Chapter XLVI

Appropriating Heuristic Evaluation Methods for Mobile Computing

Enrico Bertini
DIUF - University of Fribourg, Switzerland

Tiziana Catarci
University of Rome “La Sapienza”, Italy

Alan Dix
Lancaster University, UK

Silvia Gabrielli
University of Udine, Italy

Stephen Kimani
Jomo Kenyatta University of Agriculture and Technology, Kenya

Giuseppe Santucci
University of Rome “La Sapienza”, Italy

ABSTRACT

Heuristic evaluation has proven popular for desktop and Web interfaces, both in practical design and as a research topic. Compared to full user studies, heuristic evaluation can be highly cost-effective, allowing a large proportion of usability flaws to be detected ahead of full development with limited resource investment. Mobile computing shares many usability issues with more conventional interfaces. However, it also poses particular problems for usability evaluation related to aspects such as limited screen real estate, intermittent user attention, and contextual factors. This chapter describes a modified collection
of usability heuristics that are designed to be appropriate for evaluation in mobile computing. They have been systematically derived from extensive literature and empirically validated. They therefore offer a sound basis for heuristic-based evaluation in mobile computing. Besides introducing the reader to the practical use of heuristic evaluation, the chapter also closes with a description of potential future research in the area.

**INTRODUCTION**

Expert-based evaluation techniques, such as heuristic inspection (Nielsen et al., 1990) and cognitive walkthrough (Wharton et al., 1994) typically benefit from providing evaluators with guidance (for instance, a set of heuristics or a checklist) for identifying a prioritized list of usability flaws (Kjeldskov et al., 2005). Expert-based evaluation techniques are also well-known methods that can realize a relatively quick and easy evaluation.

According to Po (2003), mobile computing devices are typically ‘smart products’ or ‘information appliances’, and are generally consumer products. Their users are thus a ‘heterogeneous group’ (Sade et al., 2002) and so it may be more difficult to find suitable surrogate users for user-based testing in mobile computing (Po, 2003). Po further observes that even if appropriate surrogate users were found, the realistic recreation of the user context in laboratories would be challenging because of user mobility, which makes observation and video recording difficult (Vetere et al., 2003). “Given the problems associated with user-based evaluations of mobile devices, expert-based usability techniques are considered to be more appropriate” (Po, 2003). However, it is worth noting that expert-based techniques have in the past, been criticized for finding proportionately fewer problems in total and disproportionately more cosmetic problems (Karat et al., 1992). In mobile computing, the capacity of expert-based techniques to adequately capture the multiple contextual factors that affect user–system interactions in real settings has been questioned (for instance: Kjeldskov et al., 2003; Johnson, 1998).

It is believed that heuristic evaluation can be enriched and adapted toward capturing contextual factors. This chapter describes how standard heuristic evaluation can be made more appropriate/relevant for mobile computing. In particular, the chapter describes a modified collection of usability heuristics that are designed to be appropriate for this area. The heuristics have been systematically derived from extensive literature and empirically validated, and so offer a sound basis for heuristic-based evaluation of mobile computing. As well as introducing the reader to the practical use of heuristic evaluation, the chapter also describes potential future research in the area.

This work has been carried out in the context of MAIS, a project whose research goal is to provide a flexible environment to adapt the interaction and the information and services provided, according to ever changing requirements, execution contexts, and user needs.

The rest of the chapter is organized as follows: The second section highlights some of the challenges posed by mobile devices, applications, and context; the third section discusses the standard heuristic evaluation method; the fourth section describes the methodology that was adopted to appropriate heuristic evaluation for mobile computing and the results that were obtained; the fifth section contains reflections regarding this research activity; and the sixth section concludes the chapter and highlights some future work.

The focus in this chapter is on usability problems in mobile devices and a discussion of their sources. However, this should be set against a broader view of the fantastic world of new opportunities, advantages, and benefits that mobile devices and contexts bring. While it will not be explicitly touched on again, the chapter should be read in the light that the problems and limitations are ones worth tackling because of the opportunities offered by the technology.