Chapter 3
How Do People Use Their Mobile Phones?
A Field Study of Small Device Users

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ABSTRACT
The usability evaluation of small devices (i.e., mobile phones and PDAs) is an emerging area of research. Compared with desktop computers, designing a usability evaluation for small devices is more challenging. Context of use, such as environmental disturbance and a user’s physical activities affect the evaluation results. However, these parameters are usually ignored or excluded from simple and unnatural evaluation settings; therefore generating unrealistic results. This paper presents a field study that investigates the behaviour of small device users in naturalistic settings. The study consists of a series of unobtrusive remote observations and interviews. Results show that small device users normally use the device with just one hand, press the keys with thumb and make phone calls and send text messages while walking. They normally correct typing errors and use abbreviations. On average, small device users switch their attention between the device screen and the surrounding environment 3 times every 20 seconds, and this increases when they are walking.

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INTRODUCTION

Small devices, such as mobile phones and PDAs, are widely used and are becoming increasingly important in our daily life. However, the study of human computer interaction with small devices is still a young field which is highly technology driven with less reflection on research methodologies. Results of a recent survey on mobile HCI research methods indicate a clear trend on building systems and doing evaluation in laboratory settings, whereas understanding the real problems that small device users are facing is less prioritized (Kjeldskov & Graham, 2003).

Small devices, by their nature, are intended to be used in mobile settings. Different from using a desktop computer, using a small device in motion means that a user often cannot devote all their visual attention to interacting with the device. The attention of a small device user is normally switched between a primary task, such as walking and navigating, and a secondary task, for instance the interaction with a small device (Lumsden & Brewster, 2003). Unfortunately, most user evaluations of small devices are conducted in simple laboratory settings where small device users get little distraction from the environment and thus can fully devote their attention resources to the tasks in hand. For example, some artificial settings used include simulated motion using treadmills (Bernard et al., 2005; Lin et al., 2007), walking down a quite corridor with a subjectively natural speed (Mustonen et al., 2004; Mizobuchi et al., 2005) or walking down a defined track in a laboratory room (Pirhonen et al., 2002; Lin et al., 2007). Such artificial settings argued to have the advantages of strong control of variables, easy to set up and highly replicable, but the problem is that they are less realistic and thus the results are hard to generalize (Kjeldskov & Stage, 2004). There have been also several field-based evaluations conducted outdoor (Brewster, 2002; Kane et al., 2008). However, the settings were still quite artificial as participants either walked along a short and reasonably quiet path or had to repeat the same path several times continuously. Furthermore, field-based evaluations also suffer the disadvantages of complicated data collection and limited experimental control (Petrie et al., 1998) (see Background section).

Clearly, there is a need of conducting usability evaluation in a more realistic setting, and still maintains efficient experimental control and sufficient data collection. The first step though, is to understand how people use their small devices in real-world situations. Patterns of small device users’ behaviours can then be feed back to the evaluation design, making it more realistic and naturalistic. This paper presents a field study that investigates the pattern of use of small devices. To be specific, our study mainly focuses on the input aspect of small device use. We ask: do small device users use the device while on the move? Do they look around while typing or just focus on the device screen with little attention to the surrounding environment? Do they correct their typing errors? Do they use abbreviations? What is the keyboard they prefer? The field study consists of a series of unobtrusive remote observations and interviews. In order not to disturb the users and thus alter their behaviours, the experimenter plays a passive and non-intrusive role during the observations. The interviews follow the observations and are used to confirm the observational results, and also to obtain details of small device users’ long-term habit. In the interviews, we also ask questions about how small device users use the device to access the Internet. As the mobile Web has becoming increasingly popular, the investigation on this specific use case intends to reveal how people use the mobile Web. Is using-while-walking a valid scenario of using the mobile Web (see Methodology section).

The field study was conducted in December 2008. We have observed a total of 431 small device users, and have interviewed another 51 users. Results show that small device users normally type along a short and reasonably quiet path or had to repeat the same path several times continuously. Furthermore, field-based evaluations also suffer the disadvantages of complicated data collection and limited experimental control (Petrie et al., 1998) (see Background section).
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