ABSTRACT

Mobile devices have proliferated into most working and private areas and broad user groups have access to mobile technology. This has considerable impact on demands for usable designs. As users differ widely regarding age, upbringing, experience and abilities, it is a basic question whether there are user interface designs feasible that meet the demands of user diversity and trans-generational designs. The aim of the present research was to uncover effects of user diversity on menu navigation. Users of a wide age range were examined when interacting with mobile phones. In a detailed way, individual navigation routes were analyzed and effectiveness and efficiency of menu navigation was determined. In addition, effects of individual variables were considered. The results show that the usage of small-screen devices imposes considerable difficulties for all users, but in particular for children and middle-aged adults, who were very sensitive for cognitive demands imposed by current mobile phone designs.

INTRODUCTION

The distribution of mobile devices represents one of the fastest growing technological fields ever. Especially, small interface devices are omnipresent and can be characterized as important technical devices in today’s societies. Mobile devices promise to be ubiquitously applicable and cover basic communication as well as office functionalities and allow Internet access. Moreover, the devices are used for route and traffic information, but provide also fun and entertainment applications.

The ubiquity and penetration of mobile devices raise new usability concerns. Many users
show considerable problems with respect to the handling, learning, and understanding of these devices, which in turn reduce the ease of use and the perceived usefulness (e.g., Arning & Ziefle, 2006, 2007; Jakobs, 2005; Tuomainen & Haapanen, 2003; Ziefle & Bay, 2004; 2005). Yet, commonly agreed rules, which complexity of functions and which interface design is appropriate, have not been defined, and perhaps due to this fact, usability is not an issue that manufacturers are primarily investing in.

Several factors can be referred to that contribute to these difficulties. While formerly the usage of information technology was mainly restricted to technology-prone users, today, all user groups are addressed by technology. The diversity of the target groups, however, requires a basic understanding of the human factor and should be adequately addressed by device design. Users differ considerably with regard to their needs, motivation, competencies, and aptitudes, which is reflected in users’ age, gender, and experience with technical devices.

In addition, more and more transactions include the utilization of technical devices and demand the acceptance and the competence of using technical devices. Thus, technical device usage is increasingly less optional, but represents more and more an indispensable qualification for many working settings. Furthermore, the nature and number of the devices’ functionalities is elementarily changing. The traditional functionality of mobile phones, making calls, is only one among many other functions and the devices have an increasing complexity. Aggravating, numerous different device types within and across brands can be found on the market. While the applications and functions are increasingly merging across device types, though, devices differ considerably with respect to their basic structure and interface design. Within cross-platform-designs, it is thus difficult to understand, which operation modes and “device logic” is specific for a certain device and which is valid across devices (e.g., Ziefle, Arning & Bay, 2006). Finally, the miniaturization of the devices also contributes to cognitive difficulty when using technology. The tiny devices have small keys and miniature displays, thus the key handling and the visibility of the displayed information is considerably complicated. Furthermore, due to the restricted display, only few functions can be seen at a time. This increases memory load, as users have to remember function names and their menu location. Also, spatial orientation in the menu is problematical. Users do not experience how the menu is structured and how many functions are in the menu. As a consequence, users often lose their way in the menu.

**BACKGROUND**

The development of mobile technology and the device interface design still seems mainly to concentrate on what young and experienced users want (Maguire & Osman, 2003). However, children (mobileyouth.org, 2005) and older adults (Arning & Ziefle, 2007; Ziefle & Bay, 2006) are now also major user groups and, though, have not been considered adequately so far. This may be due to the fact that there is only little knowledge whether these groups have specific difficulties when using small-screen devices, and also regarding the factors, which might hamper or benefit a purposeful interaction with these devices (e.g., Arning & Ziefle, 2006; Tuomainen & Haapanen, 2003). Instead, a lot of preconceptions are prevailing. According to casual comments of many participants in our lab, we experienced that there is a “common knowledge” about aptitudes and abilities of age groups interacting with technical devices. Older adults are assumed to be the taillight regarding technical competence (and interestingly, they characterize themselves the same way), and quite low interest in technical developments is ascribed to them. As they have a different upbringing and were educated in times when technical devices were far less complex, they are thought to be considerably penalized. Conversely, children are supposed to easily master the interaction with technical devices. They are believed to understand the mode of operation of those devices much faster by virtue of their contact with interactive technology (e.g., computers, video games) from early on.