Chapter 4
Research on Mobile HCI: Taken Out of Context?

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ABSTRACT
This chapter addresses the issue of context-dependency in research on mobile human computer interaction (HCI) with an emphasis on large-scale field studies. Based on a general framework that includes all the factors relevant for Quality of Experience (QoE), the authors first show how context affects basic processes on the side of the user as well as the system or device. Then the authors describe three own studies where they aimed to account for context in app usage. The first tried to do so by offering an app for a very specific usage situation (commenting soccer world cup games), the second groups related applications of one domain (on-campus service for students) in an app-in-app bundle. The third example illustrates how evaluation of one single app across various contexts can be achieved in a classic field trial. Based on the authors’ experiences, they provide recommendations what to consider when planning a study and finally point out future directions of research.

INTRODUCTION
Interactive multimodal applications as well as multimedia transmission services (IPTV, video telephony) are currently being developed in great number and variety. A large proportion of these services is offered for mobile devices to be used in situations where next to the specific design of the application (“app” or in-browser content) also context factors are of major relevance to usage and user experience. Examples for such context factors are lighting conditions, ambient sound, device-
dependent features like display size or the overall “look and feel.” Beyond classic ergonomic criteria, new aspects like additional activities carried out in parallel (walking, driving), the assumed social acceptability, and concerns about privacy come into effect. The sight of pedestrians apparently talking to themselves only rarely causes irritation nowadays, still they should not be impaired in their role as traffic participants by their mobile phone interaction.

Multimodality and mobility in principle allow for higher flexibility in such situations, but this increase in options does not always turn out beneficial for the user, who sometimes appears to be over challenged by the various modalities and their specific interplay. Here, inappropriate design of mobile multimodal applications can frequently be traced back to a general misconception of the interaction with mobile devices: smartphones and tablets are still considered as a further variety of personal computers like desktop PCs or laptops, and even some research in HCI implicitly maintains this perspective by adhering to experimental paradigms of desktop PC usage. As a consequence, apps are either tested in isolation or together with a well-defined secondary task with little consideration of the actual constraints in a realistic usage scenario. During mobile phone interaction, users deliberately carry out several tasks in parallel without having a constant “primary task”, but rather switch their priorities following affordances from the environment and combine daily activities with the usage of the device to maximize their subjective utility, which also includes deliberate distraction or increased stimulation during routine tasks. Luckily, researchers have become aware of this limitation, and meanwhile alternative ways to examine mobile device usage exist. We will discuss these approaches and complement them with our own findings. The overall intention is to give the reader an overview on the current state of the art how to consider context in field studies beyond a particular research question, summarize our experiences with releasing apps for research purposes, and offer some heuristics that might be useful when planning a comparable study.

This chapter is structured as follows: first, we will describe a general framework that includes all factors, which may be relevant for the quality of experience (QoE) of mobile multimodal services. Next, the strategy of other researchers to face the aforementioned challenges and their results will be presented, referring to the influences mentioned in the general model. We will then describe three examples where we tried to account for the importance of context in app usage. The first example narrows the context by offering an app for a very specific usage situation (watching and commenting soccer world cup games), the second example allows for more flexibility by grouping related applications of one domain (on-campus service for students) in an app-in-app bundle. The third example shows how the evaluation of one single app (querying Wikipedia with specific questions via speech) across various contexts can be achieved. Based on our results and experiences, we will provide recommendations on how to tackle the issue of context-dependency in field trials, and finally point out future directions of research.

BACKGROUND

Quality of Experience

In order to judge whether a multimodal mobile application is successful among its users, not only the performance of the app has to be analyzed, but also its quality, as it is perceived by the users. Performance is defined as the degree to which an app can fulfill the function it has been designed for, and it includes several sub-aspects, which are linked to user and system performance (Möller, 2005). Quality, in turn, is the result of a perception and judgment process, during which the user compares his/her experience to what s/he actually expects (Qualinet, 2012, following Jekosch, 2005). In recent years, different performance indicators...
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