

# Chapter 20

## A Protocol for Evaluating Mobile Applications

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### ABSTRACT

*The number of applications available for mobile phones is growing at a rate that makes it difficult for new application developers to establish the current state-of-the-art before embarking on new product development. This chapter is targeted towards such developers (who may not be familiar with traditional techniques for evaluating interaction design) and outlines a protocol for capturing a snapshot of the present state of the applications in existence for a given field in terms of both usability and functionality. The proposed methodology is versatile in the sense that it can be implemented for any domain across all mobile platforms, which is illustrated here by its application to two dissimilar domains on three platforms. The chapter concludes with a critical evaluation of the process that was undertaken and suggests a number of avenues for future research including further development of the keystroke level model for the current generation of smart phones.*

### INTRODUCTION

Portable devices such as mobile phones and music players are capable of running a wide variety of applications (or ‘apps’) which enable users to perform a multitude of tasks while they are away from traditional computing devices. This

has contributed to the staggering growth of the mobile phone market in recent years. In 2011 it was estimated that there were almost 6 billion mobile subscriptions worldwide, with a global penetration of 87% as well as a high take up in the developing world (79%) (ITU, 2011). The combined revenue of applications funded either

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through payment for downloading, advertising, or value added services such as subscriptions is expected to rise from just below \$10 billion in 2009 to \$32 billion in 2015 (Holden, 2010), which is a significant increase in a very short space of time.

The recent growth in mobile application development is partly due to the relatively low cost and high speed of such development. One reason for this is the simplicity of the dominant mobile platforms, such as iOS from Apple and Android from Google, and also because the associated software development tools are freely available and easy to learn. Consequently, users are often faced with a broad choice of applications to help them complete a given task. A recent survey (Flood, et al., 2011) identified four factors, which influence users when choosing an application: function, price, opinions of others and usability. Developers need to consider all of these factors when designing a new application, but it can still be difficult to evaluate the current status of the market for any given domain, since each one is so densely populated.

Before any project can be started, some groundwork is needed to determine the necessary requirements and the context in which the work will take place (Finkelstein, 1993). The context is particularly important for mobile applications development since it is essential to consider the socio-technical environment in which the applications will be developed and used. The groundwork may include an analysis of the present state of the art through a systematic survey of existing applications. Accordingly, this chapter describes a flexible, cost-effective protocol that can be used to perform such a survey quickly and thus eliminate a vast number of the irrelevant applications in a domain.

The proposed evaluation methodology is performed by experts rather than by users. It comprises a series of steps that can be used to filter through a collection of applications by comparing the features that they offer, as well as efficiency and other attributes affecting usability such as

personalization, ergonomics, flexibility, security, and error management. In addition, the process was designed to elicit functional requirements by generating a list of features offered by existing applications. The protocol is both platform and task independent which is demonstrated here through its application to two separate task domains on three platforms.

This chapter is organised as follows. Section 2 contains some background information about usability evaluation, with particular reference to mobile devices. The evaluation protocol is then introduced in Section 3, followed by a summary of the results of the two case studies in Section 4. A critical evaluation of the protocol is discussed in Section 5, which is followed by some suggestions for future research in Section 6. Section 7 then concludes this chapter.

## **BACKGROUND**

Mobile devices are hand-held tools, which typically have a graphical display with input via touch, stylus, miniature keyboard, or some combination of these methods. Examples include Personal Digital Assistants (PDAs), traditional mobile phones, smart phones, music players such as the iPod Touch and tablet computers such as the iPad and Kindle Fire. The study of the usability and design issues associated with such devices is still in its infancy, since they are very different from desktop computers both in terms of interaction mechanisms and other attributes such as context, connectivity, screen size, display resolution and processing capability (Zhang, et al., 2005). The major platform providers (including Apple and Google) have produced extensive guidelines (Apple, 2012; Android, 2012) for developers of mobile applications, and there are also recent independent guidelines that focus specifically on improving the user experience (Nielsen, 2012). However, previous research suggests that current techniques for the evaluation of such technology

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