

Always Connected: A Longitudinal Field Study of Mobile Communication

Abstract

Twenty-five novice users of a new mobile communication device, allowing them to be always connected to their e-mail, e-calendar and organizer via GPRS (General Packet Radio Service), were closely tracked for a period of three months. The benefits of being always connected, to be accessible at all times and places make technology-enabled people almost automatically adapt the new mobile communication device to their daily lives for both instrumental and intrinsic uses. The results of this longitudinal field study suggest that people's motivations for using mobile communication technology are initially influenced more strongly by their perceptions about the expected use, which is more task-oriented. Over time, due to the quick habituation of the new mobile communication device important, initial gratifications, like permanent access and social interaction, appear to be less manifest reason for using the mobile communication device and become more latent, while gratifications like fashion/status and entertainment appear to become more dominant. Moreover, the boundary between work and personal life slowly disappears as people can easily use mobile communication technology simultaneously for personal and business purposes in both social and work-related contexts.

Always Connected: A Longitudinal Field Study of Mobile Communication

The use of mobile communication technology, e.g. mobile phone, pager, personal digital assistant (PDA), has become almost fully integrated in everyday life. The adoption and use of mobile communication devices has increased exponentially in almost similar patterns worldwide (see Carlson, Kahn & Rowe, 1999; Crisler, Anneroth, Aftelak & Pulil, 2003). Users want to be accessible at all times and places for both business and social purposes. In a variety of contexts users want to make phone calls, exchange messages with family, friends or co-workers, read and send e-mail, or have access to data files. The mobile phone and its growing facilities for communication have become, as Wei (2001) stated, more than just a talking device on the move. It represents a converged new communication and information technology with a variety of extensive interpersonal and mass communication services such as paging, short message service (SMS), voice-mail, news updates, e-mail, and Internet access. For both academia and industry the behavior of the mobile consumer is important in understanding the process of technological innovation and diffusion of mobile communication technology (see e.g. Green, Harper, Murtagh & Cooper, 2001).

At the beginning of 2002, a new mobile communication device is introduced by a mobile phone operator in The Netherlands. This mobile personal digital assistant (PDA) is a wireless solution for people on the go, and provides continuous mobile access to e-mail, e-calendar, SMS, and organizer wherever the users are via General Packet Radio Services (GPRS). GPRS facilitates instant connections whereby information can be sent or received immediately as the need arises, subject to radio coverage. There is no need for a dial-up modem connection, which is why GPRS users are sometimes referred to as

being “always connected”. This new mobile communication technology offers all kinds of new opportunities for mobile communication. As mobile communication technology is moving from being always accessible to being always connected, does this new technological feature change the way people use mobile communication technology?

The use of mobile communication technology

Within the tradition of uses and gratifications (U&G) research several studies have been carried out to explain why people make use of (mobile) communication technology and the gratifications people seek in using (mobile) communication technology. Research of conventional phone use shows a distinction between intrinsic (social) and instrumental (task-oriented) phone use; see e.g. Keller (1977) and Noble (1987). Intrinsic phone use refers to use of the phone for social purposes (e.g. for companionship or reassurance), while instrumental phone use refer to utility (e.g. information seeking or making appointments). Besides the intrinsic and instrumental phone use, Williams, Dordick and Jesuale (1985) found that the gratifications fun and entertainment applied to the use of the conventional phone. Dimmick, Sikand & Patterson (1994) report three gratifications obtained from the household phone: sociability, instrumentality, and reassurance. O’Keefe & Sulanowski (1995) examined gratifications sought from phone use and found sociability, entertainment, acquisition, and time management as dimensions of phone use.

A study by Leung & Wei (2000) indicates that the gratifications sought in using the mobile phone are largely consistent with findings reported in the literature on conventional phone communication. The same intrinsic and instrumental motives were applicable to new wireless communication: Leung & Wei found mobility and immediate access as unique dimensions of mobile phone use motivations that were unidentified in

the existing literature. However, one could argue whether immediate access should be regarded as an attribute of mobility. According to De Gournay (2002), mobility is unquestionably the most distinguished characteristic of the mobile phone. Immediacy is an advantage common to both the mobile and the corded telephone and reachability is an advantage of the mobile phone but it depends on the cooperation of its owner because if he or she is unavailable, the result is similar to that of corded phone. The distinction between intrinsic and instrumental use and the related different gratifications sought are also applicable to the use of other communication technology comparable to the (mobile) phone like desktop e-mail, SMS and PDAs. For example, Stafford, Kline & Dimmick (1999) found four reasons for home e-mail use: interpersonal relationships, personal gain, business use, and gratification opportunities. Competition between e-mail and phone use was measured in a study by Dimmick, Kline & Stafford (2000) at the level of gratifications derived by consumers. Dimmick, Kline & Stafford indicated that the phone serves a wider spectrum of needs, while e-mail provides greater gratification opportunities. The results indicated competition, but also revealed that the two mediums are not close substitutes. Peters, Almekinders, Van Buuren, Snippers & Wessels (2003) found four types of gratifications sought in the use of Short Message Service (SMS) via mobile phone: entertainment, social interaction, immediate access, and efficiency (in time). A study by Trepte, Ranné & Becker (2003) found three gratifications dimensions for using Personal Digital Assistants (PDAs): playful exploration, status, and function-related motives.

Initial expectations and actual nature of mobile communication technology use

In a study where new mobile phone users were closely tracked for the first six weeks after service acquisition, Palen, Salzman & Youngs (2001) found that novice users tend to rapidly modify their perceptions of social appropriateness around mobile phone use, and that actual nature of use frequently differs from initial predictions. The initial reasons for acquiring mobile telephony tended to be organized around instrumental use like business or job-related reasons, and intrinsic use like safety and security reasons. Leung & Wei (2000) found that instrumental uses of the mobile phone are more frequent and instrumental motives are much stronger than the social or intrinsic uses of the mobile phone. This is contrary to earlier research on the conventional telephone, which showed that social uses were more frequent than utilitarian uses. As the new mobile communication technology with GPRS is especially useful for people on the go who want to be continuously connected, the initial reasons to start using this new technology would be expected to be motivated by instrumental use more than by intrinsic use. Our first research question examines the potential difference between users' initial perceptions and expectations of the new mobile communication technology and the actual nature of use.

RQ₁: Does the actual use of the new mobile communication technology differ from users' initial perceptions and expectations which are expected to be primarily instrumentally motivated?

The use of mobile communication technology over time

The most common method within the U&G tradition to examine people's gratifications sought is to factor an extensive list of potential gratifications sought into

several gratification dimensions (factors) explaining the use of a particular type of mediated communication at certain moment in time. By combining this traditional U&G's approach with a more qualitative longitudinal field study, not only people's gratifications sought in mobile communication technology use can be examined, but also people's behavior in using mobile communication technology over time can be explored more in depth. The second research question is addressed to explore ways to improve the U&G approach by combining the strengths of quantitative factor analysis with the richness of a more qualitative research method in an intensive field study.

RQ₂: Are gratifications sought in using mobile communication technology subjected to changes over time?

Context of mobile communication technology use

The mobile phone has not only become more than just a talking device on the move, but also a social artifact (see Katz, 1999). According to Palen, Salzman & Youngs (2001), mobile telephony practice is influenced by the social contexts in which the phones are used, and the attributes of the owners' lifestyle, including their social networks. Gant & Kiesler's (2002) observations of mobile phone use suggest that mobile devices are often used spontaneously with no regard for time and place: they have reinforced the social blurring of many old boundaries separating work, social life and personal life. According to Gant & Kiesler, wireless technologies make it difficult to draw a distinction between work and social life for the growing ranks of the technology-enabled workforce. Our third research question explores the uses of the new mobile communication technology of being always connected in personal and work-related contexts.

RQ₃: Does the opportunity of being always connected reinforce the disappearance of the boundaries between work, social life and personal life?

Method

To answer the three research questions, a longitudinal field study was carried out with a simple interrupted time-series design, which requires one experimental group and multiple observations before and after the treatment (Cook & Campbell, 1979). A small group of novice users of the new mobile communication device were closely tracked within the dynamic of their daily practice.

Experimental group

Senior students and employees of a Dutch university who are often on the go for their work or study were invited via an announcement in the university paper to voluntarily participate in a longitudinal field study where their uses of a new mobile communication device would be closely tracked for three months. The wireless campus of the university, which has information and communication technology as one of its major research interests, offers an ideal infrastructure to perform research and develop applications in the field of wireless and mobile telecommunication. A total of 63 students and employees who are often on the move for their work or study and with a strong affinity with new information and communication technology volunteered to participate in the field study. From the first self-selective sample 12 students and 13 employees were selected at random in the experimental group ($n = 25$). To measure the affinity with and interest in information and communication technology, an 8-item scale (Collis, Pals & Peters, 2001) to measure personal engagement towards information and communication technology applications was used. The mean for personal engagement was 4.38 ($SD = .50$) on a 5-

point Likert-scale; internal consistency reliability Cronbach's Alpha was .85. To control for an effect of personal engagement on type of user (i.e. student or employee) the means of personal engagement were analyzed using an unrelated one-way analysis of variance. There was no significant effect of personal engagement on type of user ($F = 1.56$, $df = 1$, 23 , $p = .22$).

Procedure

The longitudinal field study was conducted between July and October, 2002. The design is diagrammed below.

O_1	X	O_2	O_3	O_4	O_5	O_6	O_7
-------	-----	-------	-------	-------	-------	-------	-------

Before the start of the three months period the participants in the experimental group were asked about their initial perceptions and expectations of how and when they would use the new mobile PDA (O_1).

During a period of three months the twenty-five participants were given as treatment the use of the mobile PDA with GPRS for free (X). Beside written instructions on how to set up and use the mobile PDA, a helpdesk was available for technical and operational support.

Bi-weekly questionnaires were sent to the participants to measure the gratifications sought in using the mobile PDA ($O_2 - O_6$). The questionnaire consisted of 35 gratifications sought statements for using the new mobile PDA. A 5-point Likert scale was used to rate the 35 gratifications items, with '1' meaning strongly disagree and '5' strongly agree with the reasons mentioned for using the mobile PDA. The statements were drawn from sets of previous studies by O'Keefe & Sulanowski (1995), Leung & Wei (2000), Papacharissi & Rubin (2000), and Peters et al. (2003) and were adjusted to the use of the new mobile PDA.

After the three months the participants were asked on their (changed) perceptions and on the degree to which their expectations were met using this new mobile communication device (O_7).

Complementary to the experimental measurements, a total of three focus groups were conducted two weeks after the three months period of use. A semi-structured interview guide was used in each focus group to explore the opinions and experiences of the participants with the new mobile PDA. The focus groups were videotaped and transcribed and then analyzed using a constant comparative strategy. This included both independent and team analysis of the focus groups video transcripts.

Results

Initial perceptions and expectations of the mobile PDA

Participants expected to have permanent online access to their e-mail and calendar via the mobile PDA and expected to be accessible to others at all times and places. The initial perceptions and expectations of the participants for using the mobile PDA were motivated by instrumental use of the mobile PDA rather than by intrinsic use. The overall opinion was that the mobile PDA would be very useful: for example, participants expected that the time to react to e-mails would be much shorter and therefore the communication with others would be quicker and more effective. Appointments could be made easily and the e-calendar would provide better and up-to-date access for other people to check the participant's daily schedule.

To respond more alertly, especially when involved in teamwork or work on a project, would be a major advantage of the mobile PDA. Participants expected to spend their spare time more effectively, for example when they were waiting for a client, or waiting

on a train or bus. The participants thought that they would make use of the mobile PDA when they were on the go and still wanted to be accessible to their colleagues or friends wherever required, when making appointments without having access to a computer, e.g. outside the office; or when traveling by public transportation, during congresses and courses so they could use the mobile PDA to check their e-mail and quickly respond to it. Some participants also stated that they thought of using the mobile PDA in their weekends and holidays.

Notably, participants expected to use the mobile PDA mainly in the context of their work or study, and expected to read and send their e-mail or use their e-calendar via the mobile PDA at places where this normally would not be possible.

Gratifications sought in mobile PDA use over time

A principal component factor analysis with Varimax rotation was run to determine the potential groupings of the 35 gratifications items of mobile PDA use. Ten factors emerged with eigenvalues greater than 1.0, explaining 85.2% of the total variance (see Appendix 1). Based on the factor analysis of the mobile PDA statements we grouped the statements into seven interpretable clusters of gratification scales. The first cluster of gratifications is identified as *permanent access* (see factor 1). This scale consists of the items: 'because it is independent of time and place', 'because I can use it everywhere', 'because it allows me to check my e-mail at all times and wherever I am', and 'because I can send and receive e-mail always and everywhere'. The internal consistency reliability Cronbach's Alpha is .89.

The second cluster of gratifications is identified as *entertainment* (see factor 2). This scale consists of the items: 'because it amuses me', 'because it is a pleasant activity',

‘because it entertains me’, ‘because it is pleasant’, and ‘because it is fun’. The internal consistency reliability Cronbach’s Alpha is .86.

The third cluster of gratifications is identified as *social interaction* (see factor 3). This scale consists of the items: ‘to be always available to colleagues/fellow students/clients’, ‘to constantly maintain contact with my colleagues/fellow students/clients’, ‘because it is handy to email with my colleagues/fellow students/clients’, ‘to strengthen my (work) relation with colleagues/fellow students/clients’, and ‘to be accessible to colleagues/fellow students/clients’. The internal consistency reliability Cronbach’s Alpha is .84.

The fourth cluster of gratifications is identified as *attraction* (see factor 4). This scale consists of the items: ‘because it is attractive’, ‘because it is interesting to use’, and ‘because I like to try out new forms of communication’. The internal consistency reliability Cronbach’s Alpha is .75.

The fifth cluster of gratifications sought is identified as *connection* (see factor 5). This scale consists of the items: ‘because I don’t need a fixed network connection’ and ‘because now I can be always connected with my work/company’. The internal consistency reliability Cronbach’s Alpha is .69.

The sixth cluster of gratifications is identified as *instrumentality*. It is a combination of items from factor 6 ‘when I have to wait (e.g. on the train)’ and ‘between two appointments to use my time efficiently’ and one item of factor 7 ‘at moments when I don’t have anything to do’. The internal consistency reliability Cronbach’s Alpha is .80.

The seventh cluster of gratifications is a combination of items from factor 7 ‘because it is stylish’ and ‘because it raises my status’ and one item of factor 8 ‘because it is a

modern way to communicate', and is identified as *fashion/status*. The internal consistency reliability Cronbach's Alpha is .77.

The bi-weekly means and standard deviations of the seven gratifications sought scales over the three months period of use are presented in Table 1.

Table 1

Means and Standard Deviations of Mobile PDA Use Gratifications over Time

	T1	T2	T3	T4	T5
Permanent Access	4.48 (.70)	4.50 (.60)	1.38 (.44)	1.38 (.34)	1.27 (.26)**
Entertainment	2.84 (.94)	3.03 (.67)	3.29 (.69)	3.29 (.69)	3.33 (.67)*
Social Interaction	3.81 (.79)	3.71 (.57)	2.07 (.67)	2.26 (.78)	2.29 (.81)**
Attraction	3.56 (.80)	3.83 (.52)	2.46 (.63)	2.57 (.63)	2.57 (.71)**
Connection	3.06 (1.27)	3.36 (.68)	2.61 (.88)	3.17 (.85)	2.93 (1.06)*
Instrumentality	3.61 (.87)	3.67 (.65)	2.45 (.92)	2.38 (.84)	2.45 (.89)**
Fashion/Status	2.23 (.96)	2.40 (.79)	3.71 (.73)	3.80 (.80)	3.83 (.74)**

Friedman Chi-square test for several related samples: * $p < .01$; ** $p < .001$; $N = 25$

At T-1, the mean score of permanent access is very high, followed by social interaction and attraction, suggesting permanent access as a strong gratification in mobile PDA use. The mean score of fashion/status and entertainment is low. At T-2, the mean score of permanent access is still high, followed by attraction and social interaction. Fashion/status has the lowest mean score. At T-3, fashion/status has the highest mean score, followed by entertainment. Permanent access has sharply dropped to the lowest mean score, followed by social interaction. This same pattern continues on T-4 and T-5. Over time, the gratifications permanent access and social interaction go from one of the

highest mean scores to the lowest mean scores, while fashion/status and entertainment go from the lowest mean scores to the highest mean scores. This unexpected shift in gratifications sought over time will be further discussed below (see focus groups results).

Perceptions of the mobile PDA after the three months period of use

Most of the participants stated that they used the mobile PDA constantly and everywhere, not only for business purposes but also for social purposes. A few participants indicated that it is convenient to read your e-mail and use your e-calendar everywhere, but that it is not really necessary to be always connected.

All kinds of situations were mentioned by the participants for using the mobile PDA, which demonstrates the simultaneous use of the mobile PDA in both personal and work-related contexts. Examples are during boring moments or moments of waiting, during public transportation or spending spare time between appointments, during TV commercials and lunch; at the toilet; on the bike; in the sports club and in bed before sleeping.

Participants reported that the mobile PDA saved time, time that would otherwise not be spent usefully. Having a mobile e-calendar to make and change appointments quickly and offering colleagues the possibility to view an up-to-date calendar was considered a very useful way of spending time by the participants. The permanent availability of colleagues accelerates the work process. When traveling or being outdoors, participants could still keep in touch with project members and communicate easily, especially when the communication was mainly via e-mail.

According to participants' initial perceptions about their use of the mobile PDA, participants expected their use to be driven mostly by instrumental (task-oriented)

purposes in a mainly work-related context. However, after the three months period of use, participants had used the mobile PDA in both personal and work-related contexts for both business and social purposes. The bi-weekly questionnaires show that not only instrumental reasons like permanent access are important reasons to use a mobile PDA, but that intrinsic reasons, like fashion/status and entertainment are equally important. The bi-weekly questionnaires also show an unexpected shift in the dominance of the gratifications sought over time that has been discussed among participants more intensively in the focus groups.

Focus groups results

Although most of the participants stated that they used the mobile PDA constantly and everywhere, a few participants indicated that it is not really necessary to be always connected. Participants whose activities required them to be constantly accessible to others, to have access to their e-mail and calendar, and to be informed of the latest news, found the mobile PDA more useful than participants for whom activities to communicate with others were less important. An explanation offered by the participants as to why the gratifications of permanent access and social interaction have become less dominant reasons over time to use the mobile PDA, while fashion/status and entertainment become more dominant is that the use of the mobile PDA became very natural, even obvious.

'In the beginning I used the mobile PDA because it was a new device, I really appreciated it. But after a while it just became part of my usual 'system'. The novelty had gone, it became a habit.'

'When I couldn't sleep, I would just use it. It was always next to my bed and I didn't have to get out of bed or plug it in.'

The initial perception with regard to permanent access, which involved a more alert response and the expectation to react quicker and more effective to emails, resolved in a change of use over time.

'At first you respond very fast to incoming e-mails because you can answer your e-mail everywhere. But because of my rapid response I got even more e-mail. So, I stopped responding so quickly to all e-mail.'

Another dominant gratification sought at the beginning of the three months period was attraction. Participants were curious and liked to try out new communication devices, and to be always connected via a mobile PDA was very interesting for them. Once the participants got used to the new opportunities of being always connected, other gratifications in using the mobile PDA appeared. Also the disadvantages of the mobile PDA became clear, like annoying usability features of the mobile PDA, such as screen size or small keys on the keyboard.

'In the beginning I didn't know exactly how to use the mobile PDA; but over time I learned to use more functions and therefore it became more useful for me. So, I also enjoyed it more.'

'In the beginning I enjoyed the mobile PDA much more because I could do all those new things with the device, like checking my e-mail everywhere, but after a while you don't discover any new things, so I did enjoy it much in the beginning but this feeling didn't increase'.

'Sometimes I had already checked my e-mail on a personal computer, so the need to check my mobile PDA was not great. You also couldn't open attachments on the

mobile PDA and because I receive a lot of attachments, I would rather wait until I could sit down behind my own computer.'

Over time, fashion/status and entertainment became more dominant reasons to use the mobile PDA than the gratifications permanent access and social interaction.

'It was so natural to use, it became only better over time. It was very useful for my work, so I really enjoyed it.'

'I used it more for private matters, so when friends found out that I could respond very fast, it became very pleasant.'

A few weeks after the beginning of the three months period of use, due to the growing media attention, the mobile PDA and GPRS became more well-known to the public. This was also reflected on by the participants:

'You can show off with your mobile PDA with GPRS. When I was using it on the train, people would start asking "What is it that you have there and what do you use it for?" It makes other people curious; it is a status symbol for others, but not for me.'

'There were not many PDAs with GPRS on the market, so you could show off with your mobile PDA. But that is changing now; there are already some on the market that are much prettier with color screens and all.'

Discussion

Our first research question examined the potential difference between the actual use of the new mobile communication technology and people's initial perceptions and expectations, which were expected to be primarily instrumentally motivated. In case of the mobile PDA, the initial perceptions and expectations of the participants to use the

mobile PDA were organized more around instrumental use, like work or study-related reasons and less around intrinsic use. The bi-weekly questionnaires show that over time instrumental and intrinsic reasons are both important reasons to use the mobile PDA. The results of this longitudinal field study suggest that people's motivations to use the new mobile communication technology are initially influenced more strongly by their perceptions about the expected use which is more task-oriented, like the benefits of permanent access for their professional and personal lives. Consistent with the findings of Palen, Salzman & Young (2001) that actual nature of use frequently differs from initial predictions, we found that people quickly begin to modify their initial predictions after gaining personal experience, and that other gratifications become more important, like for instance entertainment. The results from our longitudinal field study suggest that initial use of new mobile communication technology is motivated more strongly by perceptions and expectations, like 'what can I do with it?'. However, over time, the actual use of new mobile communication technology is motivated both by instrumental and intrinsic use.

The second research question examined if gratifications sought in using new mobile communication technology are subjected to changes over time. The bi-weekly questionnaires showed an unexpected shift in the dominance of the gratifications sought over time. Also the mean scores of the gratifications sought at the end of the three months period are less pronounced as at the beginning of the three months period (see Table 1). An explanation for this phenomenon could be found in the quick habituation of the new mobile communication technology. Our results show that the benefits of being always connected, to be accessible at all times and places make technology-enabled people almost automatically adapt the new mobile communication technology into their daily

life. Over time, important initial gratifications, like permanent access and social interaction, appear to be less dominant for using the new mobile communication technology and become more latent, while gratifications like fashion/status and entertainment appear to become more manifest. After four to six weeks of daily use people no longer are aware of the fact that they are always connected, which does not mean that permanent access or social interaction have become less important gratifications sought. Our results show that over time people find it obvious that these gratifications are met by the new mobile communication technology and therefore other gratifications sought become manifest. Apparently, gratifications sought are reflections of a single moment in time, subjected to changes over time.

Our third research question considered if the boundary between work, social life and personal life disappears even further because of the new technological possibility of being always connected? In case of the mobile PDA, the results show that although the attributes of the mobile PDA (e.g. e-mail, e-calendar, and organizer) are aimed more towards professional use, the mobile PDA is also used for personal purposes. The boundary between work and personal life slowly disappears further as people use mobile communication technology during weekends and holidays for business purposes as well as for personal purposes while being at work. Once familiar with the new potential of being always connected, people also experience the disadvantages of being always accessible and adjust their initial manner of use. The results of this longitudinal field study suggest that people who make use of the new mobile communication technology use it almost constantly and everywhere in both personal and work-related situations for both social and business purposes.

The results of this field study offer some important implications for more large-scale research with a purpose of generalization and suggestions for the mobile industry practice. First, this study suggests that motivations of technology-enabled people for using mobile communication technology are initially influenced more strongly by their perceptions about the expected use, which is motivated more by expected instrumental use, although over time, the use of mobile communication technology is motivated both by instrumental and intrinsic use. Recent developments in the mobile communication industry make it possible to add all kinds of ‘new’ attributes to mobile communication technology, like for example photography and radio. Does this new variety of converged technology of extensive interpersonal and mass communication services change the use of mobile communication technology to be more instrumentally motivated or to be more intrinsically motivated? More research is needed to better understand the use of this new variety of converged technology.

Secondly, this study suggests that the technology-enabled people easily adopts new mobile communication technology into their work and personal life, not only for task-oriented purposes but also for fashion, status, playful exploration and because it is attractive, even if the technology is primarily meant for professional or business-related purposes. As the participants in this study are all technology-enabled users, one could argue whether the same would be true for other groups of users who are less technology-enabled. As intrinsic and instrumental use in both personal and work-related context seem equally important, this finding could have some implications for the design and marketing of new mobile communication devices. The next generation of mobile communication technology should therefore take into consideration that users want a

variety of functions on one mobile device, which should also be easy to use in all kinds of different situations and contexts.

The nature and scope of this explorative study is restricted in its capacity of generalization to the broad spectrum of mobile communication technology users. However, this longitudinal field study is a preliminary step to gain more insight into the changes of motivations for using mobile communication technology over time, as a step forward to enhance the 'traditional' U&G approach with large-scale surveys at a single moment in time. By combining the strengths of the U&G survey research methods, e.g. factor analysis with the richness of more qualitative research methods such as a longitudinal field study, people's behavior in using mobile communication technology can be explored more in depth. Further research should continue the exploration of the traditional U&G survey research methods in conjunction with more qualitative research methods.

Literature

- Carlson, P. J., Kahn, B. K., & Rowe, F. (1999). Organizational Impacts of New Communication Technology: A Comparison of Cellular Phone Adoption in France and the United States. *Journal of Global Information Management*, July-September, 19-29.
- Collis, B., Peters, O., & Pals, N. (2001). A model for predicting the educational use of information and communication technologies. *Instructional Science*, 29(2), 95-125.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-Experimentation: Design & Analysis Issues for Field Settings*. Boston: Houghton Mifflin Company.
- Crisler, K., Anneroth, M., Aftelak, A., & Pulli, P. (2003). The human perspective of the wireless world. *Computer Communications*, 26, 11-18.
- Gournay, de C. (2002). Pretense of intimacy in France. In J. E. Katz, & M. Aakhus (Eds.), *Perpetual contact: mobile communication, private talk, public performance* (pp. 193-205). Cambridge, United Kingdom: Cambridge University Press.
- Dimmick, J. W., Sikand, J., & Patterson, S. J. (1994). The gratifications of the household telephone: Sociability, Instrumentality, and Reassurance. *Communication Research*, 21(5), 643-664.
- Dimmick, J., Kline, S., & Stafford, L. (2000). The Gratification Niches of Personal E-mail and the Telephone: Competition, Displacement, and Complementarity. *Communication Research*, 27(2), 227-248.
- Gant, D. & Kiesler, S. (2002). Blurring the Boundaries: Cell Phones, Mobility, and the line between Work and Personal Life. In B. Brown, N. Green, N., & R. Harper (Eds.),

Wireless world: social and interactional aspects of the mobile age (pp. 121-132).

London: Springer-Verlag.

Green, N., Harper, R. H. R., Murtagh, G., & Cooper, G. (2001). Configuring the Mobile User: Sociological and Industry Views. *Personal and Ubiquitous Computing*, 5, 146-156.

Katz, J. E. (1999). *Connections: social and cultural studies of the telephone in American life*. New Brunswick, NJ: Transaction Publishers.

Keller, S. (1977). The Telephone in New (and Old) Communities. In I. de Sola Pool (Ed.), *The Social Impact of the Telephone* (pp. 281-298). Cambridge, MA: MIT Press.

Noble, G. (1987). Discriminating between the intrinsic and instrumental domestic telephone user. *Australia Journal of Communication*, 11, 63-85.

Leung, L., & Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. *Journalism & Mass Communication Quarterly* 77(2), 308-320.

O'Keefe, G. J., & Sulanowski, B. K. (1995). More than just talk: Uses, Gratifications, and the Telephone. *Journalism & Mass Communication Quarterly* 72(4), 922-933.

Palen, L., Salzman, M., & Youngs, E. (2001). Discovery and Integration of Mobile Communications in Everyday Life. *Personal and ubiquitous computing* 5(2), 109-122.

Papacharissi, Z., & Rubin, A. M. (2000). Predictors of internet use. *Journal of Broadcasting & Electronic Media*, 44(2), 175-196.

Peters, O., Almekinders, J. J., Van Buren, R. L. J., Snippers, R., & Wessels, J. T. J. (2003, May). *Motives for SMS use*. Paper presented at the annual conference of the International Communication Association, San Diego, CA.

- Stafford, L., Kline, S. L., & Dimmick, J. (1999). Home E-Mail: Relational Maintenance and gratification opportunities. *Journal of Broadcasting & Electronic Media* 43(4), 659-669.
- Trepte, S., Ranné, N., & Becker, M. (2003, May). *Patterns of New Media Adoption in a World of Hybrid Media*. Paper presented at the annual conference of the International Communication Association, San Diego, CA.
- Wei, R. (2001). From luxury to utility: A longitudinal analysis of cell phone laggards. *Journalism & Mass Communication Quarterly* 78(4), 702-719.
- Williams, F., Dordick, H., & Jesuale, N. (1985). Focus Group and Questionnaire Development for Exploring Attitudes towards Telephone Service. In F. Williams (Ed.), *Social Research and the Telephone*. Los Angeles, CA: Herbert Dordick and Associates.

Appendix 1

Factor Analysis of Mobile PDA Use Gratifications Sought Items

Items “I use my mobile PDA ...”	Factors									
	1	2	3	4	5	6	7	8	9	10
Eigenvalue	4.9	4.9	3.9	2.8	2.6	2.5	2.5	2.1	2.0	1.7
%	14.1	14.0	11.0	8.0	7.4	7.1	7.1	6.1	5.6	4.9
because it is independent of time and place	0.90	-0.04	0.25	0.10	0.09	0.01	0.00	0.09	-0.03	0.11
because I can use it everywhere	0.85	0.27	0.11	0.12	-0.06	0.01	-0.12	-0.07	-0.05	0.01
because it allows me to check my e-mail at all times and wherever I am	0.78	-0.12	0.13	0.10	-0.22	0.23	-0.18	0.01	-0.16	0.04
because it is comfortable	-0.68	0.59	-0.06	0.03	-0.12	0.14	-0.07	0.05	0.02	0.08
because I can send and receive e-mail always and everywhere	0.59	-0.17	0.36	0.54	-0.11	0.06	-0.04	0.14	-0.03	-0.27
because I find it relaxing	-0.56	0.31	0.07	0.23	-0.46	0.22	0.26	0.12	0.08	-0.28
because it amuses me	-0.23	0.79	0.25	0.16	0.00	0.07	0.00	0.04	0.31	0.10
because it is a pleasant activity	-0.09	0.76	0.12	0.16	0.14	-0.13	-0.05	0.40	-0.21	-0.01
because it entertains me	-0.04	0.71	0.11	0.15	0.26	0.10	0.20	-0.13	-0.10	-0.28
because it is pleasant	-0.05	0.71	0.30	0.20	0.20	0.06	0.33	0.21	-0.24	0.07
because I can use it whenever it suits me	0.46	0.67	-0.16	-0.07	0.06	0.11	0.07	-0.13	-0.06	-0.22
because it is fun	-0.07	0.60	0.20	0.36	0.40	0.15	0.24	0.01	0.10	0.14
because it is available	0.29	0.54	-0.24	0.06	0.33	0.16	0.17	0.21	0.19	0.26
to be always available to colleagues/fellow students/clients	0.01	0.11	0.84	-0.03	0.08	0.26	-0.01	0.17	-0.10	-0.11
to constantly maintain contact with my colleagues/fellow students/clients	0.16	0.03	0.82	0.14	-0.12	0.13	0.33	-0.04	0.09	0.00
because it is handy to email with my colleagues/fellow students/clients	0.34	0.25	0.76	0.11	-0.10	-0.12	-0.07	-0.34	0.06	0.06
to strengthen my (work) relation with colleagues/fellow students/clients	0.02	0.28	0.64	-0.17	-0.06	0.29	0.25	-0.03	-0.19	0.18

to be accessible to colleagues/fellow students/clients	0.23	-0.28	0.58	0.31	-0.37	0.04	0.09	0.14	-0.35	-0.14
because it is attractive	-0.13	0.35	0.06	0.78	-0.09	0.18	0.08	0.02	-0.04	0.28
to react as soon as possible wherever I am	0.36	0.10	0.01	0.67	0.05	-0.02	-0.18	0.33	-0.25	-0.01
because it is interesting to use	0.12	0.43	0.03	0.61	0.18	0.14	0.21	0.08	0.28	-0.16
because I like to try out new forms of communication	0.37	0.24	-0.09	0.46	0.40	0.14	0.23	0.30	0.25	0.25
because I don't need a fixed network connection	0.01	-0.25	0.02	-0.04	-0.81	-0.18	0.09	-0.18	0.02	0.08
because now I can be always connected with my work/company	0.06	-0.26	0.39	0.07	-0.65	-0.22	0.01	0.32	0.25	0.08
when I have to wait (e.g. on the train)	0.10	-0.01	0.13	0.13	0.18	0.85	0.06	0.07	-0.09	0.11
between two appointments to use my time efficiently	0.08	0.20	0.29	0.03	0.06	0.84	0.15	-0.08	0.20	-0.03
at moments when I don't have anything to do	-0.07	0.07	0.20	0.29	0.29	0.42	0.56	-0.34	-0.07	0.09
because it is a habit, just something I do	-0.17	0.25	0.13	-0.14	-0.15	0.16	0.83	0.15	0.00	0.07
because it is stylish	-0.49	0.09	0.29	0.26	-0.08	-0.06	0.60	0.16	0.24	0.11
because it raises my status	-0.60	0.07	0.11	0.13	-0.06	-0.09	0.52	0.34	0.10	0.09
because it is a modern way to communicate	-0.06	0.13	0.01	0.18	0.04	0.01	0.19	0.88	0.00	-0.10
because it is a new way to communicate	-0.11	0.22	-0.14	0.18	0.46	0.47	-0.20	0.47	0.12	0.26
because it is easy to e-mail	0.14	0.23	0.33	0.17	0.19	0.03	-0.01	0.01	-0.78	0.02
because it is exciting	-0.33	0.25	0.28	0.24	0.16	0.19	0.13	0.05	0.67	-0.25
because Outlook is now available in a mobile version	0.03	-0.06	0.01	0.08	-0.01	0.11	0.13	-0.07	-0.10	0.93