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Information Seeking in Organisations: A Comparative Survey of Intranet Usage

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ABSTRACT

Trying to understand how laymen search for information, we have studied ordinary employees' use of their intranets for work-related information seeking. Based on 267 responses to our web-based survey we have examined the use of various information sources in three different organisations, with a particular focus on the intranets. We have found that employees prefer to use menus to navigate to information and that a poor structure thus results in difficulties finding the right information. We have also found that gender appears to have an effect on people's preferences for choosing one information source over another. This is a novel finding that organisations with an uneven gender distribution should consider when investing in IT support for information seeking.

Keywords

Information seeking, intranet, survey

INTRODUCTION

The field of information retrieval (IR) has undergone a tremendous development over to past decades and has come to include many things beyond mere indexing and retrieval of text. Nonetheless, it was until recently considered a rather narrow field and of interests mainly to information scientists (Baeza-Yates & Ribeiro-Neto, 1999). The success of the World Wide Web (hereafter the web) in the early 1990s radically changed this situation when the IR field was suddenly opened to millions of users with little or no knowledge of traditional search tools (Jansen & Spink, 2003). Suddenly everyone needed to retrieve information, it seemed. However, it pretty soon turned out that laymen were not actually retrieving information in the traditional IR community sense; instead these users were seeking information. Information retrieval is a precise, well-defined and algorithm-oriented act whereas information seeking is a more open-ended and human-oriented process. In information seeking, it is unknown whether or not there exists an answer to the query – in fact; the seeker may not even know exactly what the query is. The very process of seeking may provide the learning required to satisfy the information need (Choo, Detlor & Turnbull, 2000).

Trying to understand how laymen search for information, researchers have studied how casual web searchers interact with web search engines (Spink, Bateman & Jansen, 1999; Jansen & Spink, 2003), how youngsters search in digital resources (Dresang, 2005), and how people find health information on the web (Yoo & Robbins, 2008) to mention but a few areas. Still, the research community has merely begun to scratch on the surface of this large and unexplored field. The context of interests in our work is the intranet, i.e., an intra-organisational network based on web technology. During the last decade, intranets have emerged as rapidly growing information environments and there are numbers are suggesting that three out of every four web servers being installed are intended for intranet usage (Gerstner 2002). It seems reasonable to assume that organisational members spend both time and efforts searching their intranets, but surprisingly little academic attention is paid to this fact. Without knowing how these users search for information we cannot tell whether or not the technology they use is helpful. Adding to the understanding of how non-professional information seekers use the intranet to satisfy their information needs, we report from a comparative study of business-oriented information seeking. In our project we apply multiple approaches and methodologies ranging from quantitative surveys to qualitative in-depth interviews.

In this paper, we present the results from a web-based survey carried out in three different organisations – one large manufacturing company, one medium-sized paper producer, and one municipality. In the next section we shall account for some related work already carried out in this field. In section three we first describe the three organisations and present the questionnaire and the distribution process. The results of the survey are reported in section four and subsequently discussed in section five. We conclude the paper with some implications for both researchers and practitioners in section six.

RELATED WORK

Modern information retrieval has been a recognised research area at least since the 1940ies (Baeza-Yates & Ribiero-Neto, 1999). Studies of information seeking, which is a separate though related activity that in many ways differ from IR, is younger but can be traced back to the early 1960ies (Price, 1963). However, the early work on information seeking was still focusing primarily on (information) scientists, scholars and the practice of science (Leckie, Pettigrew & Sylvain., 1996).

Through the work of Spink, Jansen and colleagues, we have begun to understand how ordinary people make use of public search engines to seek information on the web (cf. Spink et al., 1999; Spink, Wolfram, Jansen & Saracevic, 2001; Jansen & Spink, 2003; 2006). However, not all seekers prefer to use search engines. Teevan, Alvarado, Ackerman & Karger (2004) took a broader focus and examined how graduate students used local files, email and the web to find information. They found that many users preferred orienteering to teleporting. Orienteering means using both prior and contextual information to narrow in on the actual information target in a series of steps, without specifying the entire information need up front. Teleporting, in contrast, happens when a person attempts to jump directly to the information target. Teleporting represents the behaviour most search engines try to support, but Teevan and colleagues found that keyword-based search engines were not often used, and when they were used, it was usually part of an orienteering strategy. Teevan et al. studied graduate students and not office workers, and consequently, the use of intranets was not covered in their study.

In their Keeping Found Things Found-study, Jones, Bruce & Dumais (2001) examined how managers, information professionals and researchers managed to re-find things on the web, but they also touched upon the way email and local files were used. They found that their users engaged in a large variety of methods, including sending email to themselves, pasting URLs into documents or printing web pages in order to (re-)find things. One conclusion from their study was that no method or tool was able to provide the user with all support needed. Although their study included the workplace it did not look at intranet usage.

One study that actually looks at information seeking on intranets is the one carried out by Géczy, Izumi, Akaho & Hasida (2007). Géczy et al. looked at office workers browsing the intranet and found that they had focused interests and explored only a narrow subset of the available resources. The office workers examined in their study achieved their goals in few steps through repeatedly applied browsing patterns. Géczy et al.'s study did however not reveal what sort of information needs the employees had or what other information sources beside the intranet that were used.

Using log file analysis followed by qualitative methods, Stenmark and Jadaan (2006; 2008; Jadaan & Stenmark, 2008) studied organisational information seeking and found that users exploit a variety of methods to find information but that much of their seeking is carried out manually (i.e., by scrolling through lists of old emails or browsing through file structures) or by tools not primarily intended for information seeking (i.e., email). This work builds on and adds to the above by looking broadly at three different organisations' use of intranets and how the organisational members go about to find information.

RESEARCH SETUP

The research sites

The empirical data was collected from three Swedish organisations: one large manufacturing company, one medium-sized pulp machine manufacturer, and one municipality. To preserve anonymity, these will be referred to as organisations A, B and C, respectively.

Organisation A

Organisation A is a large U.S.-owned manufacturing company with some 27,000 employees world-wide. The majority, or close to 20,000, work in Sweden where the company's head quarter is located. Many of the employees come from an engineering background. We worked in collaboration with the intranet administrator and the communication officer. Only 9% of the respondents were female which is considerable less than the female ratio in the organisation. The average respondent was 40 years old and 54% had high school or equivalent as their highest level of education. Close to 35% had a university degree. Almost 72% of the respondent had more than 10 years of working experience and another 13% had between 6 and 10 years. No respondent had worked for less than 3 years. Close to 20% of the respondents were managers and 11% had undergone training in information seeking.

Organisation B

Organisation B is a medium-sized supplier of machines and systems to the chemical pulp industries within a larger international company group. The company employs 600 people in 12 countries of which 500 work in mid-Sweden, where

the head quarter is located. We collaborate with the manager of one of the divisions and with the information manager. One third of the respondents were female which is somewhat higher than the female ration of the organisation. The average respondent was 43.5 years and 57% had a university degree. Less than 5% had compulsory school as their highest level of education. Sixty-three percent of the respondents had more than 10 years of experience from the business and another 33% had more than 3 years of experience. Less than 4 percent reported to have been in the business for less than 3 years. Twenty-six percent of the respondents were managers and 10% claimed to have received training in information seeking.

Organisation C

Organisation C is a municipality in western Sweden, with approximately 2.800 employees. The largest employee groups are the teachers (49%) and the health care workers (28%). Our contact person was the Information Technology co-ordinator. Almost 75% of the respondents were female which depicts the gender ratio of the organisation. The average respondent was 46.6 years (which is close to the employees' average age of 45.6 years) and almost 75% had a university degree. Only 6% stated compulsory school as their highest level of education. Little over 61% had been in the trade for more than 10 years and another 30% had worked for more than 3 years. Just over 8% reported to have less than 3 years of experience. Eight-teen percent had a managerial position and as much as 38% reported to have had training in information seeking.

The research method

We constructed a questionnaire consisting of nineteen questions. As stated earlier, we had a particular interest in intranet usage although maintaining a broad perspective. The construction of the survey instrument was an iterative process were we identified variables in the literature, discussed if and how each variable was of interest to our study, transformed the selected variables into survey questions, submitted the survey to a test audience (initially faculty members, later to members of the researched organisations), modified the question and/or the response alternatives and retested the survey. When both researchers and the participating organisations were happy with the set of questions and the wordings we came to a halt.

Representatives from the participating organisations helped with the distribution of the questionnaires by providing us with lists of email addresses to employees. Organisation A gathered a list of all employees, sorted it on last names, and picked out 215 names by scrolling down and randomly selecting one person per page. The intranet administrator thereafter emailed the respondents a cover letter and the link to the online survey. Of the 215 addressees fourteen did no longer exist, and of the remaining 201, 46 individuals replied within the first week. The administrator thereafter emailed a reminder, which resulted in another 27 replies. When we closed the survey after the two weeks, we had received 73 useful answers, which gave a response rate of 36.3%.

At organisation B, a senior executive in the organisation first emailed all employees informing them about the survey and asking for their participation. Organisation B then provided us with a list of 101 randomly selected employees, and we sent an email with the cover letter and the link to the web page hosting the survey. As far as we can tell all emails reached the recipients and 66 answers (all useful) were returned within the first week. Therefore, no reminder was issued. The survey stayed open yet another week and when we closed it, a total of 70 useful responses had been received. This gave us a response rate of 69.3%.

Organisation C, finally, provided us with 325 email addresses selected to represent all eight divisions and we sent out the emails containing the cover letter and the link to the online questionnaire. The email failed to reach 25 recipients, resulting in error messages, but we assume that the remaining 300 recipients received their emails. After 11 days, 83 replies had been received and we then issued a reminder. This resulted in another 41 replies, giving us a total of 124 usable answers. The response rate for organisation C was thus 41.3%. In total, we distributed 602 questionnaires and received 267 useful answers. This leaves us with a total response rate of 44.3%.

Working with questionnaires, a high response rate (RR) is needed to obtain "dependable, valid and reliable results" (Baruch, 1999, p.422). However, having examined 175 different quantitative studies Baruch concludes that there is no agreed norm as to how high it needs to be. In her literature review, Baruch found the average RR to be around 55% - slightly less when respondents were top managers and slightly higher when ordinary employees were used. In our study we used a mix of managers and ordinary employees, but our response rate (44.3%) is still somewhat low. It seems that when the study was officially endorsed by a senior executive (in organisation B), the response rate was higher than when only an administrator or a researcher distributed the questionnaires. We have, however, no reason to think that the somewhat low response rate affected the study negatively since the amount of responses was sufficiently large.

RESULTS

We examined with which frequency different sources were used and received the results presented in table 1. The most frequently used information sources were internal colleagues and the personal computer. Asking for what purpose they used their intranet (multiple answers allowed) we received the result reported in figure 1 below. News (general news and news about the organisation) was the alternative receiving the highest result, followed by Employee information, Staff contact, and Services (i.e., canteen menu, resource booking, time tables and such). These four were selected by more than 50% of the respondents (see figure 1).

	Daily	**Several times weekly**	**Some times weekly**	**Some times monthly**	**Every 6 months**	**More seldom**
Colleagues int.	124	76	42	18	3	4
Own computer	111	84	44	14	4	10
Internet	92	85	46	39	3	2
Intranet	92	70	67	22	11	5
Information system	88	57	41	31	10	40
Saved e-mail	85	78	56	32	7	9
Shared file server	70	59	67	37	10	24
Binder	58	56	62	56	19	16
Periodicals	15	30	66	84	36	36
Meeting	10	34	61	84	43	34
Colleagues ext.	5	37	64	77	28	56
Courses int.	2	2	2	51	102	107
Library	1	7	24	67	47	123
Courses ext.	1	1	2	28	94	141
Conferences	0	6	21	30	67	143

Table 1. The frequency with which a number of information sources were accessed by the respondents (N=267). Shaded cells indicate the highest values in each column

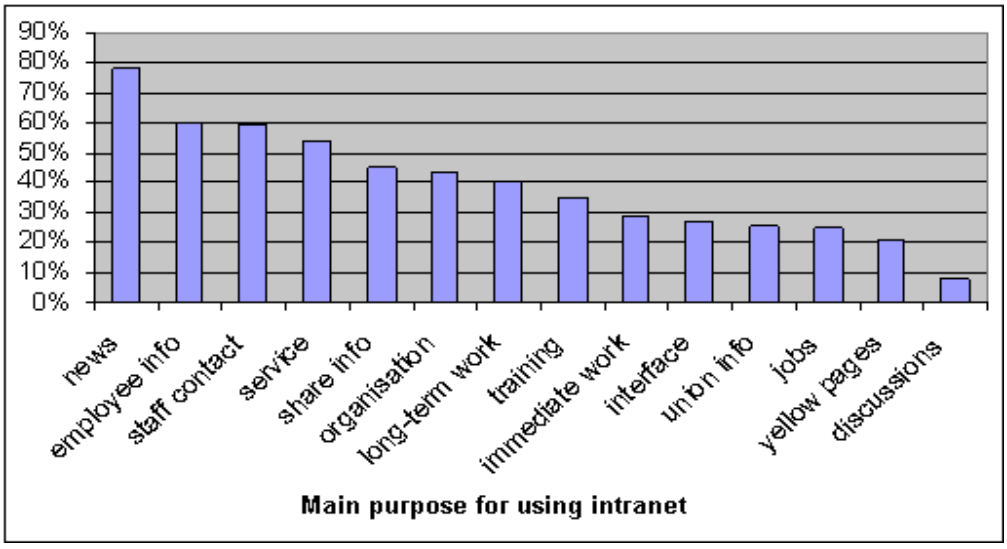

Figure 1. Survey question no. 12: "For what purposes do you use the intranet? Several options possible"

However, as is evident from figure 2, there were great differences between organisations and, except for Long-term work information and Discussions, all these differences were Chi square significant at the 0.05 level.

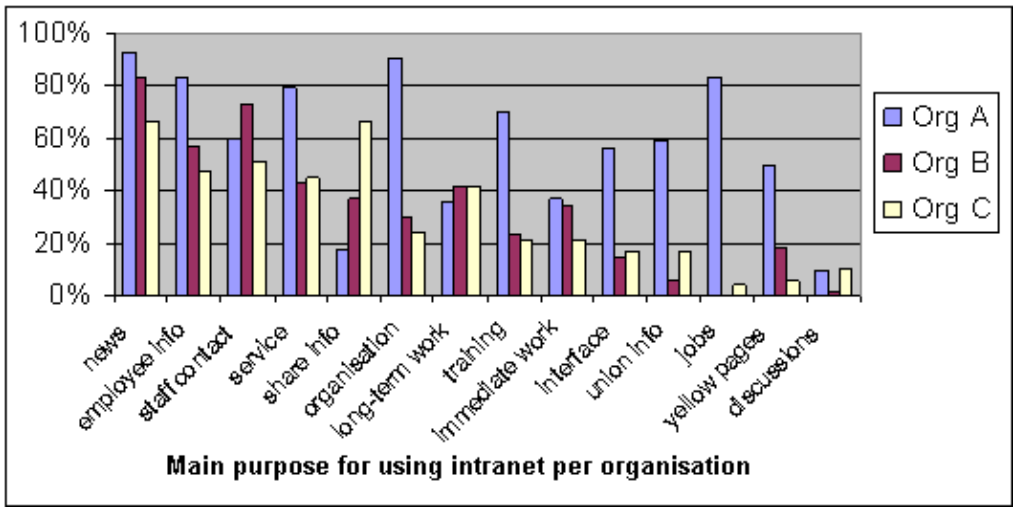

Figure 2. Survey question no. 12 displayer per organisation

Organisation A used their intranet to obtain news (93%), find information about the organisation (90%), look up employee information (84%), and search for internal job offers (84%). Organisation B used their intranet to read news (83%), find staff contact information (73%), and look up employee information (57%). Organisation C, finally, used their intranet primarily to publish information (66%), to read news (66%), and to find staff contact information (51%).

Also between occupational roles we could identify differences as illustrated in figure 3. The differences were significant at the 0.05 level for Employee info, Staff contact, Share info, Jobs, and Yellow pages.

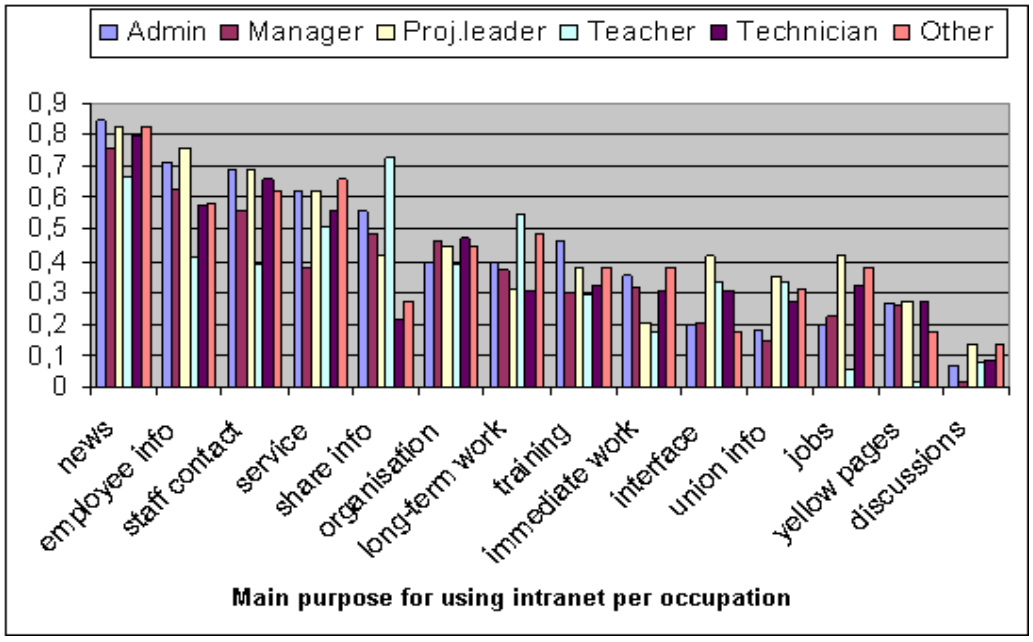

Figure 3. Survey question no. 12 displayed per occupation

The frequency with which the different organisations used the intranet also varied, as seen in figure 4.

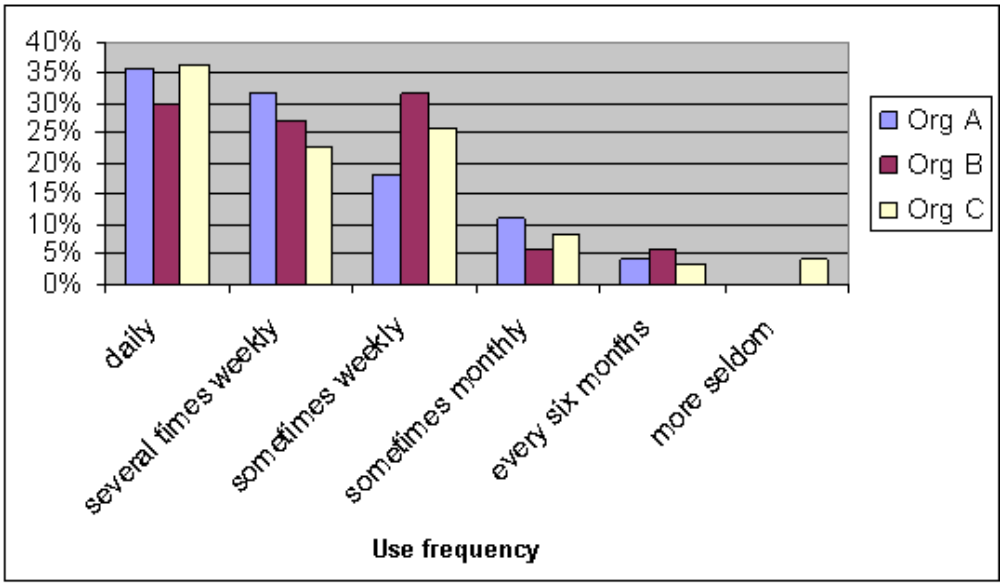

Figure 4. Responses to the survey question: "When you seek information, how often do you use the intranet?"

When asking what the strongest motive was for choosing a certain information source we received the distribution illustrated in figure 5.

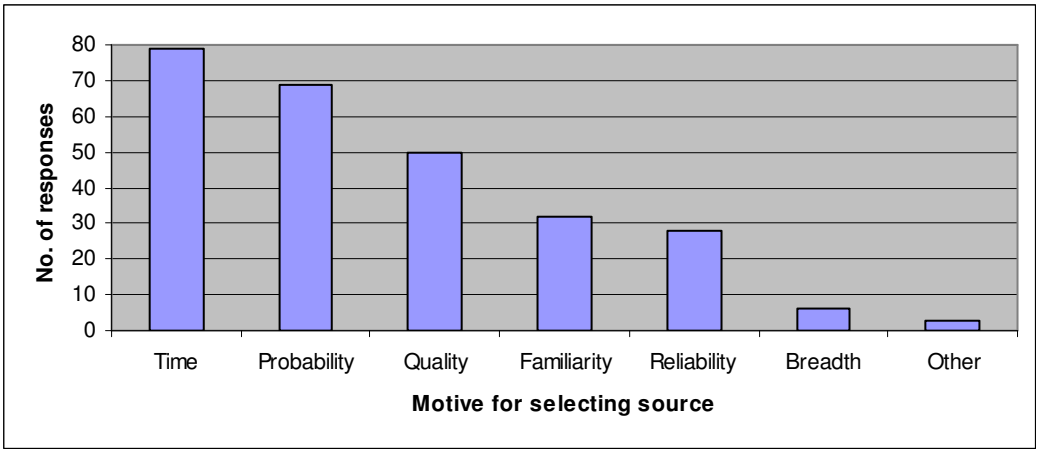

Figure 5. Respondents selecting their strongest motive for choosing an information source: Time (required to reach the information), Probability (of finding the answer), Quality (of the information), Reliability (of the source), Familiarity (with the source), Breadth (of the information selection), and Other.

As is evident from figure 5, *Time required to find information* and *Probability of finding an answer* dominated amongst the motives, whereas *Quality of the information* placed third. The above findings were consistent across organisation, occupational role, age, and level of education, i.e., none of these demographic variables seemed to have any impact on the frequency or on the motive for using an information source. Not even whether or not they had received any training in information seeking had any impact. However, in the case of gender a difference in preferences could be noticed (figure 6) that was found statistically significant (χ^2=12.882, df=6, p=0.045).

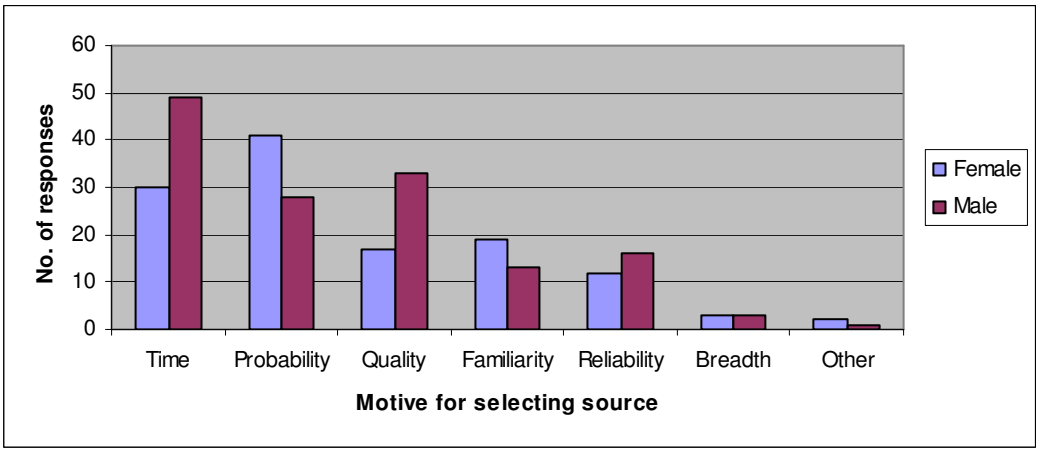

Figure 6. Motives for selecting a particular source reported per gender

In particular we were interested in how the organisational members used their intranet for information seeking and we found major differences regarding how the respondents experienced finding information on their intranet. One view concerns occupational role and this is illustrated in table 2 (χ^2=54.540, df=25, p=0.001).

	1 (very difficult)	2	3	4	5	6 (very easy)
Administrator	6	9	6	11	9	4
Manager	6	11	12	13	11	1
Project leader	3	3	9	11	3	0
Teachers	1	3	10	14	13	10
Technician	10	12	17	16	4	0
Other	2	4	6	13	4	0

Table 2. Responses to the question "How do you experience finding information on the intranet?"

Another statistically significant difference was observed between organisations (χ^2=53.984, df=10, p<0.001). As is obvious from table 3 below, respondents from Organisation B found it more difficult to find information on their intranet.

	1 (very difficult)	2	3	4	5	6 (very easy)
Org. A	4	7	15	33	12	2
Org. B	16	22	13	13	6	0
Org. C	8	13	32	32	26	13

Table 3. Responses to the question "How do you experience finding information on the intranet?" reported per organisation

Respondents from Organisation B also experienced their intranet as having a more incomprehensible structure (χ^2=60.363, df=10, p<0.001). This is shown in table 4.

	1 (Incomprehensible structure)	**2**	**3**	**4**	**5**	**6 (Comprehensible structure)**
Org. A	2	6	22	30	12	1
Org. B	24	17	15	11	1	2
Org. C	11	15	33	34	22	9

Table 4. Responses to the question "How do you experience the organisation of the intranet?" reported per organisation

Whether or not the respondents had received any training in information seeking had no significant impact on the perceived difficulties in finding information on the intranet. We did, however, find a clear correlation between how the respondents experienced the organisation of the intranet and how experienced finding information on the intranet which can be seen as a diagonal in table 5 below.

		The structure of the intranet					
		1	**2**	**3**	**4**	**5**	**6**
Ease of finding information	**1**	22	6	0	0	0	0
	2	12	18	9	2	0	1
	3	2	10	32	14	2	0
	4	1	4	21	43	9	0
	5	0	0	8	13	20	3
	6	0	0	0	3	4	8

Table 5. Combining ease of finding with structure of intranet

When asked how they went about to find information on their intranet the respondents replied according to figure 7.

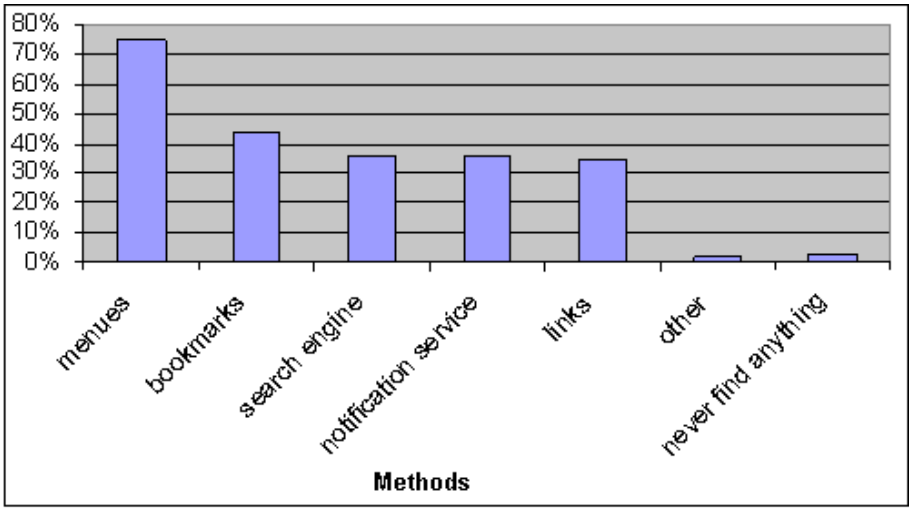

Figure 7. "How do you find information on the intranet?" Multiple answers were allowed.

Except for the use of menus (which consistently scored high in all organisations) and "other" and "never find anything" (which consistently received few answers), there were Chi square significant differences between organisations as indicated in figure 8.

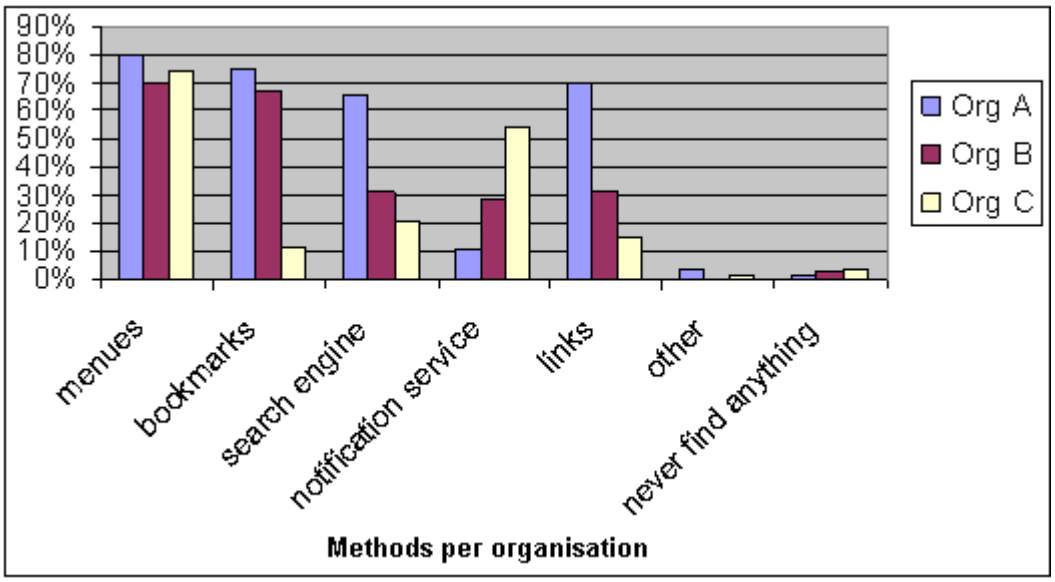

Figure 8. "How do you find information on the intranet?" displayed per organisation

Organisation A uses menus, bookmarks, search engines, and links rather evenly, whereas notification services are used only by a few respondents. Organisation B relies more heavily on menus and bookmarks but also has a fair deal of search engine usage, notification services, and links. Organisation C, finally, uses menus heavily but also notification services are frequently employed. Bookmarks, search engines, and links are used much less.

When examining the use of search engines more closely, we found great variations when looking at occupation. Teachers used search engines much less than any other group (see figure 9), and since all teachers belonged to organisation C this explains the low search engine utilisation in Org C. The difference is significant (χ^2=20.005, df=5, p=0.001) and although the usage percentage for project leaders is high, it is the utilisation amongst teacher that attribute for the difference (i.e., no significance was found when teachers were excluded).

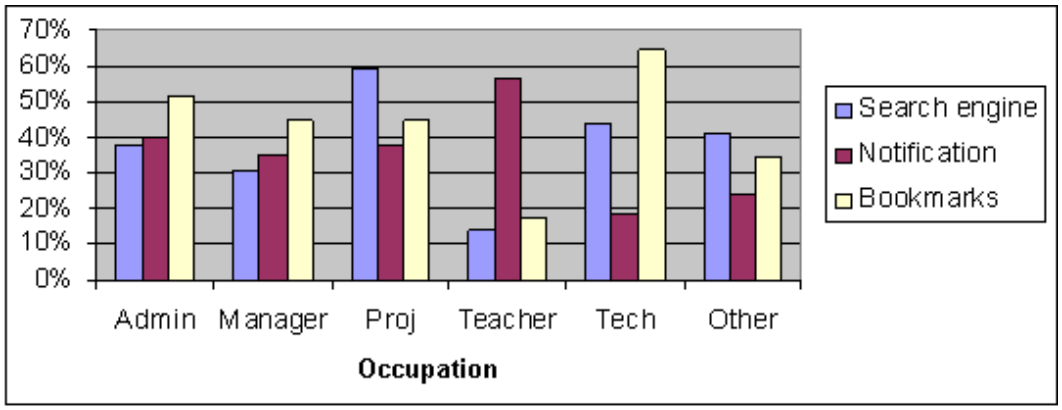

Figure 9. "How do you find information on the intranet?" displayed per occupational role

The use of notification or subscription services also varied between organisations and again teachers appeared to stand out when looking at occupational groups, as seen in figure 9 (χ^2=19.575, df=5, p=0.002). Their usage of notification services

appears to be much higher than for any other group. Again, no significant difference was found when excluding teachers. Also the use of bookmarks is significantly lower amongst teachers (χ^2=26.368, df=5, p<0.001), which figure 9 reveals.

CONCLUSIONS

Having tried to identify reoccurring patterns across our data, we find that reading news about the organisation (which almost everyone did, regardless of organisation or occupation) and participating in online discussions (which almost no-one did, regardless of organisation or occupation) are the only intranet activities where there is a common usage pattern. All other activities varied considerably, which confirms that intranets are heterogeneous information environments highly affected by the organisations that host them. Nonetheless, a number of interesting and novel conclusions can be drawn from this study.

Our study confirms Teevan et al.'s (2004) findings that people prefer menus to search engines; menus were found to be the most frequently used means of finding intranet information, regardless of organisation or occupation. We also extend Teevan et al.'s findings by showing that this is the case not only for students but for organisational employees as well. This is a contribution. In addition, our study adds to Teevan et al.'s insights by showing that there exists a strong correlation between a comprehensible intranet structure and the ease of finding information. This result suggests that work invested in finding the right labels when establishing navigation menus for corporate intranets pays off and thus is an important and worthwhile activity. We also show that the opposite is true - tables 3 and 4 show that Organisation B had problems with the structure of their intranet and, consequently, the members had problem finding information. These are useful implications for practitioners. The relationship between structure and findability could also explain the dip in figure 4, where Organisation B reports less intranet usage on daily basis than the other two organisations. This dissatisfaction with the structure cannot be tied to occupation but seems to go across the entire organisation. The exact nature of these problems remains unknown at this stage and future research - maybe using qualitative methods - may shed a light on these issues.

What may be a surprising result is the fact that the Internet was used as often as the intranet for finding work-related information. One third of the respondents used these sources on a daily basis, while approximately 50% used them some or several times per week. It would otherwise be easy to assume that corporate intranets would contain information more specifically aimed to support organisational work. One possible reason why organisational members go to the public web for information is that intranets typically contain very little work-related information since ordinary employees often are not allowed to provide information directly (Stenmark, 2006). It is therefore interesting to note that organisation C, where employees are allowed to publish information themselves, finds the intranet useful for finding information. The occupational group most successful in finding information - the teachers - belonged to Org C and a suggestion for further research would be to examine the possible relationship between allowing employees to contribute to the intranet and the perceived usefulness of the intranet. Further, most studies of intranet usage have focused on commercial organisations, and it is therefore interesting to note that organisation C is a municipality and not a commercial company. Another suggestion for future research would be to study whether attitudes towards intranet usage differs between firms and non-profit organisations.

Our results also seem to indicate that teachers were more able to find information on the intranet than other groups. Teachers also appeared to use search engines and bookmarks less than other professionals. However, a closer analysis proved this first assumption questionable. The facts that this occupational role only exists in Organisation C and that it accounts for such a large portion of the respondents (49%) make it difficult to draw so clear-cut conclusions. When analysing differences between occupational roles in Organisation C in isolation, there is no longer any significant difference between the groups and it may therefore be the organisations (or their intranets) that differ, rather than teachers (as profession) being unique. More studies are required to resolve this issue and we suggest that a future research task would be to study and compare teachers' information seeking strategies in different organisational settings.

We saw great variances in the demographic variables examined in this study, for example, the educational level differed significantly between the organisations and women typically had higher educational level than men, but this had no impact on the respondents' preferences of sources or on their experiences of the intranet. When stating the reason for choosing a particular source, "Time to reach the information" and "Probability of finding the answer" dominated. This is consistent with the literature that suggests that accessibility is the most dominant factor when choosing which form of information to use (Leckie et al., 1996). In this case, however, our study suggests that this may be a gender issue. The fact that "Probability of finding the answer" only scored second is mainly due to the low rank amongst men. Men either prefer speed to accuracy or presume that the information always will be found, whilst women seem to be less concerned with the quality of the information. The differences between men's and women's preferences are independent of both organisation and occupation. This has, to our knowledge, not been observed earlier and is hence a contribution to the information seeking literature. Having noticed this difference, we tested the sources used on a daily bases (colleagues within the organisation and documents stored on ones own computer) and again found gender-related differences. For documents stored on one's own computer the

difference was significant ($\chi2$=15.524, df=5, p=0.008) whereas the difference for internal colleagues was not ($\chi2$=10.434, df=5, p=0.064). These findings have important practical implications for the design of organisational information seeking solutions. Knowing that there is an unbalanced gender ratio in the organisation (e.g., in Org C, 75% of the work force are women), priorities may be adjusted accordingly.

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