

At Home and with Computer Access – Why and Where People Use Cell Phones to Access the Internet

Stina Nylander

Swedish Institute of Computer Science
Box 1263, 16429 Kista, Sweden
stina.nylander@sics.se

Terés Lundquist

Luleå University of Technology
971 87 Luleå
teres.lundquist@gmail.com

Andreas Brännström

Umeå University
901 87 Umeå
c02abm@cs.umu.se

ABSTRACT

We conducted a diary and interview study to investigate where and why people use cell phones to access the Internet. In more than 50% of the cases, our participants chose a phone even though they had access to a computer, and the most frequent location for cell phone Internet access was the home.

Author Keywords

Cell phones, mobile Internet use, location, motivation, user study.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Internet enabled cell phones provide opportunities to access the Web and other Internet services in places and situations which were never possible using a traditional desktop computer. We have conducted a diary and interview study to investigate the situations in which Internet use from cell phones takes place. It turned out that phones were not only used for accessing the Internet in situations where computers are not available, but in all kinds of situations.

Nineteen participants that frequently accessed the Internet from cell phones kept a diary of their mobile Internet use during seven days and were then interviewed. During that time, 260 occurrences were recorded. In this study we only looked at Internet access from cell phones. Laptops that were carried around were not considered.

Our findings show that even though “no access to a computer” was a frequent reason for accessing the Internet from a cell phone, 51% of the occurrences in the diary data took place in contexts where the participants had access to a computer. The most frequent location for Internet access from a cell phone was “at home”.

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CHI 2009, April 4–9, 2009, Boston, MA, USA.

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RELATED WORK

Lee et al. [2] have studied use contexts for the mobile Internet and their relation to types of services. However, they did not investigate the influence of users’ motivation on their mobile Internet use. We believe that it is important to investigate the motivation when examining user behavior. We have also chosen to analyze the locations for mobile Internet use in a deeper way than Lee et al. since user motivation vary between locations in our material. For example, Lee et al. only analyzed indoor and private locations, they did not look separately at the home. In our material the home turned out to be an important location. They did not look at to what extent their participants had access to a computer at the time of the mobile Internet access either. Our participants often chose the phone even though they had access to a computer.

Sohn et al. [4] have investigated people’s information needs when mobile, and how they met those needs. They found that people that had access to mobile Internet used it to meet many of their information needs, and those who did not have access to mobile Internet believed that it would have solved many of their information needs. Our material adds to this picture by showing that cell phone Internet access also is used to meet information needs in many situations that are not mobile.

METHOD

The data for this study was collected using two methods. First, participants kept a diary of their Internet access from their cell phones for seven days, and then they were interviewed about their Internet habits in general and that week in particular.

The diary method was chosen since it is difficult to conduct direct observation of an activity such as mobile Internet access because it takes place in various places and times. It is also complicated to observe what a participant is doing on a cell phone without interfering with their tasks. We sent a pre-printed paper log that had a few examples filled in to show them what kind of data we desired to the participants by mail. When participants could be expected to have received the paper log we called them to confirm that they had received it and to clarify any problems. At that point, a time for the interview was scheduled. Participants were provided with preprinted envelopes and stamps to return the log to the authors.

The participants were asked to log every session of Internet access from a cell phone during seven days. The paper log contained fields for time stamp and duration, web page or application, location, surrounding distraction, concurrent activity, purpose, why the phone was chosen and not a computer, and if any problems occurred during the session.

The interviews were semi-structured and conducted to follow up on the diaries. Questions were asked about the context information users had given in the diaries, together with more general questions about their Internet habits. Since the participants were recruited over the Web, the geographic spread made it necessary to conduct phone interviews. The interviews were about 30 minutes long.

The analysis of both the data from the diaries and the material from the interviews consisted of categorising the raw data guided by grounded theory [5]. We looked for repeating themes as well as conflicting ones and did not start out with a set of fixed categories.

The participants

Our participants were recruited through a small web survey that was published on web forums with mobile technology themes, and popular blogs. The survey was also distributed to friends and colleagues of the authors, and through a large mailing list on mobile web surfing. The criteria for selecting participants to the study were that they use the Internet frequently and regularly from a cell phone. We wanted experienced and frequent users in our study to avoid problems with scarce data and learning effects. Nineteen participants were recruited for the study, seven women and twelve men with the average age of 30 years (max 55, min 20, mean 28).

Two of the participants could only report the make of their phone but not the model. Of the 19 participants, seven had phones with a touch screen, and of them two participants had hacked iphones (the iphone was not yet released in Sweden at the time of the study). The majority of the participants were working, two were students and one was unemployed.

Anne and Tom are two typical though distinct examples of our participants. Anne is 45 years old, works with telecom research and her work pays for her cell phone. She has a SE K800i cell phone and surfed 15 times from her phone during the study. She mostly used her phone for web access during early mornings, and late evenings, and she mainly accessed news pages and the pages of her children's sports teams. Tom is 35 years old, works as a truck driver and pays for his cell phone himself. He has a SE P1i cell phone and surfed 12 times during the study. He mostly used his phone to access news pages, map pages (to find customers' addresses), and his Internet bank during the day.

Bob was not a typical participant but the super surfer of our study. He is 55 years old, unemployed and pays for his cell phone himself. He has a Nokia N95 which he only uses for web surfing (he has another cell phone for calling), and he

managed to surf an amazing 40 times during the study! He mostly used his phone to access the web before lunch and he mainly accessed web email and news sites.

BASIC DATA

260 occurrences of Internet access from cell phones were recorded in the diaries: in average 13.6 per participant (max 40, min 4). Each participant surfed in average 1.9 occurrences per day, (max 9, min 0). 84 different Web sites were visited, and 5 online java applications were used. The average duration for a session was 12.6 minutes (max 180 min, min 0.5 min). Fifteen sessions were reported to last for 60 minutes or longer.

ACCESS TO COMPUTER

Many cases of Internet access from cell phone during the study of course took place because participants did not have access to a computer. However, in 51% of the occurrences where they used phones to access the Web, they also had access to a computer! The most common reasons stated for choosing the phone even though there was a computer available were speed and convenience (24%). This explanation was particularly common in cases where mobile Internet access took place at home, where all participants had access to a computer (but one participant had malfunctioning broadband connection during the study, see table 1). Participants found it quicker and easier to perform certain tasks on the phone since they had the phone readily available, and often had the page they wanted to access bookmarked. That way they needed little time and few key presses to get what they wanted. In many cases participants reported that if they would have used a computer they would have had to take it out of a bag and start it up, which was considered to cumbersome and slow.

The cell phone was more convenient since I was in the kitchen. (T8)

A special case of convenience in our data was laziness (11%), which participants mainly stated as a reason for choosing the phone over the computer when they were at home. Our participants reported that they used the cell phone to access the Internet because they did not have the energy to get up from the TV couch, or because they did not feel like getting out of bed.

Didn't have the energy to go downstairs to the computer. (T3)

The phone also fit better with other concurrent activities such as household chores, brushing teeth, feeding children, watching TV.

In 3% of the occurrences, participants stated that they chose the phone over the computer because they specifically wanted to use the phone. In some of the occurrences this had to do with data stored in the phone, such as wanting to send a picture taken with the phone camera or storing a shopping list in the phone to bring it to the store. In other

Reason for cell phone	
No available computer	49%
Convenience	24%
Laziness	11%
Other	5%
Internet not working	5%
Wanted to use phone	3%
Restrictions at work	2%
Computer occupied	1%
sum	100%

Table 1. Reasons for choosing a cell phone to access the Internet.

Location	
Home	31%
Outdoors	23%
In transit	23%
Indoors	16%
Work	8%
sum	100%

Table 2. Locations for Internet access from cell phone. No overlap between categories.

Purpose	ratio
reading news	20%
passing time	19%
checking email	17%
situated info search	15%
general info search	15%
transactions	6%
other	6%
troubleshooting	2%
	100%

Table 3. Purpose for accessing the Internet from cell phone.

occurrences, participants simply reported that it was more fun to use the phone than the computer.

Wanted to see how the blog looked in the phone. (A1)

As described above, our participants often chose their cell phone to access the Internet even though they had access to a networked computer. This suggests that cell phones offer advantages such as always being close and being quick to connect to the Internet, that outweigh their small bandwidth and tiny screen. In our material, this seems to be especially important in private situations such as the home which will be discussed below.

LOCATION

Our participants logged the location of their mobile internet access in the diaries. The classification is shown in table 2.

Much to our surprise, the most frequent location for mobile Internet access in this study turned out to be *at home* (31%) even though all participants had a computer with Internet connection in their home. This suggests that, for our participants, the cell phone has its own role as a device for Internet access. It is not only used in situations where it is impossible to get computer access. The mobile world extends well into the home. This is in line with the results of O'Hara et al. about mobile video who found it common for their participants to watch video on mobile devices at home [3]. However, they did not report how common the video consumption in the home was compared to other locations. The most common purposes for cell phone Internet access in the home were reading news and checking email. Interesting to note is that passing time was a less common purpose at home (11%) than in the material as a whole (see table 3 for motivation details).

23% of the mobile internet access during the study took place *outdoors*. The outdoors category differs from the other location categories in that the most common purpose for mobile internet use was situated information search. This was probably due to the fact that situations such as looking for a restaurant while walking in a city and walking

(or running) to bus stops or train stations were classified as outdoors situations. We also note that passing time and checking email was not as common as in other locations. It is worth mentioning that this study was conducted in Sweden in May, when the weather is fairly warm. If the study would have been carried out during the winter, participants would probably have used their cell phones less outdoors due to the cold.

Not surprisingly, *in transit* was a common situation for mobile Internet access (23%). Our participants used the Internet from their cell phones in buses, subways, trains, tramways, taxis and cars (even while driving). The most common purposes for in transit situations were reading news (27%), checking email (22%), and passing time (22%). Both types of information search were less common in transit than as a whole (8%) which is interesting. Our participants did not seem to search very much for information that had to do with their traveling or their destination while in transit.

The *indoors* category (19%) contains occurrences of mobile web access that took place in indoors locations that was not the participants home or workplace, such as in stores, cafes, train stations, and at friends. Checking email and passing time were the main purposes for the indoors mobile Internet access, while news reading was not as frequent as in the other locations.

Our participants rarely used their phones for internet access at *work* during the study; only 8% (20 occurrences) were reported in the diaries and they mostly concerned checking email. This surprised the authors, since work is an environment that in many aspects is similar to the home (indoors, we spend a lot of time there, many participants had access to computers at work) which was the most frequent environment for mobile Internet access. We did have participants that did not have computer access at work, for example a truck driver and a nurse, and they used their phones for Internet access. Two possible reasons for the low frequency of mobile internet access at work are the fact that people have little time during work hours, and that

many of our participants spend their working time in front of a computer. However, some of our occurrences at work were due to work place restrictions on private Web surf.

REVISITING USER MOTIVATION

Much of the previous research (and commercial development) on mobile services has focused on specifically mobile situations such as travel or walking around in a city (see e.g. [1]), and providing of information connected to such situations, often tightly connected to users' location. In our material, we certainly found that kind of use where our participants were in a location and needed to know something specific about it such as exactly from where their bus would leave. This kind of use was most common in outdoors situations (25%).

However, as described above, we also found other types of use where users were not mobile and did not search for information that had to do with their situation. Instead, the most common combination of location and purpose in our material was reading news at home.

In fact the top three purposes in the material as a whole, *reading news* (20%), *passing time* (19%), and *checking email* (17%) were not connected to mobility or the current situation (see table 3 for details).

The category *situated information search* (15%) contained occurrences where participants used mobile internet access to find information about their current situation or activity. Examples were finding out from where the bus leaves, if it was necessary to run to catch the right bus, or exactly where a meeting would take place. Most of these occurrences took place under time pressure.

To see if I had to run (T8)

The category *general information search* (15%) contains occurrences where participants searched for information that was not specifically connected to their current location or activity. Examples were checking next weeks practice schedule for the kids, checking tomorrow's weather, or finding information about a vacation destination.

I checked my son's practice schedule for this week (T3)

The category *transactions* (6%) contains the occurrences that concerned financial matters. We did not have any cases of participants using their cell phones to purchase something over the Internet but we did have examples of placing bets, booking tickets, moving money between accounts, and checking account balance.

Moved money from one account to another (T7)

We also had a number of occurrences in our diary data that concerned troubleshooting the stationary Internet. A participant used his phone to access the web page of his ISP to see if there were any general problems or if the problem was at his end. Even if this does not seem to be a

representative use of the mobile internet we note that since most users have different ISPs for computer and phone, the phone can actually be used to make the computer work.

Troubleshoot the Internet... again! (T9)

The motives for accessing the Internet from cell phones are thus only connected to users' specific location and activity in 15% of our material. The remaining 85% had other motives.

DISCUSSION

We have reported on a diary study of Internet access from cell phones and our main findings were that 51% of the occurrences of cell phone Internet access took place in locations where participants had access to a computer but still chose a cell phone, and that the most frequent location for mobile Internet access was the home. Even though these results need to be validated in further studies, this suggests that for frequent users as our participants, the mobile world extends well into the home and that the cell phone has its own role as a device for accessing the Internet. For them, the phone is not a mere backup solution for when there is no computer available, but a tool that often provides quicker and more convenient service than a computer.

Our participants also stated the typical mobile example "finding out something about the location you are in" as a reason for accessing the Internet from a cell phone, but those situations only constitute 15% of our material. The remaining 85% suggests that there is room for a wide range of on-line services for cell phones that is not specifically designed for mobile situations or connected to users' immediate activities.

ACKNOWLEDGMENTS

We would like to thank our participants, and Sqaace AB that supported the study in many ways. This research was funded by the Swedish Governmental Agency for Innovation.

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