Mobile Essentials: Field Study and Concepting

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Abstract

Mobile essentials refers to the objects most people consider essential and carry most of the time whilst out and about. This paper describes a cross-cultural field study of what people consider to be mobile essentials, how those mobile essentials are carried and problems typically encountered. Through careful field observations and in-depth interviews of 17 participants in four cities, transitions between different situations turned out to be critical moments in which mobile essentials took on specific value, but also created problems of forgetting and loss. This paper introduces the notions of Center of Gravity, Point of Reflection and the Range of Distribution to describe user behaviours. Based on the study findings nine product concepts related to mobile essentials were developed, one of which is presented in this paper.

Keywords

Concept Design, Ethnography, Handheld Devices and Mobile Computing, Home, Interdisciplinary Design, Product Design, User-Centered Design / Human-Centered Design.

Project/problem statement

Most contempory urbanites own many objects fulfilling a range of practical, social and emotional needs. Most of these objects are stored in and around a home space. People tend to travel outside the home environment on a daily basis whether it is to commute to work, for exercise or to socialize. With few

exceptions, however, most people own too much to carry whilst outside their home. *Mobile essentials* (MEs) refers to the cluster of objects people consider essential to take when outside the home environment.

Given the range of possible objects to choose from what to bring and how to carry those items is not an easy choice. People apply different strategies and solutions to decide what to bring, each of which has its own trade-offs and problems depending on situation, personal habits and preferences. The objective of the Nokia Research *Kotsubu*[1] project was to better understand the issues associated with MEs through contextual field observations and interviews, and then to concept potential products and services addressing those issues. The project was assigned by Nokia Mobile Enhancement business unit which is responsible for developing the product eco-system surrounding the mobile phone, e.g. headsets, chargers, image viewers, car kits, memory cards, batteries and so on. The product concepts needed to be appropriate to for the business focus of this Nokia unit. The project team consisted of user researchers, concept and industrial designers that were present in both the field research and the concept design stages of the project. Kotsubu was conducted over nine-months concluding in June 2003. This paper presents some of the results from the user research as well as one of the nine product concepts.

Background

Surprisingly little previous research was found in the initial literary survey. Several studies, especially in the pop-ethnographic tradition, focused on the contents of wallets and handbags [1] [2] [3]. Although important

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[1] Kotsubu is Japanese for 'small little things'

MEs, these studies have not the considered the totality of MEs and especially not how people carry, manage and interact with those MEs in real life situations. Some studies touched upon how mobile phones are handled in mobile situations in which hands and attention are occupied with various degrees of multitasking [4], and how mobile phones are handled in public situations, but those observations are related only to mobile phones, not the full ensemble of MEs. Extensive research has been conducted how artifacts, sometimes also including MEs, are organized and kept in home environments [5], but that research seldom left the home environment. Investigating MEs in their real contexts of use was the primary project focus: *what* people carry, but also *how* and *why* people carry MEs the way they do. In this respect, *transitions* between situations were considered to be the most important to observe, e.g. leaving home for work, or leaving a cafe, or getting on or off a train. Rather than static observations in the same situation, moments of transitions – we reasoned - would trigger people to think about what to bring into the next situation and to reveal tensions and problems with MEs. Although both clothing and jewelry could be considered to be things 'carried' during the day, they were not included in the study, although it was acknowledged that such 'wearables' were often a part of the ME solutions people adopted.

User research

Four cities were chosen for the user research, based on business interests of our stakeholders and geo-cultural differentiation: Berlin, San Francisco, Shanghai and Tokyo. The procedure was the same for each city: some weeks before the research team arrived to the city a number of potential participants were approached mostly mediated by local Nokia colleagues based on

Mobile essentials (MEs), *keys, cash* and *phone* are the objects that most people consider essential when leaving home, regardless of gender or culture. (Naturally this assumes they own a mobile phone).

It's tempting but incorrect to use the term 'wallet' or 'purse' in place of 'cash'. However, participants who owned wallets and purses often left home without them, first extracting the necessary amount of cash for example to pop to the shops or to have a night out without wanting to carry bulk. Follow up studies in less developed urban environments i.e. Ji Lin, China also highlighted the lack of wallet use.

Despite all three items being considered essential, users did not appear to have an equal awareness of each object. For example a number of subjects responded to the impromptu question "where are your keys" by fumbling with bags and words to the effect of "there are here somewhere". Awareness was higher for cash and mobile phone. This can partly be explained by the frequency of use - an essential object is not necessarily frequently used.

their known personal contacts. Participants were screened during a 40-minute telephone interview that assessed the appropriateness of the person: mainstream participants and creative early adopters falling within the 18 to 35-age range in different life stages – single, in relationships, with family. Participant's had to live or work in the target city and to have owned their current mobile phone for at least 6 months. The screening also covered such topics as living arrangements, modes of transport, weekday and weekend routines, with the aim of trying to identify appropriate times to observe ME related behavior. Time and location were chosen to maximize opportunities for the participant to gather objects to carry, moving between environments and across all the participants to cover most modes of transport. In total 10 female and 7 male in-depth participants were recruited, and aged between 21 and 49 with an average age of 28.

The research team (normally 2 persons) spent approximately one day with each participant, first following the individual during 3-6 hours documenting behavior through camera and note taking, so called 'shadowing'. The researchers aimed to be as non-obtrusive as possible, but if a behavior was incomprehensible and the situation allowed it participants were occasionally asked to provide context and background information to what had just occurred. The range of contexts we observed our participants included: home; work; cafes; bars; clubs, restaurants; family ,mealtimes; supermarket shopping; hanging out with friends, street markets, shopping mall shopping, picking up children from school; leaving work; meeting friends; visiting family; buying presents; birthday party, government offices; taking a class; and running

errands. Participants were shadowed on foot, using subway, bus, train, car and by bicycle.

After shadowing, the research team withdrew for a couple of hours to adapt pre-defined question topics based on the shadowing session, after which the participant was interviewed, normally in their home. In the interviews we discussed participants' general use of ME and some of the more interesting observations from the shadowing, often referring to the images take some hours earlier. Next, participants were asked to show and discuss their MEs explain their purpose, financial and emotional value, origin and issues to do with carrying, security, use, maintenance and interaction, customization, and where objects were placed and used in the home. Finally, each participant was given a reward with the equivalent value of approximately 40 Euros.

Field Study Results
The exact objects considered to be mobile essentials varied from person to person and context to context. However 3 objects – *keys*, *cash* and *mobile phone* were considered essential irrespective of culture or gender. These were the objects carried by most people most of the time whilst they were out and about. Our hypothesis for why, is that at the very least, these objects aid survival in the modern urban world - keys and money provide access to shelter, food and warmth whilst the phone enables convenient communication with someone who can provide access to these. Both cash, and increasingly the mobile phone are versatile tools for aiding recovery the user be required to cope with an unexpected event. In addition to those 'core' MEs, nine broad and overlapping categories of 'peripheral' MEs were identified: travel support; identification; medical; addiction; emotional & spiritual;

Figure 1. Female participant, Berlin placed handbag and mobile phone at her front door, including objects she thought she would need the next time she left home. The day of the shadowing session, the weather forecast had predicted rain, which induced her to also put umbrella here.

appearance; entertainment; contact & other information; and payment.

We identified a number of general strategies people adopt to support carrying, *containment* being the most important. By putting MEs in bags, handbags, purses, wallets, and pockets a number of benefits are achieved: most containers hide valuable MEs from the view of prying eyes in public places, reducing the risk of theft. Containers also protect MEs from external physical damage. More importantly, containers alleviate the mental and physical workload of bringing and remembering multiple MEs: by just grabbing one's handbag or wallet, a majority of all necessary MEs are automatically 'onboard'. In contrast to dispersed methods of carrying, aggregating MEs also makes them easier to monitor in public places. On the other hand, concentrating MEs into one container increases the consequences if stolen or lost. Similar to containment, *connectors* also generate clustering benefits, e.g. key rings and various forms of straps. Connectors are especially suited for small-scale objects such as keys, making them easier to find, handle and less susceptible to loss.

Another observed phenomenon relates to the distance and position of ME objects in relation to the user, so called *range of distribution*. In environments the user considers unsafe such as rush hour public transport MEs are kept closer to body, available for immediate reach and/or within line of sight. In safer environments, on the other hand, people are more willing to be out of sight of and physically parted from their MEs, for example putting them under a table or in a different room. The range of distribution typically reached its peak in the participant's home.

There are of course also *social reasons* why people carry their ME the way they do. MEs were demonstratively used as status enhancers in public places (although interviewees were occasionally unwilling to admit it). Whilst convenience and security were two major reasons used to explain why MEs were carried where they were, a number of our female interviewees stated that objects in tight trouser pockets are not only uncomfortable and may effectively destroy apparel, but that it also creates bulgy and socially unacceptable appearance of the 'behind'. One of our female participants referred to this area as a 'female problem zone'. For many females, handbags create an attractive alternative to such scenarios (see [6]).

Forgetting MEs when shifting from one situation to the next was perhaps the most critical problem for our participants. In fact all of our participants forgot one or more objects at some point during the shadowing sessions. A primary reason for forgetting is that the ME in questions is not visible during the transition phase, for instance leaving home, a restaurant or a bus. Many of participants – consciously or unconsciously – positioned their MEs in a way to ensure that they would be visible upon leaving the situation. For instance, when visiting a restaurant, a handbag would be placed on table or hung on chair rather than put on the floor. The most interesting ME user behaviours occurred in preparation of the time before leaving home in the morning. Objects were prepared for the next day, and typically placed close to the front door (**Figure 1**).

In order not to forget her keys when leaving home, a Berlin participant hung her keys on the door handle, making it impossible to miss when opening the door. In fact, in the interview she stated that this was the single most important reason why she had keys attached to a strap!

As the example in figure 1 shows, it is the physical properties that act as reminders in themselves: to leave
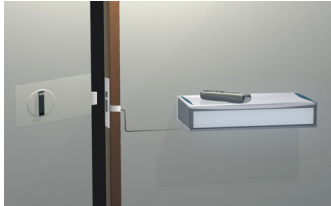
Figure 2. Reminder shelf placed next to front door

Figure 3. Digital reminders transferred to the reminder shelf

home, you literally have to stumble on the objects you are supposed to bring. Moreover, this happens in exactly the right moment: not too early (one hour before leaving home) and not too late (after leaving the house). Such objects can also act as proxy reminders for other objects to be taken - a tennis ball acts as a reminder to pack tennis gear. This has also been noted in [5].

Impaired awareness was another reason why people forgot MEs. This can be caused by tiredness or drunkenness, being absorbed in a task, or book or music or in a task being introduced immediately before the transition, e.g. an incoming phone call. The primary method people used to stay 'alert' during the transition phase we termed the *point of reflection*. Typically, this involved the user pausing other activities in order to be able to reflect on what to bring. The person stopped somewhere on the threshold between contexts (e.g. in a doorway leaving home), and looked back at the previous situation to ensure oneself that nothing was left behind (e.g. gazing into an apartment or throwing a glance at a bus seat). Very common was also to make a visual or physical check that all MEs are carried, e.g. looking into handbag or patting one's trousers or jacket. Point-of-reflection was observed multiple times during the shadowing sessions, and often the participant returned back into the previous environment to pick something up. Results: Concepts

Over 100 ideas were documented and 9 of these were selected for further exploration. For 5 of the concepts we generated short video films describing basic features and usage scenarios. Patent applications were applied for a number of concepts. One of the concepts – the *Reminder Shelf*, is presented here.

Reminder Shelf emerged from the observations on point-of-reflection: how to support a user remembering MEs when leaving home (in a possible hurry)? The physical properties of 'object reminders' left by the front door was a powerful idea which we wanted to enhance (augmenting existing practices, rather than replacing them). A shelf by the front door would allow users to create object reminders very easily (without having to put objects on the floor). Such a shelf would also be the natural place to drop off MEs when coming home (**Figure 2**). In order to make this behavior more natural, *Reminder Shelf* was equipped with a mobile phone charger giving the user a good reason to place at least one of the core MEs on the shelf. Inductive charging would remove the need for cables to the phone, and the shelf running on fuel cell technology could eliminate the need to run a cable from the power to the shelf.

In addition to the physical 'object reminders', *Reminder Shelf* also supported so called digital reminders, displayed on a screen on the front side of the shelf (**Figure 3**). Similar to the objects reminders, it should be easy to put those digital reminders to the shelf. Instead of equipping the shelf with input capabilities, we reasoned, the phone could be used to create those reminders and then automatically wirelessly synchronise the phone and shelf when they come in proximity (the shelf being equipped with a popular form of local connectivity radio, e.g. Bluetooth). With the camera capabilities of modern phones, it would be easy for users to create image-based reminders about things to bring from home, and then automatically send those reminders to the shelf display when user arrived home. This would also allow users to create such reminders whenever the thought would spring to mind. In our Reminder Shelf concept film, the main character reads a magazine on his way from work, sees an advertisement for toothpaste that reminds him that he

Figure 4. Using a camera phone to capture information to appear in the digital reminder.

needs to bring tooth brush/paste for the next day. By taking a picture of the paste ad (**Figure 4**), he then creates a reminder on his phone, which then automatically appears on the shelf display when he comes home (**Figure 3**). When leaving home the next day, picking up his MEs from the shelf, the character catches a glance of the toothpaste reminder and finds his way to the toilet before leaving home.

In contrast to calendar reminders, *Reminder Shelf* should emit no sound notifications. We wanted to avoid designing yet another home device with alarm functionalities. Instead the placement of the shelf and the gentle visual cues provided by the shelf display would be enough to generate effective reminders in exactly the right moment when they are most needed (in the transition phase). Based around typical ME sizes we concluded that the optimum size for the shelf would be around 300 x 60 mm. The concept also required mobile phone software, allowing user to create reminders and automatically synch them with the shelf when in Bluetooth proximity.

Lessons learned

Combining rich contextual user research with idea generation and concept development activities proved to be highly successful: team members working at different geographic sites has a good shared understanding of user issues and generated a high volume of relevant ideas, a number of which were filed as patents. Having concept designers present during the user research phase, and user researchers present during the concepting phases helped ensure continuity of ideas across the project.

Other factors in the project success was to assign clear roles to each of the team members: user research lead; concepting lead; data processing manager; to clearly document the originator of ideas; and to process and discuss the high volumes of images, videos and interviews as they were generated.

References

Put your references here according to the instructions in the guidelines. Below are four examples.

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Acknowledgements

Illustration 1. Reminder shelf