Exploring Users' Experience of the Web

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Abstract

While browsing the Web is a widespread everyday activity there is a shortage of detailed understanding of how users organise their Web usage. In this paper we present results from a qualitative in-depth interview study of how users browse the Web and combine browsing with their other activities. The data are used to explore three particular problems which users have with browsing the Web. Firstly, users have problems managing their favourites, and in particular accessing their favourites through a hierarchical menu. Second, users have problems with combining information across different Web sites - what we call the "meta-task" problem. Third, users have concerns with security and privacy, although these concerns seem to change as users become more experienced with shopping on the Web. We discuss three concepts which address these problems: "home page favourites", "Web clipping" and the "Web card". These concepts are attempts at incremental improvements to the Web without affecting the Web's essential simplicity.

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Introduction

With a phenomenal rate of growth, browsing the Web has risen to mass popularity in less than eight years. Recent surveys suggest that up to 60% of the U.S. population browse the Web on a regular basis - a transformation for an activity which was once the preserve of computer enthusiasts and scientists. Indeed, the end of the "dot com" boom notwithstanding, Internet use is still increasing worldwide, particularly in the non-English speaking world (Mariano, 2001). As the *New York Times* puts it, Web use has moved from the eclectic to the mundane (Harmon, 2001).

Despite this incredible growth, browsing the Web is still a relatively neglected activity in terms of research. While there has been a number of large scale quantitative surveys of Web use [1], only a handful of researchers have looked in-depth at Web browsing as an activity. In particular, people's usability problems with current Web technologies have been little discussed in the literature. Perhaps in part because of this lack of research, the motivations behind many new Web technologies, such as eXtended Markup Language (XML) or public key infrastructures (PKI), are almost entirely technical and are only vaguely connected with the problems of end users. In the research literature there is a distinct lack of basic understanding of users' problems with current Web technologies, and the Internet more generally. In this paper we discuss a study of Web usage that we conducted in part to address this. This study was motivated by a desire to explore end users' experiences and feelings

concerning their use of the Web. That is to say, its aim was to investigate what users themselves say about their use of the Web. In designing this study we were interested in qualitative data that could assist the design of new Web technologies which could make browsing easier or of more value to users.

Qualitative data have so far been a neglected source of information that could assist the design of Web technologies. In a straightforward way, the data here show the value of simply interviewing Web users: asking them how they manage their Web activities and what problems they encounter. In particular, we were interested in Web users' responses to issues such as managing lists of Web sites, security, privacy, ease of use and shopping online. It seemed to us that these areas presented opportunities for new Web technologies that while perhaps not technically radical, would make the Web easier to use.

In this study we used in-depth unstructured interviewing with a relatively small number of Web users. We wished to explore in detail the concerns of our participants in order to use these data to find opportunities for new technologies. We have found techniques such as this one successful in the past - in particular, when looking at document use (Sellen and Harper, 1997), scanner use (Brown, Sellen, and O'Hara, 2000b), mobile professionals (O'Hara et al., 2001) and music enthusiasts (Brown, Geelhoed, and Sellen, 2001). Accordingly, the aim of our methodology was not to prove hypotheses or generalise findings to a larger population, but rather to generate a detailed set of understandings which could be used to suggest potential new technologies or services that people might find valuable. The results that a study such as this one uncovers are very much results designed for design. In this, our approach has many similarities with cultural probes (Gaver and Dunne, 1999), and the use of ethnographic studies in design circles, both approaches which enjoy increasing popularity (Hughes et al., 1995). As with both these approaches there are problems with drawing strong conclusions, or generalising from such in-depth, yet limited, data. However, for the purposes of generating design concepts, greater understanding of a small sample can be more productive than large sample, less detailed investigations.

In this paper, after discussing the results from our interviews, we show how these findings can be used to inspire new design ideas by presenting three concepts for new Web technologies. These three concepts - "home page favourites", "Web clipping", and the "Web card" each address a particular issue that arose in the interviews. "Home page favourites" addresses problems with managing Web site addresses, "Web clipping" addresses problems with combining information across different Web sites, and the "Web card" addresses issues of privacy and security. Although these concepts are technically straightforward, our data suggest that they would add value to a Web user's experience.

Previous Research

With regard to studies of Web usage the literature falls mainly into two groups. The first group consists of large-scale questionnaire studies of Web usage, often conducted by commercial market research firms. These have been a familiar part of Web research since the middle of the 1990s. One of the first was the O'Reilly and Associates survey of Internet usage which predicted the U.S. Web population at 9.7 million (recent figures from December 2000 put that figure at 164 million), and discussed variables such as income, gender and where the Internet was accessed from (NielsenNetRatings, 2000; Smith, 1997). Since that time, many aspect of Web usage and the Web population have been studied using market research methodologies, such as Web pages visited, time spent online, behaviour online, and particularly purchasing behaviour online. Of particular note are the HomeNet trials of Web users conducted by Carnegie Mellon University, which collected data on the use of the Web by new Web using families in Pittsburgh (Kraut et al., 1998). Such studies are aimed at collecting data for very large samples of the population and thus enable researchers to draw generalisable conclusions about Web usage (such as Bruce, 1999; Jones and Vijayasarathy, 1998). They tend to suffer, however, either from lack of connection with people's actual activities (in the case of questionnaire studies) or from lack of a connection with the thoughts and perspectives of users (in the case of collecting online usage data).

For our purposes, however, it is a second body of work that is of more interest - in-depth studies of people's use of the Web. Such studies have looked at the use of Web browsers usually through logging the specific activities of a small set of Web users in terms of which Web pages they visit, which links they click on and so on. In particular, Cockburn and McKenzie (2000) and Byrne et al. (1999) provide useful data on Web browsing. Cockburn and MacKenzie analysed data from seventeen users browsing for 119 days and found that on average 81% of Web pages visited by their users had been visited before. In particular, the top three pages visited by a user were visited much more than any other, constituting 24% of the total pages visited. They also found relatively heavy use of bookmarks (an average of 184 bookmarks per user), although this might have been influenced by the relatively technical nature of their sample who were members of their computer science department. Bryne et al.'s study collected data from a smaller sample of users (10) in more depth, focusing on their browsing behaviour over one day. By videotaping Web browsing, more of the context of individual Web use activities could be recorded, and the authors used these data to produce a taxonomy of Web use activities. While Bryne's classification is useful, it is at a level of detail which tells us little about the end goals of users. So, for example, they make a distinction between "use information" and "locate information" as Web tasks, yet we are told little of what the located information was used for. As we have shown in other work, goals and purpose determine how information is searched for and transformed (Brown, Sellen, and O'Hara, 2000a).

While these studies produce a number of important general findings regarding Web usage, to underline the points made in the introduction, none of them contain much in the way of rich qualitative material on Web use. In particular, we have no data on what Web users themselves think about their Web activities, and the problems that

they themselves report. While obviously such qualitative findings have their own limitations, users' own responses and accounts of behaviour seem to us to be a neglected resource.

Method

In this study we used an in-depth qualitative interviewing technique. Qualitative interviewing has a number of strengths and limitations as a methodology. As Denzin and Lincoln put it, qualitative research of this kind involves "an interpretive, naturalistic approach to its subject matter". This means that qualitative researchers investigate things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them" [2]. In this way its strength is in the rich detail of meanings and practices it produces. One key limitation, however, is that interviews produce accounts of behaviour rather than direct observations. This can produce a problematic gap between description and actual practice (Cicourel, 1964). Yet this concern can be overplayed. Individuals' own descriptions of their own behaviour and feelings are an invaluable part of nearly all social research, from questionnaires to ethnography and the properly conducted qualitative interview has proven to be one of the most powerful social science research techniques in use (Fontana and Frey, 1998). The key issue in using data of this sort is to be aware of its limitations and strengths, to see it as a technique more powerful in terms of *understanding than generalisation*.

For this study participants were selected from the friends and family of staff working at the Hewlett-Packard research lab and factory in the South of England. Although gender, age, profession, socio-economic status, and other demographic factors were not experimentally controlled, we selected a group of interviewees who varied in terms of their age, occupation, gender and experience with the Web (Table 1). All the participants selected had used the Internet for at least three hours a week. Four of the twelve participants had just started shopping on the Internet (less than two purchases in the last year) and the other eight were experienced Internet shoppers (more than two purchases in last year). Participants were also an equal mix of male and female (50% each) with an average age of 29. A range of professions and domestic situations was also represented amongst the participants. Participants also differed in whether they accessed the Internet at home or at work being broadly split between the two (six accessed the Internet mainly at work, five mainly at home and one equally at both). Only one of our home users had a broadband connection, while the others relied on 56K modems. All the work-based participants had broadband Internet connections.

Occupation	Gender	Experienced Internet Shopper?	Age
University Lecturer	Male	No	26
Publicity Manager	Female	Yes	32
Graphics Designer	Male	Yes	23
Student	Male	Yes	21
Programmer	Female	Yes	22
Student	Male	Yes	19
Home Keeper	Female	Yes	58
Office Manager	Female	No	27
Secretary	Female	No	22
University Researcher	Female	Yes	30
Student	Male	No	21
Statistician	Male	Yes	45

Table 1: Summary of study participants.

Interviews were carried out in front of participants' own PCs (either at home or in the office). Lasting around an hour, interviews were centred around the discussion of actual and recent occasions using the Web to help unearth details about people's activities. In particular, since we were at the site where individuals normally used the Web, they could explain to us and show us the particular sites they used, the contents of their favorites lists, and so on. Carrying out the interviews *in situ* also uncovered some of the contextual features of their Web use. That is, for example, it showed the ways in which browsing the Web became interwoven with domestic or work activities, or even the avoidance of these activities. All the participants were asked to have their PC connected to the Internet during the interview.

The interviews themselves were semi-structured. There were set key questions which each participant was asked around their general Internet experience, their experiences of Internet shopping, their experiences of Internet content sites, and their experiences of socialising on the Internet. However, as much as possible in the interviews, we attempted to encourage users to discuss the issues which they felt themselves to be of importance or interest. The interview transcripts were then fully transcribed and coded to uncover analytic themes.

Results

We will discuss the results from the study under four headings, each of these covering a particular aspect of Web browsing experience as reported by our participants.

Incorporating Web browsing into other activities

When discussing the use of technology with our participants we were struck by the fact that users were often unclear about the different terminology used to discuss Internet technology:

I: How often do you use the Web?
P: The Web? I'm never sure what the Web is. Is it when I click on the "N"?

Although there was a wide range of Internet and technology experience amongst those who we interviewed, many users had little knowledge of their computer systems. Indeed, the value of the Internet for these users was that there was little technical knowledge required for it use. There was no need to install particular programs so as to access a particular service - all Web sites were available from the same Web browser. This point is particularly worth emphasising with those who used their computers at work. The installation of software on individuals' machines can be closely limited and controlled by IT support staff. Since Web sites can be accessed using standard software, there is no need to install anything on the host machine. This makes use of Internet services on work computers common, whereas the installing of software on work computers would have made it more problematic.

The ease of use of Web services at work meant that Web browsing was an activity which could be easily incorporated into other activities. Our participants in particular talked about using Web browsing as a way of relaxing or taking a break from work. That is, throughout the day users took a break from their work tasks by using the Internet. Interestingly, this form of Internet browsing, as with the descriptions of Internet browsing we received more generally, tended not to be like near-random "surfing" the Web for pages of interest, but tended to be more focused around particular activities such as checking a bank balance, or checking the prices of a particular item one was interested in buying:

I: How often do you browse the Internet?
P: Not that often. Normally when I'm trying to find a particular piece of information.

Internet use also appeared to fit into the working day as something that became part of individuals' daily routines. For example, some users browsed the Web at set times - say every morning or every lunch time:

I: How often do you go on the Internet?
P: As much as possible! Every time I get bored but generally quickly when I get in to work, lunchtime and then before I go home.

P: I tend to surf first thing in the morning and that's for specific things, it's not just general ... depending what the day's like I do a bit towards the end of the afternoon.

For home users, Internet sessions would often be motivated by a particular activity. That is, a user would decide to do their grocery shopping, try out a Web site that a friend had recommended or complete a bank transfer. Interestingly, going online was rarely described as a leisure activity, but rather as a purposeful way of completing a specific task:

P: There are a lot of times when I have a purpose... most of the time it's purposeful. At the moment I'm doing a lot of travel stuff, I'm going off to Asia for two months so there's a purpose in most things I do but I call that fun as well.

P: I must admit 90% of the time it's for a purpose; I don't tend to surf for fun.

The popular description of Web use as "surfing", then, is perhaps a slightly misleading description of these users' Web usage in that it emphasises the random enjoyable aspects of Web use over the specific tasks which users wished to carry out.

Managing and structuring favourite Web sites

As could be expected, there was a large variety in the type and number of Web pages which users visited. Previous studies have mainly categorised Web pages according to content or context (Attardi, Gulli, and Sebastiani, 1999). Using the interview data from this study, one alternative categorisation is in terms of the frequency of access. In this way Web pages can be roughly structured into four types. Firstly, there were pages which they would check "every morning" - these were the regular sites that the users visited such as news Web sites. A second category was those that users would check more sporadically when they had some time - these might be sites which had content which only changed every week or so. A third category was pages which users visited when need to do something specific, or find out some specific information (such as to purchase a book or consult a train time). The frequency that these sites were visited varied very much according to the task and how frequently a user needed to do that task. Finally, a fourth category was sites which the participants spoke about exploring often coming across them by searching or by accident.

So, for example, one user checked the BBC news Web page and their online bank every day. Then every few days they went to handbag.com (a features Web site aimed at women) to read some articles, or jungle.com to consult prices on new computer equipment. When they specifically needed to buy a CD (which might happen every few months) they would go to Amazon, since they had used it in the past. Finally, when wanting to buy a minidisk player they might search using Google, and find a review on e-opinions.com. Later they also browse around e-opinions and add it to their favourites - in that way a Web site moves from being a "discovered" page to a site they will go back and use when they are looking for specific information. In this

way Web sites would be discovered and sites would move between the different categories, as users' interests changed:

P: I do it every morning ... I check my bank account ... I'm so appalling with money ... I check the BBC everyday, and I check the BBC Bristol, Yahoo to check my (mail) account ... there are lots of other Websites I use, Tottenham Hotspurs which is fantastic. You can actually plot through the year what I've been looking at when I was buying a house you've got all the mortgage companies.

This said, the tracking of Web sites should not be seen as a highly ordered activity. In fact, for most users, management of Web pages was fairly chaotic and problematic. Users generally kept track of sites using one of three methods - they would keep sites in their favourites, search through their browser's history or they would attempt to guess using the company or service's name:

P: There are only a few {Web sites} I put in my favourites. Some of them I don't but they pop up when I put the name in.

While the favourites or bookmarks list in Explorer or Netscape might seem sufficient for tracking Web sites, it has a number of key failings. In terms of managing the list, keeping the list in any sort of order involves considerable effort in moving favourites into individual folders. Without this, the list soon expands to an unmanageable length. The favourites list also only keeps the name of the site in the list, making it difficult to differentiate between different sites quickly. It is also easy to forget to put something into the favourites. Indeed, since putting a site into the favourites increases the list size which one has to search through, there is considerable incentive not to put sites onto the favourites lists. Also, frustratingly for those who use multiple machines, the list of favourites is tied to a particular machine. This means that a Web site can often be in the wrong place in that its address is bookmarked on the wrong machine.

Users worked around these problems in a number of ways. Some users abandoned using favourites altogether and instead resorted to using the history mechanism of their browser. By typing in the name of the site, the history matching mechanism would usually find the Web site address they were looking for. Other users would attempt to guess Web sites from memory - usually by putting "www" and .com before and after a company name, although this obviously did not work very well for non-company sites. Ironically, the way that the favourites mechanisms worked encouraged users to bookmark the sites that they visited the most. But these are the very sites that users are least likely to forget. The favourites mechanism fails to help users track sites which they occasionally visit, such as when looking for a specific item. One participant even resorted to writing down in a small book the Web sites that she wanted to remember since she found this mechanism more reliable and portable than using the favourites mechanism in Explorer.

As with managing the current list of Web sites, finding out about new Web sites was a fairly haphazard activity for most users. Major sources of finding out about new Web sites were the press (magazines and newspapers), friends and search engines. However, despite the attempts of search engines such as Yahoo! or Google, searching for Web sites specifically is still problematic. So, for example, to find a garden plant retailer in the U.K. is not something which is straightforward on the Internet, even

with human indexed systems such as Yahoo! This suggests that this is an area that could be approached more systematically with technology. Specifically, systems could watch a user's Web browsing so as to suggest new Web sites that they could be interested in. This is an approach taken in the Recer system (Chalmers, 2000). As a collaborative filtering problem this is fairly straightforward, particularly because the preference data is already recorded online in the form of Web searching histories.

The 'meta task' problem

A broader problem is that the tasks which our participants wanted to carry out usually were at a level above that of a specific Web site. For example, one participant wanted to plan a trip to France from England with his car. This involved going to a number of different Web sites. Firstly, he looked at the different costs of crossing over the channel from England to France. Then he worked out the distances between the different ferry ports and the town he wanted to visit. Then he worked out how much petrol it would cost using his knowledge of current French petrol prices. Adding all these bits of information together he then worked out the cheapest and fastest way to get him and his car to France. This was not a straightforward task: it involved visiting six different Web sites, consulting a car atlas and a number of travel brochures, taking notes on all this information and combining it to get the information needed.

Many of the tasks which users spoke about required the browsing of numerous Web sites and combining the information. Perhaps most obviously was the way that shopping on the Internet spanned across multiple Web sites. Not only do prices need to be compared across Web sites, but the information on different Web sites varies in quality. So, for example, Amazon excels in terms of its user reviews, but CD-NOW has more music samples available. In the past, tasks such as these would be carried out by expert intermediaries. In the case of travel, for example, a travel agent would collect this information from different sources and combine it. This suggests opportunities for electronic intermediaries which can automatically pull information from different sources and work out the different possible solutions. For example, one could image an "A-to-B" Web site where one could put in two different towns and the Web site (or application) would work out the possible routes.

While this is a fairly straightforward example it does demonstrate how users' tasks often sit at a level above that of the individual Web site. The first manifestation of Web sites to address this problem is the idea of a price comparison Web site which will search for the prices of a given product. However many of these Web sites currently fail to integrate the purchase into the actual Web site (and perhaps lose what should be the main profit source for an intermediary). A travel agent, for example, does not want you to go direct to the airline since they lose their commission. Price comparisons, however, are only a specific example of this more general problem with individuals' tasks and Web sites.

Problems with Internet shopping: trust and risk

These observations move us on to consider our participants' experience of shopping online. Although an increasingly common activity, as with general Web browsing, Internet shopping suffers too from poor usability of its Web sites (see, for example Nielsen, 2000 and Nielsen, 2001). Furthermore, the shopping task is often one which

exists at a 'meta-level' rather than at the level of individual shops or sites as described above. Despite these problems, however, Internet shopping does offer some convenient advantages. One part of this is that shopping online cuts down on the travel time involved in visiting a physical shop. The elimination of travel time also means that shopping can be carried out at times when shopping would normally be impractical or when bricks and mortar shops are closed. Of course, while the "time to shop" is reduced, the time until actually obtaining the goods is increased since the goods must be delivered. Moreover, for many goods, not being able to view and handle the actual product also limits the shopping experience. We also found that the issue of returning goods was something which is more involved online that offline. The following comments reflect these points of view:

I: What makes you shop over the Internet?
P: Complete laziness ... I couldn't be bothered to get on the bus and carry the shopping back so I get someone else to do it.

I: Have you ever bought any clothes {online}?
P: No, it doesn't appeal to me. I actually like to see what I'm buying.

I: Why do you shop on the Internet?
P: Time.

Along with these factors, Internet shopping offers an important price advantage. Internet retailers can sell items at a lower cost since they have lower overheads (at least in theory). This means that for some items, online shopping - as with mail order shopping - will attract consumers for whom cost is the most important factor. However, cost, as with the other factors described above, can influence individual consumers in different ways. For some of the people we interviewed, searching for the cheapest price was something of an end in itself and they would go to the extent of checking with numerous Web sites and online stores until they made a purchase:

P: Sometimes you get a lot more choice, and it's cheaper. With AOL and Amazon competing and they're a lot cheaper than what you'd buy in the shop anyway.

Other users were relatively cost insensitive and instead would stick with a Web site that they knew and had used before. This is similar to behaviour with conventional shopping (Antonides and Raaij, 1998). Along with price, Internet retailers can also offer the ability to purchase items which are rare or of a specialist interest. Speciality items (such as, for example, a particular type of football scarf) might be hard to track down normally but on the Web they can be ordered and even shipped from overseas. Internet shopping is thus a particularly good medium for specialist purchases:

P: I bought my husband a gift voucher for Christmas for one of those off-road-4by4 things ... it was more interesting to do it on the net ... it was quicker.

P: Look at this gun (produces very real looking gun). I bought this from Hong Kong. It's an air pistol, but it looks real - I got that online - the man who runs the air pistol store told me about the Web site, and I went online and it arrived about two weeks later.

However, Internet shopping does present some problems with regard to issues of trust and privacy. These have been established as major challenges for Internet shopping (Cheskin-Research and Sapient, 1999). One important aspect of trust online is the nature of risk in terms of actual damage, spam e-mail, financial or time cost, and perceived loss of privacy (Nikander and Karvonen, 2000). The participants we spoke to who had not used the Internet for shopping or who had just started to use it were very cautious about risk online. They talked about how they were perhaps "stupid" for shopping online and often made reference to media reports of fraud. Many of the issues regarding security online are highly technical, and these individuals explained that they found it difficult to know if the Internet or if particular sites were secure. Yet despite these hesitations, experiences with friends and colleagues had encouraged them to show an interest in shopping online and to consider experimenting with making some purchases to "see what happens":

P: I don't actually buy things online but I do use all the shopping sites. I'd find out everything I need to know from the Web and then I'll actually phone up or do it in person, largely because I'm not used to having my card number floating about [...] I think it's probably because no one has ever sat down and explained to me the type of safety precautions they have. The other day Dan explained to me about all the safety precautions sites like Amazon have which no one had told me about before {...} You hear all these horror stories. I would certainly think about giving online shopping a go in the next couple of weeks.

The more experienced Internet shoppers still shared these hesitations about shopping online. However, these hesitations did not appear to have prevented them from shopping online:

P: I am a bit wary of giving my credit card number away ... but for instance (buying online) the hovercraft ticket was so beneficial for me that I took the chance.

P: Someone might steal my details or what proof have I got, I haven't physically got a ticket in my hand, I haven't physically got a receipt in my hand, what is there to saw when I get to the airport my tickets don't arrive, you know how do I get hold of that person to say you've taken the money, it's that sort of detachment from you and the service provider ... But having said that I do book my flights over the Internet because it's cheaper.

P: I don't feel too bad about it (security online), I did when I first started shopping on the Net. I was very frightened and I think I bought something once and I thought oh no I'm going to get masses of other people's bills on my cards and things. But no, I've never had a problem yet.

These participants were attempting to make judgements regarding the risks involved in their actions. While media reports obviously have some effect on these judgements, the views of friends and colleagues are likely to rank higher, and personal experience highest of all. This is a finding confirmed by studies of perceptions of risk with new technology *per se* (Slovic, 2000). So if individuals use the Internet for shopping and find that they experience no immediate problems, then their judgement of the risk of online shopping decreases. This causes the other factors described above - such as convenience and cost - to dominate their use decisions.

This judgement of risk appears to be generally attached to the use of a new media or technology such as shopping on the Internet. For example, participants compared having their credit card details stored (as it were) in their wallet to having these details stored on their computer. A physical wallet is something which individuals know about and can control - a computer wallet is something unknown and not as easily controlled. So when participants were asked about their computer storing credit card details and such, there was considerable hesitation:

I: How would you feel if your computer stored your personal information and gave it out to the Web sites that asked for it?
P: I would probably be a little concerned because I've got four sons ... just in case they were able to access it and do things that I wouldn't want them to do.

An important question to ask at this point about this fear of risk, is: "Risk of what?" The two main forms of risk on the Internet are risk of damage and risk of loss of privacy. The potential of damage is fairly straightforward. It can take the form of credit card fraud, no delivery of goods, or spam messages sent to your e-mail address. While direct credit card fraud is covered by most cards, gaining a refund can take considerable time and effort. When we discussed the problems of security online it was these "damage" items which seemed to be the most immediately obvious to the individuals we interviewed:

P: I normally tick the box because I don't want things passed on ... I cannot stand junk mail.

However, on encouragement, our interviewees also admitted that they were worried about their privacy, although this was often described in very general terms:

P: I only tend to give out my personal details when I have to ... what really annoys me is they all expect a phone number ... why on earth should I give them a phone number when they're only dealing with me over the net?

P: I think we should be very worried about who's got access to your information. I've no doubt there is in existence a Big Brother ... there's not much you can do to stop it unfortunately ... it's quite worrying to think how much information about me is on the Web, your shopping habits, what food you eat, what cigarettes you buy.

I: How do you feel about companies tracking what you do on the Internet?
P: It's bit like Big Brother, I don't really like it.
I: But it doesn't stop you from doing it?
P: No, because if I really wanted to do something I would brush it aside slightly. I don't know anything that I have to do, perhaps if I did it would be different, but it's just the general uncomfortableness of why should people know?

Indeed, while individuals would describe a general fear of "Big Brother", or having their privacy infringed, they were still perfectly willing to give their personal details out so long as there was some advantage to this. One way we explored the issue of privacy, and more generally trust, was to bring up the topic of supermarket loyalty cards. These cards are supplied by a number of supermarkets, and allow an owner a small discount on their shopping in exchange for using their card every time they

shop. The use of the loyalty card can then be used by the supermarket to link individuals with specific purchases, and to use statistical techniques to learn about their customers and their behaviour. In a sense therefore, in using a loyalty card a shopper exchanges their privacy for a discount on their shopping. We brought up the topic of loyalty cards and asked our participants to compare how they used that card to how they felt about their online shopping, and the use of their shopping data.

All of the participants (except one) had some sort of loyalty card which they used when making purchases in conventional stores. Even those who had previously complained about their privacy appeared happy to have their shopping tracked with a loyalty card:

I: What about loyalty cards like the Boots one where you get points?
P: Oh I get lots of them, you name it I've got it, BP, Argos, Boots, Sainsbury's, Tesco's ...
I: Do you mind that the shop can track what you're buying?
P: Yes, but I want freebies, every single person has a couple of store loyalty cards so it's going to happen anyway, there's not much you can do about it ... in this world we're tracked by CCTV cameras ... so its going to happen anyway.

P: Yes, because a store card is only food isn't it? I mean what information are they going to get out of what food I buy?

P: Overall the discounts you get is enough to give them that information.

This perhaps presents something of a paradox in that while our participants seemed to be willing to volunteer information, they still had general worries about privacy. In turn, they were also willing to lose that privacy for very little gain. There are a number of possible solutions to this paradox. Firstly, it may be that the issue of control is important here. As has been shown in a number of other studies of privacy, controlling visibility is an important issue for users, even if they do not themselves even use that privacy protection (Bellotti and Sellen, 1993). With the Internet it is possible that users perceive that they have very little control over their details and this contributes to their concerns. Secondly, it is possible that the details held with loyalty cards (such as supermarket purchases) are considered to be so trivial to be unimportant. More personal details which are transmitted over the Internet (such as bank statements) may cause more concern.

A more complex answer may also be that participants feel that they should be concerned about these issues - in terms of appearing as reasonable individuals - although in practice these issues may not actually influence their practice. This is perhaps similar to the "hidden voting" effect in surveys of voting intention, where individuals hide their true voting preferences and instead say what they think is who they "should be" voting for. In this case, it takes the form of individuals' feeling that they should be concerned about privacy, yet they would not actually pay money or put effort into protecting their privacy. Investigating this issue is difficult since methodologies which are based around declared rather than actual activity are likely to all suffer from this problem.

Design Implications

As mentioned in the introduction, this study was an explorative one which was aimed at generating data to assist in the design of new Web technologies. These findings have been used to generate three new concepts for technologies to assist users on the Web. The three concepts we have generated and are currently implementing are: the"home page favourites", "Web clipping" and the "Web card".

Home page favourites

This concept is based around creating a new home page for a user from their favourites list. In the application we have built, a user's favourite Web pages are scanned and converted into a Web page. For each item in the favourites list, a thumbnail of that Web page is inserted, along with the Web page name. This page can then be used as the user's "home page" - the first page which appears when the user runs their browser. To access each favourite the user then needs only click on either the name or the thumbnail of the Web page. An example page is shown in Figure 2, with Figure 1 showing the current favourite display in Microsoft Internet Explorer.

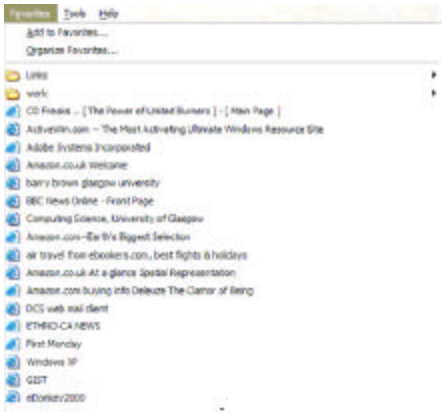

Figure 1: Favourites displayed in Microsoft Explorer as a menu

Displaying the user's favourites in this way is an attempt to address some of the difficulties which users have in managing and accessing their favourites. The system developed displays a larger thumbnail of the Web page (using a tool tip) when the mouse pauses over a particular page. By showing thumbnails of each page a user is able to find a page from their favourites more easily through recognising the Web page (see, for example, Woodruff et al., 2001, on thumbnails of Web pages). Using the two dimensions of layout available on a page also allows the favourites to be displayed over a larger area.

Figure 2: Favourites displayed using "home page favourites" with thumbnails of each Web page. The mouse is over the apple thumbnail and a preview of the Web page is displayed.

Using the whole screen rather than just a list contained in a menu gives two advantages to users. Firstly, there is more space taken up by the favourites on screen, enabling a longer list of favourites without scrolling. Indeed, although we are currently experimenting with the optimum size of icon, it is possible to see over double the amount of favourites available in a menu list without scrolling, along with the thumbnails for each page. A second advantage is that users can remember the position of particular favourites on the page. For example, a user can remember that a favourite is somewhere at the bottom right of the page and start looking there on the page. Placing the favourites page as the first page which is loaded when a browser is opened also speeds up getting to a particular favourite since the need to access the favourites menu after opening the browser is skipped. A user need only click on the favourite they need as soon as it is displayed.

Although this is an implementation of an extremely simple idea, this is not to discount the value it could have for users. The comments of the users we interviewed suggests that allowing users to quickly access their favourites is a small yet important way to improve the Web experience [3]. We are developing this system further to allow for the rearranging of favourites from the home page, so that the home page completely replaces the use of the favourites menu.

Web clipping

The second concept addresses some of the issues which arise from the "meta task problem" discussed above. The meta task problem arises from the information which is needed by users being distributed across multiple Web sites and Web pages. In this system, a user can clip a Web page to an area of storage by simply pressing a button on their Web browser's taskbar. A copy of the Web page is quickly recovered from the browser and saved, allowing the user to quickly clip a number of pages without having to wait. Moreover, the Web clipping feature we are building allows only a section of a Web page to be selected and stored. In this way a user can clip the section of a Web page that they are interested in (say a price, or some details which they will need to refer to later). The system then allows all the information that has been clipped to be browsed together so as to compare and extract the information needed.

This functionality is already available in a limited form on the Macintosh version of Internet Explorer (where it is called "Web scrapbooks"). Web pages can also be saved to disk from Netscape or the Windows version of Internet Explorer. However, both these techniques have their limitations and do not directly address the meta task problem. When using the Macintosh Internet Explorer's "Web scrapbook" only one Web page can be viewed at a time, making it difficult to compare information between pages. On the Windows platform, when saving a Web pages the page has to be named, and the saving of the page can take a considerable amount of time.

Although Web clipping is a trivial application technically, and is certainly straightforward to implement, we believe that it addresses a number of the problems discussed by our users. By allowing for different information to be quickly clipped, information can be compared at a later date side by side. Current methods of clipping information from Web pages involve either writing information on paper, or using the clipboard to copy and paste details from Web pages, and have their own attendant problems. In particular, copying and pasting often eliminates specific formatting of Web pages, and necessitates keeping a document open for the information to be collected in. Using a feature such as the one described means simply that it is much easier to collect Web-based information.

The Web card

A final concept is aimed at addressing some of the concerns that the users we spoke to had with regard to their security online and specifically their perceptions of risk. It is a physical card which is sent to customers of a particular online retailer on request, usually if that user requests additional security. While looking like a credit or store card, this card allows a user to shop online only at the one retailer, and only in combination with the ID and password for a particular user account. To make a online purchase the user needs to supply a number from the Web card, their ID and their password.

Again, although while this idea may seem trivial technically, it addresses a number of the concerns which users volunteered in the interviews. Most prominently, the system allows users to judge the risk associated with online purchases. That is, users are used to the use of cards to make purchases. Yet, purchasing online adds a level of technical detail which makes it difficult for users to judge the risks involved in purchasing

online, and this in turn leads to uncertainty and hesitancy about shopping online. By having a physical card users can judge the risk involved through analogy with physical credit cards. Moreover, since the card is tied to a particular online account, the risks involved in theft or losing the card are much reduced since the ID and password would also have to be stolen. Of course, this concept does little to directly improve online security technically, but that is not the card's role. Instead, the Web card allows users to reason about the risk involved shopping online and to feel more secure in their ownership of a physical card.

There are a number of similarities between the Web card and the store loyalty cards which we discussed with the study participants. In both cases it is through a physical artefact that a retailer attempts to make a connection with their customer. As customers are comfortable with having their shopping purchases recorded with loyalty cards, by analogy it is likely that they will be more comfortable with having their purchases recorded online. In this way some of the privacy concerns of shopping online may be mitigated through the issuing of the Web card. Again, there is an attempt to allow users to reason about risk and privacy using analogies with existing products (such as loyalty cards) which they are familiar with.

Conclusion

In this paper we have reviewed some of the practices surrounding the use of the Internet for a range of different activities. These different activities all underline the popularity of the Internet and how it is moving beyond enthusiasts into use by the general population. Indeed, technological concern in the online world are now more general public concerns. There is no denying, for example, that the sharing of music using Napster was a worldwide public event rather than a technological one. Qualitative interviews here have been used in this paper to generate understandings about how users organise their use of the Web. We have used the data from the interviews to look at how the Web has began to fit into individuals' lives both in terms of their work and their leisure. Obviously, with results such as these it is possible that there is a cultural bias. We have also interviewed a relatively small group of individuals. However, the aim of this study was to explore the details of Web use with these users, rather than draw strong general conclusions about Web use. As an exploratory study the results should thus be taken as a start to understanding Web use in depth.

That said, it is understandings of this kind that are specifically of use for generating new concepts. This is demonstrated by the three concepts discussed above. Indeed, the three concepts which we described, favourites home page, Web clipping, and the Web card, address problems and concerns which users directly expressed. Their development is grounded in user experiences rather than technical advancement. We would suggest that this improves the chances of these concepts improving users' experiences rather than simply being technology for technology's sake. Moreover, these concepts are based around very simple innovations. It is the very simplicity of

the Web that has been part of its success, and any successful innovation must follow that simplicity. Our aim therefore has not been to build large systems which add a level of complexity. As the Web is becoming increasingly prevalent, we believe it will be simple concepts such as these which are likely to bring the greatest benefit to users.

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Notes

1. For example, Nielsen Net Ratings (http://www.nielsen-netratings.com/) regularly survey Web users.

2. Denzing and Lincoln, 1994, p. 7.

3. Although this system is currently in development, it can be downloaded from http://www.dcs.gla.ac.uk/~barry/homefavourites/

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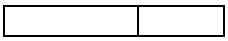

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