Chapter IX
Learning-Disabled Children: A Disregarded User Group

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ABSTRACT

In usability research it is a common practice to take young and healthy university students as participants for usability evaluations. This chapter focuses on the “weaker” mobile phone users, which have been mostly disregarded in this field: Learning-disabled children. Their interaction with mobile phones is compared to that of average children and students. Results show that the consideration of the “ergonomic worst case,” which means a user group with cognitive deficiencies, leads to qualitatively and quantitatively different insights into the impact of specific design decisions. In contrast, when only students are involved as participants in the evaluation of technical devices, the impact of characteristics of the user interface on the ease of use is dramatically underestimated. One factor hampering the ability of learning-disabled children to interact meaningfully with a technical device may be their big difficulty building a correct mental representation of it. Therefore, this process should be especially supported.

INTRODUCTION

In most research projects, focusing on the usability of technical devices students serve as participants for the experimental evaluations. As students are bright and technically skilled, highly performance-motivated, have high cognitive and verbal abilities and no fear of being tested, the examination of this user group can be regarded as benchmark. Of course, this may give an insight into the effects of a specific design on users’ performance interacting with the device because results can be interpreted as mainly caused by the design of the technical device, and no shortcomings have to be considered from the users’ side. Furthermore, there are practical reasons for this procedure, as
students can be recruited very easily by research institutions. On the other hand, the fact that some devices such as the mobile phone can be found in all age groups and levels of society give reason to seriously doubt whether students as participants in usability tests will be able to identify the real impact of specific user interface alternatives on the ease of use of the device. Taking only students’ performance as basis for design decisions seems to be risky.

The purpose of the present study was to learn if and to which extent the performance achieved by students in usability studies may be generalized to a broader (or weaker) population. The motivation was to assess with a common technical device and typical tasks whether not only the quantitative performance level but also specific difficulties of the special user group could be identified. If the same difficulties may be found this means that the user interface design should be aligned with the “weakest” user’s needs. If specific problems are encountered, a “design for all” approach would not be feasible but special design recommendations for different user groups would be needed.

BACKGROUND

Considering the variance in all factors characterizing the users it is highly debatable if the benchmark procedure for usability evaluations meets the demands of easily usable devices for all target users. There are differences, for example in expertise, experience with technology in general, domain knowledge, cultural factors and upbringing, but also developmental aspects with respect to the huge field of cognitive abilities, ascending in children and descending in older adults. As shown in earlier studies (e.g., Bay & Ziefle, 2003a; Liben, Patterson & Newcombe, 1981; Vicente, Hayes & Williges, 1987; Westermann, 1997; Ziefle & Bay, 2005a, Ziefle & Bay, 2006) a number of cognitive abilities, for example spatial cognition or verbal memory, show a considerable change over the lifespan.

Given that diversity, it may be problematic to focus only on best case conditions and to neglect weaker users. Rather, it might be more advisable to pursue an inverse proceeding in usability research in order to reach what usable designs promise.

Everyday, products as the mobile phone should be conceptualized bearing in mind the “weaker” user, that is, for example, a user with cognitive abilities below average. These users are the ones who need to be supported much more than those who are well trained with technical devices and office software because otherwise they may not be able to handle a device even after a substantial time of exposure. Also, more and more children possess mobile phones, which have not been specifically designed for this user group. Probably children would not even want to use a “kid’s phone” because of “image” issues. In the recent past a number of studies have been concerned with enlightening children as a special user group of technical devices or technology in general (Berg, Taylor & Harper, 2003; Carusi & Mont’Alvao, 2006; Hanna et al., 1998; Jones & Liu, 1997; Ketola & Kohonen, 2001; Lieberman, 1998). While some knowledge was collected on children’s attitudes (e.g., Vincent, 2004) and general usage criteria (e.g., Crenzel & Nojima, 2006), only few studies have investigated how children actually interact with different mobile phones in terms of efficiency and effectiveness (e.g., Bay & Ziefle, 2003b; Bay & Ziefle, 2005; Ziefle, Bay & Schwade, 2006). And in even fewer studies a direct comparison of the children with the performance of other user groups (i.e., young and older adults) was undertaken (Ziefle & Bay, 2004; 2005b).

Similar to the small HCI research output regarding children there is even less knowledge about mentally impaired users’ interaction with technology (e.g., Oliver et al., 2001; Petrie et al., 2006; Márai, Kosztyán & Sik-Lányi, in press). Especially for these people the importance of usable mobile devices is high. Given the fact that mere calling is not longer the most frequent interaction but impaired users could be supported by memory functionality (e.g., medical monitoring) or navigation aids of mobiles, the mobile device could be a supportive aid enabling more independency and higher mobility of this special group.