22.1 Introduction

By 2050, it is estimated that the number of people aged 60 and over will more than double from 650 million of the global population to 2 billion, representing 22% of humanity. In addition, the number of persons aged 80 and older is increasing rapidly: by 2050, they will constitute approximately 20% of the older population (UN, 2006). In the United States, eighty percent of older adults have at least one chronic condition, and 50% have more (CDC, 2009). In the UK, it is estimated that 17.5 million adults are living with a long term condition. The management and treatment of chronic conditions demands a major proportion of health and social care resources (DH, 2004). These long term conditions are recognised to have huge impact on the physical, emotional and mental well-being of individuals, often making it difficult for people to perform daily routines and to engage in an active social life.

Chronic disease management provides a systematic approach to improving health care. Benefits of good management include significant reduction in hospital admissions and bed occupancy, along with a reduction in the use of medication (DH, 2004). The potential of technologies to encourage the involvement of people in their own care and decision making is now beginning to be recognised by health care professionals and policy makers.

The ‘Self Management supported by Assistive, Rehabilitation and Telecare Technologies’ project (SMART Consortium, 2007) is developing a personalised self management system (PSMS) for use in the home and in the immediate community for people living with the long term conditions of stroke, chronic pain
and congestive heart failure (CHF). Self management encourages the person to solve problems, take decisions, locate and use resources, and take actions to manage their own condition and is perceived as being a significant way of achieving reduction in health care costs and promoting quality of life in people living with a long term condition (Battersby et al., 2009; MIT Media Lab, 2009; Taylor et al., 2009).

Over 400 studies worldwide report that self management can lead to improved outcomes for patients. In the UK, the expert patient programme showed that 4-6 months after the course (a) General Practitioner consultations decreased by 7%, (b) out-patient visits decreased by 10%, (c) accident and emergency attendances decreased by 16% and (d) pharmacy visits increased by 18%. Nevertheless, these positive results mask a mixed picture. Even though self management education programmes may lead to small, short-term improvements in participants’ self-efficacy, self-rated health, cognitive symptom management, and frequency of aerobic exercise, a Cochrane review (Effing et al., 2007) indicated that there is currently no evidence to suggest that such programmes improve longer term psychological health, symptoms or health-related quality of life, or that they significantly alter healthcare use.

Changing established behaviour, which has developed in response to the long term health condition and its related problems, is a challenging task. This is evidenced by the difficulty in tackling long term societal issues such as smoking, obesity, and alcohol misuse even when the health benefits of a ‘healthy’ lifestyle are compelling. Self management is a health care delivery model based on preventative and person-centred health systems. This new model can only be achieved through the proper use of ICT, in combination with appropriate organisational changes and skills (EC, 2006). The research detailed here describes the technology which is being developed to assist with tailored self management programmes and the complexity of the issues which need to be taken into account. The research questions are as follows:

- Can technological solutions be identified to deliver self management interventions to people with long term conditions?
- Can technology, remote from a health care professional, promote health behaviour change?
- Can technology which situates behaviour change in everyday life improve traditional self-management strategies?

This paper focuses upon providing the details for an initial prototype of the technological and interface choices for the introduction of technology based solutions to support people with long term conditions being conducted through the SMART2 Project (EPSRC under the EQUAL5 initiative, 2008–2011). The research team combines expertise in computer science, psychology, cognitive science, human computer interaction and clinical rehabilitation.

The interaction required by the user with the technology has been identified as of prime importance, and therefore interfaces that support the user and provide appropriately presented information are being designed. This paper describes the process of identifying relevant interface designs with potential users.