Chapter LVIII

A Field Laboratory for Evaluating in Situ

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ABSTRACT

Evaluating mobile technologies “in the real world” is hard. It is challenging to capture key situations of use, hard to apply established techniques such as observation and “thinking aloud,” and it is complicated to collect data of an acceptable quality. In response to these challenges, a “field laboratory” has been developed for evaluating mobile technologies in situ. Facilitating high-quality data collection as well as unobstructed user interaction, the field laboratory allows a small wireless camera to be attached to a mobile device, capturing a close-up image of the screen and buttons. This chapter describes the iterative development of the field laboratory over 4 years of evaluating several mobile systems in field settings. It leads to a description of the current setup and how it is used, and explains the rationales for key decisions on technology and form factors made throughout its development.

INTRODUCTION

Studying peoples’ use of technology is a key activity within the research field of human-computer interaction (HCI), providing software developers with invaluable information about the usability and usefulness of their systems at different stages of the process from conceptual design to a final implementation. Traditionally, such studies have taken place in dedicated “usability laboratories”
where users’ interaction with computer systems can be observed in a controlled experimental setting providing video and audio data of very high quality. Studying the usability of mobile technologies, however, raises new questions and concerns. Mobile systems are typically used in highly dynamic contexts involving a close interaction between people, systems, and their surroundings. Therefore, studying mobile technology use in situ seems like an appealing or even indispensable approach—rather than trying to recreate the use situation realistically in a laboratory. However, studying mobile technology usability “in the real world” is difficult. It is difficult to capture key situations of use, apply established usability techniques such as observation and “thinking aloud” without interfering with the situation, and it is complicated to collect data of an acceptable quality.

In response to some of these challenges, our stationary usability laboratory at Aalborg University’s Department of Computer Science has been extended with a mobile counterpart, the field laboratory, which can be taken into the field when studying mobile system use and usability. Facilitating high-quality data collection as well as unobstructed user interaction, the field laboratory allows a small wireless camera to be attached to the mobile device, capturing a close-up image of the screen and buttons while a third-person view is captured by a handheld camcorder.

The purpose of this chapter is to communicate the experiences with developing and using the field laboratory for evaluating mobile technology use and usability in situ by taking the readers through 4 years of major iterations leading to its current configuration. By doing this, the aim is to make practitioners, researchers, and designers of mobile technologies able to set up and use their own field laboratories for evaluating mobile systems in situ. The aim is also to inspire further development of even better field laboratory setups facilitating better, easier, faster, and cheaper use and usability data collection in the field. It is not the purpose of this chapter to discuss the relation between evaluating in the field or in the lab. The point of departure is taken in the assumption that you have decided to evaluate in the field and focus on how you can collect high quality data while out there. It is also not the aim to present or discuss findings about the usability of the specific systems that have been evaluated with the field laboratory (these can be found elsewhere). Instead, the purpose of mentioning these studies here is to illustrate how they functioned as vehicles for iterating on the field laboratory’s configuration.

The chapter begins with a short summary of related work motivating the development of techniques for improving evaluation data collection in the field. Three iterations of developing the authors’ own field laboratory are then described. For each of these iterations, there are descriptions of the initial motivations and aims, the corresponding configuration of equipment, an example evaluation where it was used, and the pros and cons identified. The next iteration then describes how the field laboratory configuration was modified accordingly, and what was learned from using it in practice. Finally, the current setup is described, some future trends within this area of research are outlined, and the work presented in the chapter is concluded on.

**BACKGROUND**

In the proceedings of the first workshop on Human-Computer Interaction (HCI) for Mobile Devices in 1998, researchers and practitioners were encouraged to investigate further into the criteria, methods, and data collection techniques for usability evaluation of mobile systems (Johnson, 1998). Of specific concerns, it was stated that traditional usability laboratory setups would not adequately be able to simulate the context surrounding the use of mobile systems and that evaluation techniques and data collection methods such as think-aloud, video recording, or observations would be extremely difficult in natural settings. These concerns have since been confirmed through a number of studies such as (Brewster, 2002; Esbjörnsson, Juhlin, & Östergren, 2003; Pascoe, Ryan, & Morse, 2000).

In 2003, a literature study revealed that 41% of mobile HCI research involved evaluation