Gender Differences in Interface Type Task Analysis

Raafat George Saadé, Concordia University, Canada
Dennis Kira, Concordia University, Canada
Camille Alexandre Otrakji, Sigmawave Inc., Canada

ABSTRACT

The three pillars of usability are efficiency, effectiveness and satisfaction. Today’s human-computer interface (HCI), used in cellular phone, software, Internet, personal digital assistants and others should be designed to meet these three pillars. This research investigates the influence of two different interfaces on usability as they relate to gender. An experiment was conducted such that objective data were first captured while participants were performing specific image editing tasks, followed by a subjective evaluation of the participants’ experience. The independent variables were gender and the interface. The dependent variables were task completion time, perceived ease of use and perceived usefulness. Results suggest that males outperform females in new tasks while using a menu driven interface and both new and common tasks while using an icon based interface. Both genders seem to take longer time to complete the same task (for both common and new) using an icon based interface. It was also found that there was general agreement among gender and interface type on the level of perceived ease of use and perceived usefulness of the image editing software used. Important differences in the distribution characteristics were noted. Implications for researchers and software developers are discussed.

Keywords: Gender, Icon, Interface, Menu, Perceived Ease of Use, Perceived Usefulness, Task Completion

INTRODUCTION

Throughout the world, the “online information technology” paradigm has impacted many aspects of our lives. Many are completely pre-occupied with the electronic world to shop, work, study, interact with others, play, date, gamble and marry. Many governments are even encouraging its citizens to become part of the information society (French & Richardson, 2005). There seems to be an ‘electronic pressure’ to participate. Everybody is urged to use some form of information technology whether that may be a cellular phone, a personal digital assistant or simply a laptop to connect to the internet for school, work or leisure. In this perspective, our use of information technology can be considered mandatory. It may therefore be expected that judgment on user satisfaction would be based on productivity gains using the information technology. In other words, the expectations to perform and complete specific tasks faster continue to increase. In the context
of internet surfing and playing games however, this may not be the case, since the driving motive of usage and satisfaction is more intrinsic. One can therefore assume that user satisfaction is based on the total subjective interactive experience in using an online environment (Lindgaard & Dudek, 2002).

Regardless of the mode (mandatory or optional) of interaction with the computer, the main issue remains to be usability. According to the international standard on usability, ISO/DIS 9241-11 (International Organization for Standardization, 1997), the three pillars of usability are efficiency, effectiveness and satisfaction. Based on this definition, today’s human-computer interface (HCI), regardless of its application (e.g., cellular phone, software, Internet, personal digital assistant . . .), should be designed to meet these three pillars. In specific, it would be expected that an end-user regardless of the technology used would have to learn to use an HCI to successfully complete tasks, fast (efficiency), be able to execute tasks accurately with little or no errors (effective) and if all goes well, be satisfied with the technology experience. This seems to be particularly true in the online playing context. Users expect to complete game objectives fast and accurately. Only then will they be satisfied with the online game.

The user interface is what connects the user to the computer application being used. Through the interface, the user can interact with the application (Lucas, 1991). The design of the interface must address issues such as ease of use, clarity, consistency and attractiveness in communicating with the user. These issues are important because the quality of the interface contributes towards the ability of the user to participate and perform well. Additionally, the visual design of the interface affects the impression and understanding that the user will develop of the interface, and have the desire to use it (adoption) (Passig & Levin, 2000).

An implicit assumption in the design of novel user interfaces is that a large portion of the end users possess equivalent propensities to perceive, interpret, manipulate and understand the visual properties of the objects presented through the interface (Hubona & Shirah, 2004). Clearly, this assumption is not a good one because it blinds HCI designers to the fact that the end user population contains a broad number of different characteristics. Gender differences although well acknowledged by the behavioral research community, is not that well known in the user interface design community (Hubona & Shirah, 2004). There are in fact gender differences in innate cognitive spatial abilities which are suspected to directly relate to perception, interpretation and cognitive processing of spatial properties as well as relationships among the visual objects present in interfaces.

Today, more and more, end-users are utilizing different software applications to perform every day personal and work-related basic tasks. Their interaction with a multitude of different types of user interfaces on a daily basis, stress the need to better understand the role of different user interfaces on end user usability and satisfaction (Saade & Otrakji, 2004; Chalmers, 2003; Colley et al., 1994; Benbasat & Todd, 1993; Kacmar & Carey, 1991; Gittins, 1986; Hutchins et al., 1985; Hemenway, 1982). Previous work has indeed investigated the role of computer interfaces on satisfaction, however only within the context of end-user training and in a corporate setup (Davis & Wiedenbeck, 2001; Davis & Venkatesh, 1996; Davis, 1993; Davis & Bostrom, 1993; Brancheau et al., 1986, 1987).

The primary aim of this study is to investigate the influence of two different interface types (menu driven and icon based) on usability as it relates to gender differences. A controlled experiment was conducted with objective as well as subjective data captured. In this paper, we provide a background review of the concepts related to our work, namely HCI, gender and satisfaction. We then elaborate on the experiment that was conducted followed by an analysis and discussion of the results using descriptive statistics, ANNOVA and box plot for task analyses and psychometric analysis for the subjective data. Finally, we discuss limitations of this study and provide recommendations for future research.
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