The Hankie Probe: A Materialistic Approach to Mobile UX Research

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Abstract
Mobile user experience (UX) research can benefit from unexplored opportunities from theory and practice. Contemporary sociology has developed sophisticated understandings of mobilities that can expand the scope of mobile HCI research. At the same time, we need to extend the scope of mobile experience beyond its current main foci on the portable device and moments of experience. We report the interim results of exploratory pilot studies of a fabric based probe that has been developed to extend the scope of mobile experience research both theoretically and in the range of insights that can be collected in mobile user studies. We report our initial experiences with a 'hankie' (handkerchief) probe that aims to gather rich usage and experience insights for early stages of design.

Keywords
mobile UX; mobility; methods; materials

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

Introduction and State of the Art
In this paper we present ongoing work on mobile probes. Our approach aims at prompting rich accounts on user experience (UX) with mobile communication technologies in everyday life that can inspire design.

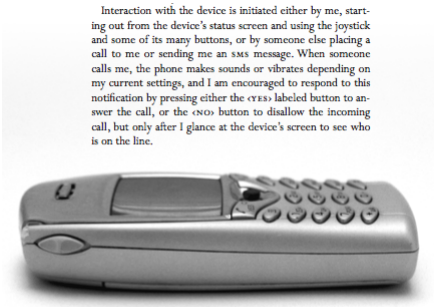


Figure 1: Device centred accounts of mobile user experience [2]. The sensual aspects are highlighted and described.

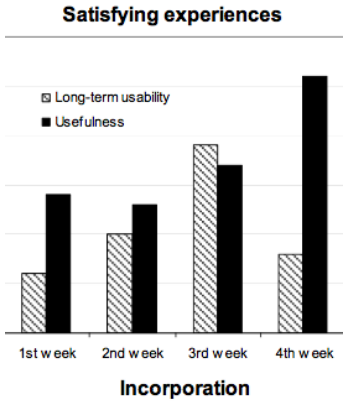


Figure 2: Experience with mobile phones from a device and functionality point of view [7].

Experience of/with mobile devices

The trend in HCI for mobile experience research remains fairly device centred (e.g. [2,6]; Figures 1 and 2), resulting in practices that are strongly focused on devices, their functions and screens of mobile devices, on how they are perceived, sensed and what they express (e.g. tactile aesthetics, sounds, identity). Likewise, Roto [11] classified mobile user experience as a result of interaction between user and a mobile device. Such approaches however overlook the fact that mobile devices are integral entities of everyday practices – and changing everyday practices respectively. Mobile devices connect people in new ways, changing the value and meaning of places, feelings of connectedness and awareness. Practice-based and pragmatic research approaches that look at mobile experience from such an angle have so far not transferred well to mobile HCI. Only a few HCI studies implicitly report on such aspects of mobile devices and mobile experiences e.g. [5, 7, 10]. These studies however do not discuss any theoretical issues of mobility or methodology.

Contemporary sociological research has developed a sophisticated understanding of mobility from which HCI can benefit [1]. In this research mobile communication is considered to be "virtual mobility" as it allows us to transcend space. But there are other "mobilities" too. For instance corporeal mobility (e.g. walking) or imaginative mobility (e.g. seeing a picture of the Bahamas on the web) [1]. These categories however are not exclusive, these mobilities co-exist and can overlap. This means that mobile experience is a nexus of different mobilities, substituting or requiring each other. For instance, virtual mobility often requires corporeal mobility. People walk out of the room to make a phone call or people don't go next door, but simply text. Buying a trip to Bahamas includes different types of mobilities. Roaming pictures of these islands on the internet may create desire in the first place, which is a sort of imaginative mobility ("I want to be there"). Booking the trip on a tablet PC, we sit on or couch and not at a travel agent, which is virtual 'shopping' mobility obviating corporeal mobility. Its hard to separate these mobilities[1], but altogether they create new desires and possibilities for social interaction and a different kind of awareness. People experience a system of mobilities. Looking at mobile devices through this lens, they are no longer mere portable tools, but are integral part of everyday practices and entities in a complex mobility system.

Methods to research mobile user experience (UX)

The methods used to study mobile interactions are diverse but often place a narrow window over mobility. Tools like Mobile Probes [3] or Experience Sampling (ESM) [4] connect researchers and participants digitally. They are mainly concerned with capturing moments and mobile situations, but without embedding them into an broader understanding of mobility. Mobile devices become a medium through which participants collect data. Feedback is more immediate, but this does not necessarily mean that the dynamics of being mobile and the experience of that is being captured. Secondly, methods in mobile UX research are mainly based on paper (e.g.: questionnaires) or on digital media (e.g.: digital recording tools, ESM). This means that the creative potential of materiality is often lost. The expressivity which digital media provide are often

[1] [1] identifies other mobilities too, like transportation infrastructure (bus, car, airplanes, etc). These categories exceed the scope of our research at the moment though.

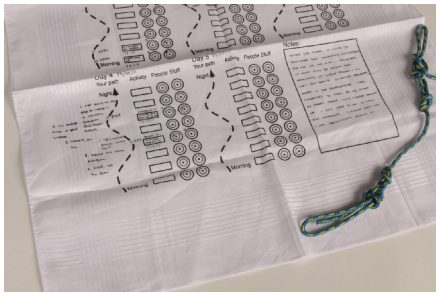


Figure 3: Starting to experiment with materials as carrier medium. Hankie questionnaire as it was used in pilot studies. A rope was given to participant as an additional remembrance tool, allowing people to make knots in it. Participants are asked to explain the meaning of knots during a follow-up interview.

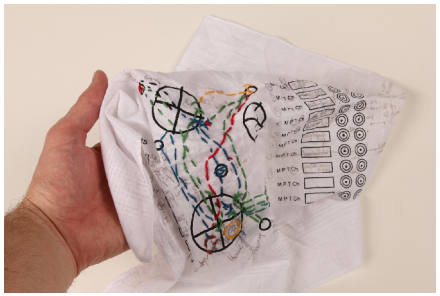


Figure 4: Iterated version of the hankie questionnaire. To use the material better and to introduce some creative opportunities we started to experiment with needle and threads to allows participants to indicate their daily paths. Selection of colors and the indicated paths are then used to prompt experience accounts in follow-up interviews.

limited to the frame that they allow (e.g: a snap shot + a descriptive text). This is an issue, especially in design centred approaches, which thrive on surprising data that opens up new design spaces, ideas and inspiration [9].

Opportunities based on this state of the art:
There are two opportunities. The first is an opportunity to look beyond mobile devices and to *incorporate a broader understanding of mobility and mobile experience in our methods* to benefit form a rich multi-dimensional understanding of mobility (= virtual, corporeal, imaginative mobility). There is also an opportunity to *introduce materiality in mobile experience research.* "Materiality" refers to the use of media and entities other than paper or digital that allow alternative open ways of data collection and representation and also to new ways of making probes portable.

Pilot Studies

Several studies have shown that mobile devices are ubiquitous and are not limited to being used 'on the move'. To get a better understanding of how to address this ubiquity of mobile user experience, we conducted two pilot-studies, overall involving 10 young males in the age between 20 and 25. This is a rather restricted user group, but as our aim was mainly to explore aspects of our approach to mobility, we accepted this limitation. We were looking at experiences with mobile facebook clients and mobile texting over the period of one week. For the studies we started to experiment with fabrics with the aim of improving the wearability of mobile diaries. After some iterations we came up with a first version of a questionnaire printed on a hankie (Figure. 3).

During these studies we realised that a good way of prompting experience accounts was to start with the *significant context of mobile interaction*. By "significant context" we understand the momentary contextual traits of interaction, which includes activities, social aspects and social proximities, product ecologies, physical context and body postures of the user. This approach worked well and we included it in the current design of the probe. This too helped us to focus on a user centred view on mobile context (mobile context is where mobile interaction is taking place, e.g. even in the home) instead of a space centred view (mobile context is e.g. interaction in public urban areas). In addition, watching people using the fabric questionnaire showed us that there was a *certain quality to it that went beyond wearability*. There was something special about how people kept and dealt with this tool during the study and the interviews. One person showed and explained the hankie to friends, one would ask if he could keep one unused hankie to use it as a decorative object. These were promising aspects we further wanted to explore and in which we saw new potential to introduce materials to mobile UX studies.

The hankie probe

With these pilot studies conducted, we designed a mobile probe, called the mobile 'hankie' probe (Figure. 7). The probe focuses on the experience of technology mediated social communication in everyday life. For the design of this mobile probe, we applied the notion of a multidimensional mobility that is developed within sociology (virtual, corporeal, imaginative mobilities). Likewise, we wanted to expand the use of materials further to enhance the potential for creative application by participants.

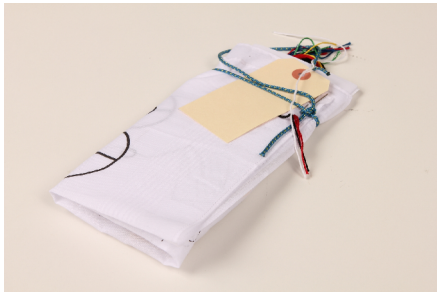


Figure 5: Hankie probes package. Each participant received one hankie probe package.

The lack of materialistic, creative and tangible prompts in mobile experiences research inspired us to extend the use of fabrics, which introduced a different way of experience recording too - opening up new ways of "recounting", of "reflecting" and "interpreting" experience [9]. We experimented with needles and threads to exploit the materiality of the probe better (Figure 4). In the current version of the probe, people are asked to sew their physical path onto the hankie. The idea is to use the selection of colours and/or "the artwork" people create to prompt experience accounts and space for interpretation and discussion.

The hankie probe tries to capture *different mobilities at the same time*. The aim is to capture corporeal mobility (how people physically move, their paths), virtual mobility (use of mobile technologies and technology mediated communication) and imaginative mobility (people's awareness of other people and places). To capture corporeal mobility, the hankie probe uses space-time diaries, represented by several circles printed onto the hankie (indicated on the left side of the hankie). They allow people to record how they move in the course of a day, by indicating their paths and places. As shown in Figure 7, the circles printed onto the hankie represent abstractions of places, which people are free to appropriate to their own

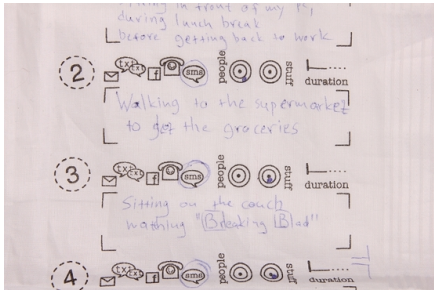
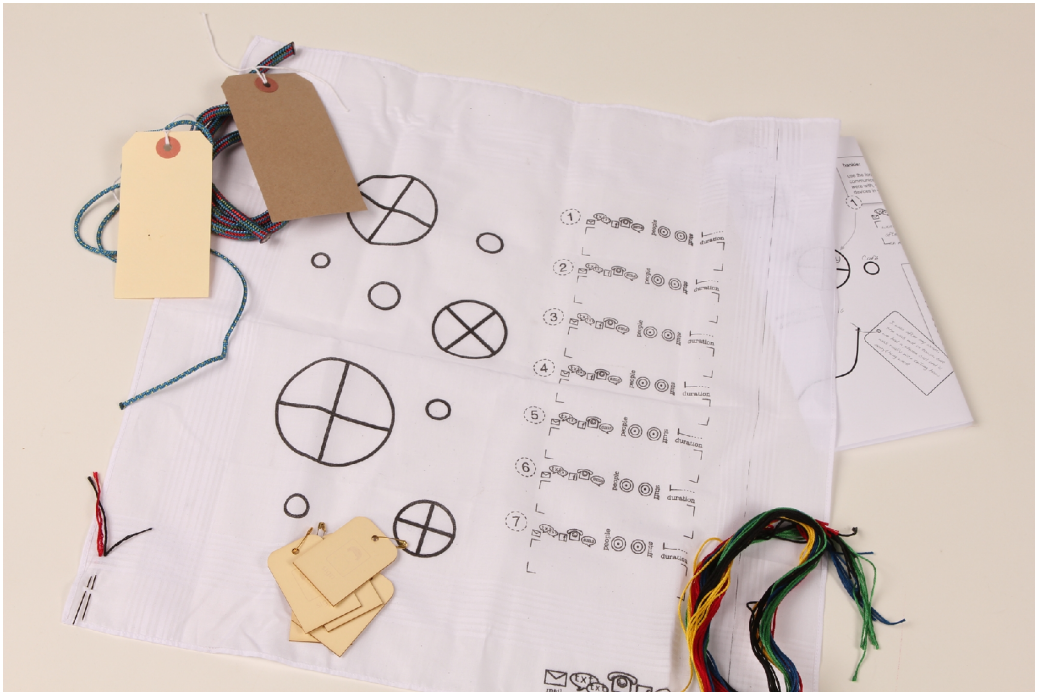


Figure 6: People are asked to record aspects of their device use. This data is used to start discussion on the situation and experience of device use.

Figure 7: The mobile hankie probe. The main object is a handkerchief. People are asked to use it to record their paths by using needle and threads. For this purpose there are several circles which represent abstraction of places they have been to. By sewing their path onto the hankie people create their own space-time diary. The probe also prompts recording of aspects about mobile device use (Forms on the right side). In addition, tags can be attached to record associations and imaginative mobility (see study for further explanation).

The use of materials aims at improving the wearability (in pockets and bags) and the potential for creative data collection and representation.



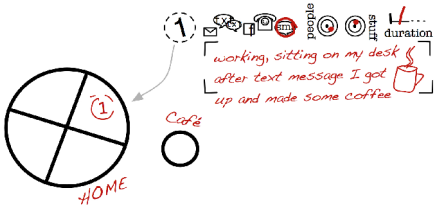


Figure 8: People are asked to locate each entry on the map. Circles on the hankie stand for abstractions of places, which people are free to interpret and adapt to their use (E.g. "the big circle stands for home, the small one for the cafe next door")

Figure 9: Tags to record associations and aspects of imaginative travel. Couples were asked to record things that reminded them about each other in daily life, e.g. A picture in one's wallet or a message popping up on the screen indicating that a person is going online.

interpretation. They can choose, name and classify them as they wish. The idea is to learn how people move and how they experience moving. At the same time this lets us identify the places where people use their mobile devices and how they experience these places, their device use and their communication in these places. At the same time we learn about their strategies of making space for communication and how they involve their devices into the context [2], e.g. when people physically change location, even if it is just a small shift of their body posture, to change the social setting enabling them to make a phone call or send a text message.

To capture aspects of device use, the probe asks people to record these details on open forms printed on the hankie. We again use the notion of the significant mobile context, as we applied it in our pilot study, namely the social and activity context, the product ecology (=other devices) and the physical context. The probe asks questions "what people did with their device?", "when?", "which media?" they used, "what they did before and after?", "who else was there?" and "in which places were they?" (Figure 6). People find these "forms" printed on the hankie next to the space-time diary (see Figure 7). They are further asked to locate these entries on the map they are creating through sewing (Figure 8). The aim is to use these records to later prompt accounts about how they involve their mobile devices into a significant mobile context and how they experience these situations and practices.

First application: studying mobile relationships

In this study we decided to look at mobile experiences of couples and what it means for them to be on their individual paths, in different places, but still connected with each other via different media. We wanted to look at couples's multifaceted mobile behaviour and how it influences their communication and their experience of mobile media use to maintain their relationship. We were working with 4 couples, all academics in their late twenties. 2 of them shared flats, 2 of them lived in the same town. Each of them recorded their mobile device use for 1 week using the hankie probe (Figures 5, 10, 11). We asked each person to record their physical path using needle and threads and also when and how they used their devices with the forms provided on the hankie. In addition, couples were asked to record associations and things that reminded them about their partner in everyday life, with which we were aiming at capturing their imaginative mobility (e.g.: I think of my girlfriend when I see her going online on Skype). For these latter aspects they were asked to fill in small tags that we added to the probe package (Figure 9) and attach these with safety-pins onto the hankie to identify where and when these associations happened. After one week we met for an interview to go through the data. Two couples we interviewed separately, two of them together (latter due to time constraints). The interviews were recorded on video and analysed later.

Applying the hankie probe showed us the potential of this tool. The hankie revealed certain mediated space-time choreographies of our couples and how they felt about these, e.g. they would always call or text each other when leaving work towards home; sometimes walking home, sometimes still sitting at their desk. For them it was to start off their experience of being together. The data about the significant context of each communication that we asked people to record did provide good prompts to start off discussions. This for

Figure 10: A completed hankie probe: On the left the sewed time-space diary indicates peoples' places and path. The stitching aims at changing the way of experience recording and accounting and as a starting point for discussion into mobile user experience.

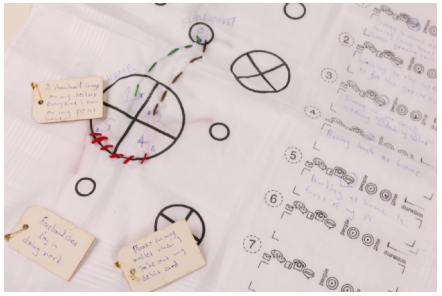


Figure 11: Hankie probe used by participants. In addition to the sewing, people recorded their associations using tags and attached them onto the hankie. These are things that remind them of each other.

instance included the experience of having to move physically to make such phone calls to their partner, to get away from distractions or to maintain the required privacy. The space time-diary allowed us to integrate these momentary situations into a general picture of mobile experience (= a combination of virtual, physical and imaginative mobility). During the interviews the hankie provided a good medium to engage with our participants. People called it a motivating and playful tool to make recordings, and again one person asked to keep an unused hankie. Two people expressed that the sewing was even relaxing for them and a good way of thinking about one's own behaviour. They hardly did the sewing "on the go" though, but mostly when they had time to do so (e.g. at a cafe, evenings). For some the sewing became a bit too time consuming after some time and they started using a pen to indicate their paths. This is a drawback in terms of portability and usage of the probe; which however we believe is outweighed by the positive aspects we observed.

Discussion

In this paper, we presented the mobile hankie probe, a tool a) to research and apply a broader understanding of mobility in mobile UX research and b) to raise the potential of creative and playful use for data collection and representation. Applying the probe in initial studies gave us insights into a broader kind of mobile experience: One that goes beyond merely looking at devices, but recognises experience as a combination of virtual, corporeal and imaginative mobility. Looking at what we call the significant context opens up a ubiquitous notion of mobility and a good starting point of looking at this multifaceted mobile UX. The materials we used, especially the use of the fabric, the threads and tags lead to individual and open ways of data collection and representation. Whereas literature shows that such kind of data feeds well into design [8], we still need to evaluate the quality of our particular data within design. According to participants' feedback the hankie probe raised their engagement in the study and animated their data collection.

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