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# Saying it all in 160 Characters: Four Classes of SMS conversations

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## ABSTRACT

Past research into the uses and practices of mobile phone text messaging (SMS) focuses on the user groups of teenagers and claim that research into this group can inform us about design of future communication technologies. By studying another user group and relating SMS to PC based instant messaging, we gain insight into more complex use entering the work sphere. In addition to most of the findings similar to the previous studies, we find, firstly, that SMS use supplies users with a comforting social presence while it aids to control negative associations with availability. Secondly, SMS changes our group's lifestyle and behavior to a much higher degree than other communication technologies. On the basis of these findings we present a model separating between four types of communication facilitated by SMS. The model describes the novel aspects of instant text communication and aims to inform the design of future communication technologies.

## General Terms

Design, Human Factors.

## Keywords

Computer-mediated communication, ubiquitous computing, User studies, qualitative empirical methods.

## 1. INTRODUCTION

Text communication keeps expanding to new media; from email and PC based instant messaging to mobile phone based text communication, these channels are used for collaboration and communication to a greater extent than ever before. SMS (Small Message Service) is one of the most unlikely successes in this category. Despite a limitation of 160 characters<sup>1</sup>, limited input modality, over 5 million text messages were sent in 2001 in the Scandinavian countries alone and mobile phone subscriptions had reached over 80% of the population in Scandinavia in 2002, making the mobile phone almost twice as popular as the PC [16]. Many researchers have been puzzled with the rate of adoption, especially among teenagers [5, 9, 13]. They have

searched for the underlying motives and have found that the medium is used because it affords discreteness, light social interaction and mobility. Still, SMS is increasingly becoming part of other age groups' everyday life and even entering professional work spheres. A logical step in research is to explore older age groups and compare to previous research to explore how SMS facilitates social behavior and habits when the teenagers 'grow up'.

In this paper we focus on young urban adults who's usage of SMS have expanded over the last years, just like teenagers, and as we will show, contain several similarities with the teenage use patterns found in previous studies, but still differ as young adults hold more professional relations and the cost of mobile phone use is not considered an issue. First we present results from a study comparing use patterns of SMS and IM. The study was designed to reveal how input methods and mobility influence use patterns in instant text messaging. Second we elaborate on three major findings: SMS use is rooted in social context, SMS helps users gain a social presence while controlling availability and finally that SMS is in fact changing the user's life style and behavior. Finally we present a categorization of what we found to facilitate SMS communication that can be divided into four different classes. We conclude by pointing to how SMS communication can facilitate a multitude of lifestyles because of its simplicity, discreteness and mobility. As today's teenagers and young adults enter the professional world of work (some already have), they are likely to bring their SMS habits with them and continue to explore new parts of their lifestyle that SMS can support.

## 2. RELATED WORK

Despite SMS being a new media channel, a lot of research already exists in this area. Most of the studies concern mobile phone use as a whole, but some studies have considered SMS use separately because of its increasing popularity. SMS is referred to differently in different parts of the world; in the UK it is simply called 'text messaging' and in some Asian countries, it is referred to as 'mobile email'. However, to Europeans, mobile email refer to sending and receiving actual email from a mobile phone (which is possible by way of WAP), where SMS is only received by one single physical phone. Most research of SMS use has taken place among groups of teenagers in either Scandinavia or Asia [9, 13, 22] and they concern several issues from use patterns and motivation to class difference and peer-

<sup>1</sup> Some newer mobile phones have doubled this capacity, but it still means that the receiver with an older model will get two messages.

pressure. Our study is also placed in Scandinavia (Denmark) but we explore a slightly older group of users. Where the few studies concerning other age groups include a wide user group in age and lifestyle [10, 12], our user group is fairly homogeneous.

Before looking into the findings of previous work on SMS and general mobile phone use, we briefly point to another relevant instant text communication channel that has received much more attention because it is (at least in a technical sense) a much older medium: Instant Messaging.

### 2.1 Instant Messaging

IM is not a new technology, and it is rapidly becoming more common, for example in work environments and among teenagers, where most research is represented [6, 11, 15]. Studies focus on users' style and purpose for communicating through this particular medium but have also focused on issues such as awareness and presence [14, 24]. Where early research determined that IM is used primarily for information exchange [8], Nardi et al. report on their findings of outerraction: how people use IM for the purpose of maintaining social connections to others [15]. As we will show, similar aspects of social presence were found in our study. Nardi et al. report that their participants maintain a close bond to their co-workers by just watching their 'buddy list'.

None of the reviewed studies look at whom users communicate with. This is mainly due to the fact that the studies are already set in a specific user group. Since several studies looked at IM usage in the work place and among teenagers [6], research has shown that IM communication takes place between co-workers and peers. We aim to use IM to distinguish two similar yet different communication channels and therefore explore the same kind of users for both channels; the IM use is in our study not limited to either work or peers.

### 2.2 Mobile Telephony

Although mobile telephony is a new communication medium, at least in relation to its distribution among the population, much research has already been conducted in the area of mobile phone use and its effect on social and behavioral patterns. Some research focuses on the initial adoption of mobile telephony [19], where other research looks at use within certain populations such as teenagers [13, 23]. Issues such as general handset usability have also been examined [20] and the identification of the mobile phone's move from the workplace to the domestic environment has been explored cross-culturally [2].

The use of SMS has most often been studied within the studies of overall mobile phone use. It is difficult to distinguish between behavioral patterns in the use of text messaging and voice communication, because, as we will point out further down, most text messages are 'substitutes' for minor coordinating voice phone calls. In the present study we address the distinction between text and voice communication by specifically inferring the participants if they would have made a phone call instead of texting and we are aware that because the communication medium is the same, the use patterns sometimes melt together in the actual interaction. But, as we will show, there is a distinct difference between using SMS and voice communication; users are much more likely to communicate via SMS than voice calls

due to numerous factors that will be elaborated on further down. We now present the two-part study comparing the use of IM and SMS and the elaboration of SMS use.

## 3. THE INSTANT TEXT COMMUNICATION STUDY

We conducted the comparative study to find if SMS and IM share use patterns and, if so, what these are as well as to distinguish a new mobile text communication channel from a stationary one. The findings show that the similarities in use are very limited. We then continue focusing on SMS communication and conducting a qualitative study exploring in depth the use of SMS.

Because much previous research of mobile phone use has focused on teenagers, we found it important to look at a different user group. Based on casual observation, it is our belief that SMS has a much greater user population than teenagers and we therefore chose to look at young, urban adults, students as well as professionals. This group indeed show different patterns of use; one of the major differences being their lack of economic concern. Where studies show that teenagers often use SMS because the cost is more predictable than phone calls [5, 23], none of our participants had any financial concerns. In fact most of them report that money is never on their mind when using their mobile phone, either calling or SMSing.

### 3.1 Method

The first comparative study was carried out as a qualitative study of the participant's communication habits over a period of 12 days. We conducted the study through a fairly simple set-up. We wanted to be able to compare the use directly and we focused on conducting the study of each group – IM and SMS – in a similar fashion with similar participant demographics. The two subgroups were found in different countries (the United States and Denmark), in order to get participants who were either SMS users or IM users and who used the technology to a fairly even extend; we believe that despite the cultural differences, since both groups were found in western, urban areas and had the many similar features such as age and gender distribution. This initial comparative study lays the ground for the in-depth study of SMS use. Because it is now possible to log into an IM account on a cell phone, we made sure that all our participants in the IM groups were using the stationary version of IM.

The first part of the study consisted of a fill-in journal, composed as two 'mirrored' journals, where the same inquiries and questions were posed, regardless of the communication technology. Naturally the journals were adapted slightly to the each group, especially in regard to messaging level. Where we could easily ask the SMS users to report the number of messages they had sent and received for example, IM use is more conversational in nature and the level of use can therefore not be compared directly. We can only compare the number of different people that each user communicated with per day. The journal questions varied each day, ensuring that the participants kept paying attention to the question being asked and had to read the fill-in journal closely every night again, in order to answer each question. Sample journal inquiries are presented in table 1.

**Table 1. Examples of questions.**

SMS user group	IM user group
How many of the SMSes you sent today were important?	Of the conversations you have had today, which ones were then important?
Think of the third SMS you sent today. Explain what you said and why you send it. Why did you use SMS and not any other medium?	Think of number 3 person that you 'chatted' with over IM (if you only chatted with two, think of no. 2, if only one, think of that one): What was the topic about?
Thinking of same conversation: would you have called up that person to have the same conversation if SMS had not been available?	Thinking of same conversation: would you have called up that person to have the same conversation if IM had not been available?

The second study was conducted by interviewing 7 of the SMS participants inquiring to the details of their SMS use. Few of the original SMS users were in fact IM users as well and some had picked up the technology in-between the course of the two studies, therefore these were chosen and their IM use was then related to their SMS use. This way we could not only diminish the cultural difference, but also get insight into an internal difference between the two communication channels. The users were interviewed one-on-one and the interviews were recorded and transcribed immediately. The interviews regarded the use of SMS communication and elaborated on the diary that they had filled in a couple of months before. They consisted of open-ended questions and revealed details about topics of conversation as well as users' motivations for initiating conversation. Because of the time span between the two studies, we did not infer to specific answers in the participants' fill-in diary, however, the interviewer read through the individual participant's diary before each interview.

### 3.2 Participants

Since much use of instant text communication is found among teenagers and young adults, researchers have previously focused on this group in their studies [4]. But since use is not limited to this group we decided to look at another growing group of users: young, urban adults, professionals as well as students. Many subgroups within this population use one of the communication technologies but not necessarily the other. We therefore chose to study two sub-groups of young urban adults in their twenties and early thirties, each group using one of the communication technologies. They were chosen to represent a strong group of highly active, technology savvy users, who do not have the economical restrictions as for example teenagers. As we will elaborate on further down, their main concern was time and their lifestyle was in many cases highly mobile due to either their job or their combination of student life and job.

**Table 2. Participant Demographics, Study part I.**

Participants	IM user group	SMS user group
Number	22	21
Males/females	10/12	9/12
Average age	25.3	25.8
Age range	20-34	21-36
Age standard deviation	4.0	3.5
Students/non-students	12/10 (57%)	14/8 (64%)

Our 43 participants were all recruited from either a predominantly IM-based environment or an SMS-based environment. The former group was selected partly from a group of computer science graduate students and partly selected among participant applications from the general community in the San Francisco area. The latter group was recruited within Copenhagen, Denmark where SMS communication is much more common than in the United States. The participants were matched to the first group, so that both groups had an equal distribution of males and females, students and professionals and roughly the same average age. We did not control for measures such as social status, education level (among the professional group) and general interests. It should be noted that the students were from many different areas; only 30 % of the IM participant students and 18% of the SMS participant students were in computer science.

**Table 3. Participant Demographics, Study part II.**

Participants	SMS user group
Number	7
Males/females	3/4
Average age	25.7
Age range	20-32
Age standard deviation	3.9
Students/non-students	4/3 (57%)

The greatest difference between the groups is that 57% of the IM group are students, whereas 64% of the SMS group are students. We made sure that participants were not using the other type of communication to a high degree, however, where only one participant in the IM group uses SMS 'about once a week', 7 participants in the SMS group use IM 'a couple of times a week', or 'about once a week'. The remaining participants did not use the other communication technology at all. Both groups received equal compensation for their participation.

The last part of the study was carried out with 7 selected participants from the SMS group. They were selected from being

some of the most active SMS users and because some had taken up the use of IM in-between the studies, we chose to interview mainly dual users. 5 of the 7 were therefore also IM users at the time of the interview.

#### 4. MOBILE VS. STATIONARY TEXT COMMUNICATION

In this section we review results from study part I, in regard to three findings of interest: how much they use medium, who users communicate with, and general subjects of their communication. All three factors have been investigated before and we therefore relate our findings to previous research.

##### 4.1 Frequency of communication use

The SMS users of the part I study were high-level users of instant text communication and seemed to use SMS as an integrated part of their life; only 1 of 12 days on average did the participants not use SMS and they sent on average 4.5 messages a day and received 4.5 messages as well. Not all were evenly active and the average for all 12 days varied between 2 and 19 for the sum of sent and received messages. Most participants received on average the same number of messages as they sent; only one participant received on average 6 messages but sent only 3.5. The frequency is slightly higher than reported by Grinter and Eldridge in their study of teenagers, where their participants on average received 3 and sent 3 messages per day [5]. It is likely that the older group's lack of economical concern is due to this increase, but another factor could be that their study was made in 2001 and our in 2003; the number of SMSes has increased continually the past years.

Although it looks like the participants sent the same amount as they received, we found a difference according to gender. Where females send more than they receive on average, males receive more messages than they send. As table 4 shows, it is not a great difference but it is apparent.

On important to notice in comparison to past studies is that all the SMSes were sent from the participant's mobile phone. Where previous research report that many text messages are sent from PCs to a mobile phone [5], this was not possible for the participants at the time of the study. The mobile phone providers in Denmark and some other Scandinavian countries made it impossible to send SMS via the Internet in 2002 and since then SMS has been confined to mobile phones, thereby always charging the user a fee.

The frequency of IM use is not directly comparable to the SMS because IM is most often used synchronously where SMS is used more asynchronously due to the differing input modality and the absence of certainty that the receiver is present; however, it can be argued that both media channels can be used both ways. As expected with a stationary communication channel, the IM users had more days where they didn't communicate with anyone through the medium than the SMS users. On average the participants did not use the channel 2.2 out of the 12 days. However, this factor is very likely due to limited availability to the medium.

##### 4.2 Who do the users communicate with?

The people the participants communicated with differed greatly when comparing the two groups; as shown in figure 1, is SMS mainly used to communicate between friends and significant

others (the number was adjusted for the participants who reported not having a significant other). IM communication on the other hand has a much broader scope of relationships. It should be noted that even though we defined a 'long-distance friend' similarly to the two groups ('a friend you have to drive for more than an hour to visit'), the cultural difference make it impossible to compare directly. Where the lifestyle of Americans and the major distances result in numerous 'long-distance friendships', the compactness of Denmark makes this type of relations much more rare. Still, as described in other studies of SMS use, the communication mostly takes place between peers, also in our age group [23].

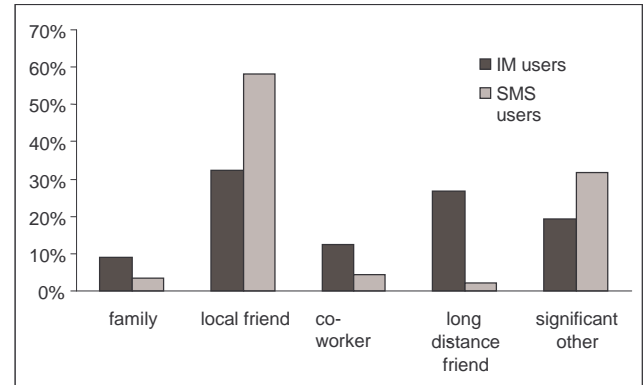


Figure 1. Percentage distribution of people the participants 'talked' to each day, separated into category.

##### 4.3 What do people use Instant Text Messaging for?

The users in our study merely confirmed present research that IM communication is used to uphold social relations as well as for work purposes. Most IM communication relates specific goal oriented questions such as help with a specific task or general update on each other's lives. One participant describes a conversation:

I talked to my brother about how he is and how the wedding preparations are going. I always talk to my brother over IM because it's cheap and effective. We hardly ever talk on the phone unless needed.

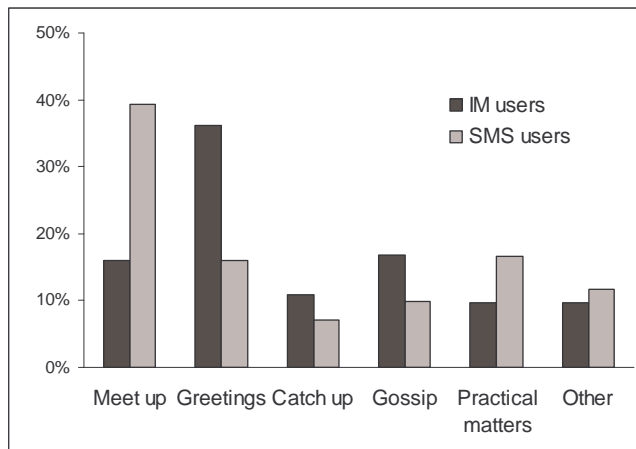
This sentence illustrates many of the IM conversations well. It was an important conversation, but without IM it would probably not have taken place in the same impulsive way. Other conversations are meta-communication, which is also pointed to in other research. Many of the participants in Grinter and Palen's study of teenagers use IM to ask if others are available for communication [6]. One of our participants describes a conversation:

My boyfriend lives in [another state] and I logged on to tell him I was trying to call him and to answer his cell phone.

As seen in figure 2, the IM users were more focused on general greetings and SMS users were very focused on coordinating and meeting up. The SMS communication was mainly target oriented and, as indicated by previous research, used to a great

extent to coordinate social activities [5]. Often the messages were directly used to coordinate further details of where two people were supposed to meet. One participant describes a message:

[The message was regarding] where exactly we had arranged to meet. We were actually standing at two different entrances [to the theater]. I SMSed because I didn't want to call in case she was just a bit late. ... It was just to say where she could find me, without seeming too impatient.



**Figure 2. The topics of conversation in percentage according to communication medium.**

The finding that our participants use SMS for coordination relates closely to Ling and Yttri's concept of micro-coordination. They describe several aspects of micro-coordination, a redirection of a trip that has already started (calling to ask the boyfriend to stop by the store for milk), 'softening' of time (calling to say that one is late) and the 'progressively exact arrangement' of a meeting (coordinating more precisely as seen in our example above) [12]. Although the researchers include both voice and text communication, we found all three types of communication in our study of SMS. The second action, SMSing that one is late for an appointment, is especially common among our participants; one of the participants of study part II says that she often SMSes if she is stuck on a late bus or train, but she would never have called because that would take too much effort. It is a message that does not need a reply, thereby making it the perfect candidate for instant text communication.

## 5. VOICE VS. TEXT COMMUNICATION

We now continue describing results from study part II; here the use of SMS is explored in depth, as an integrated part of a young urban lifestyle. However, we explicitly distinguish SMS from cell phone-based voice communication in order to extract the behavioral patterns that are essential to text communication rather than general mobile telephony. Most previous studies look at the overall use of mobile phones; however, we limit our research to one communication channel: SMS. To distinguish voice communication use from text communication in the results we asked the participants in part II of the study how their world would look if they had voice communication on their mobile

phone but not text communication. Almost all of the participants agreed that although they indicated in the diary that they would have had to place a phone call in many specific SMS situations, their behavior would be entirely different. Three of the interviewees said specifically that they hated to talk on the phone and that they would just make set plans for meeting if SMS was not available; they claimed that many of their friends and acquaintances were people they would rarely call up but they didn't mind SMSing them. This factor says not only a great deal about social behavior but also about Danish mobile phone culture<sup>2</sup>. We therefore conclude that SMS is the great factor of the change in lifestyle, not just the mobile phone as a whole.

## 6. SMS IS ROOTED IN SOCIAL CONTEXT

We have in study part I seen that where IM communication supports many different relations and increase users collaboration efficiency, SMS communication actually changes users social behavior. Because of the age groups of our participants, almost all had been young adults without mobile phones and were able to compare their life style than and now and several of them pointed to the way the coordination of arrangements had changed since the arrival of the mobile phone. Only one female from study part II was opposed to the common habit that all arrangements were now planned ad hoc and very loosely. But she felt the need to conform, since her friends made plans this way. The use of SMS is deeply rooted in the social context of the users and their change of lifestyle indicates that the impact is mainly socially based. Another study of SMS use, or 'text messaging' as it is referred to in the UK, also concludes that the medium has altered teenagers' coordination behavior and communication habits [5]. It is here argued that social context is the basis of the adoption of such resent communication medium, which is also true for our age group. One distinction though is that our participants use it for practicalities as well as work related issues on top of upholding social relations [5, 10]. SMS is in our group used to manage the participants' busy life styles and live up to social obligations. Several of the participants use SMS to inform other people that they are running late for a meeting. Where the teenagers of Ito and Okabe's study mainly use it for social gatherings, it is also appropriate for our participants to send late-SMSes to the secretary and in regards to business meetings. Especially one participant, who is the head of a political organization, finds it more convenient to receive SMSes than actual phone calls, which are more disturbing. However, where studies of teenage use indicate intimate conversations of non-essential information exchange, our older participants have limited conversations of this kind. A general trend is that women tend to send messages of non-essential character, where the men stick to essential messages of practicalities (or polite answers to the women's comments!) Table 4 shows that the send-to-receive ratio is higher among women than among men; the female participants

<sup>2</sup> It is the authors' beliefs that the 'shy Scandinavian' is one of the main factors that SMS is so popular in Scandinavia and have not caught on to the same extent in the US. Where the US possess a very voice communication based culture, Scandinavians have traditionally paid (quite a lot) per minute of telephone communication and did therefore grow up to limit their phone communication.

generally sent more messages than they received where the male participants received more than they sent. The SMS communication has already gained common practices that users adhere to which is also reported by for example Ito and Okabe, who, referring to Japanese text message users says that '[t]he technosocial situation of the "text chat" is a flexible one but one with clear social expectations and rhythms' [10]. We now look into other issues of SMS as rooted in social structure; first we focus on social presence that SMS and mobile phones provide, and second, we bring out factors of simplicity and availability as incentives to use such low-level communication channel as SMS.

**Table 4. Average daily messages sent and received according to gender.**

	Male	Female
Sent messages on average per day	4.37	4.61
Received messages on average per day	4.61	4.16

## 7. TRADE-OFFS OF SMS USE

Two contrasting concepts emerge through the study; first, the social presence that users feel when knowing that they are in instant contact with virtually all people in their address book and second, the negative side of the coin, the expected constant availability that users feel they have to live up to. The latter is referred to in other studies of general mobile telephone use [19] and it is not difficult to trace the stress level that a mobile phone can in certain situations induce. However, as we will elaborate on in this section, SMS is in fact aiding users in controlling this constant availability that a mobile phone generates. We describe how the positive factors outweigh the negative ones to a degree that make people believe the mobile phone improve their life style. It leads us to the arguments of why such low-level communication channel is so common and has had such large impact on people's behavior.

### 7.1 Social Presence

Social presence or awareness has often been addressed in relation to video mediated communication [1, 3]. Some researchers point out that although video cannot make up for real life interaction, it supports the notion of awareness [8]. However, technical limitations have confined this to limited sets of environments where bandwidth is high enough and technical support is available; video communication is still not common other than certain work environments. Gaver refers to other attempt of providing awareness, such as the glass cone with a feather that sway inside when a picture frame in another location is handled [4] but none of these are commercially employed. PC based instant message systems are technologies most often referred to as providing users with 'awareness' [6, 14], a trend we also find in the IM user group's diary. Many of the participants report that they feel they are 'not alone' when seeing their friends and family online and use this as an indication of social presence and awareness within their 'buddies' group. When considering the SMS users, the social

presence is of a different kind. Because the communication is asynchronous the sense of social presence is not apparent; however, because the channel is mobile the social presence is continuous rather than 'there' or 'not there'. Simply the close proximity of the phone makes the participants comfortable and aware that their friends are just an instant SMS away. Although not all participants in part II of the study will admit that they find the constant communication possibility comforting, all participants say that keeping the phone is important to them. One participant phrases it as this:

I know whom I can expect an answer from when. My father and sister for example are not into SMSing and take often say, 36 hours to respond. I don't feel that all my friends are available all the time but some I would expect an answer from within an hour.

She clearly feels some kind of scattered presence with certain friends, but in order to answer the question she takes into account whom she is dealing with. There is obviously a heterogeneous availability. Another participant who uses SMS mostly on weekends to coordinate social gatherings says:

I know that my friends check their phone all the time. It is like direct email and we just have like an unwritten agreement to coordinate our plans on weekends. It might just be habit to use SMS but it makes things so much easier.

The feeling of social presence is in this participant's life is attached to certain time of the week. He knows that his friends will be available on SMS right before and during the weekend. The social presence is clearly there, as a positive factor, instrumented by SMS.

### 7.2 Availability

A study of mobile phone acquisition reports that users often acquire a phone to be available and they view this as a positive factor [19]. However, studies of general use also reports that users feel a lot of pressure to be available and that this pose a threat to the sense of comfort that users desire [17]. Although most of our participants claim that they feel 'just fine' being available almost all day, when answering this question in the journal, the interviews reveal the negative side of the availability that having a mobile phone introduce. But as most of the participants in study part I points to, when asked how they feel about being constantly available, it is a choice they have made when carrying a mobile phone. Three of the interviewees say that they don't always answer the phone when it rings because it might not be convenient and others claim that it is not always convenient to be expected to answer back SMSes but that they feel obligated to do so, even though they are busy. An interesting notion is that participants seem to control their availability by the means of SMS. 4 of the 21 participants constantly keep the phone silent or on vibrate and therefore decide themselves when they are 'available'. They mainly use the mobile phone for SMSing and to call from, an indication of how large a role SMS plays in their overall mobile communication. They check the phone for text messages once in a while but otherwise they use it as a mobile answering machine. The participants find SMS very convenient for deciding when they want to communicate. One person mentions the convenience of SMS by referring to a specific situation:

It is so easy to just send an SMS, go and take a shower, and meanwhile an answer appears on the phone. They don't have to worry about talking on the phone in the shower!

The voice communication is, according to the participants in study part II, reduced extensively in place of SMS. One participant says:

I don't like to talk on the phone when I am outside, I actually don't like to talk on the phone at all. I just think SMS is so much easier. And you don't have to answer right away. When you talk on the phone you have to chit-chat and talk about all kinds of things, with SMS you can just say the things you need to say.

The problem of availability relates to the design of communication technologies because interactive communication systems can 'regulate' availability to a certain degree. Some context-aware mobile telephone systems enable the phone to display the user's situation to the potential communicator [21]. Still, problems with availability exist, because human context changes rapidly from one minute to the next one and so far the updating has been the user's responsibility, making the system subject to outdated states. Another problem is the potential communicator's own perception of the situation. One of the participants in Study part II for example says that even though she has set her state to 'busy', people message her on her IM client. When confronted with it, her friends claim that she is 'always' busy and it therefore does not 'count'! However, 18 out of the 21 participants in study part I respond positively to our proposal of a system where users 'publish' their state. They do not generally object to the thought of showing potential callers what state they are in, but 8 of the participants says that they would probably never use such system themselves due to the perceived cost in updating their status.

## 8. FOUR CLASSES OF FACILITATING COMMUNICATION

The messages that we collected in study part I were very coherent across participants and after coding them we found a trend of approximately four classes, supporting each a main purpose. Figure 4 shows each class and a sample message or selection of messages taken directly from the survey. Each example is chosen to illustrate the diversity of communication and many layers that SMS covers.

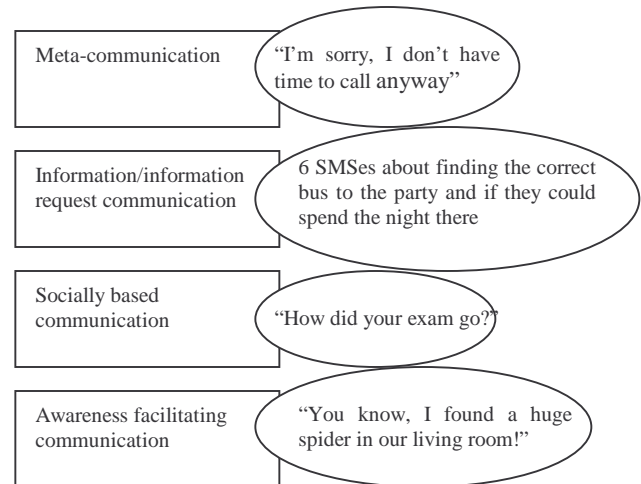


Figure 3. Four classes of SMS communication

### 8.1 Meta-communication

Meta-communication is found in many other studies of both SMS and regular mobile phone use [10, 5]. Users ask if others are available for another richer medium (IM or voice telephony) or as in our example, tell another that they are not available. What this negation suggests is that SMS creates an extra opportunity now to actually coordinate communication better. The participant says that the communication would never have taken place without SMS, because then she would have had to decide to call or not. Meta-communication is fairly limited among our participants, which is a relevant factor in relation to our age group. Where other studies point to meta-communication as a way for teenagers to deal with factors of parental control and tight living space [5, 10], our participants do not have as many considerations of this kind, since they all have their own living space or live with their partners.

### 8.2 Information/information request communication

Essential information exchange such as micro-coordination [12] where the main purpose is to coordinate where and when to meet is one of the most common uses of SMS. Other information exchange such as request for email addresses, other people's phone numbers and status of someone's whereabouts also falls in this category. We found several instances of those as well; however, as pointed out earlier, coordination and meeting up messages outweigh other types of messages.

### 8.3 Socially Based Communication

Most communication in general has social undertones; where people will often have a cover-up purpose for initiating conversations, they often have an underlying desire to just 'chat'. We found several cases where the communication purely served a social purpose such as participants asking how 'things are going' or just the very common social phrase of 'thank you

for last time'<sup>3</sup>. We also found several goodnight messages, which is similar to previous research targeting teenagers [5]. The participants found the social communication especially important in their use of SMS. When asked why they use SMS, one of the participants in study part II said that she used it because it was enjoyable and pleasant. She said that it was very important for her to keep in touch with friends this way and it didn't take much of her time compared to other communication channels. Although the participants often highlighted this factor in their use, the communication in this class was in fact fairly limited. This indicates that while the possibility of social communication is comforting, the use in this category does not exceed other more practical use.

We differ between socially based communication and information communication because the underlying motivations are different. Although the information request for a social activity might seem to support social life (and it certainly is), we define the socially based communication as communication that support social structures and common practices. The participant who asked his friend how the exam went, explained that it was not a friend that he would have called up, since they were casual friends, but because it was easy to send an SMS, and he knew the friend had just had an important exam, he sent the SMS as part of 'proper social behavior'.

#### 8.4 Awareness facilitating communication

As reported earlier, we found SMS to provide users with a social presence of others; however, the presence was found merely from the *possibility* for SMSing. The direct facilitation of awareness is the type of messages that are not essential information, but merely 'updates' on the sender's situation. One participant for example SMSed her boyfriend in the middle of the day, to tell him that she found a large spider in their house. When sending such non-essential information, the participant requests some sort of confirmation that her boyfriend is 'out there' and present in her life. Other types of awareness facilitating communication include messages that do not need replies, but make other people aware that the sender is thinking of the person. One participant for example wished her girlfriend a good holiday in France, because she knew the girlfriend was leaving that day.

This type of communication is distinctively facilitated by SMS; phone calls do not provide this awareness to the same degree because the messages would not have been delivered solely by a phone call. All the participants claim that they would never have called to give the same information; some of them are even a bit embarrassed when they tell about these messages to the interviewer. The awareness is extremely subtle and the users themselves do not notice it themselves. They notice how important SMS is to them when it is gone. One participant spend one month in Mexico where she did not bring her mobile phone. She says:

At first it was really difficult. I felt not only far away because I was in Mexico, but I was so used to just being able to have my friends right there. Now I had to find an Internet Café to email them, or spend money calling them. I realized that I was really addicted to my phone back in Copenhagen and just being 'an SMS' away from my friends.

Finally, we point to the awareness as a significant factor in communication design. Where lots of research focuses on providing awareness for separated people, they often go to great lengths to present peoples' situation or context to other users. In our study, one of the most simple communication channels of today provide a great deal of awareness to the users without video, without sensors, without context clues. Although other media channels also support awareness to a certain degree, SMS is used very specifically to confirm awareness from other people.

### 9. SUMMARY AND CONCLUDING REMARKS

In this paper we explored the use structures among urban young adults. To distinguish this study from other research we looked into factors that might differ between our age group and previous explored age groups of teenagers such as work sphere and concerns with cost of voice calls and text messaging.

First, we compared SMS communication to IM communication and although they are different in input method and are either stationary or mobile, where SMS is primarily being used in social settings within a physical proximity, IM is used more equally for different purposes which also covers work related communication and maintaining relations with long distance friends.

Second, we looked deeper into the context in which SMS is used and found that it is not just a new way of communicating what would otherwise had been communicated through other media on the contrary it has changed the lifestyle among young urban adults. The mobile phone have altered the way people make arrangement because of its mobility but the SMS have done it even further especially regarding micro-coordination. Even more important is the change which stems from the character of SMS, which, compared to talking on the phone, is less intrusive and intimate. We found that the users would send an SMS to people whom they otherwise rarely would make a phone call to. Furthermore we found that SMS gives the users a sense of social presence because of the continuous possibility to reach or be reached by friends, acquaintances, co-workers and family but it also aids them in controlling their availability.

Third, we explored the underlying reasons for using SMS and presented four different classes of SMS messaging: Meta-communication, Information/information request communication, socially based communication and awareness facilitating communication. The four different classes of messages propose that SMS has several layers of incentives and that the complexity of communication does not decrease in a low key text based channel. Where the old saying that a picture says more than a thousand words, is still true, in the world of SMS, few words says much more than those words, because the underlying circumstances plays a major role. The place and time for a messages is crucial to understanding which class the message(s) belong to and

<sup>3</sup> The phrase of 'thanking' someone for the last time they saw each other is one of the most integrated part of Danish social life, similar to the English phrase of 'how are you?'. The Danish phrase is mainly expressed when people get together again after a social event but in relation to SMS it is proper to say the very next day.

Finally we conclude that although SMS seem as a simple temporary communication channel, our research points to the fact that SMS is already solidly placed in social structures among several age groups; it is here to stay.

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