Chapter 5
What Do Elderly Users Want and Need from Fitness Technologies? Findings from the ELF@Home Project

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ABSTRACT
It is well known that physical exercise has a significant beneficial effect on mental and physical health, and elderly fitness programs are a good and widely accepted approach to prevent frailty. In this chapter, we examine what elderly people actually want and need when it comes to technologies designed to support and encourage their physical fitness. We present the ELF@Home project as a case study, and report design insights and other results from user involvement in the project. User involvement is a key component of the approach and uses methods such as interviews, focus group meetings, early component and prototype tests with users, as well as inputs from medical experts. ELF@Home is a clear example of a “Positive Technology” approach. The project proposes the adoption of new technology in everyday life from the perspective of positive psychology, approaching this aim by designing devices and systems that are actually usable and desirable in supporting extended healthy living for the target population.

INTRODUCTION
According to the Constitution of the World Health Authority: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1948). Physical and mental wellbeing cannot be completely separated, and indeed go together in most current conceptions of health and, in particular, in successful ageing. Thanks to increasing computing power, reduced size
What Do Elderly Users Want and Need from Fitness Technologies?

and costs of electronic components such as sensors and displays, it is now both possible and affordable for individual elderly people to be supported by technology that encourages them to exercise to maintain fitness and also allows them to check their own health status regularly. Sensor-based devices and popular interaction technologies developed for computer games make it feasible to design health- and fitness-supporting devices for use by the elderly at home and even when out of doors.

In this chapter, we examine the question of what elderly people – in the age range from 75 years and upwards – actually want and need when it comes to such technologies. How can we design devices and systems that are actually usable and desirable to support extended healthy living for this target population? Unless we can do that, the potential of technology to provide this kind of support for successful ageing will not be fulfilled. And how do we know whether or not we have succeeded in that aim? To address these questions, we report on findings from an ongoing project funded by the Ambient Assisted Living Joint Programme – ELF@Home: elderly sELF-care based on sELF-check of health conditions and sELF-fitness at home (ELF@Home, 2015).

BACKGROUND

Physical Exercise and the Elderly

Frailty syndrome (Fried et al., 2001) has emerged in recent years as an explanation for age disability when no other relevant pathology exists. Frailty is an important cause of loss of autonomy, conferring a high risk of falls, disability for activities of daily living (ADL disability), cognitive disease, hospitalization and mortality. Frailty is considered highly prevalent in old age and according to the SHARE study (Santos-Eggimann, 2009) in ten European countries, more than 42% of the elderly aged over 65 years are pre-frail and 17% are frail.

It is well known that physical exercise has a significant beneficial effect on health, and elderly fitness programs are a good and widely accepted approach to prevent frailty (Cadore et al., 2013) (Liu et al., 2009). Furthermore, in recent years there have been many investigations that conclude that the absence of this exercise is related to the development and worsening of many chronic diseases, such as cardiovascular disease, type 2 diabetes mellitus, colon and breast cancer, and cognitive decline in the elderly (Nascimento et al., 2014).

Ischemic heart disease, along with stroke and other cardiovascular diseases is one of the main causes of death in industrialized countries, and it has been observed that regular physical activity is associated with a lower risk of developing such diseases (Do Lee et al., 2003; Kesaniemi et al., 2001; Liu-Ambrose et al., 2010). In order to establish what kind of exercise would have most benefits for the elderly, it would be wise to consider the following:

- **The Correlation between the Amount of Physical Activity and Health Benefit**: You can get great health benefits by practicing small amounts of exercise and this benefit does not necessarily scale up by increasing the amount of the same, as in the case of ischemic heart disease.

- **The Intensity of Physical Activity**: We know that moderate and high intensity physical activity have a positive effect on cardiovascular health. Although there is no evidence about low intensity exercises, we do know that for people over 65 years of age there is a correlation between walking and a lower risk of ischemic heart disease.
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