Chapter 5
Usability Techniques for Interactive Software and Their Application in E-Commerce

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ABSTRACT
The purpose of this chapter is to provide an overview of usability and usability techniques. It discusses interaction design with a bias on web-based technologies, focusing on usability and usability definitions. Usability principles are discussed with a particular focus on web usability, and some of the techniques that can be used to incorporate usability design and testing. The chapter also considers aspects of electronic commerce usability. These techniques are divided into usability evaluation, (heuristic evaluation, checklists, usability tests, think aloud approaches) followed by designing with usability in mind (including user and task analysis, walkthroughs, user experience and scenario-based usability). Several E-commerce case studies, from a developing economy perspective, are then analysed, before finally discussing E-commerce usability.

INTRODUCTION
For a system to be usable an interface must let users of the system, working in their own physical, social and cultural environments, accomplish their goals and tasks effectively and efficiently (Hackos & Redish, 1998).

Meeting the needs of users who demand power without complication has made the computer industry increasingly sensitive to the design of the user interface. The user interface could be the most important determinant of success for electronic commerce (Singh & Erwin, 2002). In fact, to many users, the interface is the system (Turban & Aronson, 1998). The success of any interactive product or system is ultimately dependent on it providing the right facilities for the task at hand in such a way that they can be effectively used, at an appropriate price (Dillon, 1994). To achieve success, good design is essential. In relation to E-commerce, Cockton

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(2005) advocates Value-Centred Design—the intent to create value must be incorporated as early as possible at the initial design stage.

To enable development methodologies to be Value-Centred, Cockton advocates a design philosophy that is intended to create value—for the enterprise (and the consumer in relation to E-commerce). To become Value-Centred, Cockton stresses the necessity for opportunity identification, where the intended value of a digital product is identified, agreed, and specified—the virtual ‘gap in the market.’

There are several reasons why we should consider interaction design in any system. MacKenzie (2000), for example, provides a list that documents the cases of possible computer-related accidental death (to end of 1992). Prominent on the list is what MacKenzie (2000) labels the ‘human-computer interaction problem’. Examples include problems with medical equipment, mission controls, airplanes, robotics and general work equipment that have ‘malfunctioned’ due to problems in the interface, and caused the loss of human life. Although electronic commerce users will not die from using poorly designed electronic commerce web sites, designers should consider the impact of poorly designed user interfaces. This idea reinforces the arguments of Pressman (2000), discussed later.

Another reason for considering interaction design is that of dependability. Computer systems’ dependability is intrinsically multifaceted. Dependable hardware is patently of limited value unless accompanied by dependable software - which may not be very helpful if the human interaction with the hardware and software system is fault-prone. The resulting effect is that the dependable socio-technical performance of an inappropriate task may cause wider damage (MacKenzie, 2000). The usability factor is a critical aspect of the dependability puzzle (Scholtz, 1995). Yet another reason why one should adopt a human-centred design approach is the increasing legal regulations for designing safe systems, which do not harm the health or the well-being of their intended users (ETSI ETR-095, 1993).

**HUMAN-COMPUTER INTERACTION AND INTERACTION DESIGN**

**Human-computer interaction** aims at designing, constructing and evaluating computer-based interactive systems, including hardware, software, input/output devices, displays, training and documentation, so that people can use these computer-based interactive systems efficiently, effectively, safely and with satisfaction (Baeske & Buxton, 1987; Carroll, 2003; Cox & Walker, 1993; Dix, Finlay, Abowd, & Beale, 2004; Down- toin, 1993; Hartson & Hix, 1989; Hartson, 1998; Kotze & Johnson, 2001; Newman & Lamming, 1995; Preece, Rogers, & Sharp, 2002; Preece *et al.*, 1994; Shneiderman, 1998; Sutcliffe, 1988). Human-computer interaction is cross-disciplinary in its conduct and multidisciplinary in its roots. Human-computer interaction draws on, synthesises and adapts from several fields, including:

- **Human factors** (e.g. the roots for task analysis and designing for human error in HCI)
- **Ergonomics** (e.g. the roots for design of devices, workstations and work environments)
- **Cognitive psychology** (e.g. the roots for user modelling)
- **Behavioural psychology and psychometrics** (e.g. the roots of user performance metrics)
- **Systems engineering** (e.g. the roots for much pre-design analysis)
- **Information systems** (the development of user-centric computer artifacts)
- **Computer science** (the roots for graphical interfaces, software tools and issues of software architecture) (Hartson, 1998)
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