

Challenges of Usability Evaluations in the Emerging Multimedia Environment

Margherita Pagani

Management Department
Bocconi University (Italy)

Abstract

The rapid development of mobile devices, PDAs, and other wireless technologies over the past decade has engendered a plethora of portable devices for data transmission and processing applications. Moreover, the development of digital television and the opportunities opened by interactive digital TV applications has motivated TV producers and consumer electronic manufacturers to invest their research efforts in usability areas in order to help drive the design of future interactive services and devices. The integration of devices allows to improve the mobile experience by integrating cell phones with PCs, the Web, TVs.,

and so on. The ergonomics challenges for these devices involve trade-offs between increasing levels of miniaturization, and the relative size of the human hand and visual acuity of the human eye (for mobile applications) which require relatively large user interfaces for successful technology access.

In such environment new digital delivery mechanisms must be straightforward to use with minimum effort required (Agarwal & Prasad, 1998; Dabholkar, 1996; Lederer, Maupin, Sena, & Zhuang, 2000; Meuter et al., 2000; Seffah, Donyae, & Kline, 2004). The ease of orientation, navigation, and understanding are crucial (Seffah, Donyae, & Kline, 2005).

Multimedia technologies (in particular digital TV and 3G wireless technologies) require significantly more attention to human factors and a progressive re-examination of the traditional usability engineering concepts and evaluation methods.

These emerging critical issues have great managerial implications for all players involved along the multimedia value network: from content providers and application service providers to device manufacturers. Easy to use interfaces are more and more critical for successful adoption and use of applications.

If we look into the IT articles published in the last years, we may also discover that much has been written and debated about methods of measuring usability and the principles behind an object's perceived efficiency or elegance (*Norman 2002; Nielsen 1994; Shneiderman 1980; Holzinger 2005*). Design components have been found to influence attitude toward the technology (*Stevenson et al. 2000; Bruner & Kumar 2000*). This parallels previous research on attitude-toward the adoption itself combining cognitive evaluations of the adoption and affective reactions (*Burton, and Lichtenstein 1988; Miniard et al. 1990*).

A significant association is pointed out between perceived ease of use (PEOU) and attitude towards adoption and between PEOU and perceived usefulness (*Davis and Venkatesh, 1996; Agarwal and Karahanna, 2000; Gefen, Karahanna and Straub, 2003*).

The design of mobile applications and interfaces has received considerable attention over the last decade (*Abowd et al. 1996, Cheverst et al. 2000, Cheverst et al. 2002, Pospischil et al. 2002, Fithian et al. 2003*) showing the impact of the limitations of small screen size, lower screen resolution, and cumbersome input mechanisms (*Buchana et al. 2001; Duchnicky and Kolers 1983; Han and Kwahk 1994; Jones et al. 1999*).

With the development of new digital video broadcasting handheld (DVB-H) services and iTV applications new usability evaluations involving the use of a wide range of methods and techniques borrowed from usability research into 'desk bound' computers and their use, need to be adapted to fit these special needs and opportunities. These evaluations all provide valuable insight into usability and usefulness and typically inform design refinements and/or inspire new design concepts.

However, little research has been published on the particular challenges to usability evaluation posed by mobile devices and iTV applications; how should we evaluate mobile devices and digital TV sets, what methodological challenges do we face, what are the pros and cons of different usability evaluation approaches?

Only a few authors considered different usability evaluation methods and techniques for mobile computer systems (e.g. *Borntrager & Cheverst 2003; Brewster 2002, Pirhonen et al. 2002, Kjeldskov and Skov 2003, Kjeldskov and Stage 2004; Kray and Baus (2003)*).

There are various guidelines for usability testing of desktop applications. However, those established concepts, methodologies, and approaches commonly used in traditional human-computer interaction research are not always applicable to iTV and mobile applications (*Jones, Marsden, Mohd-Nasir, Boone, & Buchanan, 1999*) due to mobility and the distinct features of mobile devices, wireless networks and digital TV.

It's important to realize, in fact, that usability depends on a number of factors including how well the functionality fits user needs, how well the flow through the application fits user tasks and how well the response of the application fits user expectations.

Accordingly to this consideration, usability is the quality of a system that makes it easy to learn, easy to use, easy to remember, error tolerant and subjectively pleasing. Different media and devices provide different functionalities and usability needs to explore in depth new factors such as cost-effectiveness and usefulness.

Managerial implications and benefits emerge for designers, users and companies.

Designers need to learn design principles and guidelines in order to create a highly-usable system through a process that involves getting information from people who actually use the system. From the user's perspective usability can make the difference between performing a task accurately and completely or not, and enjoying the process or being frustrated. Finally, from a management point of view, software or any kind of application or device with poor usability can reduce the productivity of the workforce, in all case lack of usability can cost time and effort and can greatly determine the success or failure of a system.

Thus, there exists growing demand to evaluate the *usability* of mobile, iTv and other emerging applications and devices quickly as well as comprehensively.

I hope that with my short remarks I have incited readers' wishes to go more deeply into the interesting peaces of research related to usability.

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Author Biographies

Margherita Pagani is Assistant Professor of Management at Bocconi University (Milan) and Head Researcher for New Media&Tv-lab at the I-LAB Centre for Research on the Digital Economy. She is Associate Senior Editor for the *Journal of Information Science and Technology JIST* (USA). She was Visiting Professor at Redlands University (California) and Visiting Scholar at Sloan-MIT (Massachusetts Institute of Technology) where she collaborates within the working group "Value Chain Dynamics" (Communications Future Program). She is member of the Editorial Advisory Board of *International Journal of Cases on Electronic Commerce* (IJCEC), *Idea Publishing Group* (USA), *Industrial Marketing Management*, *European Journal of Operational Research and Tourism Management*. She is the author of the books "*La Tv nell'era digitale*" (EGEA, 2000), "*Multimedia and Interactive Digital TV: Managing the Opportunities Created by Digital Convergence*" (IRM Press – USA, 2003 and Communication Books – Korea, 2006), "*Wireless technologies in a 3G-4G mobile environment: exploring new business paradigms*" (EGEA – 2006). She has edited the book *Mobile and Wireless Systems Beyond 3G: Managing New Business Opportunities* (IRM Press 2005) and *Encyclopedia of Multimedia Technology and Networking* (IPG, 2005). She has published articles focused on mobile adoption models and interactive digital television in *Information&Management* (Elsevier), *Journal of Interactive Marketing* (Wiley) and *The International Journal on Media Management*.