

Chapter 14

Use of Large Multi-Touch Interfaces: A Research on Usability and Design Aspects

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ABSTRACT

This study explores the design considerations and usability factors of using large multi touch interfaces. In this study, an experimental approach incorporating a large multi touch interface environment was used. End user usability test sessions supported with glasses type eye tracker and interview sessions were conducted. The data were collected from one expert and three non-expert users by implementing a task on a military training application. Two analysis methods were used, analysis for eye movement data of users and analysis for interviews. This study revealed that users were generally focusing at the center of the screen while using the large multi touch display. The most common gestures were Tap and Drag which are single touch input gestures. It was easy to adapt to the system by recalling the previous experiences from mobile devices, to manage the area on the screen, and to interact with two hands thanks to display size.

INTRODUCTION

The increasing use of touch devices has brought significant changes on Human Computer Interaction (HCI). Users have started to use touch technology in their daily lives as an inevitable consequence of increasing usage of smart devices. Because of this trend, the needs of users have been changed in terms

DOI: 10.4018/978-1-5225-2616-2.ch014

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of the display size of devices. Users started to request for using larger display size with multi touch capability. According to Martin-Dorta, Saorin and Contero (2011), using touch screen interfaces increases the motivation and satisfaction of the students during the interactive courses.

The use of devices with touch ability like smart phones and smart boards is increasing day by day, because using devices by touching is easier and more collaborative than traditional usage of devices by using keys, keyboard and mouse. According to Wahab and Zaman (2013), multi touch interactive tables are started to be essential technology for collaborative works. As a consequence of this increase, the demand for larger multi touch devices emerged. It necessitates the studies on this issue.

There is a need to investigate the usability factors of large multi touch displays, because the gestures used on large multi touch displays should be different from the usual touch gestures which are used on smaller displays like smart phones or tablet PCs. Besides, user preferences on using large multi touch displays can be different from the user preferences on smaller multi touch displays. Most of the multi touch devices are designed for single person use. Although the small displays have primary role in disseminating multi touch gestures, Very Large Displays (VLDs) need new definitions and suggestions to integrate these gestures in those sizes. Creating a usable interfaces for VLDs, a series of experiments should be conducted. In this study, basic usability methods are integrated with the eye tracking technology to record and analyze bases of user responses. The findings highlight the users' attitudes and behaviors toward a newly produced VLDs. Besides, the findings are important to design of next generation large multi touch displays. In addition, there are not many studies about the design of VLDs in the HCI literature. One of the aims of the current study is to suggest answers about the design guidelines for VLDs.

LITERATURE REVIEW

This part includes five main sections, namely the history of touch displays, larger touch displays and usage, technology of touch displays, gesture standards for touch devices and Very Large Displays (VLDs), and the current VLDs.

History of Touch Displays

At the beginning of the post PC era, the idea of tablet PCs was created well-known patent disputes between two main players, namely Apple and Samsung in the market (Hey & Pápay, 2014). During these lawsuits, Samsung showed Stanley Kubricks' 50 years old "A Space Odyssey" movie as a proof against Apple claims in which a tabletop screen is shown explicitly. Although the tablet PC seen in this scene is no more than an LCD display, it creates the sense of using screen as an input device. Afterwards any developments in interactive large displays were announced "dreams come true" by referencing the movies in which interactive tools depicted.

This shows that there is a breakdown between technological and conceptual development in the subject of multi touch screens. The developmental tracks of tablet computers and touch screen technologies followed different routes before incorporated into a device. For example, the first patent which can be linked to the use of screens as an input devices can be dated back 1915, a century ago (Goldberg, 1915). Pen is the first input tool used instead of keyboard among computers in earlier models at 50s (Dimond, 1957). Although many different models or mediums produced as prototypes for modern touch screens, they won't become a part of daily life until first introduction of iPhone by Apple in 2007 (Grissom, 2008).

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