured fairly well in the start phase. The same applies to the second step. Usually, the first two sources were able to meet the major information need, and characteristic of steps 3 and 4 were that they provided additional or complementary information. In particular, printed sources such as magazines or books served this end. It also seems that if more than three steps are needed to solve a problem at hand, human sources tend to be consulted to obtain feedback, for example, experience-based opinions of friends about the ways in which the information seeker intends to solve the problem (steps 4 and 5).

Naturally, due to the small sample of the present study, these findings are only indicative, and further research is needed to explore the characteristics of information pathways in more detail. However, the quantitative findings concerning information source horizons and information pathways support each other in that both demonstrate the significant role of human sources and the Internet in problem-specific information seeking.

5.2.3. Qualitative picture of source preferences

We may enhance the quantitative picture by discussing in more detail how the participants explained their source preference criteria. The following section is based on the qualitative content analysis of the interviews. The findings will be discussed by source type, beginning with human sources which were reported to be the most important sources overall, and ending with organizational sources.

5.2.3.1. Human sources. As indicated by Tables 1 and 3 indicated above, human sources were favored most strongly as sources of problem-specific information. These sources were predominantly placed in Zone 1 or 2, and almost without exception, the criteria by which human sources were preferred pertained to the content of information.

In cases where human sources were preferred most strongly, they were praised for their capacity to provide filtered and experience-based information about the problematic issue at hand. Thus, people that have solved similar problems before are particularly useful sources of information.

> "I got information from my pals, based on their experiences. They were able to put the promises given by computer magazines on a reasonable scale. At least I felt that hardware that was ranked high in computer magazines was two times more expensive than hardware that my pals found as equally good. Computer magazines tend to glamorize information technology, but from the perspective of the experiences of my pals and my experiences, too, this glorification is not necessarily well-founded." (P-2)

Human sources were also favored since they may provide easy and quick access to information and clarify complicated issues in an interactive way since they may provide immediate feedback.

> "It is important that someone recently retired can share truthful information about everyday issues related to it. Then you can discuss with people that are going to retire soon. You can compare experiences and the problems they have faced. I may consult these people because of my laziness. When you try to seek information elsewhere, it demands patience." (P-7)

Other people, for example colleagues, were also valued as sources of ideas. One of the interviewees had pondered the opportunities to abandon work-life, at least for a while, and try an alternative way of life. In her case, a human source appeared to be very central in supporting the final decision.

> "I had worked there several years and it (work-life) grew worse and worse all the time. Once of my work mates said that "hey, have you ever followed the recent debate on the legislative reform related to unemployment issues? You seem to belong to the last age group that may benefit from the current law". Then I went on to check the law and thought what if? Well, it was her idea, it stemmed from that. She had heard about it from the media. I would never been able to find that by myself that I may leave work-life. It was a good decision. She just gave me a hint about this opportunity." (P-16)

In some cases, problem-specific information was sought collaboratively from human sources; McKenzie (2003) refers to this mode of ELIS as "information seeking by proxy". Other people aware of the information need of a person may help him or her, for example, by monitoring newspapers and other media, and letting the person in question to know if something relevant has been found. This practice was reported by a university student who lived in a neighboring city at the time when she was looking for accommodation. In this case, information seeking by proxy greatly helped her problem solving.

> "My friends living in Tampere checked, for example, the University bulleting board because sometimes there are announcements about flats to rent." (P-6)

Even though human sources occupy the central position in seeking for problem-specific information, they may provide opinions or interpretations that are not necessarily useful. One of the interviewees (P-19) had consulted the expert working in a child health center, and got somewhat conflicting information about the eventual problems caused by breast-feeding. The expert had claimed that it may cause holes in the child's teeth, whereas people debating in an electronic discussion group had defended an opposite view. Despite differing views in this specific issue, the expert was valued as an information source more generally. A similar kind of example was provided by an interviewee asking for his friends' opinion before making the final decision to purchase a laptop computer.

> "In a way, it was natural for me to ask about their experiences in these matters. Anyway, it came as a surprise to me how strongly some guys commented on the technical details, for example, saying directly "don't be taken in" or "don't believe that". I felt that was rather frightening." (P-2)

In a few cases, the human sources were placed in the peripheral zone of the information source horizons. This was because the most important information for decision-making was obtained from other sources, for example, the Internet or special magazines. Therefore, human sources were used to obtain support to the decision that was almost taken down. These cases were characteristic of purchase decisions. One of the participants reported about his way of deciding on the purchase of a computer.

> "Then, I finally had two or three candidates (=computers) there. One day, once again I talked with my acquaintaces about it and said, well, I have considered these three, what would you say?" (P-1)

The opinions provided by other people may affect the final decision, in particular if their arguments are based on actual experiences of using computers of similar kinds. However, human sources seem to be preferred more markedly in cases where they provide a strong idea to launch a major project, for example, to abandon work-life. If the decision has already been made, for example, to purchase the most powerful computer available in a local shop, despite its high price, critical information obtained from human sources was valued less because other people's opinions may provide only complementary information that will not change the decision.

5.2.3.2. Networked sources. Even though the Internet was mentioned less frequently as a source of problem-specific information, it occupied a significant position on the information source horizons. Similar to human sources, the participants tended to place the Internet in Zones 1 or 2; interestingly, no one located this source in the peripheral zone.

In the case of the networked sources, too, content of information, as well as its availability and accessibility were emphasized as preference criteria. In an almost self-evident manner, the Internet was conceived of as an enormous and easily accessible repository of facts and opinions, and a superb source enabling rapid information seeking.

> "The Internet comes first because it is the easiest (source) and because it contains most of all information. When you get a major idea at home and you have to find out something more about it, there you have the Internet. It is just how to hit the right search words in there. Then it (information) will come from there." (P-4)

In the construction of source preference for the Internet, references were not only made to the actual strengths of the networked sources such as extensive and rapidly up-dated information content, but also these strengths were further emphasized by discussing the weakness of "static" traditional sources such as printed newspapers. The following quote illustrates the comparative approach. The lengthy excerpt is taken from a critical incident dealing with the search for a student apartment.

> "Naturally, I started from the Internet, because there is information about organizations providing student housing, their web sites and information about the rented flats provided by the town. At that time I lived in Jyväskylä. There I checked there various announcements related to "looking for accommodation". People insert announcements on the net, and you have to check them every day. If there is an announcement, and someone gets interested in it, it may take only an hour or two, and that flat has gone to someone. So you have to be quick. In addition, there may be more announcements about flats for rent than in newspapers. The problem with the newspaper announcements is that they tend to useful only if you live in the locality where you are looking for housing. In addition, these announcements may contain no floor plans and so you may never be sure whether the flat will be OK." (P-6)

Another major reason for the preference of the networked sources is the opportunity to make comparisons across information sources and conduct specifying searches as the problem-solving process evolves. These strengths of the Internet may manifest themselves, for example, when considering the purchase of a computer.

> "The Internet is certainly invaluable as a source of price information and comparison of prices. It would take a huge amount of time to run from one shop to another, and still, you would have no choice but be satisfied with the local price level. On the net, you can compare the computer shops in Turku and Helsinki and check their special offers." (P-2)

The Internet was also valued because it may provide an interactive forum to support decision-making. For example, an individual comparing the quality/price relationships may benefit from the feedback provided by people who have recently purchased computers. The Internet was also preferred as source providing access to alternative viewpoints. As noted above, one of the participants (P-19) consulted a discussion group focused on child care in order to support her arguments when debating with health professionals about the ways in which breast feeding may affect her baby's teeth. She believed that breast-feeding mothers sharing their recent experiences in web forums may be more credible sources than health professionals working in child health clinics. Thus, the Internet can be used as a supplementary source of information that helps to challenge the authoritative interpretations offered by professionals.

5.2.3.3. Printed media. It was characteristic of the role of printed media that they were almost equally placed in various zones of information source horizons. This suggests that printed sources such as books and magazines can also be used as to supplement information received from other human or networked sources. Except one case, the content of information was perceived as the primary criterion for the preference of printed sources.

Printed media were mainly favored because they provide facts, e.g., about new products and services available on the market. One of the interviewees (P-10) had got a major idea from a newspaper advertisement when considering the purchase of the laptop computer. In this case, computer magazines may be extremely useful, since they provide an overview of the products available and their features, as suggested by the following example:

> "In fact, I favored the computer magazines. One reason for this is that our employee subscribes to them. So I browsed them at the workplace, not systematically, but anyway. I just looked whether there were comparisons of various computers. In that way, I succeeded in getting "onto the scene" to know what is available, what kind of computers, what kind of prices and so on. The process started that way and I began to think what kind of features I would need in my computer. In fact, I had kept my eyes open even before. For example, when visiting my friends, I used to have a look at computer magazines if they happened to be available there." (P-1)

This example suggests that the seeking of job-related information at the workplace may serve the non-work information needs, too. Similarly, seeking orienting and problem-specific information may intertwine. Further, information may be found by chance. Naturally, this may be the case when using human and networked sources, too.

Printed media, particularly newspapers and magazines were also valued as sources of supplementary information when the problem solving went on. As the review of the information pathways indicated, information seeking often began by consulting human and networked sources, and the printed media tend to be used to obtain additional information. As discussed above, the Internet may be the most effective source, e.g., for students looking for flats to rent, since information can be sought and shared rapidly in an interactive way. However, not all web sites serving these needs are necessarily available free of charge, and in this case, the information seeker may prefer printed newspapers freely accessible in public libraries, for example. One of the participants (P-15) preferred newspapers since they occasionally provided useful information about renovation – a fairly expensive and long-time project for her family. In this case, too, seeking orienting information on renovation projects more generally, and seeking for problem-specific information about the availability of, e.g., building material intertwined.

Sometimes printed media were placed in the peripheral zone of information source horizons. In these cases, information received from these media was primarily perceived as entertaining and only marginally useful. One of the interviewees (P-5) mentioned a magazine reporting on a major dental operation – similar to what he was preparing at the time of reading. Although interesting in itself, the article was not able to provide new facts compared to information received from other sources used before. However, articles such as these may be valued since they provide emotional support and thus motivate problem solving.

5.2.3.4. Organizational sources. Organizational sources were preferred fairly seldom, and almost without exception, information content was the primary criterion. In contrast to other source types, organizational sources were mainly chosen because in practice there were no alternatives to them. For example, the solving

of certain health problems is often fairly difficult without consulting professionals such as dentists. Similarly, university students struggling with problems related to study grant applications have necessarily to contact the office specialized in these issues.

One of the interviewees (P-5) preparing himself for a major dental operation first contacted the student health care service by pointing out that this source was "a kind of automatic choice". Another participant planning a trip to Mexico needed vaccination, and her choice also appeared to be obvious.

> "Well, because I was studying at this university, it came first to my mind to contact the Student Health Care Service." (P-17)

Organizational sources were also preferred due to their expertise. In this context, libraries were also mentioned. One of the interviewees preparing herself for medical treatment was interested in learning more about the forthcoming operation. She had first consulted the Internet, but noticed that more specific information was needed.

> "In fact, I was not able to see these things exactly. So I thought that the library even might provide even Finnish literature on this topic. I knew that there are experts in this field in Finland and that they have written a book in Finnish. Then I walked to the library, and the book was there. In fact, I soon realized that I have to go to the library because the Internet is not enough. This was because I had to consider what kind of knowledge I could trust. In a way, the Internet searches conditioned me to seek additional information from the library, because I thought I might find more specific information there. On the other hand, my knowledge appeared to be insufficient and I was no longer able to filter the essential information found in the Internet." (P-4)

As the above example suggests, organizational sources may occupy a significant position on the information source horizon even though they are not necessarily consulted first. Particularly in cases where the problems at hand are complicated, the Internet may be able to provide "first aid" only. Organizational sources such as health centers tend to be associated with cognitive authority, and libraries are also believed to give access to filtered high quality information. On the other hand, the cognitive authority of organizational sources like child health centers may also be challenged by drawing on networked sources, as exemplified by the case of breast-feeding discussed above. This suggests that ultimately information sources are not perceived as useful *per se*, but their usefulness is judged from the perspective of the requirements of the problem at hand.

6. Discussion

The mapping of information source horizons and information pathways, combined with the critical incident technique provides a useful way to identify source preferences in the context of seeking for problem-specific information. In ELIS studies so far, the source preferences have not been discussed in detail in the above context; the present study fills this gap by drawing on an exploratory study based on interviews with 18 environmental activists.

The study revealed that people primarily seek problem-specific information from human and networked sources. Printed media and organizational sources also figure in their information source horizons, but less importantly. The content of information appeared to be the main criterion of source preference in the case of all source types. Availability and accessibility of information are of some importance while selecting sources deemed most important. The role of other preference criteria, that is, usability of information and user characteristics remained marginal. Somewhat surprisingly, situational factors such as lack of time were not referred to as criteria used in source selection. This may be due in part to the limitations of the critical incident technique: the participants were no longer able to recall the situational details of the information-seeking process, even though it had occurred quite recently.

The analysis of the information pathways complemented the review of the information source horizons. The findings suggest that in most cases people use 3–4 information sources when seeking for problem-specific information and that they tend to start the information-seeking process by consulting networked and human sources. If more sources are needed, information seekers are likely next to try printed sources such as maga-

zines or to contact organizational sources. On the other hand, the nature of the problem, for example its urgency, may significantly direct the first choice in individual cases. This may be the case particularly when the individual faces health problems. However, in less acute cases, the most obvious organizational sources, such as doctors, are not necessarily consulted first, but preliminary information may sought from the Internet, for example (cf. Johnson et al., 2006, p. 574). Earlier used experiences are also important here because people tend to use sources that have proved useful while solving similar problems.

Overall, the findings confirm the results of earlier studies suggesting that health and consumption related issues tend to trigger most processes of problem-specific information seeking in everyday contexts (see, for example, Ellen, 2003; Warner et al., 1973). On the other hand, the varying topics of the critical incidents reported in the interviews support the view that everyday life information needs are fairly heterogeneous (cf. Chen & Hernon, 1982; Marcella & Baxter, 1999). Further, the study confirmed the findings about the growing importance of networked sources in ELIS (Johnson et al., 2006; Rieh, 2004). On the other hand, the findings support the view that even though human and networked sources are preferred most strongly in problem-specific information seeking, information sources tend to be used in a complementary way (cf. Nguyen & Western, 2006).

The findings specify the picture of source preference criteria yielded by earlier studies. Similar to the studies conducted by Julien and Michels (2004) and Fisher et al. (2005; cf. Fisher and Naumer, 2006), the findings emphasize the significance of the content of information, as well as availability and accessibility of information. Interestingly, the findings of the present study emphasize more strongly the significance of the content of information, as compared to availability and accessibility.

This difference becomes even more clear if we review the major principles of information seeking proposed by Harris and Dewdney (1994, pp. 21–24). They suggested, among others, that ''people tend to seek information that is most accessible'', thus echoing the significance of the principle of the least effort. Currently, probably due to the ubiquity of the networked sources and services at work and at home, information seekers may devote less attention to issues of availability and accessibility of information. In many cases, these factors may be taken as self-evident, and when considering the preference criteria, the focus lies on the content of information. Interestingly, these notions are in line with the findings of studies showing that topicality is the most important relevance criterion (cf. Rieh, 2002; Tombros, Ruthven, & Jose, 2005; see also Savolainen & Kari, 2006).

7. Conclusion

Since the present study is exploratory and it is based on a rather small convenience sample of environmental activists, further research is needed to elaborate the source preference criteria with studies focusing on other population groups in order to obtain comparative data. In this context, for example, comparative studies exploring the source preference criteria of people making use of various kinds of information grounds would be welcome (Fisher & Naumer, 2006). One of the challenges of the future studies of source preference criteria is to develop more focused research settings by recruiting interviewees whose articulations of critical incidents would concentrate on specific topics such as health problems. There is also a need to investigate in greater detail the ways in which information source horizons change when information seekers move along information pathways, for example, during the health-related problem solving process. In this way, it would be possible to capture the dynamic nature of source preference construction. Naturally, such studies require context-sensitive information gathering, e.g., by means of daily diaries and complementary phone interviews. Finally, a challenge for further research is to explore how the use of the sources chosen will affect the formation of source preferences, that is, the choice of the next source that forms a new step on the information pathway.

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