

Always connected: a longitudinal field study of mobile communication

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Abstract

Twenty-five novice users of a new mobile communication device were closely tracked for a period of three months. The results of this longitudinal field study show 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 reasons 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.

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1. Introduction

The use of mobile communication technology, like the mobile phone or pager, and other personal communication technologies, like the personal digital assistant (PDA) or electronic organizer, has become almost fully integrated in everyday life for both social and business purposes. The arrival of wireless technologies enabled users to be accessible at all times and places. By incorporating wireless technologies into personal communication technologies, they become mobile personal communication technologies. The mobile phone as most prominent example of mobile personal communication technology has become, as [Wei \(2001\)](#) stated, “more than just a talking device on the move” (p. 703). 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. The adoption and use of mobile communication devices has increased exponentially in almost similar patterns worldwide (see [Carlson et al., 1999](#); [Crisler et al., 2003](#)). In a variety of contexts users want to use mobile personal communication devices to make phone calls, exchange messages with family, friends or co-workers, read and send e-mail, use their organizer and e-calendar or want to have access to data files. Another technological development within mobile communication technology is the use of 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”.

At the beginning of 2002, a new mobile communication device using GPRS was 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 GPRS.

The mobile communication industry like, for instance, the telecommunication companies and manufacturers are operating in a very competitive market, where a lot of time and money is invested to develop new services and products that meet the demands of a very diverse and demanding group of customers. Understanding the behavior of mobile phone consumers is important for the mobile communication industry in order to be able to react accurately on the changing behavior of their customers. Understanding customers' needs and desires is vital to be able to offer them products that they will actually use. For both academia and the mobile communication industry the behavior of the mobile consumer is important to gain a better insight in the process of technological innovation and diffusion of mobile communication technology (see e.g. [Green et al., 2001](#)).

One of the most important aspects in the process of the diffusion of innovative information and communication technologies (ICTs) is to understand people's behavior for using ICTs. In order to clarify people's motivations towards the use of media and ICT, several theoretical approaches can be applied, one of the most prominent one being the uses and gratifications (U&G) approach. U&G finds its ori-

gin in the field of mass communication research where it is generally recognized to be a sub tradition of media effects research (see [Ruggiero, 2000](#)). Although U&G finds its origin in the field of mass communication research where it has always, according to [Ruggiero \(2000\)](#), provided a cutting-edge theoretical approach in the initial stages of each new mass communications medium: newspapers, radio, television, and Internet, it also has been a dominant research framework for (mobile) telephone studies.

According to [McQuail \(2001\)](#), media use behavior is frequently not very rational, motivated or planned, but is a result of habit, circumstance and change, as well as being moved by emotions. [Aarts et al. \(1998\)](#) proposed that when behavior is performed repeatedly and becomes habitual, it is guided by automated processes, rather than being preceded by elaborate decision processes (i.e., a decision based on attitudes and intentions). The descriptive benefits of U&G are very extensive and significant and may well be sufficient to account for the continued appeal of the approach ([McQuail, 2001](#)). However, the explaining and predicting quality of U&G for media use and choice is less pronounced.

The purpose of this study is to explore how people's motives change over time in the initial stage of adopting new mobile communication technologies in an attempt to fill a void in mobile communication research using the U&G approach by combining the strengths of quantitative research methods with the richness of more qualitative research methods in an intensive field study.

2. The use of mobile communication technology

Previous research on the use of mobile communication technology, in particular the use of mobile telephony, serves as a departure point for grounding the present study in existing theory. In addition, to establish a theoretical framework of analysis, this study also integrates recent studies on uses of new wireless telephony technologies such as short message service (SMS) and personal communication technologies like the conventional personal digital assistant (PDA). [Katz and Aakhus \(2002\)](#) propose a theory that puts the focus solely on human use and consequences of personal communication technologies. This theory, the so-called Apparatchest theory, sets parameters that try to explain and understand the role that machines play in people's daily lives. According to [Katz and Aakhus \(2002\)](#), there seems to be movement towards certain inherently consistent patterns in the way people use personal communication technologies. This occurs even when such consistency is not predicated by the design aims of the creators or marketers of the technology in question (p. 303).

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 refers to utility (e.g. information seeking or making appointments). Besides the intrinsic and instrumental phone use, Williams et al. (1985) found that the gratifications fun and entertainment also applied to the use of the conventional phone. Dimmick and Sikand (1994) report three gratifications obtained from the household phone: sociability, instrumentality, and reassurance. O'Keefe and 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 and 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 and Wei found mobility and immediate access as unique dimensions of mobile phone use motivations that had remained 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 reach ability is an advantage of the mobile phone, but only when its owner is available; otherwise, the result is similar to that of a corded phone. Ling and Yttri (2002) studied how the mobile telephone's adoption has yielded new forms of interaction and especially coordination. At the most basic level they found that the mobile phone was used for security. This was often an issue for elderly people. Coordination was a more common theme for active adults, especially two-career parents. Ling and Yttri call this type of interaction micro-coordination. Micro-coordination refers to the instrumental use of the mobile phone; a largely functional and instrumental activity to coordinate everyday life. In addition to instrumental use, Ling and Yttri found that teens have adopted the expressive use of the device and use it for the social presentation of self. This use leads to what Ling and Yttri call hyper-coordination. According to Ling and Yttri, hyper-coordination encompasses instrumental and expressive use of the mobile telephone as well as strictures regarding the presentation of self.

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 et al. (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 et al. (2000) at the level of gratifications derived by consumers. Dimmick, Kline and 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 media are not close substitutes. Peters et al. (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 et al. (2003) found three gratifications dimensions for using

personal digital assistants (PDAs): playful exploration, status, and function-related motives.

3. 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 et al. \(2001\)](#) found that initial reasons for acquiring mobile telephony tended to be organized around instrumental use like business or job-related reasons, and around intrinsic use like safety and security reasons. [Leung and 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, it would seem that their initial reasons to start using this new technology would be related to instrumental use rather than to intrinsic use. Therefore we ask:

RQ₁: What are users' initial perceptions and expectations for using the new mobile communication technology?

4. 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 a certain moment in time. By combining this traditional U&G approach with a more qualitative longitudinal field study, it is not only possible to examine people's gratifications sought in mobile communication technology use, but also to explore in more depth people's behavior in using mobile communication technology over time. The second research question is designed to try to fill a void in mobile communication research using 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: How do gratifications sought in using mobile communication technology change over time?

[Palen et al. \(2001\)](#) found that novice users tend to rapidly modify their perceptions of social appropriateness around mobile phone use, and that the actual nature of use frequently differs from initial predictions. Our third research question examines the potential difference between users' initial perceptions and expectations of the new mobile communication technology and the actual nature of use.

RQ₃: How does the actual use of the new mobile communication technology differ from users' initial perceptions and expectations for use?

5. 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 et al. \(2001\)](#), 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. [Campbell and Russo's \(2003\)](#) study to test the hypothesis that perceptions and uses of mobile phones are socially constructed in close personal networks reveals that social interaction with family and friends influenced many of the study's participants to adopt mobile phones. According to Campbell and Russo: "interactions with social contacts, situated in social context, play an important role in mobile phone adoption, perceptions of products and services, socially normative mobile phone use, and use of the mobile phone as a collective resource" (p. 329). [Gant and Kiesler's \(2002\)](#) observations of mobile phone use suggest that mobile devices are often used spontaneously with no regard for time and place, and have reinforced the social blurring of many old boundaries separating work, social life and personal life. According to Gant and 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 fourth research question explores the uses of the new mobile communication technology of being always connected in personal and work-related contexts.

RQ₄: To what extent does the opportunity of being always connected reinforce the disappearance of the boundaries between work, social life and personal life?

6. Method

To answer our four 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 and Campbell, 1979](#)). A small group of novice users of the new mobile communication device were closely tracked within the dynamics of their daily life.

6.1. 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 which involved that 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 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 ($n = 25$) were selected at random in the experimental group, consisting of 19 men and 6 women (M age = 27, $SD = 8.0$, range = 20–52 years). To measure their affinity with and interest in information and communication technology (ICT), an 8-item scale (Collis et al., 2001) to measure personal engagement towards information and communication technology applications was used. The requirement for selecting the participants of this study was that they should be technology-enabled users, i.e. that they should have a strong affinity with ICT. After all, the aim of the study was to understand the behavior of potential adopters of the new mobile communication technology over time. 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 ($F = 1.56$, $df = 1, 23$, $p = 0.22$).

6.2. 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
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Before the start of the three months period the participants in the experimental group were given a questionnaire containing questions about their initial perceptions and expectations of the new mobile PDA (O_1). During the next three months the 25 participants were given as treatment the use of the mobile PDA with GPRS for free (X). Besides 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 ($O_2 - O_6$). Once the three months were over, the participants were given a questionnaire about their (changed) perceptions and the degree to which their expectations were met using this new mobile communication device (O_7).

6.3. Instrumentation

The participants filled in a questionnaire that consisted of (a) demographics; (b) position and work environment; (c) information and communication applications;

(d) current use of e-mail; (e) current use of e-calendar; and (f) personal involvement with ICT applications. There were three open-ended questions relating to the expectations about the use of the mobile communication device. The participants were asked about: (a) the expected possibilities of the mobile communication device; (b) the situations in which they thought they would be using the mobile communication device most frequently; and (c) the degree to which they expected the mobile communication device to be useful for their work or study. After three months of using the mobile device, the participants were asked the same three open-ended questions; this time, however, the participants were asked to report on the actual use of the mobile communication device.

A questionnaire containing 35 items was used to assess the gratifications sought 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 and Sulanowski (1995), Leung and Wei (2000), Papa-charissi and Rubin (2000), and Peters et al. (2003) and were adjusted to the use of the new mobile PDA.

A principal component factor analysis with Varimax rotation was run to determine the groupings of the 35 gratifications items of mobile PDA use. The criteria for loading on a factor were (1) an eigenvalue larger than 1.00, (2) a factor loading of at least .45, and (3) maximum loading on a secondary factor no more than .30. Items that did not meet these criteria were removed from further analysis.

Ten factors emerged with eigenvalues larger than 1.0, explaining 85.2% of the total variance. Based on the factor analysis of the mobile PDA statements, we grouped the statements into seven interpretable clusters of gratification scales. Items that met the statistical criteria for loading on a factor but were not relevant with respect to the denomination of the cluster scale were excluded from the scale. The first cluster of gratifications was identified as *permanent access*. The internal consistency reliability Cronbach's Alpha was .89. Four items loaded above .59 on the first factor. The scale consisted 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 second cluster of gratifications was identified as *entertainment*. The internal consistency reliability Cronbach's Alpha was .86. Five items loaded above .60 on the Factor 2. The scale consisted 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 third cluster of gratifications was identified as *social interaction*. Five items loaded above .58 on the third factor. The internal consistency reliability Cronbach's Alpha was .84. The scale consisted 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 e-mail 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 fourth cluster of gratifications was identified as *attraction*. The internal consistency reliability Cronbach's Alpha was .75. Three items loaded above .46 on the fourth factor. The scale consisted 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 fifth cluster of gratifications sought was identified as *connection*. The internal consistency reliability Cronbach's Alpha was .69. Two items loaded above .65 on the fifth factor. This scale consisted 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 sixth cluster of gratifications was identified as *instrumentality*. The internal consistency reliability Cronbach's Alpha was .80. It was a combination of items from factor 6 'when I have to wait (e.g. for 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'. Two items loaded above .84 on the sixth factor and one item loaded .56 on the seventh factor.

The seventh cluster of gratifications was 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 was identified as *fashion/status*. The internal consistency reliability Cronbach's Alpha was .77. Two items loaded above .52 on the seventh factor and one item loaded .88 on the eighth factor.

6.4. Focus groups

In addition to the experimental measurements, a total of three focus groups sessions were conducted two weeks after the three months period of use. This qualitative approach was used to gain a better understanding of the experiences of the participants with the mobile communication device.

The focus group sessions lasted approximately 1.5 h. To enable comparisons between the three groups 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 questions that were asked in each focus group were derived from the results of the survey with the aim to clarify these results (see [Appendix A](#)). The three focus groups were videotaped and transcribed verbatim.

6.5. Data analysis

To answer the research questions, a Friedman Chi-square test for several related samples was used to test the mobile PDA use gratifications over time. The means and standard deviations are reported. The transcripts of the focus group data were analyzed using a constant comparative method ([Strauss and Corbin, 1998](#)). This included both independent and team analysis of the focus groups video transcripts. From every focus group transcript 'striking' or 'typical' quotes ([Hansen et al., 1998](#)) were selected which illustrated, confirmed and enhanced our understanding of the experiences of the users with the mobile PDA. When quotes were repeated or included different words and phrases which expressed the same meaning, they were assigned to a theme.

7. Results

7.1. *Initial perceptions and expectations of the mobile PDA*

The first research question explored the initial perceptions and expectations for using the new mobile communication technology. The data revealed that 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 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 participants' daily schedule.

To be able 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 for 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. As such, it seems that 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.

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. The results of the focus groups showed that the initial perception with regard to being always connected, which involved a more alert response and the expectation to communicate quicker and more effective, resolved in a change of use over time.

7.2. *Gratifications sought in mobile PDA use over time*

The second research question concerned how gratifications sought in using mobile communication technology were subjected to changes over time. 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](#).

At T1, 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 T2, the mean score of permanent access is still high, followed by attraction and social interaction. Fashion/status has the lowest mean score. At T3, fashion/status has the high-

Table 1

Means and standard deviations of mobile PDA use gratifications over time

	T1	T2	T3	T4	T5
Permanent access	4.48 (0.70)	4.50 (0.60)	1.38 (0.44)	1.38 (0.34)	1.27 (0.26)**
Entertainment	2.84 (0.94)	3.03 (0.67)	3.29 (0.69)	3.29 (0.69)	3.33 (0.67)*
Social interaction	3.81 (0.79)	3.71 (0.57)	2.07 (0.67)	2.26 (0.78)	2.29 (0.81)**
Attraction	3.56 (0.80)	3.83 (0.52)	2.46 (0.63)	2.57 (0.63)	2.57 (0.71)**
Connection	3.06 (1.27)	3.36 (0.68)	2.61 (0.88)	3.17 (0.85)	2.93 (1.06)*
Instrumentality	3.61 (0.87)	3.67 (0.65)	2.45 (0.92)	2.38 (0.84)	2.45 (0.89)**
Fashion/status	2.23 (0.96)	2.40 (0.79)	3.71 (0.73)	3.80 (0.80)	3.83 (0.74)**

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

est mean score, followed by entertainment. Permanent access has sharply dropped to the lowest mean score, followed by social interaction. This same pattern continues on T4 and T5. 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. 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.

Most of the participants stated that although 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 became less dominant reasons over time to use the mobile PDA, while fashion/status and entertainment became 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.

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 seemed very interesting to them. Once the participants had grown used to the new opportunities of being always connected, other gratifications in using the mobile PDA came into focus. The disadvantages of the mobile PDA became clear too, like annoying usability features of the mobile PDA, such as its screen size or its 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 to 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 urgent. 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.

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

The third research question addressed the actual use of the new mobile communication technology and how this differed from users' initial perceptions and expectations for use.

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 showed that not only instrumental reasons like permanent access were important reasons to use a mobile PDA, but that intrinsic reasons, like fashion/status and entertainment were equally important.

7.4. Disappearance of boundaries between work, social life and personal life

The last research question was concerned with the disappearing of boundaries between work, social life and personal life when users are always connected. All kinds of situations were mentioned by the participants for using the mobile PDA, which demonstrated the simultaneous use of the mobile PDA in both personal and work-related contexts. Examples included use 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.

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 was convenient to read their e-mail and use their e-calendar everywhere, but that it was not really necessary to be always connected.

8. Discussion

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 qualitative research methods such as a longitudinal field study, people’s behavior in using mobile communication technology can be explored more in depth.

The results of this longitudinal field study showed that the initial perceptions and expectations of the participants to use the new mobile communication technology were organized more around instrumental use, like work or study-related reasons and less around intrinsic use. The bi-weekly questionnaires showed that over time instrumental and intrinsic reasons were both important reasons to use new mobile communication technology. People’s motivations to use the new mobile communication technology were 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 et al. \(2001\)](#) 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 became more important, like for instance entertainment. 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 bi-weekly questionnaires also 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 than at the beginning of the period (see [Table 1](#)). An explanation for this phenomenon could be found in the quick habituation of the new mobile communication technology. Our results showed 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, appeared to be less dominant for using the new mobile communication technology and became more latent, while gratifications like fashion/status and entertainment appeared to become more manifest. After four to six weeks of daily use people were no longer aware of the fact that they were always connected, which does not mean that permanent access or social interaction have become less important gratifications sought. It could be that the new mobile communication technology became institutionalized after four to six weeks. These findings support [Aarts et al. \(1998\)](#) notion that when behavior is performed repeatedly and becomes habitual, it is guided by automated processes, rather than being preceded by elaborate decision processes.

Seen in the light of the Apparatus theory of [Katz and Aakhus \(2002\)](#), this does not mean that the new mobile communication technology is rendered invisible by the users. But it does mean that the users take the technology for granted, in this case the new mobile communication technology giving the users the possibility of being always connected wherever they are.

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.

The distinction between latent and manifest reasons is also mentioned by [Katz and Aakhus \(2002\)](#). They present both manifest and latent salient points in people’s reasoning, and break them further down into technological and social aspects of personal communication technology. We agree with Katz and Aakhus’ notion that “both manifest and latent functions are required for a full understanding of personal communication technologies role in people’s daily lives” (p. 310).

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. 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 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.

9. Limitations and future research

The nature and scope of this explorative study is restricted in its capacity of generalization to the broad spectrum of mobile communication technology users. Replication studies should test whether our findings are applicable to other mobile personal communication technologies and contexts of use. Another limitation is the small group of participants; a larger sample could give a more representative image of the use of mobile communication technology. The implications that are based on the results of this study could also suffer from the self-selective sample.

Further research should continue the exploration of the traditional U&G survey research methods in combination with more qualitative research methods. In addition, more research is needed to gain a better insight in the relationship between manifest and latent reasons of mobile personal communication technology use.

10. Practical implications

Although there are several studies that have examined gratifications of new communication technologies (Leung and Wei, 2000; Green, 2003; Trepte, Ranné and Becker), a better understanding of the obtained gratifications is necessary for the mobile industry. We tried to obtain this better understanding via the longitudinal field study and the results offer some important implications for more large-scale research with a purpose of generalization as well as 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. This could mean that the mobile industry should put emphasis on both the instrumental and intrinsic use of new mobile communication devices. 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 adopt 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. The mobile industry has to acknowledge this development because

it means that the same mobile communication device can be attractive for a target group that consists of a variety of people. Mobile communication technologies are not only interesting for people who want to use the device for more instrumental purposes but also for people who wish to use it for more intrinsic purposes. We could say the mobile industry should offer mobile communication devices that include both instrumental features as well as less-task oriented features, e.g. games.

As the participants in this study are all technology-enabled users, one could argue whether the same conclusion can be drawn 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.

Appendix A. Semi-structured interview guide

1. The results from the survey showed that the utility (being always and everywhere available for others) of the mobile device decreased during the three months period. How did you experience this?
2. The results from the survey showed that at the end of the three months period the appreciation of the mobile device was higher and more pleasant. Can you clarify this?
3. The results from the survey showed that the attractiveness was constant during the three months. Did this also apply to you individually? How did you experience the attractiveness of the device?
4. At which moments did you make use of the mobile device? In which places and situations did you make use of the device?
5. The results from the survey showed that the possibility to be able to always and everywhere check your e-mail and e-calendar was an important reason to use the mobile device in the beginning. But after some time this decreased. How did you experience this?
6. The practical use and easiness of the device were very high in the beginning but decreased after some weeks. What was your experience? Can you give an explanation for this?

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