

Chapter XLIV

Usability Evaluation Methods for Mobile Applications

Regina Bernhaupt

University of Salzburg, ICT&S Center, Austria

Kristijan Mihalic

University of Salzburg, ICT&S Center, Austria

Marianna Obrist

University of Salzburg, ICT&S Center, Austria

ABSTRACT

Evaluating mobile applications and devices is particularly challenging given the variability of users, uses, and environments involved. This chapter introduces usability evaluation methods (UEMs) for mobile applications. Over the past decades various usability evaluation methods have been developed and implemented to improve and assure easy-to-use user interfaces and systems. Since most of the so-called 'classical' methods have demonstrated shortcomings when used in the field of mobile applications, they were broadened, varied, and changed to meet the demands of testing usability for mobile applications. This chapter presents a selection of these 'classical' methods and introduces some methodological variations for testing usability in the area of mobile devices and applications. It argues for a combination of both field evaluation methods and traditional laboratory testing to cover different phases in the user-centered design and development process.

INTRODUCTION

Usability testing of mobile applications is an emerging area of research in the field of human-computer interaction (HCI). It is commonly accepted that data collection for evaluation of mobile devices and applications is a central challenge, and that novel methods must be found for that (Isomursu, Kuutti, & Värinämo, 2004).

Overall, the study of the phenomena in the field of mobile HCI is highly driven by technology and concentrates primarily on producing solutions rather than reflecting on the methodologies in use. So far, only a few in-depth studies of the methodology utilized within the field of mobile HCI have been undertaken. Wynekoop and Conger (1990) describe the following methods in the face of mobile HCI: case-studies, field studies, action research, laboratory experiments, survey research, applied research, basic research, and normative writings. Kjeldskov and Graham (2003) conducted one of the most comprehensive reviews of the mobile HCI research methods. In their review, Kjeldskov and Graham (2003) selected papers focusing on mobile HCI from relevant conferences over the past years and classified them according to the described research methods. The findings clearly show that the prevalent mobile HCI research falls into the applied category (55%) followed by laboratory experiments (31%). On the bottom portion of the scale, no entries were found for action research, while only three and four (out of 102) research methods were conducted as case and field studies respectively. These findings imply that there is a strong tendency towards environment independent and artificial settings in research, while research on real use and action basic research is still widely neglected.

The evaluation of systems takes place predominantly in laboratory settings (e.g., Jones, Buchanan, & Thimbleby, 2002; Mizobuchi, Mori, Ren, & Michiaki, 2002). This lack of real-use-contexts and natural setting research could be justified by the fact that mobile HCI has strong roots in the field of computer sciences and HCI. These fields have a strong bias towards engineering and evaluation methodology. In addition, the methods stemming

from the social sciences are normally more costly and resource intensive.

Recently, the need of addressing the question of what is useful and what is perceived problematic from a user perspective and under real use conditions has been noted. Increasingly researchers are incorporating natural setting methods—case and field studies and action research—either as stand-alone methods or in combination with artificial settings (e.g., Tamminen, Oulasvirta, Toiskallio, & Kankainen, 2003; Bohnenberger, Jameson, Krueger, & Butz et al., 2002; Hibono & Mockus, 2002). These methods offer ideal opportunities to study real-world user cases, to increase learning from existing systems within real-world contexts and assist with the translation of needs into new designs.

A good design, including usability and user friendliness, is not only critical for market success, but can also reduce mental and physical stress, reduce the learning curve, improve user-device operability when using the device. All these factors together improve the overall product quality (Duh, Tan, & Chen et al., 2006). As already mentioned, numerous methodologies are used for designing products and evaluating their usability. These methods are also applied to mobile device and application designs. The next section gives an overview of usability evaluation methods used.

USABILITY EVALUATION METHODS FOR MOBILE APPLICATIONS

The current trend of users demanding mobile information and communication technologies (ICTs) to support their everyday life and work has led to new generations of mobile devices. Mobile devices have expanded their functionality step by step. Looking at today's generation of mobile phones, various functions are offered. People may communicate via voice and text (short message service), receive information from the Internet, or use calendars on their cell phone to organize their daily lives. An endless variation of functionality exists on these pocket-sized devices. Mobile devices are used in various situations and contexts. They are used to

12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/usability-evaluation-methods-mobile-applications/21863

Related Content

An Energy-Efficient Multilevel Clustering Algorithm for Heterogeneous Wireless Sensor Networks

Surender Soni, Vivek Katiyar and Narottam Chand (2011). *International Journal of Mobile Computing and Multimedia Communications* (pp. 62-79).

www.irma-international.org/article/energy-efficient-multilevel-clustering-algorithm/55868

The What, How, and When of Formal Methods

Aristides Dasso and Ana Funes (2019). *Advanced Methodologies and Technologies in Network Architecture, Mobile Computing, and Data Analytics* (pp. 1600-1614).

www.irma-international.org/chapter/the-what-how-and-when-of-formal-methods/214724

Attacks and Authentication for Mobile Banking

(2018). *Advanced Mobile Technologies for Secure Transaction Processing: Emerging Research and Opportunities* (pp. 17-54).

www.irma-international.org/chapter/attacks-and-authentication-for-mobile-banking/188297

Reducing Network Overhead with Common Junction Methodology

Shashi Bhushan, Mayank Dave and R.B. Patel (2013). *Contemporary Challenges and Solutions for Mobile and Multimedia Technologies* (pp. 210-220).

www.irma-international.org/chapter/reducing-network-overhead-common-junction/70817

Quality of Service Analysis and Queuing Performance Modeling of Orthogonal Frequency Division Multiple Access Based IEEE 802.16/WiMAX System

Abdelali El Bouchti, Abdelkrim Haqiq and Said El Kafhali (2012). *International Journal of Mobile Computing and Multimedia Communications* (pp. 54-70).

www.irma-international.org/article/quality-service-analysis-queuing-performance/69533