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Mobile Phones as Technological Companions:

Users Perspectives and Experiences

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Abstract

Mobile Phones as Technological Companions: Users' Perspectives and Experiences

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The applicability of the term technological companion on mobile phones has been investigated with focus group sessions with mobile phone users in Uppsala, Sweden. A definition of a companion with features like, friendliness, long time proximity, information handling was conceived. With the help of this definition the applicability was then tried with the help of data gathered during the focus group sessions. The study shows that users rarely turn off their phones and that the phones accompany them almost everywhere. The phones are mostly used for communication between people, but also to access information, play music and to take photographs. The users would not want to live their lives without their phones but some of them agree that mobile phones and constantly being within reach can increase the feelings of stress. The users do not agree that they have a relationship to their mobile phones, other than that it is a useful tool for getting things done. Thus it is concluded that the users do not think of their mobile phones in terms of technological companions. Given that mobile phones do share a lot of the features that are thought to be necessary for a companionship it is suggested that mobile phones are likely to be a suitable platform for implementing a technological companion.

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Sammanfattning

Användarnas perspektiv på och erfarenheter av mobiltelefoner som kompanjoner

I takt med att datortekniken utvecklas har forskare börjat studera och utveckla nya typer av människa-datorinteraktioner. Tidigare har datorer främst setts som verktyg för att lösa olika uppgifter, men nu undersöker man möjligheterna att också skapa datorer som vi kan ha en mer personlig relation till. Forskarna tänker sig att datorn ska bli mer som en personlig assistent. Man brukar kalla dessa datorassistenter för "technological companions". Dessa assistenter är tänkta att hjälpa och avlasta användaren med hjälp av olika metoder för sökning, bearbetning och användning av information, exempelvis receptförslag baserat på kostrekommendationer eller genom att utföra bankärenden. Forskarna vet ännu inte exakt hur dessa assistenter kommer att se ut eller vilka egenskaper de kommer att ha i detalj.

För att ta reda på vad det är för egenskaper som är viktiga i ett kompanjonskap behöver man ha någon form av norm att utgå från. Om man antar att relationen mellan en människa och en annan människa i form av en kompanjon är snarlik den mellan en människa och en teknisk assistent, kan man utifrån definitioner av ordet "companion" hitta ett antal egenskaper som är nödvändiga att på sikt bygga in i den tekniska assistenten för att relationen ska upplevas som nära nog mänsklig. För att få en bättre uppfattning om vad begreppet innebär och hur det kan användas har detta undersökts. I den här studien är följande fyra egenskaper normerande för den tekniska assistenten: närhet, tillgänglighet, behjälplighet vid informationshantering, samt att användaren upplever en vänskaplig relation till sin assistent.

Mobiltelefoner omfattas á priori av åtminstone ett par av de egenskaper i relation till användarna som man tror att en teknisk assistent kommer att behöva ha, och i studien ställs därför frågan om mobiltelefonanvändare tänker på sina mobiltelefoner som tekniska assistenter, eller "companions".

Genom att studera mobiltelefonanvändare och hur de uppfattar sina mobiltelefoner utifrån de egenskaper som identifierats som nödvändiga för ett kompanjonskap, kan man få en insikt i huruvida användarna uppfattar sina mobiltelefoner som tekniska assistenter eller inte. För undersöka detta har femton mobiltelefonanvändare i fyra fokusgrupper fått tala och berätta om sina mobiltelefoner under fria former. Frågorna rörde hur de använder dem, när de använder dem respektive när de inte använder dem och så vidare.

Resultaten från dessa fokusgrupper visar att mobiltelefoner uppfyller de flesta av kraven på ett kompanjonskap, främst egenskaperna närhet och tillgänglighet, samt informationshantering. Det enda krav som inte uppfylls är det om en vänskaplig relation mellan användaren och produkten. Mobiltelefoner kan därför idag inte sägas vara tekniska assistenter i den meningen att de upplevs som kompanjoner. Däremot verkar det inte osannolikt att mobiltelefonerna skulle kunna vidareutvecklas till sådana, då de redan uppfyller tre av de fyra uppställda kraven på ett kompanjonskap.

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Abbreviations

3G	Third generation mobile phone technology
GPRS	General Packet Radio Services – A technology for sending information in packets.
LIREC	LIving with Robots and InteractivE Companions – A research project funded by the EU
MOBIC	Mobility of Blind and Elderly People Interacting with Computers – A project that developed technological aids to assist blind and elderly people.
PDA	Personal Digital Assistant – A term for a type of hand held electronic organizer.
SICS	Swedish Institute of Computer Science
TED	Technology Environment and Design, a seminar for exchanging ideas
UBICOMP	Ubiquitous computing – A term for describing how computers are becoming more and more common and how their presence integrates with and disappears into the background.
WAP	Wireless Application Protocol – A protocol for wireless communication
WLAN	Wireless Local Area Network – Wireless Local Area Network

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1. Introduction

Technological companions are being developed by several research groups around the world, such as (www.cogniron.org, 2009 and www.semaine-project.eu 2009). These companions are thought to become a new type of interface to computers making the human computer interaction more life like than it has been previously.

One feature of the companions are their ability to build relationships with their users. To achieve this a number of things is thought to be needed: companions should be available during extended periods of time, have a "memory" of their previous encounters with the user, they should be of general help to the user.

A companion could be used much like a computer is used today, for finding information, doing calculations and such. But some researchers are hoping that companions are to become equipped with some form of artificial intelligence, making them able to perform tasks autonomously, such as finding a lunch restaurant based on your taste, find more information about a subject you read about in the morning paper, as well as being able to participate in social activities, such as a conversation.

The notion of technological companions share some characteristics with the mobile phones of today. Mobile phones have rapidly become almost a necessity in the modern life and allow the users to communicate with people around the world, read and send emails, listen to music, browse the Internet and play games. Most users have their mobile phones with them at almost all times. Is it then possible that mobile phone users think of their phones in terms of a companion?

One of the research projects that work with technological companions is called LIREC, LIving with Robots and Interactive Companions. Research here aims to establish a multi-faceted theory of artificial long-term companions and establish this theory in robust and innovative technology (www.lirec.eu, 2008). The consortium consists of six universities, two research institutes and two companies spread across Europe. One of those research institutes is the Swedish Institute of Computer Science, SICS, and the Mobile Life lab. Their work focus more on the users needs and desires rather than the technological challenges. "At Sics we will try to start from peoples interests and needs, rather than to just focus on the technological aspects. We think that robots for example can function as a cross between a pet and a toy. We will start by studying different user groups and their attitudes and then create possible applications" (www.sics.se, 2009). This thesis was initiated as a part of that work.

1.1 Disposition

In the first chapter an introduction to the thesis is given and to the term technological companion. A research question is formulated.

The second chapter gives the reader the background to the thesis, a companion is defined, its use is motivated and some examples of personal information technology are given.

The third chapter describes how the study is done. The qualitative method, focus groups and limitations are discussed among other things.

After this, the data from the focus groups are presented in chapter four. The data is categorized according to how the term technological companion was defined in chapter two.

In the fifth chapter the results from chapter four are discussed, as well as the study it self.

In chapter six some conclusions sum up the thesis before it ends with the references in chapter seven.

2. Background

The first computers were very large and they were operated by a team of researchers. But already from the start computers started to get smaller and increasingly powerful, so that within a couple of years another step in computer evolution was taken when the computer became personal. The operator sat at a desk working on a computer screen. Now we have begun taking the next step in computer evolution. Computers have become smaller, faster and cheaper than ever before, making it possible to have a ratio of several computers per human. Just think about the abundance of mobile phones, music players, laptops, desktop computers, video games etc. The computers are playing an ever increasing role in our lives and are becoming so widespread that it is possible to talk about the computer becoming ubiquitous.

The term and concept of ubiquitous computing (ubicomp) was introduced in an article by Mark Weiser (1991). In it he describes a future where we are surrounded by networked computers who seamlessly integrate with each other and with our lives to make information and services constantly accessible. It was important for Weiser that the computers would become transparent, he said “The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it”(Weiser 1991, p. 1). In the next phase of computing, technology should become calm. It should not intrude on us, demand our attention or force us to do things. Rather it would just work, seamlessly and aid us in our lives. In the paper Weiser exemplifies how networked clip on ID-cards could be used to open doors to only the right people, telephone calls could automatically be forwarded to wherever the recipient might be, how automated meeting diaries could be generated just by knowing who were in what room together and what files were displayed etc. (Weiser 1991, p. 3). These examples might seem a little outdated since people nowadays have mobile phones constantly available making the the need for telephone call forwarding to the nearest phone obsolete, but they show that Weiser's vision was one of utility. Coffee would be ready when we woke up, our work would be simplified and cooperation made easy.

As Weiser's vision is slowly becoming a reality, people and researchers have been using computers to simplify everyday life for some time already, not counting what we usually think of as computer assisted work such as typing, doing spreadsheets and performing control tasks. Instead, using combinations of technology to create assisting and supportive tools for everyday life.

One example of such a tool is the Mobic, Mobility of Blind and Elderly People Interacting with Computers from the mid nineties. The Mobic was a two piece system that used GPS and speech synthesizers to help blind and elderly people plan and move out on the streets by them selves. The users could get information of where they were, what was in the surroundings and if they had programmed a route, where they should head next. This system made the users more confident and let them live more autonomously (Gill et. al 1995).

This system was quite bulky, the user had to wear a backpack with the computer,

batteries, a communication unit and the GPS in it. Since then the equipment has gotten smaller and cheaper, so the same functionality nowadays can be found in something with the size of a mobile phone.

A more recent example of a personal technology is the Sixth Sense prototype from MIT Media Lab. Built from off the shelf parts a research group have developed a wearable "gestural interface" that allows the user to interact with the device with hand gestures. The system consists of a projector and a camera connected to a communications unit for wireless access to the Internet. The system can project an image on any type of surface, showing information about the product you hold in your hand, display a map of the area you are in etc. (www.pranacmistry.com, 2009).

It is obvious that the development of computers goes towards smaller and smaller while gadgets become more and more competent and powerful as they combine different technologies and create novel solutions.

We are now ready to start looking at whether mobile phone users think of their mobile phones as technological companions.

3. Theory

3.1 What is an artificial companion?

After all this talk about companions it might be a little surprising to discover that there does not seem to exist a clear cut definition of what an artificial companion really is. We are used to think and talk about companions in everyday life, such as business partners, friends etc. But that is probably not quite it, they are artificial after all.

Since there is no clear definition of a companion, we can look at some various definitions and see where they overlap and where they do not, in order to form our own definition. For example the *Companions Project* who ”aims to change the way we think about the relationships of people to computers and the Internet by developing a virtual conversational 'Companion'” says that their companion ”is designed to interact with the user, develop a persistent representation of the information provided, and allow the user access to various kinds of information” (www.companions-project.org, 2008).

Researchers at LIREC ”aims to establish a multi-faceted theory of artificial long-term companions (including memory, emotions, cognition, communication, learning, etc.), embody this theory in robust and innovative technology and experimentally verify both the theory and technology in real social environments” (www.lirec.eu, 2008).

Dictionary.com a website that uses multiple dictionaries defines ”companion” as ”1. A person who is frequently in the company of, associates with, or accompanies another 2. A person employed to accompany, assist, or live with another in the capacity of a helpful friend” (www.dictionary.com, 2008).

A companion is also used to describe a many books, such as ”Students companion to Astronomy/Physics/Shakespeare/something else” which are user-guides to different subjects.

The lack of a unified definition might have to do with the fact that artificial companions mostly is a thing of the future. What is meant by an artificial companion is not exactly clear, perhaps because it changes according to what time horizon you use. If you are to talk about a companion today you have an experimental machine that might handle a limited variety of tasks. But if you think of what it might be in ten or twenty years it might be a totally different story.

By summarizing these various definitions we see that a definition of a companion includes features like availability and proximity, helpfulness and friendliness. Features we likely will see as requirements in a technological companion.

Availability and proximity for a technological companion is to be understood as it being in reach of the user for extended periods of time, during a long time. It could be that the companion is with the user for a whole day, several days, weeks and months in a row. A helpful companion might be a companion that remembers someones birthday, fetches a timetable for buses, suggests what to buy in the grocery store for that dinner it

suggested previously or something else entirely. Friendliness means that a companion has a more personal tone than computers usually have today. It might have anthropomorphic features and try to form a relationship with the user.

> In other words, a companion could be defined as something that is *accessible over longer periods of time,* you *have a friendly relation to,*and that *helps* you find, make sense of and use *information*.

These requirements can be met in a number of different ways. One could, for example, easily imagine prototypes with a life-like embodiment such as a robotic pet that moves around on the floor, wiggles its tail when happy etc. Or, just as easily, an interface on a computer screen, on a mobile phone or something completely different. This, in turn, makes it a bit difficult to pinpoint where to draw the line between the hardware and the software. Is a technological companion a matter of software or a hardware?

One could argue that a companion is exclusively a matter of software and that the platform does not matter since it is the software that will have the artificial intelligence, be friendly, that will help us find information and make it understandable etc. On the other hand, making use of the hardware, to create a body that utilizes emotional cues could probably enhance the relationship experience of the software. Thus marrying the software and the hardware and strengthening the relationship between the technological companion and the user. The answer to the question seems to be the not so satisfying, "It depends".

3.2 Mobile phones as companions

The companion features can to various extent be found in mobile phones of today; we carry them along all day, they give us access to friends and family, some of them have web-surfing and e-mail capabilities, they can synchronize with other appliances around us etc. And it is probably safe to say that there are plenty of users who can not imagine their everyday life being without their phones. Does that mean mobile phones could be viewed as companions?

As an additional motivation of the relationship between mobile phones and technological companions, think for a moment of smart phones and Personal Digital Assistants (PDAs). It does not really matter how is smartphone or a PDA are defined (there are no formal definitions), but think of what the names communicate. A smartphone for example, is by no means an ordinary phone, no, a smartphone is beyond your ordinary dull phone, it is "smart". What smart means is not entirely clear that too is not defined so potential customers will have to form in their minds their view of what it is to be smart. One can speculate that the advertisers are hoping for associations along the lines of *consciousness, will, knowledge* or some kind of *agency*. Turning to the PDA, we observe a perhaps even bolder claim to *consciousness* and *knowledge* communicated by the word "Assistant".

Before going any further one might wonder whether it is possible for humans to form relationships with technology at all. Isn't a relationship something between living things? Not necessarily it seems.

3.3 How people respond to computers and other media

To anthropomorphize is to attribute uniquely human characteristics to non-human creatures and beings, objects or abstract concepts. Almost anything can be subject to anthropomorphism and the ability to anthropomorphize seems to be a part of what it is to be a human. This means that emotional responses to computers are not necessarily as far fetched as it perhaps might seem at first. Researchers Reeves and Nass at the Department of Communication at Stanford University have in a series of experiments shown that people very often treat computers, television and new media like real people and places. They have shown that social and natural rules that we take for granted in real life and in interpersonal relationships, actually are at play even when we interact with various forms of media (1996 p. 5).

Reeves and Nass have for example shown that people tend to give higher grades to a computer that is evaluating itself than when another computer is evaluating the first. Much like you would to a human who is asking how well he or she is doing (1996 p.19 ff).

The reason for this politeness towards a computer, that we in an intellectual way know for sure do not have any feelings that might be hurt if we told it the cold hard truth, is that we are not adapted to a world with media. During our evolution the only socially rich behavior in our world came from other humans. Making the responses to this behavior almost automatic. Everything that seemed real was in fact real. Reeves and Nass argues that that still holds true to a large extent. Of course people can think about media and realize that computers do not have feelings, that stones that are thrown towards the viewer on a TV-screen will not hit them and so on, but surprisingly often peoples initial responses show that they do not make a distinction between flying stones on a TV or in real life, if it seems real, our brain says it is real.(Reeves & Nass 1996 p. 12).

Interestingly the illusions do not have to be well done at all. People readily attribute a wide variety of features to the character of a picture of objects drawn by a single line on a piece of paper just by looking at it (Reeves & Nass 1996 p. 81f).

As an example of how humans are being able to think socially about “dead” objects, think of the Tamagotchi, the Japanese toy that boomed throughout the world in the late nineties. The Tamagotchi is a small hand-held digital pet that “lived” inside a simple egg-shaped computer. The pet was cared for by three buttons allowing the owner to play with and feed the Tamagotchi, pick up its waste material and a few other tasks. If the tasks were not performed the pet would get a sad face and cry for attention. The Tamagotchi became quite popular for a while, especially among children but also among grown ups. (Donath 2004) The Tamagotchi-owners became so involved in their pets that they disrupted teaching in classes and prohibitions were discussed at some schools. There are even stories of road accidents because the driver was paying attention to the Tamagotchi instead of the road (Wilks 2006 p.3).

Forlizzi have shown that people who use a Roomba, a self propelled vacuum cleaner, quite often start to talk to it while it works it way around the floor, some families gave it

names, changed how it looked. There were even reports of a lady who had bought another Roomba to keep the first one company, since it seemed lonely (Forlizzi & DiSalvo 2006), (Forlizzi 2007).

The interesting thing about this is that it shows how easily we humans develop feelings towards simple objects that can not speak even when we have a fairly accurate idea of what is going on "behind the scene" (Wilks 2006 p.3).

3.4 How a companion could be used

According to the Companions project a technological companion is a new type of computer interface that allows the user to interact more naturally with the computer than before. It will not only be possible to talk to the companion and ask it to perform certain tasks, but also to have everyday conversations with it about such trivial things as the weather, old memories or what to eat for dinner (Wilks 2006). Technological companions are believed to be able to fundamentally change how we view computers and how we interact with them. Researchers hope that this will be done by a number of new techniques that are being researched and developed in the present. These techniques can, as already mentioned, allow for verbal communication, much like how we talk with other human beings. The companions will engage the users in a number of relationship building activities, have recollection of previous conversations and be able to make references to these, pick up unanswered questions or return to a topic that have been discussed previously (Wilks 2006).

Researchers picture these companions as long term friends who will follow the user wherever he or she might take it, being ready to constantly aide in information processing activities, provide company if lonely, remind you to exercise or suggest that you take an umbrella with you, since the weather forecast says it is going to rain in the afternoon. The companion could handle web searches based on your own profile, pick out interesting news articles, suggest concerts with music you like that will be held in your area, or suggest that newly opened lunch restaurant with Chinese food near your work, since you like Asian food. The possibilities are virtually endless.

Having computers sort out and suggest news articles based on your preferences, or suggest music according to you taste exists in various forms today. What a companion will do, among other things, is to implement an artificial intelligence and provide these or other services autonomously.

One motivation for these type of interfaces are that they have the possibility to allow users who for one reason or another have trouble using the old interfaces access computers and services. Or as a cheaper replacement to personal assistants. These users are typically thought to be elderly or children (Kenny 2008), (Wilks 2006).

As Wilks puts it, "a large proportion of old people of today are excluded from information technology, the Internet and advanced mobile phones because 'they cannot cope with buttons'". A companion who you could talk to, could then help them overcome difficulties with buttons and aide them in their correspondence with authorities, do banking tasks, ordering food, making appointments with nurses and doctors. The companion could remind them to take their medicine, monitor their

behavior and alert someone if they changed abruptly. As well as keeping them company and chat with them (Wilks 2006).

Another reason for researching companion technologies is the acknowledgement of the difficulties to handle and make sense of the increasing amounts of data and information that is available to us. Here it is thought that a companion could act as a middle layer, sorting out information according to the users interest, previous experiences and such, making the burden of information handling easier (Xiao 2001, Dowling 2001).

3.5 Research question

As shown above mobile phones have quite some features in common with technological companions so the question presents itself quite naturally;

do mobile phone users perceive and experience their devices as technological companions?

4. Method

4.1 Design of the study

Recapitulating the research question “Do mobile phone users perceive and experience think of their devices as technological companions?” one must ask how that question might be answered. What kind of data would have to be collected to be able to make a claim about what or how users think of their mobile phones? A straight forward approach would be to ask a sufficiently large number of mobile phone users if they think of their phones as tech companions. But since the term technological companion is not very well established among the public it might prove difficult to get an idea of whether users think of their mobile phones as companions or not. In the cases where users have heard of the term previously and have some understanding of it, it would not be surprising if there were variations between their definitions. Thus if you asked the question, the answers might get problems with validity. Are the respondents answering the same question, does your nay mean the same thing as my nay? What about positive answers?

One solution could be to describe the concept of a companion, in text or face to face so that the respondents may ask questions of their own, before asking if they think of their phones as companions or not. This method sure seems attractive, as it gives a clear answer as well as being fairly cheap, it could for example be done as a questionnaire that could be spread widely. This method though would limit the answers down pretty much to just a ”Yes, I do” or a ”No, I do not”. Surely one could allow for written comments on the questionnaire, allowing the respondents to specify how and why they think like they do, but there is a high probability that those fields would be left blank.

Ponder for a second that the study were carried out like this. A questionnaire was created; describing the concept of a technological companion in the best possible way, the question, Do you think of it as a such? And some space for comments. Lets make it easy and say that everyone who got a questionnaire took time to read, think about their phone use and then answered a yes or a no, and even wrote a short motivation. We would then be able to make a diagram showing two columns and say that 70 percent do not and 30 percent do think of their phones as companions. It answers the question, but does it not feel as if something is lacking? Why do they answer like they do? If they say no, how do they think of their phone instead?

So in order to get an idea of how the users think of their phone, it seems as if one would have to ask questions about how they use their phones. How often do they use it, where do they bring it, when and where do they leave it behind, what do they do with it? How is the mobile phone thought of? Larsson (2000) has shown that teenagers in Gothenburg use their phones not merely as a tool for remote communication but as an integral part in the social lives with their friends as they receive and write text messages, as well as having conversations with someone else on the phone, together with their localized friends. Making the phone something else than just a tool for remote communication. Knowing it started out as a mobile phone, a phone which was mobile, at first it was usually found in cars since the mobile phones were too bulky to carry around. But

eventually they got smaller and smaller and got more and more features such as a phone book, calendar, some games, text messaging just to name a few. After the first digital cameras made there appearance on the market, it did not take many years before we saw the first camera-phone. During the same time we started seeing phones with the ability to play digital music. The trend seems clear, the phones are getting more and more functionality built into them, and so, the degree of the phone that is used for making phone calls is getting smaller and smaller, up to the point where it is reasonable to ask whether it still is a phone with added functionality. Or if it would be more fair to talk about something in the lines of a ”multi-functional communication platform”? By asking all of these questions it would be possible to use the answers to see whether their relationship to the phone has some of the characteristics that a relationship towards a technological companion should have.

4.2 Focus groups

A focus group consists of a small number (3-6) of persons who sit together with a researcher and talk about a given subject. One of the main ideas of this formalized conversation is that the participants are to speak more with each other than with the researcher, who is mostly there to observe and if necessary moderate the discussion, introduce new topics.

One of the reasons for choosing this method rather than the classic interview is its ability to let the researcher get to know a wider range of ideas that comes to surface when a group of people interact and build their thoughts on the other peoples inputs. The use of focus groups can also be a good way to get new ideas for future research. There are two main approaches towards a focus group interview, the structured, and the unstructured. The structured approach is recommended when the participants are to talk about a potentially delicate matter, when they are in a vulnerable situation or when the object is to evaluate a product, a marketing campaign or something similar. The researchers role will then be to guide the participants in the conversation by asking the right questions at the right time, in order to maintain a delicate balance, or, when evaluating something make sure that the participants stay on course and cover the specific topics of interest. In the unstructured approach the discussion is less restricted, the researcher can let the discussion wander of topic to see if new associations are made that can be of interest that the researcher wasn't aware of previously. The focus is more on what the participants think is interesting that guides the conversation rather than the researcher.

Since it can be difficult to discover reoccurring patterns in a small sample, it is said as a rule of thumb that there should be at least three focus groups (Vibäck 2000 p.48). Depending on the complexity of the research topic it is possible that more groups could be needed in order to exhaust the subject fully, until a theoretical saturation has occurred (Vibäck 2000 p. 49).

The recommended size of the focus group varies between different authors, but Vibäck argues that in order to get the most out of every participant it is recommended that the focus groups consists of no more than four to six persons, with exception of the researcher. This has to do with the ability to see and be seen by everybody, to avoid the group breaking down into sub-groups who discuss with themselves and the distance

between people and the ability to feel a connection between every member in the group (Vibäck 2000 p. 49f).

4.3 A questionnaire

Before the session started the participants were asked to fill out a form with some questions about their mobile phones. Most of the questions were open ended, such as, what was most important when you purchased your phone, what do you use it for except making phone calls, what functionality does your phone have (some examples were given).This was done to get information about the the functionality of the phones, how much they paid for their phones monthly, and so on. Questions that would give a fuller picture of the respondents but was not necessary to ask during the sessions.[1]

After the main part of the study was conducted, it was decided that the demographic of the respondents should be somewhat widened. This was done with two short interviews by phone with middle aged mobile phone users.

4.4 Procedure

To find participants to the focus groups notes were put on bulletin boards asking for people who were interested in talking about their mobile phone use. Some of the notes specified that a compensation in form of a movie voucher would be given. The bulletin boards were on and around the campus area at Uppsala University.

When enough participants were interested to form a group a date and time was set. The sessions were held at after work hours in a classroom at the campus.

The discussions were filmed, after the respondents had been reminded that their participation would be anonymous. The sessions lasted for about an hour. After a short introduction to the subject the discussions started, usually with the question if and when they turned off their phones. During the sessions the respondents got to talk quite freely, with the moderator mostly listening, introducing new topics if the conversation came to a halt.

After the sessions the discussions were transcribed and analyzed. The sessions were held in Swedish, the respondents native tongue, the transcribed discussions have been translated by the author.

As an expansion of the research two fifteen minute interviews were made by phone with middle aged mobile phone users. Those interviews were not recorded but notes were taken during the phone calls.

The collected data was evaluated according to the definition of the term technological companion that had been created.

4.5 Limitations

Technological companions are still being researched and the forms and meaning of the

1 See Appendix 1

term has been agreed upon formally or informally by the research community. This means that “a companion” to one researcher might have a different meaning to another one. This means that the definition chosen in this thesis might not be how we will know or define technological companions in the future. It also means that the functionality that it is suggested in this thesis that future companions will have is likely to change.

Some researchers (Wilks 2006) have suggested that a companion might become a tool mostly for senior citizens and children. Despite that I have chosen to use young adults in their twenties as my primary group of respondents. This has to do with the focus of the research, the applicability of the term technological companion on mobile phones. Not all mobile phone users are in their twenties though. Since this research was made during 20 weeks I only had time to perform a few focus group sessions. With more time at hand one could interview more user groups.

5. Mobile phones as companions

In this part of the thesis the results from the study will be presented. Starting with the respondents themselves before moving on to what they said during the sessions. The information from the sessions is arranged in a thematic order according to the features outlined in the *Background* section. For each one of the feature there will be an excerpt from the discussions highlighting the views of the respondents. This will then be commented briefly before going further to the next feature. A discussion of the results can be found in chapter 5.

5.1 The respondents

The respondents were mostly university students in Uppsala. They were all in their twenties. They were studying a variety of subjects from engineering, librarian, physicians, teachers. Some reported that they were working beside their studies. The respondents had entered the survey by answering an ad posted around campus and in student housing areas. The ad were looking for people willing to discuss their mobile phone habits in groups and stated that they would get some form of compensation. Some of the ads specified the compensation to a gift-card to a movie theater.

Fifteen people responded during the time the survey was going on, resulting in four different focus groups. The groups consisted of three to five people. Some of the groups consisted of friends who volunteered together and other groups consisted of people who hadn't seen each other previously. The discussions were usually more lively in the groups where the respondents already knew each other.

The focus group sessions were held in classrooms at the university campus in after school hours, except for one group that were interviewed mid day.

To somewhat broaden the background of the respondents two short interviews (15-20 min) were made by phone with middle-aged people. They were both working and got to answer questions similar to the ones in the focus group discussions. Since the interviews were made one on one there was not much of a discussion or exchange of ideas as could be seen in the focus groups.

The respondents answered a questionnaire before the sessions started. They were not filmed when they were filling these out. But should they have been it would have shown them interacting together with each other and their mobile phones, showing their phones to the others, asking if they knew which model number their phone had. This happened even in the groups were the participants had not met each other previously. When the questionnaire asked about what functionality the phones had, such as 3G, camera, GPRS, WAP, music player, smart phone, WLAN, Bluetooth, e-mail etc, discussion often arose as to what technology was hiding behind the acronyms and whether this or that phone had that particular functionality. The apparent, or often used, functions were easy to write down, but quite a few of them were uncertain about their phones capabilities. This uncertainty were handled either by asking the people around the table, or if still uncertain either leave it out or guessing the functionality.

One respondent, Ms. Orange, choose to skip most parts of the form, especially the technical parts about the phones functionality but also what had been important when purchasing the phone.

A summary of the questionnaire reveals that 12 out of 15 respondents reported to have some sort of camera in their phone. 12 people also said that they had Bluetooth-capability. 10 had music players, 9 had WAP and 7 reported 3G capabilities.

In the field “Besides calling I mostly use the phone to” the most common answer was SMS: 14 followed by Calendar 6, Alarm and Photo/Movie had been answered 5 times.

These questions were open-ended meaning that the respondents could answer whatever they liked, or to not answer at all. For example, only one wrote that they use the phone as a watch, but during the sessions several respondents claimed that their mobile phones were their only watches. That more people didn't answer “as a clock” in the questionnaire can have several explanations, perhaps most likely that they didn't think of it. Why they didn't think of it can also have a number of explanations; that the clock isn't one of the phones main features when you think of it as a phone, that the use of the phone as a clock is obvious or so common that it wasn't thought of, or any other possible explanation. It might seem peculiar that five respondents said they used the alarm function on the phone, and while it's difficult to know if they include the watch in the alarm as well, the two functions seems to be close to each other.

5.2 Results from the sessions

5.2.1 Are the phones accessible over longer periods of time

As stated above a technological companion is something that is available and accessible over extended periods of time. So to see if a mobile phone could be regarded as a companion, the respondents were asked about when and where they had their phones with them, see Table 1, Table 2 and Table 3.

Moderator	Do you always carry your phone with you, why is that? Or perhaps, when don't you have it with you, and why?
Ms. Purple	I always have my phone with me. The only time I shut if off is when I'm having practice at Ackis[2], where you can't have it on, on some departments, then I turn it off. Otherwise I think it's almost always on.
Ms. Yellow	I always have it with me and I always have it on, I always have it with me because I use it as an iPod as well, so I use it to listen to music.
Mr. Grey	I turn my phone off if someone asks me to do it.
Ms. Orange	Yes, I guess I always bring my phone with me... I think. Sometimes I turn if off. Sometimes when I

2 The academic hospital, Uppsala, Sweden

	sleep. In school, at lectures and stuff I turn it off.

Table 1. Group 1 on accessibility.

Another group got the same question:

Mr. White	I have my phone with me practically at all times.
Mr. Pink	Yes, exactly the same here. I always have it with me unless I forget it. And it's never turned off either, I don't think I have turned my telephone off consciously in I don't know how long.

Table 2. Group 2 on accessibility.

The third group had similar answers:

Mr. Blue	There is a very easy answer to that question, or rather, I can put it like this, I can answer very easily on that question: I always have my phone with me. I never turn it off.
Mr. Green	You don't ever turn it off? But you do turn if off on seminars and such?
Mr. Blue	No.
Ms. Brown	Silenced.
Mr. Blue	I have it silenced. Even at night. But I don't have it silenced at night either. I think have have it with me at all times quite simply.
Mr. Green	Well, I have it with me at all times, I might turn it off sometimes, at night it's silenced and vibrationless as well.
Mr. Blue	You have vibrationless at night?
Mr. Green	Yes, so that I don't wake up of it. I'll see if someone has called me, but I won't wake up, this is because my cohabitant demands it.. yes. But otherwise I think that I have it with me at all times.
Ms. Brown	I think I do to.

Table 3. Group 3 on accessibility.

So, are the phones accessible over longer periods of time? Well, the short answer is clearly yes. But, when the respondents elaborate a little further it wasn't unusual that they remembered situations where they actually did turn it off, put it aside or left it somewhere, such as when training, at lectures or at a movie theater or as one respondent put it “in milieus where it is required”. But it is clear that the normal state of the phone is turned on and present.

5.2.2 Is it a friendly relationship

The friendly companion is more than a tool. It's an entity. A tool is a thing used to do

another thing, an instrument of use or service. To be friendly is to meet half way, to consider each others wants and needs. Although the definitions have varied during the centuries friend and friendly today are more mutual than previously.

Although mobile phones are customizable and hence become personal, they rarely give anything back to the user. They don't say hello, they don't ask how do you do, rarely provide guidance or comfort. The only mutuality found in my research is Ms. Yellow who has a Magic 8-ball in her phone that she " when [she] can't make a decision, [she] ask it..." This is not to say that the respondents do not have feelings about their mobile phones. They do, as shown in Table 3, 4 and 6.

Moderator	Would you call yourself addicted? Would your lives become more difficult without your mobile phones?
Ms. Orange	Yes
Mr. Grey	It would take much more time.
Ms. Yellow	Not mobile phones in general, but my iPhone is my baby and I would be extremely [inaudible]. But I don't know about particularly about the calling. It's more that you can poke the screen and do fun stuff with it.
Ms. Purple	Then you would get a land line.
Ms. Yellow	Yes you would definetley do that [inaudible].
Ms. Orange	We have a land line, but it's only me who uses it.
Mr. Grey	Yeah, but it's one of those rotary dials, then you can't make phone calls that needs button sounds.
Ms. Purple	But still, it feels like you're addicted on the phone.
Ms. Yellow	Yeah, you're depending on having some telephone.
Ms. Purple	But still, when I was out sailing a couple of weeks this summer, there wasn't any reception and then it was really nice not to have the mobile. It's really relaxing.
Ms. Yellow	I'm almost more frustrated if I have the mobile phone with me but there isn't any reception, than if I don't have it with me. I rather wouldn't have it in a metropolitan area rather than out in the countryside where you still aren't able to call with it.

Table 4. Group 1 on relationship.

In another group Mr. White talks about the use of his mobile phone during his trip around the world.

Moderator	Mr. White you've traveled around the world, and I guess you had your phone with you. Did it have any... what role did it play then?
Mr. White	Ooo.. It played a major part actually. It was, First, it was very practical to be able to send text messages back home and to text people you met on while

	traveling. You rarely called people because it was very expensive, but text messages isn't, it's pretty doable wherever you are. But, most of all, it's gives a strong sense of security when you're abroad. You have the possibility to call people when you're in a place where you don't know anyone, and you have the opportunity to get in touch with your parents in case you need to... I lost my credit card and then it was very nice to be able to call home to your parents, but also to be able to speak.. I mean people from the bank could call you and you could manage everything like that. Security, I think is the best word for it, actually.

Table 5. Group 2 on relationship.

In these excerpts we see that the users usually don't think of their mobile phones as ”friendly ”. It is rather thought of as a necessary tool for managing the everyday life, although there are a lot of emotions connected to the presence and use of this tool.

This is perhaps most visible in the case of Mr. White, it is not the mobile phone in itself that provides comfort or a feeling of security. It is the phone's capability to get Mr. White in touch with his beloved ones, or someone at his bank, that gives him comfort and a sense of security. But also for

A third group also talks about how the mobile phone can work in a social context.

Ms. Brown	But what is that, it's some kind of need that you apparently have to be able to be reached at all times and that you get stressed by knowing that people can't get to you.
Mr. Blue	I can really say what that is about, it's caused by an extreme fear of loneliness. [Everyone laughs]
Mr. Blue	But that's what it is, really I'll tell you... I remember...
Mr. Green	You don't wan't to be disliked.
Mr. Blue	No.. no, I'd say that it's more about that when I was little I liked to walk around in large warehouses, because there were always people around me, at the same time as I... it's the same things as here, there is a security in having, to know that you always can be reached and reach other people. You're not alone...
Mr. Green	But what about the other way around, the day it stops calling, when people don't call? Nowadays you're measuring your love “Damn, no one has called me during the entire week! I'm always available?! But no one is calling?!”
Mr. Blue	Yeah..
Mr. Green	You haven't got there yet because your phone is ringing all the time but I mean that it can be

	grueling... It seems as if you get a lot of your confirmation by the phone.
Ms. Brown	Via the phone.

Table 6. Group 3 on relationship.

Here, once again, it is noted that the respondents, in particular mr. Blue, do not turn to the phone in it self for company or gratification, but uses it as a tool to get in the company of his friends.

Another indicator of the users emotional attachment to their phones can be found when they are asked about what happens when they for some reason or another have to be without it for a while.
Several of the respondents in the focus groups claimed that they felt stressed if they had forgotten their phones somewhere, if the battery run out of power or if the signal were out of reach so that the phone could not communicate with the rest of the world.

Two respondents said that when they were on vacation and had deliberately left the phone at home they felt calm inside. This was interpreted as it was the phone that was the key factor behind the calm sensation. It is of course possible that the whole vacation experience combined made the respondents feel less stressed.

Is the relation between the user and the phone friendly? Well, it seems as if friendly or not is not a relevant question. The users do not seem to have any relationship to their phones, other that recognizing it as an important tool for managing their everyday lives. They do not turn to their phones for comfort or company.

5.2.3 Are the phones being helpful

The helpful companion aides in remembering time and places, provides shopping lists and makes time table for buses available. This is often described as functionality. So when turning to mobile phones “helpful” could be translated to what the phone can do, or let the user do. It is also closely related to the availability and use of information.

In today’s mobile phones it is quite easy to see at least three different functions that earlier were separated into three different platforms. It is the phone, the camera and the music player. All of these, as well as many other functions (calculator, watch, calendar to name a few) have migrated to a common platform. The respondents in the focus groups generally seem to appreciate this movement, but it is a development that at least for some, has a price that is too high.
After having discussed how it seems that social networks on the Internet such as Facebook more or less has become the standard for keeping in touch with groups of friends (for making invites to parties and arranging group activities where it would be too much hassle to call each and everyone that is to be invited) and that there is a growing number of social networks that you are more or less expected to be in, Mr. Blue makes a statement about multi functional tools.

Mr. Blue	But the best would be to have all that gathered in a small box. This is where it happens, in this thing. We’ve already started to remove stuff… well, like the

	watch, the calculator and put in things like the camera, I like that… I like it.
Mr. Green	The multitool…
Mr. Blue	The multitool-thingy, the MacGyver swiss army knife function
Ms. Brown	I'm a little skeptical to that.
Mr. Green	You are a little skeptical to that, why?
Ms. Brown	Because everything gets a little bit worse. The quality of everything you put in will get a little bit worse. If you put in a camera it will get worse, if you put in… by putting more functionality in a machine, you will lose a little quality on all the pieces.
Mr. Blue	Yeah, I can give you that, really, but…
Mr. Green	But it's the same thing, I would rather have an okay camera that I bring to a party and take photos with, rather than not having a camera at all, because otherwise I won't. And once more, I would rather have a decent music player…

Table 7. Group 3 on helpfulness.

In Table 8 Mr. Pink, Mr. White and Mr. Red are also discussing the built-in camera function.

Mr. Pink	Yes, but still, it does not work very well.
Mr. White	It isn't fully com... fully complete.
Mr. Red	Yeah, the resolution in mine isn't that good so I don't really use it.
Mr. Pink	Exactly, mine neither. And if I've understood things correctly the new ones aren't... quite as good as... I don't know... answer to the real deal.
Mr. Pink	Surely they are getting better, but they can't compete with regular cameras.
Mr. Red	But they are getting better.
Mr. White	I don't think they will catch up with system cameras but an ordinary digital camera I think they'll catch up.
Mr. Pink	Yes, and when they do that, I'm going to start use them.

Table 8. Group 2 on helpfulness.

Later on in their discussion Mr. Pink sums it up pretty well. See Table 8.

Mr. Pink	But still, to be able to put it in a small slim phone, the smaller the phones are the more difficult it's going to be to get it to work equally good, to get a good sound from it, to get a good camera from it at the same time and be able to call with it and use it in a LAN… all at once. At the same time you want it to be small.

Table 8. Group 2 on helpfulness.

The respondents seem over all to be aware of the trade off between size and functionality but they differ on where the benefits outweigh the disadvantages.

In Table 9 Group 1 describes a day when they use their phones extensively.

Ms. Yellow	Yeah, I would start by waking up to it since I use it as a alarm clock. Uh, then I check my schedule with it, and I check my calendar, I check the weather before i get out, instead of looking out the window to see if it rains i check my iPhone to see if it rains. I use to read, I've got Gone with the wind on right now that I'm reading.. and that's pretty nice because that book is this thick otherwise [shows with her hand] So i use to read it when I eat my breakfast, on my iphone... And.. when I was new in Uppsala i used to check my GPS to see where i had my lectures. I listen to the iPod going to the lectures, I've took lecture notes on the phone once, but that was pretty hard. I check my e-mail, uhm.. play some games.. ahh, I think that's about it..
Mr. Grey	But, i happen to have a free of charge mobile broadband so that when I don't have my computer i can.. But today I've used my iphone to wake up, then checking up train departures, I was going to Stockholm this morning, and check the buses, where they really departed. They had moved them three times apparently, there was three road constructions going on.. And if i hadn't had it with me i would have missed it and been three hours late. Or, i would have had to bring 100 time tables for the buses.. And I play a few games on it, and listen to music. Then it's nice to have one thing in the pocket instead of several. And i make some phone calls too.
Ms. Yellow	I do that too, and look up the time and take pictures sometime.
Mr. Grey	There are too many games on it.
Ms. Yellow	Mmm yeah, i also have a Magic 8-ball in mine so that when i can't make a decision, I ask it... and i write my shopping list on it when i'm going to the store.
Mr. Grey	Yeah, I do that too, 'cause then you have it with you.
Ms. Yellow	Mmm, but there is this shopping-list think you can download.

Mr. Grey	I have a schedule here as well, so I can se when to do stuff and where.. I synchronize automatically with my computer, all of the time. So if I change something in the computer it changes here too. Then, Text messages ans stuff... it looks kind of different compared to a regular phone, where it's just one text-message, here it's a long list so that you can follow it more easily.
Ms. Yellow	Yes, i have back to august 14 with my boyfriend. It is pretty long.

Table 10. Group 1 on helpfulness.

Are mobile phones being helpful? The answer is not as clear cut as in with the first questions. In this excerpt it shows that mobile phones can be and are being used quite extensively to solve a number of tasks, where talking to someone on the phone is merely one task among others. The phones are used to store books for reading, finding travel information while on the move as well as directions from the GPS, it is used while shopping for groceries. At one occasion a couple of weeks after the focus group session Mr. White demonstrated how he could access a recipe database from his phone, while inside a store, in order to get inspiration to cook a dinner.

Most of the respondents have mobile phones that has some sort of Internet access. Which means that anything on the web is, more or less, easily accessible via the phone. With sections of Wikipedia downloadable to OS-based phones (http://mobile.wikipedia.org, 2008), (www.wikipanion.net, 2008) and the rest of it, as well as search engines and other services accessible via the web mobile phones certainly can make information available and thus fills the helpfulness criterion of a technological companion.

It should be noted that it seems as if it is only the users with more sophisticated phones, here the iPhone, that use the web browsing capabilities. None of the other users said much about using it, indicating that they did not use it. It is reasonable to think that it is their phones who limit the Internet experience and that that is the reason why they are not using it more. Some of the iPhone users mentioned the cost of data transfer as a hindering factor for their Internet use.

One respondent who's phone bills are payed by the company and therefor do not have to care about costs did not use the possibility to connect to the Internet with his phone. This was partly due to the little screen, and the small buttons on his present phone. He also did not think that he would search for a phone with a larger screen and buttons to his next phone.[3]

Summarizing we see that although the phones are used not only for communication with other people, but also for listening to music and looking up information on the Internet, it is safe to say that the main use is as a telephone. There is little communication with the phone itself, and the interaction that happens between the phone and the user is mostly a necessity to be able to do something else. This is not surprising as the phones usually do not support this kind of interaction.

3 Phone interview, 18/2 2009

5.2.4 Is it a mobile phone

How is a mobile phone perceived? Since modern mobile phones have become so complex and with such varied functionality as cameras, gps, music players and Internet browsers, is it still "just" a phone?

After having discussed "the perfect mobile phone" and the respondents have come up with a gadget that is connected to the web, has a good digital camera, a music player with a large storage, a good screen for playing games and watching movies, a lot of small programs, like a calculator, an almanac, a system for handling notes, purchase-lists etc. Then the moderator asks if it would still be a phone.

Moderator	Would it still be a phone then? We now start by stating that it is a phone, and then add a camera, music and Internet-functionality and stuff… but if we re-think the last 30 years of technological development and just "Bang! We now have this apparatus. It has these functions." The same functions as a mobile phone, but not a phone first and foremost, we look at it with a different understanding of what it is.
Mr. Blue	It's not a mobile phone?
Mr. Green	It has all the functionality.
Moderator	Yes, but now we understand, or think of it as originally a phone that we have added functionality to. If we would… If you would start with a blank page "We now have all these functions built in to this box" do you think we would use the phones differently, do other things with it, and look at other features when purchasing a new one rather than the ability to send MMS or whatever it is? Think of an iPhone, except it isn't a –Phone but a –Box with the same functionality.
Mr. Green	But isn't it so, that even if we speak about other functions the primary is to be able to call each other, isn't it? And that might be because we started with a phone and not a…
Moderator	Camera with a built-in phone?
Mr. Green	Precisely, a camera with a built-in phone, but it's still so, in a way, that it feels like the need is biggest with the phone.

Table 11. Group 3 on how the mobile phone is perceived.

Later on Mr. Green says that even if we had started out with the camera, we would probably end up with a phone in the end. Although he admits that he says that in the context of having lived at least the last 24 years.

Group 2 got the same question, their answers can be read in Table 11.

Moderator	Yes exactly, I mean that it could be seen as a new interface to the world, that it IS the sixth sense[4].
Mr. Red	A multi function machine.
Moderator	Would it… you have sight, sound, touch, taste and smell and then you have that, an ability to grab messages out of the air, find time tables in other cities and stuff. Is it possible to see it like this, or is it still first and foremost a phone?
Mr. Pink	Well, I think you could look at it in that way, like a little friend you have that helps you with everything.
Mr. Red	Isn't it always a question of where to draw the line, I mean ten years ago you could send text messages and play games, wasn't it a multi function machine then already?
Mr. Pink	A little bit, but it was more a phone then than it is now.
Mr. White	Yes, then it was a mobile phone.
Mr. Pink	Now it is more other stuff than the phone.
Mr. White	But it's still called a mobile phone.

Table 12. Group 2 on how the mobile phone is perceived.

The respondents seem to recognize that the mobile phone perhaps is not as much a mobile phone as it once used to be due to the adding of other types of functionality. That said, they do not appear to willingly think of the phone as ”something else”. But, as Mr. Green notes, they have all been growing up and seen the change from just a phone, to a phone with a camera and music player. This reluctance might have to do with their historic understanding of the phone.

5.2.5 Other aspects of mobile phone use

During the sessions some topics were discussed that are not directly related to whether or not mobile phone could be thought of as technological companions. But since they shed light over how the users use their mobile phones some of those topics are presented.

One topic that was raised in many of the groups, often by the respondents themselves, were regarding how our lives have changed and how to value that change, since we started using mobile phones.

The trade-off between good and bad, or perhaps, wanted and unwanted effects of the mobile phone, returns in many forms during the focus group sessions. In Table 12 Mr. Grey talks about his ideas of how the concept of time and space has changed throughout history and how things now happen at an seemingly ever increasing pace.

4 The sixth sense in this discussion is a figure of speech, not a reference to the prototype developed at MIT Media Lab mentioned in Chapter 2. Background.

Mr. Grey	Well, if I'm to compare with… just something historical… if we start with before you had clocks and that stuff… it took several weeks to do things… things didn't happen as rapidly… now things are more direct.
Ms. Yellow	But I don't think that it is the time that has gotten more expensive per unit, but that we structure things in a different way, that we want to finish this sequence of events before we start thinking of the next one. While previously you sent a letter and then did a hundred other things before you got an answer, you now want to send an SMS and receive an answer before we go about and do things.
Mr. Grey	But at the same time I think… that if you had this time-space earlier, then you packed, you had to pack it more loosely, since there were more gaps when there was no communication, you couldn't reach that person, so you had to have more gap, but now you reach that person all the time so you can pack your time tighter, but if you then loose some bits that gets more valuable… that's also one of the shortcomings with the technology.

Table 13. Group 1 on how mobile phone have changed our lives.

In Table 13 Mr. White unknowingly picks up where Mr. Grey left of as he explains why he chose the iPhone and describes the dilemma with its many features.

Mr. White	Yes. Many want to have it all-in-one. And that is… that is part of the reason I chose my iPhone. But… if you have all in one, especially e-mail and that stuff. It kind of becomes a stress factor in your day to day life because if you have the ability to check your e-mail, your work mail and school mail and stuff, then you do, because you can. And then you'll have to answer a long e-mail but you don't want to do it on the phone because it is to cluttered, so you will have to wait until you get home a couple of hours later or go find a computer… It's very practical in one way even if it is a stress factor in another since you get more and more reachable the more the phone can do.

Table 14. Group 2 on how mobile phones have changed our lives.

The idea that mobile phones makes us more stressed by constantly interrupting us and never letting us have longer periods of time when we can work or think uninterrupted is found in the other focus groups as well. When discussing whether constant availability is healthy or needed Mr. Blue raises a question about how we define what is good and bad, see Table 14.

Mr. Blue	…is it really unsound to bring the mobile phone along all the time? I don't think so.
Ms. Brown	I think so.

Mr. Green	Yeah, I think I agree with Ms. Brown that it is unsound, but then Ms. Brown and I aren't that sound either. Sound should really be to turn it off for longer periods… like, when we are studying, studying for an exam you and me, at first my phone rings, I walk away 10 min to talk. Get back, we're about to tackle the problem anew. Then your phone rings, you walk away to talk, you get back, then my phone calls again or I receive a text message and I'll reply while we're discussing the problem at hand. This "on demand" thing is a bit… harmful… to productivity.
Mr. Blue	But then… well.. it's kind of… I don't know, you have to put it against each other, the good vs. the bad. I won't say whether it's more sound or not… because you just said that is has something with effectiveness to do, and you can say that there are so many other forms of effectiveness. We live in parallel lives. You have all your booking reservations, I… have friends calling.
Mr. Green	Kontaktdagen.[5]
Mr. Blue	Let's not forget Kontaktdagen! So I would say that I would probably be less effective if I had… If I wasn't always available…

Table 15. Group 3 on how mobile phones have changed our lives.

The respondents in the focus groups seems somewhat ambivalent on how to judge the impact of mobile phones. This ambivalence, and especially the stress that constant availability generates, is not something that the older respondents said anything about. As a final thought it could be noted that even if some of the respondents were concerned about getting interrupted and felt stress, none of them reported on taking measures to prevent it.

5.3 Summary

The main findings in the study can be summarized as below.

Accessibility - Turned on and present, but usually turned off in milieus where required.
Friendliness - The respondents does not think of the phone in terms of friendly or not.
Helpfulness - The phone is used as an aide to get things done, it does not do it itself, and thus is not as helpful as it is useful.
Mobile phone - It is first and foremost a telephone but with some added functionality.
Other aspects - Constant availability is generally appreciated but causes some stress.

5 Kontaktdagen is an event where students meet representatives from the labor market.

6. Discussion

After reviewing the data gathered in the focus group sessions we are ready to return to the research question, “Do mobile phone users think of their phones as technological companions?”

In the *Background* section a technological companion was defined as something that, is *accessible over longer periods of time*, and that you *have a relation to* and in a *friendly* way *helps* you find, make sense of and use *information*. We have then examined these features one by one with the help of the comments gathered during the focus group sessions.

We have seen in table 1,2 and 3 that the respondents have their mobile phones accessible for extended periods of time. This fits well into how a companion is thought to be used. Researchers want the companions to be available but non-intrusive. This is similar to mobile phones in the way that they play a signal when incoming calls arrive. And even if companions are long term, it is quite possible that they at sometimes will be turned off, set to a “silent mode” of left at home. Perhaps when you go to a movie or have guests over for dinner or other times when a companion are not suitable. Much like we do with mobile phones.

In Table 4, 5 and 6 we have seen that the respondents do have a relationship to their phones. This relationship is characterized of the phones value as a facilitator of communication with remote people, or, in other terms, as a telephone. The relation has little to do with the phone it self, and one phone could be exchanged for any other phone quite easily. The relationship between the respondents in the study and their mobile phones can not be said to be characterized by relationships that are to be formed with technological companions.

This result is not surprising. Mobile phones do not invite the user to any emotional interaction with the phone it self and does not use any anthropomorphic cues that could appeal to the user to assign it any human features. Thus it is merely regarded as a tool for communication. One can speculate in whether this has to do with the evolution telephones have undertaken. As Mr. Green pointed out they all have a preconceived notion of what a telephone is remembering the phones from his childhood when a telephone was merely an apparatus for making distance calls. If so, then the children of today who are growing up with mobile phones might have a different view of what a phone is.

Mobile phones are not considered particularly friendly. But they do aide in information processing, either by allowing communication with someone else with a telephone, or by being able to access the web and finding information there or in some other way, see Tables 7, 8 and 9. As mentioned above, since mobile phones do not engage in any relationship building activities it is hardly surprising that they are not considered friendly. Regarding the information handling capabilities of mobile phones, it should be mentioned that the kind of personalized interface companions are thought to become have not yet been widely spread. Even though mobile phones are personal they do not

store much private information about the users habits and personal taste that could be used for making the information processing more personal.

Taken together, one must conclude that the mobile phone users in this study does not seem to think about their mobile phones as technological companions. Although mobile phones and companions share many characteristic features, mobile phones are generally lacking the feature crucial for a companion, the ability to build a relationships.

But since mobile phones do share some of the features with technological companions it seems that mobile phones would be a suitable platform to implement a companion on. Previously mobile phones usually had a screen and some buttons, but since the success of the iPhone and its full phone size touchscreen more and more manufacturers seem to develop phones with similar layout. This screen could be used to present the companion visually, making the phone look less like a phone and more like a companion, i.e. there would not be a lot of buttons reminding the user of it being a phone.

If visual cues are important for how users receives the companion, it could argue that a technological companion might be suitable to implement on a device such as the aforementioned Sixth Sense. The companion could then display itself on any available surface. The companion could also take on any character of the users liking, such as a cat, a human face, a paper clip etc.

How companions will be received brings us once again to Mr. Greens statement about preconceived notion of mobile phones. This study indicates that users do not think of their phones as companions nor as “multi functional communication platforms”. Could a technological companion implemented in a phone change how the users perceive their phones? It is reasonable to think so since a companion would be a radical step in how you interact with the apparatus, and, companions would be able to do even more things than a mobile phone does. It is of course possible that technological companions could be introduced as something entirely new, and with a novel form factor that does not remind users of mobile phones.

With the advancements in robotics it have become meaningful to think about how the interaction with a robot might be designed. We are not necessarily talking about humanoid robots at first, but perhaps a robot animal something like the Aibo or the Pleobot. If that would become a reality one would also have to think about physical interactions, would the robots want to hug their users? Would the users want to hug their robots?

Aside from the technical discussion, one should also take some time to think about the moral and ethical issues with what you are doing. Relationship building technological companions will have an impact on us if they become what the researchers are striving for. Since they will spend time with us they will get to know us, what will happen with that knowledge? Ponder for example that an elderly person have spent a lot of time with her companion, looking at photos from a rich life, talking about them, trying to sort out the important events in life. Making a biography of her own. What would happen with the companion and the knowledge that it has acquired when that old person passes away? Is it obvious that the content would be available to her relatives, who might get

very happy to hear their late grandmother talk about pictures from her childhood? What if it turns out that there were some nasty secrets no one knew about, that perhaps should have followed grandma to the grave?

This example sure seems odd and they do make little sense now but could eventually become something that we in a very real way will have to deal with.

6.1 About the study

In this study the application of the term ”technological companion” is tested on mobile phones. The definition of a technological companion used in this thesis were grounded in various definitions of what a companion is. Then its main features were identified and motivated in a discussion. These were later used as a reference to decide whether or not the respondents thought of their mobile phones as companions.

The respondents were mostly students at Uppsala University. Since the sample size is fairly small it is not possible to come to any general conclusion about how people in general think about their mobile phones.

I, the author, find my results credible. And even though I have tried to maintain a neutral standpoint towards my material and let it guide me in the research process, I must admit that I from time to time have been skeptic about the idea of a mobile phone as a companion. With this said, it is possible that I have overlooked some detail, missed a nuance or perhaps asked the wrong questions completely, and thus “guided” my respondents to give a “correct” answer. I do not think that is very likely though. It was a conscious decision to let the respondents speak freely among themselves in the hopes that the discussion would be guided by their thoughts and ideas.

All in all the reader should be able to follow the decisions that have been made throughout the thesis, and even if the reader does not agree with them, they should have been motivated.

On a personal level I find the idea of technological companions as pets, caretakers, buddies mildly disturbing. I find some comfort in knowing that there is quite a long leap between alive and inanimate, if only because it reduces the amount of possible answers to the question of the meaning of life, universe and everything.

7. Conclusions

In this study the meaning of the term “technological companion” is studied. A definition of a technological companion is created and argued for. The term technological companions applicability on mobile phones is investigated through a series of focus group sessions and interviews by phone.

The study shows that mobile phone users in this study do not think of their mobile phones in terms of companionship. They could at best be described as valuable tools. This conclusion is not very surprising since most mobile phones do not engage the user in relationship building activities that seems to be important to define a companion. Mobile phones and technological companions share some common features which might make mobile phones suitable platforms to implement companion technology on.

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9. Appendix 1

Background
Name: _____ Age: _____

Occupation:

_____

Current mobile phone (brand/model):

_____

Functionality (3G, camera, GPRS, WAP, music player, smartphone, WLAN, Bluetooth, e-mail etc.):

_____
_____
_____
_____
_____

Type of subscription (pay per month, pay as you talk):

_____

Who pays the costs for the phone:

_____

When I bought my phone, this was the most important thing:

_____
_____
_____

Number of previous phones (ca):

_____

Besides making phone calls I usually use the phone to:

_____
_____
_____
_____
_____