

People Versus Information: the evolution of mobile technology

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Abstract. This reports research on users' attitudes towards and use of GSM devices and discusses the implications these have for the future evolution of hand-held devices. It argues that current usage patterns suggest that there is unlikely to be a widespread convergence of information accessing devices and person to person communication devices. It also argues that the latter devices and their associated applications could provide much richer opportunities for communication behaviours than is currently available, and that therefore design efforts within the mobile HCI community should focus on this rather than on information use applications.

1 Introduction

1.1 Mobile HCI

If one looks back at the history of mobile HCI, one can see that certain assumptions have underscored the research undertaken within its auspices. Expressed very simply, it has been the case that the research questions have to do with information usage. This in turn has split into two main research topics: access to information when remote and away from an office, and, on the other hand, interaction with information on the hand held devices themselves. The one has to do with the constraints of interaction over distance [e.g. 24], the other with constraints of interaction on small scale devices [e.g., 14,23]. More recently, this basic dichotomy has been supplemented with a concern for how interaction with people (or other users if you will) may be combined with information access. This has taken many forms, ranging from location-based service applications through to how different user groups bring themselves together with the use of distinct types of information, such as provided by games and sports [2, 12].

Throughout the history of mobile HCI there have of course been various tangential research activities that don't fit so easily within these basic assumptions and subsequent strands of research activity. My own early work on location-based services, for example, was one such activity [9]. Here we had neither a clear idea of what informa-

tion may be interacted with nor how that might augment person to person communications. There are many other curios within the research literature. But these tangents notwithstanding, mobile HCI has remained and is essentially about human-information interaction over devices that are remote and small, in varying degree. In this regard, mobile HCI has been primarily concerned with what goes on inside the head and not, if you like, with what goes on in the heart. It has been concerned what the mind thinks rather than what the body feels.

Without wanting to suggest that this dichotomy between the heart and the mind is the only one of note—though I shall come back to this—what I am wanting to argue is that the information centric assumptions of mobile HCI are not the only ones that one might wish to start with. One could easily start from a different set of assumptions, and this would lead research in different directions. Now it seems to me that one might not want to treat this problem in a *carte blanche* fashion, as if it did not matter which set of assumptions research is built on. After all, a great deal of effort goes into building up the assumptions that underscores any discipline. Nonetheless, it is worth while to occasionally revisit these assumptions and consider whether other disciplines, have something to say about them that may justify their revision.

As a case in point, mobile communications engineering is a discipline that has, until very recently, been quite separate from the HCI community, yet at the current time seems to be moving into a similar space, albeit with a very different set of agendas and research questions. This is because its assumptions are quite distinct. Though the computing power that mobile communications researchers take for granted is equally large to that in mobile HCI, the opportunities that this power is thought to afford, the way that this is leveraged to offer new services and applications, and the model of human needs that underscores examination of these issues, are all different. Instead of interaction with information, it is emotional action with partners, instead of navigation with information on hand held devices, it is navigation to one's friends and family that is investigated; instead of speed of data entry and retrieval, it is the social cost of a communication that is important.

These differences are not merely incidental. They have all sorts of implications for evolution of the research questions that each programme of inquiry—or paradigm if you will—undertakes. They also have implications for certain ideas and beliefs that underscore both. For example, it is commonly believed in both the mobile HCI and mobile communications paradigms that future devices will combine the properties of each: the *converged device*, for want of a more suitable term, will offer both communications power and information access.

But it does not seem unreasonable to ask whether this will happen: after all, can the design solutions of each satisfy both? Or will it be the case that one will win out over the other? In other words, is convergence another name for the dominance of one paradigm over another? Besides, are the two so different anyway that attempts to satisfy what is understood to be the problems that each has to solve will inevitably pro-

duce solutions that, in trying to please everyone, please no-one at all, least of all the lowly user?

I want to reflect on the particular differences between mobile communications research and mobile HCI not merely for the sake of it, but because now is an especially opportune time to do so. For one thing, many commentators claim that convergence is imminent; for another, and I think this is more important, there is an increasing amount of data about human behaviour that indicates how the future might be shaped by the user and not by the industry (or even for that matter by the research community related to that industry). This is particularly the case in relation to the ways in which people might want to optimize their use of mobile technology. This may force a revisiting of the idea of convergence.

I want to suggest, and bring a little bit of empirical evidence to show, that the future of mobile devices will be first and foremost about offering users the ability to keep in touch with friends, family and colleagues, and that this will take precedence over technologies and applications that will offer information access and use. This is not to say that the latter will have no role, but it is to say that their role will be of less significance to the user than the former. This will in turn have numerous implications for the kind of devices people will want to carry around with them and, relatedly, the kinds of bundles of services that they want these devices to provide. I will argue that they will want devices that support communication above all else, and other services will be subordinate to this. One consequence of this will be that some services will not find a place in the bundles, and the reasons for this will have to do with what the hierarchy of user preferences imply in terms of the interaction mode(s) that devices support. These modes will constrain what is possible on devices, not in the sense that it might be impossible to design some services and applications for certain of these modes, but because users will find it too hard to do so. Doing so will be, to put it colloquially, too much bother for them. In short, I will argue that to be *in touch* constantly and easily will compromise the design of applications that offer *information use*. To satisfy the former, user needs result in the usability requirements of the latter being cast aside.

This does not mean that the future will be a dull area to research. Just because communications between people will take precedence over interaction with information does not reduce the opportunities for insightful and creative design. The use of information supporting devices will continue, I believe, and thus research will need to continue apace—though these devices might not be so important as some researchers currently think.

On the communications side, even more research is needed than has been undertaken to date. After all, the user of mobile devices would find little different between the devices they currently use and the fixed point telephone user of the 1930s and 40s. The only difference perhaps is the short text messaging service. And yet the possibilities for human contact are inordinately rich and diverse. I am convinced that the future

of communication will be as broad as we can design it to be, though as yet no-one has stirred up the mobile communications community to produce any such insights.

1.2. The research

I will make this argument on the basis of research I and my colleagues have been undertaking for the mobile industry over a number of years [1,3,24,25,26,27]. For those who have been funded by the computer industry, this might hint at the possibility that what I am claiming simply reflects the view of my paymasters. But this is not the case. After all, and this is to restate what I have just mentioned, the idea of convergence—the myth of it if you will—is held equally in the mobile industry as it is in the computer systems world. Both industries have much at stake when it comes to convergence. Neither wants the future to unfold in the way the evidence suggests. Besides, my view is based on evidence from studies of people using technology and these studies have included looking at information use devices just as much as communications devices. This research has been solely motivated by a concern with the user, not with how I or anyone else thinks the future ought to be.

2 From analogue, to GSM to UMTS

2.1 A brief history

Mobile telephony is now omnipresent so it may be hard to realise how rapid and recent has been its emergence, especially when compared to the slow pace of adoption for office information systems. In the UK and the rest of Europe, for example, analogue TACS/NMT mobile phone services became available in 1985 and the GSM digital service in 1993 yet by the end of that decade GSM devices were an everyday occurrence.

One also might forget that although people quickly became familiar with the concept of mobile telephony, it was at the outset high priced and targeted at business users. Yet oddly enough, organisational management were unpersuaded of the benefits the technology might provide, and initial take-up of the technology within business was essentially on an individual rather than corporate basis, where individual staff adopted the technology and then gradually demonstrated to their colleagues the benefits they derived. Eventually, business management as a whole began to recognise these benefits and so began to be more willing to pay for and support mobile devices. Despite a regulatory framework designed to reduce price, the products still remained expensive and thus were expected to continue to be primarily for business use. Yet, once businesses made the technology familiar to the public at large, there was an unexpected and rapid growth in non-business, consumer demand. This became so strong

that, in less than a handful of years—by the mid to late nineties—a point had been reached where owning a mobile became a social norm, particularly in Western Europe and Japan.

In simple terms, the history of the mobile can then be described as, first of all, a period of individual business people pulling the technology; second, their success leading to a period of business management pull, which resulted in a sufficient level of familiarity with the general public for a third period during which the consumer at large adopted the technology very rapidly; and fourth, this eventually resulted in the situation we have now where having a mobile phone is virtually a social necessity.

In many respects, this path of evolution and in particular, the unexpected uptake of mobile communications as a mass consumer product was a boon for the industry, though the fact that this was a surprise is testament to how ineffective the mobile industry has been at understanding its market place. This is all the more surprising when it is realised that the pattern of adoption of mobile devices is common with the introduction of other technologies, including the fixed line telephone at the start of the last century and the introduction of televisual broadcasting technologies in the middle part of that century [3]. Whether a similar pattern will hold true with UMTS and other so-called 3G standards, is, of course, part of the subject matter of the research reported here.

2.2 The social shaping of the mobile

In any event, if this is the general character of the take up, the actual impact of the mobile phone itself is another matter. Initially the mobile phone did not displace other communications devices, most especially the fixed line. Certainly there was continual change in the technologies in the users' hands, but this had more to do with the cycle of new mobile systems being introduced and replacing antiquated technologies than in what the technology could do [3,27].

Overall however, mobile telephony created an addition to people's lives rather than substitution of previously existing telephony and communications systems. The result was that mobile phones expanded what is called in the literature the 'ecology' of communications technologies, and in so doing became as important to work, family and personal life as the fixed phone and other communications systems [10].

There were nonetheless substantial differences in this ecology, according to culture, social class and the myriad types of relationship consumers could have with providers and manufacturers. This relationship was mediated through not only the devices themselves but also in such mechanisms as billing and payments methods. Differences showed themselves in prepaid being a success in Europe and less so elsewhere, for example, and in the brand acceptance of some terminal manufacturers over others [27].

Research on these and other topics is quite extensive, and without wanting to go into detail about it all, a number of main areas or topics of inquiry can be identified. To begin with, there is a consensus that mobile phones had—and continue—to reinvigorate social relations through providing a voice or text mediated form of face-to-face relations. Some commentators view this ‘virtual presence’ as counterbalancing the increasing social isolation created by other new digital media, such as interactive digital TV, computer gaming and the Internet [7, 11]. This benefit made mobile communications unlike other digital technologies and unique from the users’ perspective.

It is also argued that with mobile communications, person to business relationships could become much more personalised than before, with mobile communications allowing more intimate and frequent contacts. In large part this is because mobile networks provide much more fine grained, ‘particularised’ information about user behaviours than has been possible hitherto [21], though users did not—and still do not—perceive this as a concern nor has business effectively leverage any opportunities this provides. Much of this data has remained untapped (though new services are likely to latch onto its possibilities – location services, spam text and so on)

Mobile phones also result in more private behaviours in public spaces than ever before, with gradually fewer boundaries to acceptance of where and when people can use their mobile phones. This is a world wide phenomenon, though the extent to which it occurs varies between different countries. This particular aspect of mobile devices is perhaps the one that’s been given the most attention, with research reporting the effects of this in Finland [18], France [8], Italy [4,5], the Far East [17] and elsewhere.

Lastly, and this returns us to the main theme of this paper, many commentators argue that the relationship between the user and the device itself has become much more emotional than was hitherto the case with computer technologies. It is argued that this is a function of the social connectivity that mobile phones afford and thus reflects a relationship with the content more so than the device itself [4,16,19,20].

2.3 Explorations in the emotional dimension

Clearly, each of these dimensions are deserving of much attention. The one I am exploring here, though, the one about emotion, has I think, a number of important implications. To understand these requires some careful thought, however.

For example, Fortunati [4] suggests that mobile devices are treated in an emotionally distinct way because they are, as she puts it, charismatic. This results in users spending more on their mobiles than they would on any other technology, and being covetous of the devices themselves, getting highly distressed when they are lost, and making sure that they are always near them, like a child or a partner. Fortunati makes

no suggestions as to what the implications of this might be for future services but it seems not unreasonable to assume that if this is the case, then they should be designed to reflect this charisma, irrespective of how that might be done. Certainly, in human factors and ergonomics and more recently even in HCI, the idea that emotional reactions to an object, what one might call the lust of an aesthetic, has been gaining prominence, whether it be in the work of Jordan in ergonomics [14] or Norman in HCI.

Be that as it may, Fortunati's view suggests that it is simply the object itself that engenders emotional reaction, as if the need for a mobile phone is merely created by marketing. But in contrast, most of the research on mobiles, including my own, takes a different view and this holds that the emotional value is a result of what people do with their phones. In this view, the shape or form of the device—those properties that might reflect its charismatic nature—seem less important than its functions.

Some evidence by a project by Ericsson sums up the issue I and my colleagues have begun to identify (though as it happens the Ericsson researchers do not take the same lesson from it) [22]. In their research, a young woman from Singapore was presented with all the hand-held and portable devices she currently used or could buy, including her mobile phone, PDA, Blackberry and Walkman, and was then asked which she would like bundled together. Her response was to say that she wanted everything to go into one object *except* the mobile phone. That was special, she explained, and too important to be mixed up with other things. She did not trust that if it were put in with other devices it would be capable of doing what she wanted it to.

Of course, this begs the question of what exactly she did with her phone as well as the question as to what she thought the Ericsson researchers in particular would do to it—given their poor reputation for user friendly devices. That aside, her comments allude to and resonate with the bulk of research into user behaviours that indicates that something about the role of the mobile phone, something about its shape, form and function, when combined, results in users finding that mobiles play an irreplaceable role in their daily lives: not in the sense of bringing charisma to their existence, but in the sense that the phones become key tools in their lives, one of such importance that mobile phones even appear to affect who they are.

2.4 A methodological approach to the issue

Now, as we were gleaning various perspective on emotion in the literature and listening to presentations by Ericsson and others, we were not quite sure where the inkling that something more was afoot might lead to, or even if it would lead us any where at all. But the general swell of evidence recommended us to explore further. We had already been undertaking extensive ethnographic studies, so we opted to complement these with a research approach that could be more focused. We also wanted to undertake some international comparison. Therefore we decided to undertake focus

groups activities with colleagues in Germany (Erfurt) and in the UK (London and South East). We also issued a fairly detailed questionnaire that was completed by 72 individuals in the UK and France. We then presented results from these activities to key players in the mobile industry to test whether our evidence resonated with their insights, and if not, whether it might be revised. The results made it clear that the view of people like Fortunati, though certainly capturing some of the issues in question, did not quite capture the full salience of them. It is to explore what they are that we now turn.

2.5 The language of users

Findings from different data sources obviously need to be made tractable in various sorts of ways. In our ethnographic research for example, we had discovered that many of the texting activities of the people we studied could be thought of as kinds of gift giving, though many of our subjects would not use that term themselves [25,26]. In contrast, one of the tasks we set ourselves in the focus group endeavour was to address the very issue of language and understanding, and to try and capture users' own ways of formulating and describing their experience.

What we found is that in some of the focus groups, particularly in the UK, few people use the term emotion to describe their relationship with mobiles: "*It's a funny way of putting it*" being a common response to the proposition. Elsewhere, in Germany for example, the term seemed to accurately capture what users thought themselves.

Beyond these differences in the initial formulation of language terms, what we did find is that most of our subjects, wherever they were and irrespective of their age, gender or income, use emotional language categories to explain their mobile usage. These categories could be listed and categorized in ways that reflect the complexity of the term emotion. We found that there appeared to be six main types or dimensions of emotional language category used to account for ownership and use.

Strangeness This is perhaps the most interesting term since it is suggestive of how fundamental mobile ownership has become. The term was used to label those who don't have mobile phones. They were viewed as strange not in the sense that "these days everyone has a mobile" and that these people were merely unfashionable. The term strange was used to intimate the idea that those people who do not have a mobile phone must live in a world that is quite unlike the world of everyone else. Those who exist without a mobile must be, according to this view, attenuated from society at large. In other words, non-owners could not be normal in a profound sense.

Panic Here the term was used to describe the feelings that absence from the device created. Now, though users of PC's might also feel a sense of panic when their machines break or perhaps are removed from their desktops for one reason or another, the

tenor of the panic produced by the loss of the mobile is quite distinct. Here the panic is not for the loss of money or value in the device itself, it is panic for the loss of being in touch that resulted. To put this boldly: what the focus groups suggested is that to lose one's mobile means to lose one's connection to society. To lose one's PC is to not be able to work for a while or undertake some leisure activity: this is quite different.

Irrationality One negative consequence of ownership and use is the fact that people recognize that often they cannot control their behaviour with mobiles. In this sense their actions really are emotional, insofar as it is sometimes the heart that exerts control over the mind, rather than the other way round. The best example of this is when people use their mobile while driving, despite the fact that they 'know' it's dangerous.

Thrill Another obvious manifestation of emotion comes from the excitement that is induced by using mobile devices in particular ways: there is the novelty of use for example, though this pales with familiarity. More permanently, thrill comes from the ability to transcend the borders of public and private behaviours: receiving intimate texts in public places is one such activity.

Anxiety One consequence of having a mobile and knowing that others do too, is the realisation that people might have personal reasons not to be in contact with one another. It is no longer technology that thwarts them. If this is so, then people get anxious because they want to know what are the reasons why some one might not be willing to call. Is it because they are angry? Have they forgotten to? Are they ill? Not knowing the answer to these questions makes people worry. Conversely, if one can always be in touch, when has one been in touch *enough*? How much more could one know? What is the right balance?

2.6 The actions of users

So, these are the language categories that people use to explain and account for their relationship with mobile phones. Certainly, these would seem to confirm the idea that there is a distinctly emotional flavour to this experience, and moreover suggest that this is potentially powerful: those who do not own a mobile are viewed as existing in an almost different world to 'normal people', one where being in touch does not matter. According to this, it would appear that having a mobile is not a perk of the 21st century but a prerequisite of living.

Ideas and modes of expression are not sufficient to fully understand what is the character of the mobile in modern society, of course. There is also the question of what people do with their mobiles. Again, from the focus groups, what became clear is that the primary goals relate to achieving emotional ends.

Perhaps the most obvious and most commonly reported has to do with setting up social arrangements: *"I call my friends ...stupid calls...I'm meeting them in half an hour and I'll call them, speak to them... until I meet them"*. Another has to do with avoiding making set appointment times - just arrange to call when you get there: *"meeting in a big park of people"*. And a third (though there are more) has to do with making or breaking relationships: *"You can be silly on texting, you're too embarrassed to phone"*; *"If I want to speak to my girlfriend any time of the day I know that I can & it kind of takes the fun out of it when I'm seeing her."*

In addition to emotional goals, users also behave 'emotionally' in the sense of behave in irrational ways, as alluded to above in the discussion of language terms. They constantly call their partner/spouse, for example, even when they are in the same house: *"I just feel the need to"*. They use the mobile impetuously: *"I just had to call someone"*. And even though they know they should not, they use it in places that creates danger: *"Even when I am driving and I go over those mini roundabouts in 4th [gear]."*

2.7 Interviews with experts

Before we began trying to explore what these findings meant in terms of the future evolution of services and products, we tested them against what the industry as whole knew about users. The response of various industry experts to these materials, in marketing, in product design and in strategy departments, was generally confirming, though the extent to which the relationship with mobiles could be described as emotional varied according to cultural differences, as we found in our own focus groups. In Israel and Germany, it appeared that there was a widespread recognition of these values, while in the UK this was not so clear. In other countries, Sweden, Italy and Ireland, the view seemed to be somewhere in the middle.

All concurred, however, in believing such things as the personalisation of GSM devices (colour, directories, ring tones) was less a reflection of the normal pattern of the evolution of consumer products (where personalisation to some degree is used to differentiate products) as an indication of the particularly emotional character of users' attitudes toward mobile devices. Some even remarked on the way mobile devices are held and touched to affirm their own understanding that the users relationship with mobiles is indeed different from their relationship with other products, cultural differences of expression notwithstanding.

Looking toward the future, the expert panel commented that, in the first instance, they would be attempting to leverage emotional values to identify and sell new products. Key to this will be using emotional relationships between friends as a route to offer services and products that augment those relationships. In the longer term, the panel explained that they would introduce products and services that would be less and less emotional, thus leading themselves out of the confines of satisfying purely emo-

tional needs. Their view was that they need to start developing 3G services through leveraging person to person emotional needs, and then, step by step, introduce more person to information-like services.

3 Implications

Using emotion in the way described by these industry experts to maximise the potential of products and services would appear challenging not least because it demands a level of understanding of customers—existing and potential—that has not, historically, at least, been known by the mobile industry. It demands knowledge of the purpose of the user's communications, for example, of how those purposes deliver particular kinds of emotional value, and so forth, that is at a level of granularity that does not seem to fit the typically high level modeling of user needs deployed in the industry.

For instance, the use of SIM card readers by some service providers to collect and store information held on mobiles—phone numbers in particular—is a present day example of a service that responds to users' fear of losing data but goes only a small way to addressing how to do so in a way that reflects the emotional value given to the information stored on their phone. Much more needs to be understood about how emotional values are delivered and preserved before designers can identify ways of leveraging opportunities related to emotion. After all, these SIM card readers cannot distinguish between numbers that the users' thought they had deleted and those that they 'really want'; between those numbers that link them to people that matter on an emotional level and those that were put in there temporarily for a short trip or such like. The latter can be forgotten; the former are too precious and may even be kept when the relationship in question has finished. SIM card readers treat stored information as much of a muchness (i.e., as all the same). For this to change, of course, not only will the reader technology have to change, since one would imagine that there would also need to be changes in the design of the virtual address book so that application that relied upon in it, like the SIM card reader, would be instructed as to types of information stored on it. One can imagine an address book for temporary numbers for example, the stuff that does not need to be copied over, and a book for personal and permanent numbers, that should be.

This is but one prosaic example illustrating the general point that a failure to understand the emotional aspects of the 'mobile experience' could lead not just to a failure to offer everything users might want, but even to undermining their needs. New services could fail if they replace or impinge upon services to which the user ascribes an emotional attachment. For example, the threat of losing text messaging and having it replaced by new technologically better services may create considerable resistance from users. For not only is texting now a key tool in sustaining emotional lives, but storing personal text messages is now a highly valuable element to people's emotional arsenal [1,25,26]. SMS may be thought of as simply a communicative tech-

nique from the supplier's point of view, but to the user it has values over and above this [11].

Relatedly, the adoption of new form factors may affect these emotional values. For instance, the current size of GSM devices supports constant carrying around: "*it never leaves you*", as one of our subjects put it. This means that users are never forced to relinquish contact with those they need to be in contact with. Now, it should be clear that before GSM they would have had to be out of reach for certain times of the day and in certain places. The point is that with GSM they have come to expect this constant access. Future devices must not threaten this. Many information delivering services and products, for example, require larger screens than most current GSM devices do, and this may lead to expanding the form factor to a level that makes constant carrying difficult or at least irritating and burdensome. It does not matter whether these new devices are provided by UMTS providers or the Wire-free community, each reflecting the two distinct domains of mobile research mentioned earlier, the outcome from the perspective of the user would be the same.

Similarly, one-handed input means that it can be used at almost any time "*even when driving*". Many 3G devices, particularly those which combine the PDA form factor with soft keyboards for dialing and so forth, require two handed in-put. This inhibits the places in which they can be used. Clearly in some respects this could be advantage: stopping people using the mobile while driving may be viewed by some as a way of increasing safety on the road, for instance. But for many users it is precisely the ability to be in touch at any time that provides the value that has made the GSM phone distinct. Assault these values with new products, even if it is only at the edge, and the overall value may be diminished.

Beyond these specificities of form factor and service change inertia, a further and perhaps more significant implication is that demand for services that sustain emotional lives may be highly inelastic: people may pay "whatever it costs" to have and use a mobile phone (though the cheapest will do). This may drive out other devices simply because the user may have to choose what to spend their disposable income on. Thus, it may be that users will always choose a communications device first, even though this might leave no budget for information access and use devices. This may be despite the fact that the user may recognise that some value would be provided by owning such a device. Their predicament however, relates to the fact that their communications needs, their desire to be in touch and to satisfy their emotional lives, swallows up all the cash they have.

4. Conclusion

What has been argued then has to do with how user needs and patterns of behaviour might shape future demand for services and products. At one level, the argument has been that users place a different value on what one might call information, on the one

hand, and words, on the other. The former may be thought of as the kind of content that, let us say, the Web provides, the latter as the kind of content that GSM devices provide (though the latter includes both the spoken and the written word). The claim is that 'person to person' connectivity services engender emotion and that in so doing create considerable value. In contrast, 'person to information' connectivity does not achieve the same emotional value. The result is that when it comes to the crunch, when it comes to having to choose between spending on one rather than the other, it would appear that emotion will win out over information.

Now, of course, it may be that in the future the cost of either kind of service will not force a choice between one or the other, though at the current time this looks like being unlikely. But irrespective of economics and the kinds of disposable incomes people may have in the not too distant future, there is also an ergonomic argument that leads to the same conclusion. For the evidence also suggests that the capacity to be 'in touch' any time and place, irrespective of the danger and irrational behaviours that results, is a key added value for the mobile user. The form factor of the current GSM devices, then, may satisfy a need that new form factors more ideally suited to other needs, such as information use, might not satisfy so well.

Underscoring this is what is sometimes called the appliance argument. This holds that interactive devices need to be designed to offer 'radical ease of use' through placing the primary function at the top of the level of functions [13]. In so doing the ideal design for usability is optimized for the application that is most sought after by the user. One byproduct of this is that all other applications have their usability needs compromised. As I said at the outset, though this may result in devices that can be used for a host of applications, in practice, this may lead users to only use one or two applications, primarily the communications ones as I suggest, because the others are too much bother. The users may feel that they just take too long to use, or are simply too difficult. Needless to say, it might be possible to create designs that optimise a multiplicity of applications so that such compromises need not occur. Sadly, if one looks at the efforts of mobile HCI and the mobile communications research community, the likelihood of this occurring is very slim indeed.

But in any case it might be that trying to solve this particularly obdurate problem is not an area that research should focus on. If one thinks about human communication in the general, one will note that exchanges between people are not all the same, as if a hello were the same as a summons, as if a whisper from a lover is the same as a bellow from a boss. Yet if one looks at current communications applications and protocols one will see there are few alternatives made available to the user, and people cannot vary the ways they call their friends, partners, or colleagues, except perhaps through the use of text. Indeed, perhaps this is precisely why texting has been so popular. There are beginning to appear some design ideas that explore this space but as yet these are too few and too limited in imagination. This need not be so. I urge mobile HCI and the communications industry to take up the challenge.

References

1. Berg, S. Taylor, A. Harper R. Mobile Phones for the Next Generation: Device Designs for Teenagers, *Proceedings of CHI 2003*: Florida, ACM Press, (2003).
2. Borovoy, R. Silverman, B. B. Gorton, T. Klann, J. Notowidigdo, M. Knep, B. Resnick, M Fold. Computing: Revisiting oral traditions as a scaffold for co-present communities, *Proceedings of CH2001*, ACM Press, (2001), pp466-473
3. Brown, B., Green, N., & Harper, R. (Eds.), *Wireless World: Social and Interactional Aspects of the Mobile Age*. Godalming and Hiedleburg: Springer Verlag (2001).
4. Fortunati, L. The Mobile Phone: An Identity on the Move, *Personal and Ubiquitous Computing*, (2001) vol. 5, no. 2, pp. 85-98.
5. Fortunati, L., Italy: stereotypes, true and false, *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*, Katz J and Aakhus M, (2002) 42-62.
6. Gaver, B. Martin, H. Alternatives: exploring information appliance design through conceptual design proposals, *Proceedings of CHI 000*, An M Press, (2000), pp209-216.
7. Gergen, K., The challenge of absent presence, *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*, Katz J and Aakhus M, (2002) pp227-241.
8. Gournay, C., Pretense of intimacy in France, *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*, Katz J and Aakhus M, (2002), pp193-205.
9. Harper, R. Why People Do and Don't Wear Active Badges: A Case Study, Harper, R.H.R. In *CSCW: An International Journal*, Vol. 4, (1996) pp.297-318.
10. Harper, R. The Mobile Interface: Old Technologies and New Arguments, in *Wireless World: Interdisciplinary perspectives on the mobile age*, Brown, B. Green, N. & Harper, Springer Verlag, Hiedleberg and Godalming, UK, (2001) pp207-224.
11. Harper, R. Are mobiles good for society? Keynote address for *Mobile Communications: Social and Political Effects*, Institute for Philosophical Research of the Hungarian Academy of Sciences and Westel Communications, (2003) April 24-5th, Budapest.
12. Ijas, J Isomurso, M. Isomursu, P. Mustonen, M Still, K. Designing a mobile terminal for horse aficionados, in *Proceedings of CHI 2003*, ACM Press (2003), pp646-647
13. Jenson, S. *The Simplicity Shift*, Cambridge University Press, London and New York. (2002).
14. Jones. M. Buchanon, G. & Thimbleby, H. Sorting out searching on small screen devices, in Paterno, (Ed), *Human computer interaction with mobile devices*, Springer, (2002) pp81-95.

15. Jordan, P. Human factors for pleasure in product use, in *Applied ergonomics*, Elsevier, Vol 29 (2002), pp25-33.
16. Katz J and Aakhus M *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*, Cambridge.
17. Kim, S.D. Korea: personal meanings *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*, Katz J and Aakhus M,(2002) pp63-79.
18. Kopomaat T. *The city in your Pocket. Birth of the mobile information society*, Helsinki, Gaudeamus (2000).
19. Licoppe, C., & Heurтин, J. P. Managing One's Availability to Telephone Communication through Mobile Phones: A French Case Study of the Development Dynamics of Mobile Phone Use. *Personal and Ubiquitous Computing*, vol. 5, no. 2, (2001) pp. 99-108.
20. Licoppe C., Heurтин J., France: preserving the image, in *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*, Katz J and Aakhus M, (2002) 94-109.
21. Lindgren, M. Jedbratt, Svenaaon, E. *Beyond Mobile: People, communications and marketing in the mobilised world*, Basingstoke: Palgrave, (2002).
22. Loudon, G. *Design issues in mobile communications*, Ericsson (Singapore) and Light Minds, (2002).
23. Marcus,A. Ferrante, J. KuutiK, & Sparre, E. Babyfaces: User-interface design for small ispalys, *Proceedings of CHI 98*, ACM Press, (1998), pp96-7;
24. Perry, M., O'Hara, K., Sellen, A, Brown, B., & Harper, R. "Dealing with Mobility: Understanding access anytime, anywhere," *ACM Transactions in Computer Human Interaction*, Num. 8(4), (2001) p323-347;
25. Taylor, A. & Harper, R., The gift of the gab: A design oriented sociology of young people's use of mobilZe" in *CSCW: an international journal*, Kluwer, Amsterdam (forthcoming).
26. Taylor, A & Harper, R. "Age-old practices in the 'New World': A study of gift-giving between teenage mobile phone users", *CHI 2002*, Minneapolis, ACM Press (2002).
27. UMTS Forum: *The Social Shaping of UMTS*: http://www.umts-forum.org/servlet/dycon/ztumts/umts/Live/en/umts/Resources_Reports_26_index (2003)