Chapter 5
User-Centered Designs for Electronic Commerce Web Portals

Robert Jeyakumar Nathan
Multimedia University, Malaysia

Norazah Mohd Suki
University of Malaysia Sabah, Malaysia

ABSTRACT

Websites connect businesses with customers. They are an important medium that facilitates online transactions, a necessity for businesses. The design and usability of an Electronic Commerce (EC) website play an important role in achieving its objectives (Kumar, Smith, & Bannerjee, 2004; Marcus, 2005; Nielsen, 2003; 2005; Krug, 2006; Cappel & Huang, 2007). Recognizing their importance, design and usability aspects of EC websites have been widely researched in both applied and academic research (Lecerof & Paterno, 1998; Lohse & Spiller, 1999; Nielsen, 2000; Cao, Zhang, & Seydel, 2005; Flavian & Guinaliu, 2006; Nathan, Yeow, & Murugesan, 2008; Nathan & Yeow, 2009; Robins & Holmes, 2008). This chapter discusses the recent work with web design and electronic commerce. The importance of usability and user-centered web designs are highlighted. Usability to specific target groups and industries, such as airlines, government, and services portals, are also discussed. Altogether, design guidelines are given for web industries, and recommendations are made for better usability in designing websites.

WEB DESIGN AND USABILITY

The design of Websites, particularly the usability aspects of Websites, assumes great significance. The *International Organization for Standardization* (IOS) 9241 defines usability as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (Karat, 1997). Driven by the importance of usability in Web applications, there are several studies on Web usability. For example, Nielsen (2000) and Lecerof and Paterno (1998) studied how Website usability standards reduce errors,

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enhances accuracy, increases usage, and improve the look of a Website. An empirical study by Lohse and Spiller (1999) found that Website usability explains a high percentage of variance (61%) in online sales.

Moraga *et al.* (2006) compared the different quality models for Web portals and found that researchers paid special attention to visual aspects of interface design. Calero *et al.* (2005) reviewed 60 papers on Web quality (including Web design) from 1992 to 2004 and classified them to the Web Quality Model. Allen (2002) studied the interface design of the University of South Florida's virtual library using usability testing method (University of South Florida Virtual Library, 2012). Chowdhury *et al.* (2006) reviewed many usability studies (including research on interface design) and studied their impact on digital libraries. They concluded digital libraries should be evaluated with respect to their target users. Xie and Cool (2000) compared the search experiences with Web and non-Web interfaces to online databases and found that some of the designs of Web interfaces outperform non-Web interfaces. In essence, all authors agree on the importance of interface design in making an online system usable by users.

Lecerof and Paterno (1998) highlighted the importance of specified users in determining the crucial usability aspects of a system. For example, ease of use may be the crucial usability aspect for Websites targeting children, whereas efficiency may be the crucial usability aspect for business-to-business e-procurement Websites. Ginige and Murugesan (2001) recommended ten key steps for the successful development of a Website. Among them is the need for developers to clearly identify the system's main users. This is in agreement with the ergonomics rule of thumb which states that "one size does not fit all". However, most Website design guidelines are catered to general users, for example, Ergonomic Guidelines for User-Interface Design (Hix and Hartson, 1993) and Web Analysis and Measurement Inventory factors (Kirakowski *et al.*, 1998). Users vary in many ways, thus different groups of Internet users may have different needs for Web interface design. A user-centric design is a vital consideration in designing an interface for Web-based systems (Tilson *et al.*, 1998; Ginige and Murugesan, 2001). Several Web usability factors are introduced based on past empirical studies in the areas of Internet Marketing, Ergonomics and Human Computer Interactions.

The *Overall Web Usability* (OWU) is vital to the success of EC Websites (Agarwal and Venkatesh, 2002; Flavian and Guinaliu, 2006; Tilson *et al*., 1998). It plays a vital role in the successful design of a Website (Kumar *et al*., 2004; Liu and Arnett, 2000). In this chapter, seven factors affecting OWU are discussed. These factors are known as Web Interface Usability Factors (WIUFs). The WIUFs have several similarities with the factors in Microsoft Usability Guidelines (MUG) as shown in Table 1.

Graphic and Color Designs in Websites

Kirakowski *et al.* (1998) conducted a survey on the various factors that influenced customers' decision-making in using Websites. He found attractiveness (e.g. UCF and UGM) to be most important compared with factors such as ease in navigation, ease in finding items, and clearly labeled items. Media use refers to the aesthetic appeal (attractiveness) of a Website, which is determined by the extent of the UCF and UGM. Several Web usability studies have also confirmed that appeal does significantly affect the usability of Websites (Lindgaard, 1999; Tractinsky *et al.*, 2000; Brady and Phillips, 2003; Phillips and Chaparro, 2009).

Shenkman and Jonsson (2000) found the most important determinant of the overall judgment of a Website was aesthetic appeal (or beauty). Aesthetic appeal, linked to human emotions, is attractive and will trigger a positive emotion resulting in a positive outcome such as a transaction (Isen, 1993). Another study found that attractiveness will make users feel better when using a product