Getting connected – at what cost? Some ethical issues in mobile hci

Antti Pirhonen
University of Jyväskylä
Finland

Elizabeth Sillence
University of Northumbria
UK

Abstract
The large scale deployment of mobile applications inevitably affects our daily lives and the whole culture. Not all of these effects are desirable. In a market economy, ethical issues are not the foremost drivers in the development of technology. In this paper, we ask whether the mobile human-computer interaction community could take an active role in discussing the issues which really matter in the development of technology for human beings, rather than concentrating on the fine tuning of emerging gadgets.

Introduction
The research paradigm of human-computer interaction (HCI), despite its brief history, has established itself as representing the human point-of-view in terms of the research and development of digital technology. However, what 'human' means is far from clear in this context. The history of HCI shows that the paradigm aims at combining computing, behavioural studies and design (see e.g. Myer, 1998). The contribution of behavioural studies has entailed the adoption of empirical methods and the approach of the behavioural sciences, psychology in particular.

Exploiting psychological methods in HCI studies certainly reveals important issues for a community intent on developing highly usable products. HCI, as a paradigm, thus seems to have a mainly instrumental value in terms of producing usable and ultimately top selling products. Nonetheless, to use the term 'human' forces one to take a broader view of human beings than simply his or her behaviour or cognitive capacity. Psychological studies may reveal what a product should look like, sound like or feel; or what the logic of the application should be like. We argue that these kinds of practical design issues, though important, don't tell us much about the more complicated issues, for example the ethical ones.

In this paper, we challenge people, who are involved in the research and development of mobile HCI, to take an active role in the discussion of the inevitable ethical problems resulting in the rapid penetration of mobile applications. Some of the examples of ethical problems which will be handled can be argued to be far-fetched in terms of mobile HCI tradition. However, we think that the mobile HCI community cannot afford to shy away from or wash their hands of these difficult ethical issues, perhaps suggesting that the responsibility lies elsewhere. As long as we are part of the structure which develops mobile computing culture, we are also responsible for the results.

What follows is a discussion of a number of topics which we feel deserve more attention from the mobile HCI community. Most of them, if not all, could be

categorised under the heading of ‘health’, including not only physical health, but also mental and social aspects of well being. We could also use the term ‘welfare’, which we take to include a broad variety of qualities towards which we are aiming when trying to construct a better future.

Roasting your brains

It is not headline news to report that mobile phones affect human brains when using them traditionally as a handset. The views about the health risks of this form of radiation are highly controversial, and there is no sign of this debate being resolved in the near future. It is actually difficult for a consumer to find relevant information about the risks, while commercial interests are so evident in both the research and reporting of research in the area. It is not a surprise, that when a mobile phone manufacturer is funding a health risk study, the published results never indicate any danger. One thing we can say for sure is that currently no one really knows how severe the risk really is.

What is the role of the mobile technology designer in terms of possible health risk then? A good example of what the role should *not* be was highlighted in a brief interview about ten years ago. In those days, most of the mobile phones had a visible aerial on the top of the device. It was known that the radiation is strongest in the immediate proximity of the aerial. A phone designer was asked, whether the aerial could be situated at the bottom of the device, thus markedly increasing the distance between the aerial and the brain. The designer responded that an aerial pointing down was out of question – it would look so stupid that no one would buy it.

The example above illustrates that design matters, sometimes in a very concrete way, in our welfare. The designer could have taken an active role and started to talk about the health risks openly. It might even have resulted in commercial success, if the message had been skilfully communicated.

Being connected to work – with chains?

Being constantly connected to digital communication channels via small, portable devices is somewhat of a double edged sword. From the point of view of the employers’ short term benefits, it might sound great that almost half of US employees do at least some work from home, via digital networks (Madden & Jones, 2008). Quite often, the opportunity to be connected to your work is presented as an opportunity to flexibly share time between your work life and your private life. On the other hand, however, if 70% of Blackberry and PDA owners check their work related emails at the weekends, suspicions are evoked as to whether it is a question of reciprocal flexibility anymore. Even more suspicious is the recent observation that 22% of employees claim that they are expected to be reachable through e-mail outside working hours.

The challenge for the developers of mobile devices and services is huge. We already have evidence that the opportunity to be constantly reachable through small, portable devices affects amongst other things the way we work and spend our free time. We do not believe that the developers’ aim was to increase peoples’ stress levels or to disturb family life by binding people to invisible networks, from which they cannot free themselves. But perhaps we simply developed the technology with an inadequate understanding of human nature. No responsible parents would give their small

children knives to play with. The parents have a clear vision of what knives are for – or to use our language, a use-scenario. Of course, the developers of mobile applications had a vision as well. What if the vision does not come true? Should we take the gadgets away like parents take knives away from their children, or just trust that these toys gradually find an appropriate role in our culture?

Widget-assisted family life

We are constantly being reminded that our culture is rapidly changing due to our exploitation of mobile devices. Indeed, the change has been salient in everyday family life. We have been given the impression, that when everyone has a mobile device in their pocket, communication among family members is fluent and immediate. Parents welcome tiny widgets which enable effortless controlling of their offspring.

What about family life and the relationships between family members then? If mobile technology has enhanced communication in families, it should have also strengthened family ties. Some people argue that this is the case (see for example a recent study by Kennedy et al., 2008). In particular, communication with family members from a distance is argued to be easier with the help of mobile devices and the internet. Mobile devices we are told also make it possible to keep in touch despite the hectic rhythm of life. However, the same study reveals that families, in which digital communication devices are heavily used, are less likely to have meals together. The same group of families also reported being less satisfied with their leisure time.

With almost 100% mobile phone penetration it is extremely easy to contact a family member. However, the changes in terms of how people live their daily lives deserves a closer, critical look. Is it really the case that mobile phones have helped support communication in our hectic lives, or are mobile devices actually one of the main reasons for the busy lifestyle? A few years ago, Finnish boys went out after school to play football or ice-hockey together. At the moment, they rush home to chat via the internet, and are unable to agree with their friends what to do next – there simply does not seem to be any plans further than for the next minute. If they get fed up with chatting, they text their friends and ask if they would like to do something (and rarely succeed in getting anyone out). At the same time, obesity as well as back and neck complaints among 8-12 year olds have increased rapidly. Mobile devices, do however, it could be argued enable ‘mobility’, and support the ‘instant-life-style’ making it possible to contact anyone any time. The lack of meals together indicates the same phenomenon; even that one single time, e.g. dinner time, cannot be agreed in advance. Instead of proper meals, we eat unhealthy snacks, with the well know results. Concerning communication, the worth of family meals should not be underestimated (see an overwhelming collection of research reports about shared meals and their impact in physical and social health by Mayfield, 2007).

Growing old? No problem, we have technical solution for you.

The population is ageing. Improvements in mortality and a falling birth rate mean that in the UK the fastest growing age group in the population are those aged 80 years and older (National Statistics, 2008). Consequently supporting independent living is high on the agenda for many designers and technology providers. It is also on the minds of everyday citizens, consider this typical scenario: A concerned son buys a mobile phone as a present for his elderly parent. The parent is instructed that the phone is to help them feel safer and more secure (although of course it is also a form of family

tracking). The son then reports feeling frustrated that his mum always has the phone turned off The parent reminds him that it was only for emergencies anyway and 'why should I have to always be contactable?' This example highlights the distinction between keeping a friendly eye on a loved one and something potentially more sinister – the idea of tracking and surveillance. Some 'surveillance' systems are intended to monitor the physical well being of elderly people with a view to supporting independent living. Blood pressure and pulse for example can be monitored and recorded remotely. Such systems, however give raise to the notion of 'Big Brother' and place constraints upon personal freedom and autonomy. The system will know immediately if the monitored person has drunk or eaten something forbidden or has stayed up to watch their favourite film and thus not had enough hours sleep.

Similar issues arise when considering location based tracking devices. These devices monitor the elderly inside and outside of the home environment and can potentially protect against 'wandering' as well as measuring and encourage mobility. Can the person being monitored decide when to turn the device on and off? Should people have to be able to account for every minute of their day? Journeys to the shops, the doctors or outings to the library etc form an important part of older people's daily activities. In turn this makes up an integral part of the storytelling that occurs between friends and family either face to face or during the weekly call with long distance relatives. The conversation 'You'll never guess where I went last Tuesday' would be rendered redundant if the family had access to the tracking details.

The provision of monitoring systems may be accompanied by a reduction of direct contact with relatives, friends and care personnel (Abascal & Nicolle, 2005). At what point does monitoring become surveillance and to what extent are we (accidentally or otherwise) removing the need for human contact? Yes people want to maintain independent lives in their own homes but on the other hand they don't want to be looked after by a robot' (Monk et al, 2004). How are these systems attending to the elderly person's emotional and social wellbeing? Twenty years ago a community warden scheme supported older peoples' independent living. A call from the warden's home through an intercom (like) system twice a day provided social contact, reassurance and an opportunity to exchange information. The warden typically lived five minutes walk away and could pop around if there was a problem or alert the relevant caregivers.

Creating a healthy connected society?

Mobile and ubiquitous computing have huge implications for healthcare. One can envisage systems that act, not simply to store health information, but to continuously monitor and communicate health status, coupled with intelligent environments that can respond immediately to this information: Restaurants that can check the food on offer against known allergies, buildings that adjust temperature and lighting in accordance with known medical conditions and hospitals that are primed with up-to-date information the moment the patient arrives.

Here is an excerpt from a scenario used by Little & Briggs (2008) in their work on trust and privacy issues in ubiquitous computing. *Built into Bob's PDA are a number of personalised agents that can pass information seamlessly to relevant recipients. As Bob is epileptic his health agent monitors his health and can alert people if he needs*

help. One lunchtime Bob trips and falls to the ground. When he fails to respond to his PDA alert the health agent takes over and contacts the emergency services. The paramedics are able to assess Bob and upload all his medical information direct to the hospital via their hand held devices. Meanwhile other agents built in to Bob's PDA take control of his diary, cancelling appointments and informing his parents of the situation.

This scenario highlights rapid communication of health status and health history between interested parties but exchanging information in this way raises important ethical implications about disclosure (Stanford 2002). Participants responding to this scenario (Little & Briggs, 2008) were concerned about increasing social isolation, dehumanisation and bystander apathy – surely there is no need to rush to the assistance of someone who has had a fall as the paramedics etc will already been alerted? What is the value of the human word or thought or deed in that situation?

GlucoMON™ is an automated, long-range wireless blood glucose data monitoring and transmittal system. A child's blood glucose results are automatically transmitted via email or text to other family members. The promotional video for this product shows a child being reminder by an older friend to test her blood sugar levels. The results are then transmitted to her mother's mobile phone. The mother then calls her daughter's school and asks them to increase the amount of snack food her child has at break time. What would happen if the mother could not get through to the school? Whilst such devices appear to do the reassuring for us, knowing that the school had developed a culture in which the child's diabetes was an understood and accepted part of everyday life would perhaps provide a broader form of reassurance for parents?

Putting the record straight

We do not oppose mobile technology by principle. Mobile technology, like most technologies can be used for good or bad. What we do oppose though is the wrapping of, purely commercial aims, for example, in a human-looking package under the topic of human-computer interaction. The phenomenon is familiar in all areas of HCI, but because of the rapid growth of mobile technology, it is perhaps even more salient in this context.

In science, one of the most traditional virtues is the exact use of concepts. Therefore, we doubt whether the term human computer interaction is accurate enough to illustrate the range of activities under that heading. Instead of 'human', which is clearly too encompassing, if not misleading, the current trends in research could be better expressed with different, more appropriate wording. For instance, in studies which focus on the observable behaviour of the user, the more appropriate term would be 'user'. Or, if the over-all aim of the research and development efforts is purely to create best selling products, why not use 'consumer' instead of 'human'? Thus the use of the term 'human' could be saved for endeavours in which the underlying motivation arguably could be the construction of a better world in terms of our understanding of humanity.

There is a lot of good work being carried out in the field of mobile HCI. Mobile devices have truly provided new means of communication for the deaf. Blind people may also benefit a great deal from a vast array of devices designed to help them to survive in the world which has primarily been constructed for the sighted person..

Indeed some people have been saved from dangerous situations, e.g. remote mountainsides with the help of mobile phone. The list of these more positive examples is endless.

Someone has designed all the devices which we now have in active use. So are the designers and practitioners of today creating our tomorrow. As scientists and human beings we should play with an open hand, and make our motives transparent. That would provide the best starting point for creating technology which does not conflict with our human values.

References

Abascal, J. & Nicolle, C. (2005). Moving towards inclusive design guidelines for socially and ethically aware HCI. Interacting with Computers 17, 5, 484-505.

Kennedy, T. L. M., Smith, A., Wells, A. T. & Wellman, B. Networked families. A report of Pew Internet & American Life Project, October 19. Retrieved (4/11/2008) from http://www.pewinternet.org/pdfs/PIP_Networked_Family.pdf

Little, L. & Briggs, P. (2008). Ubiquitous Healthcare do we want it? Presented at BCS British HCI Group Conference, Liverpool, UK 1-5th September.

Madden, M.& Jones, S. (2008). Networked workers. A report of Pew Internet & American Life Project, September 24. Retrieved (4/11/2008) from http://www.pewinternet.org/pdfs/PIP_Networked_Workers_FINAL.pdf

Mayfield, B. (2007). Selected References: Family Meals. Purdue University, Center for Families. Retrieved (4/11/2008) from http://www.cfs.purdue.edu/CFF/documents/promoting_meals/mealtimereferences.pdf

Monk, A., Brant, J., Wright, P. & Robinson, J. (2004). CUHTec: the Centre for Usable Home Technology. CHI 04. Vienna, Austria.

Myers, B. A. (1998). A brief history of human-computer interaction technology. Interactions 5(2), 44-54.

National Statistics, (2008). More pensioners than under-16's for first time ever. Retrieved from (3/11/08) http://www.statistics.gov.uk/cci/nugget.asp?ID=949

Stanford, V. (2002). Pervasive health care applications face tough security challenges. Pervasive Computing, 8-12