Gaining Empathy for Non-Routine Mobile Device Use through Autoethnography

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ABSTRACT
In this paper, we report on autoethnography as a method to access non-routine usage of mobile devices, such as during business trips, vacations, etc. Autoethnography, a self-study method with the researcher as participant, was employed for the evaluation of a wrist blood pressure monitor used by people with conditions such as hypertension. The findings from the study were surprising, especially with respect to the environmental and social impact on the use of the technology. Although the autoethnographic method can be disruptive for the researcher, it enables them to understand and empathize with the experiences mobile device users can face in difficult to access contexts. This method allows HCI researchers to better understand user experiences with mobile devices, including mobile medical technology, especially during non-routine times that can be difficult to study in-situ with traditional user studies.

Author Keywords
Autoethnography; context; empathy; mobile; healthcare.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Mobile devices can be difficult to study in context as found in a number of situated studies in HCI [14]. They can be carried and used in a wide range of situations, which of course can be hard to capture with methods such as observation. Other methods such as diary studies and the experience sampling method may be used, but there are times when users may not be amenable to participating in this type of study, including when they are travelling, on holiday, or attending celebrations. These non-routine times can be difficult to study because of their infrequency and because of possible intrusiveness in participants’ lives.

This is a particular concern for studying mobile medical technologies, used by people for the care or maintenance of a health condition. Such devices are becoming increasingly popular based on the financial need to move healthcare outside of clinical settings, enabling patients to live more independently [9]. Because it is difficult to observe interactions in these non-routine contexts, nuances of the interaction that influence the adoption and use of these medical devices are not captured. Without a rich understanding of the interactions, it is difficult to have empathy with users and this may influence the quality of both the design and evaluation of mobile technology.

In this paper, we report on a study that explores the potential value of autoethnography for evaluating mobile medical devices in-situ. A study was conducted using autoethnography, a method of self-observation with the researcher as participant [7], to experience aspects of using a mobile medical device during routine and non-routine times. Although the method was personally disruptive and could not capture the whole user experience, it revealed subtleties in the interactions that influenced the adoption and use of the device, providing the researcher with more empathy for situations mobile medical device users experience, particularly during non-routine usage.

AUTOETHNOGRAPHY AND EMPATHY
Empathy is an important resource for design and evaluation [15]. A goal of much HCI design, evaluation, and research is to understand the user [16]. Wright and McCarthy propose that this should be extended to understanding what it feels like to be a user, influenced by what they call a pragmatist approach: the felt and valued response from the researcher’s point of view to the separate and unique user. For HCI researchers and practitioners, they propose that this can be achieved through dialogue, narratives, and ‘the imagined other’ [16]. Gaining empathy with users through ‘the imagined other’ involves researchers personally in the use of technology and includes various forms of self-study.

Self-study is not new in HCI; for example, in the 1990s, Jeff Hawkins carried a block of wood in his pocket to simulate what a Palm Pilot would feel like to actually carry around and use all the time [3]. Methods of qualitative self-
study arose in the form of ethnography where the researcher adopts the role of participant. It has been used in a wide range of HCI studies, allowing researchers to gain empathy with users of various types of technology (e.g. [10]), including a similar technique used for design - experience prototyping - in the medical domain [6]. In a review of eleven researchers who had used autobiographical design, a self-study method for exploring design prototypes, for over a year, it was found that the method uncovered the ‘big effects’ on usage, surprising usage practices, and “detailed, subtle understandings that [...] might have seemed unremarkable” [11:31]. The self-study method’s popularity in HCI can be attributed to the need to conduct ethnography-light studies, as “spending twenty-four hours over several weeks with the participants is just not feasible” [7:2]. Self-study can be used to explore ‘the imagined other’ [16] in a less time consuming and resource demanding way during the evaluation of mobile devices.

As such, autoethnography has potential for revealing user experiences when using mobile medical devices in context. The importance of understanding context has been recognized by the medical usability standards that are used for the design and evaluation of mobile medical devices [1,8]. However, recommended methods for addressing contextual factors all require some level of observation that may not be possible with mobile medical devices used by patients. One standard [8] explicitly states that designers should not participate in user studies.

In this paper, we report and reflect on the use of autoethnography for the evaluation of a mobile blood pressure monitor. We explore the use of autoethnography to gain access to non-routine situations that might not be available to researchers conducting traditional user studies. During travel, business trips, celebrations and other non-routine times, users can be in unusual situations and may use their mobile devices in different ways [13]. However, these are the very times that users might be reluctant to disrupt for researchers using other HCI methods, such as diary studies or observation. Alternatively, researchers can become participants, and in doing so, disrupt their own holidays and celebrations to experience the use of such technologies in context. The autoethnographic self-study of a mobile medical device presented below discusses the challenges and opportunities for gaining insights into the non-routine contexts of use not easily captured with user studies.

**METHOD**

In order to explore various contexts of use for mobile medical devices, the first author (O’Kane) conducted an autoethnography study covering normal routine and non-routine usage. During this study, O’Kane had planned a number of non-routine events, including visiting family overseas, going to a wedding, attending an academic conference, and having visitors stay in her shared apartment, together with her usual daily routine activities as a PhD student in a major city (studying, eating, meeting friends, bicycling, using public transport, etc.). Using information from discussions with mobile medical device users, an autoethnography study was planned to emulate some of the conditions they reported experiencing, using a non-invasive wrist blood pressure monitor as the device to be evaluated.

The test was taken twice a day using the Omron R7 monitor [12] and O’Kane was reminded to test through a mobile phone alarm. The study was conducted over three months and O’Kane recorded her use of the device using a mobile phone diary keeping technique [4], capturing photos of the context and optional text descriptions. An iterative and open thematic analysis [5] of diary entries, personal reflection, and discussion with other researchers, suggests that autoethnography is particularly well suited for uncovering insights concerning the context of use during non-routine times and also with mobile medical devices.

**FINDINGS**

The findings from the study are discussed in terms of social and environmental factors, highlighting the most unusual and influential contexts of use.

**Unexpected Environmental Influences**

During a number of discussions with mobile medical device users, it became apparent that non-routine times sometimes led to using the devices in unfamiliar places. During O’Kane’s use of the wrist blood pressure monitor through non-routine times, she often found herself using a washroom stall or a more private area to conduct the testing alone. The earlier interviews prepared O’Kane for these situations at an abstract level, but the subtleties of these experiences were not fully comprehended until she experienced them herself.

What stood out for her were the noises the device makes during the testing procedure. This was an issue in public washrooms that O’Kane often used in unfamiliar places - where the noises could be a great source of embarrassment. When the user adjusts their arm towards the proper angle for testing, there is feedback in the form of beeps to indicate when the angle of the device is getting closer to the proper testing angle. In addition, the device has to inflate around a user’s wrist in order to test blood pressure, which causes a flowing air sound. Although this sound is not particularly loud, it is quite distinct and cannot be silenced. O’Kane also found that the noises could cause embarrassment elsewhere, including during unusual times at home.

*A friend of my flatmate is staying with us [...] I’m a little worried she heard it.* (Diary Entry on June 19)

Other than the noises it caused, physical features of the device seemed to be designed for ideal conditions that did not allow for variations in the environment. This was very
Session: Personal Values and Preferences

clear when O’Kane was in a conference restaurant with colleagues, and used the washroom to conduct the test, only to encounter poor lighting for reading the results of the test. As well as problems with illumination, the device design imposed other unexpected demands on the user. The testing process requires a person to rest for about 5 minutes before taking the test whilst sitting. This frequently caused disruptions to normal activities, but the need to rest was particularly hard to accommodate in non-routine situations. This issue came up at the conference venue washrooms, which did not have seats on their toilets. As there was no other easy location to conduct the test, she tried to perch on the toilet paper dispenser, which of course caused tension in her legs producing an error message on the device (see Figure 1). Although this was only encountered once, having found that the conference centre washrooms could not be used, O’Kane had to more carefully plan her activities to have easy access to a suitable place to conduct the testing.

Figure 1: Wrist blood pressure monitor showing an error

The preparatory dialogues with mobile medical device users were very helpful in planning the self-study, but these conversations did not give a thorough understanding of the physical constraints of the environment in which these devices were used, as was experienced by O’Kane when sitting in a public washroom stall for too long with the device making beeping noises. O’Kane experienced the subtleties and nuances of using the device in environments that she could not control during non-routine times. Although it was awkward to conduct the self-study when visiting family or during an academic conference, these inconvenient times highlighted how the design features could create embarrassment in uncontrolled environments and how these negative experiences guided the way she used the device.

Unexpected Social Situations

Based on the interviews and the dialogues O’Kane had had with medical device users, she had expectations as to what it was like to try to adapt quickly to unfamiliar social situations. It was only through experiencing the testing that she was made aware of the significant impact the medical aesthetic of the device had.

In public settings, it was sometimes not possible to go to a washroom for privacy during non-routine times. These were generally times when O’Kane had belongings that she was not able to take with her to a washroom stall easily or that could not be left in public as she went to a washroom stall. When she was away from her office and working on her laptop in coffee shops, O’Kane did not want to close her laptop, unplug her phone, pack up her bag, give up her seat, and take her coat to the washroom, just to unpack everything again once she had completed the test. She experienced something similar while waiting in an airport alone. Both times, she chose to use the device in front of strangers, but tried to diminish the attention it received.

I did hide the device slightly behind my hair whilst doing the actual test and didn’t look up to make eye contact. […] Not that embarrassed, but maybe because I felt if anyone did pay too much attention to me they would be in the wrong judging someone with a health issue. (Diary Entry on May 2)

Like anyone visiting family or attending a conference, O’Kane had many social engagements and was regularly carrying the device with her. Often, this would put her in a situation where she was rushing to complete the test as she felt social pressure to not keep people waiting. Also, if the alarm went off during a conversation or social interaction, O’Kane would have to interrupt that interaction to take the test. In some circumstances during non-routine times, she chose not to explain these disruptions to her companions, as she did not know them well enough to feel comfortable in doing so. One instance of this was at a friend’s wedding where O’Kane only knew a handful of other guests. After being delayed in the testing because of speeches, and in the middle of a polite conversation with someone at her table, she excused herself to conduct the test in the washroom, as she did not want to pull out a medical device that might gain attention. Additionally, O’Kane had to find an evening purse large enough to accommodate the device, so as not to attract attention. This bag was a striking orange colour, meaning she had to match her entire outfit to the only large purse she possessed that could carry the device.

Had to wait until dinner was served and then also a speech so I’m late. […] I’m in the washroom trying to be silent but also quick so that my table doesn’t notice. Also. The device hardly fit in the only purse that matched my dress and it is quite chunky looking. (Diary Entry on April 28)

Funny anecdotes of awkward social interactions had been brought up in conversations with mobile medical device users, but many of these instances were not amusing to the device user at the time; O’Kane got to experience some of these types of interactions. She was able to attain empathy with users who need to carry devices with them at all times, through having to alter a wedding outfit and also interrupt conversations to conduct tests. She got to experience what variables influenced her to conduct the test away from others, such as embarrassment with acquaintances, or to test in front of others, such as not caring what strangers thought. Although the social influences on her use would not be the same as someone with an actual health condition, O’Kane
got closer to what it feels like to use mobile health technology during non-routine times.

DISCUSSION AND CONCLUSIONS

O’Kane experienced a range of interactions with a mobile medical technology and was able to gain insight into the influence of contextual factors by actually using the device herself, especially during non-routine times. We found that autoethnography allows the researcher to comprehend the experience of using the device during times not normally available to them during other kinds of user studies, such as when devices are used on vacation. Instead of putting users in inconvenient situations, the researcher can try using them during their own vacation and other non-routine times so as to actually experience some of the awkward situations that can occur when using mobile interactive technology.

What we found was consistent with the literature: namely that self-study allows practitioners to capture some of the subtleties and nuances of those contexts that can influence the adoption and use of a device not easily achieved without experiencing them [11]. In addition, we found it to be a lightweight yet powerful tool compared to time-consuming user studies [7]. We propose that this method is additionally useful for accessing non-routine times not easily captured through user studies. For example, during holidays, conferences, and celebrations, users may not be able to control where and when they use their devices, influencing their use and adoption of them. This is particularly important for healthcare technologies that require regular interaction for personal health and yet may be designed for more stable contexts. Hence, the self-study method can be useful for the evaluation of mobile medical devices, despite its absence from medical usability standards.

As this is the case, autoethnography should be considered as an additional method that designers, evaluators, and researchers of mobile interactive technology could employ to understand better non-routine user experiences. This method could be particularly useful as a first step in user research, to inform the design of user studies, and to be used as a lightweight method throughout an iterative design cycle. Despite the disruptiveness of the method and how subjective and personal the results can be, if a HCI practitioner keeps these concerns in mind, their reflections on the results and discussions with other researchers can produce interesting insights on the use of mobile technologies, particularly in unusual contexts. Although this method should not replace standardized usability methods, for non-routine times it is an insightful method for challenging assumptions, gaining empathy with user experiences, and planning future user studies, including with mobile medical technologies.

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