Chapter 72
Usability Engineering and E-Health

David Haniff
Pervasive Technology Lab (CIC), UK

ABSTRACT

The chapter presents case studies of e-health applications that the author has been involved in such as a paramedic application that presented treatment information to the paramedic. Furthermore, a review of e-health applications to help people with medical issues and in particular people with mental health problems is discussed. In addition, various tools to use in the development of e-health systems such learning models, focus groups and the Technology Acceptance Model (TAM) are presented. Finally a methodology that combines technological consideration as well as human factors issues is proposed.

INTRODUCTION

Usability engineering helps to ensure the success of a product by taking into consideration the end-user in the development of the systems. Health can be broadly categorised as being mental or physical. This chapter focuses on the mental health area as it has been often neglected due to being an internal cognitive problem rather than an external physical illness. Computational devices are moving from just being desktop PC based applications to mobile devices (Baber, 1997) that can be accessed by the patient anytime and anywhere. This can lead to a timely medical intervention that would otherwise be unavailable. The Internet is becoming pervasive where information on health can be accessed at work or in the home by a variety of age ranges. The use of e-health in its variety of forms can therefore provide many advantages in the treatment of many illnesses. The access to information can be anonymous which avoids embarrassment some people may feel in seeking treatment for their illness. It is generally known that early treatment of illnesses can lead to a better chance for a cure. Therefore e-health can provide this early detection of an illness by enabling access to information in a discrete manner as well as being implicit.

DOI: 10.4018/978-1-4666-2770-3.ch072

A variety of techniques can be used to gain knowledge about what people think of a product, for example, techniques such as cognitive walk-through (Sears, 1998), focus groups (Cooper and Baber, 2003) and experimental trials of technologies have been used by usability engineers. The human component is just as important as the technical part of the development but is often overlooked despite its' importance. In addition an approach to the development of an e-learning approach will be proposed.

E-health applications provide an opportunity to use technology in an innovative manner to address health problems. Presented within this chapter are three case studies on the design of e-health systems that the author has participated in. The three main projects are the development of a the paramedic application to help treat patients, smarts homes to help the elderly and Pervasive Computing to help people with mental health problems.

Methodological considerations are then discussed such as the use of learning principles and focus groups in order to provide a user-centred approach to the design of e-health systems. A methodology is then proposed that encompasses technological as well as human factors design of e-health systems in order to ensure a usable and innovative e-health system. The case studies point out the utility of a user-centred approach which can be used to develop e-health system such as for those suffering from mental health problems. Furthermore, the usability engineering approaches that are discussed can aid in the development of mental health applications The background of the research with issues surrounding the area is first considered.

BACKGROUND

The ISO standard (9241-11) for the usability of system state the development of a system is regarded "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." In order to achieve the target of providing a system that help the user to achieve their goals a user-centred approach to the design of e-health systems needs to take place. As suggested by Haniff et al (2004) various user groups have different needs and psychological traits, for example, Everett (1995) has suggested the elderly are late adopters of new technology. Rogers has also suggested that social aspects also have an influence on the adoption of new technology such as e-health systems, for example, a person in authority within a group using a new technology will influence other people in the group. Davis (1989) has developed a model on what influences people's decision to accept a technology (Technology Acceptance Model) which incorporates issues such the user's perception of the technologies ease of use and usefulness for the task that they are doing. Usability Engineering is therefore crucial producing useful e-health technologies.

The chapter will initially look at e-health systems that have been developed and in particular e-health systems that are intended to help people with mental health problems as this is often a neglected area. Mental health issues are becoming an increasing problem and e-health system can provide a means of providing discrete information to sufferers who often feel embarrassed by their problems. Following this review of e-health systems suggestions for usability techniques such as learning styles, focus groups, card sorting and the Technology Acceptance Model are described in order for the designer of e-health systems to be aware of the tools that are available to provide a user focused development process. In addition, in order to provide innovation in the production of e-health systems a technology review is suggested to match the user's complaint with the functionality of new technology. For example, a global positioning system (GPS) that indicates the location of a user has been used to guide the visually impaired around a city (Looms et al, 1999). E-health systems can therefore utilize new technology and sensors