

Interactive Digital Television to enhance older people's quality of life

Andrea Miotto

Psychology Department,
Goldsmiths, University of London
New Cross, London, SE14 6NW, UK
(+44/0) 20 7919 7338
A.Miotto@gold.ac.uk

Jane Lessiter

Psychology Department,
Goldsmiths, University of London
New Cross, London, SE14 6NW, UK
(+44/0) 20 7919 7338
J.Lessiter@gold.ac.uk

Jonathan Freeman

Psychology Department,
Goldsmiths, University of London
New Cross, London, SE14 6NW, UK
(+44/0) 20 7919 7338
J.Freeman@gold.ac.uk

ABSTRACT

As people grow older, their cognitive ability tends to decline, which can result in mental, physical and social hardships. Recent research has shown that cognitive training can provide a cognitive stimulation which slows down the decrement in capacities related to the ageing process. Our work aims at using cognitive psychology and Interactive Digital Television applications to enable older people to actively and autonomously participate in brain training activities while sitting in front of their TV set. In this paper, we present an initial overview of the user requirements useful for the technical design stages of the interactive system and key factors that may facilitate or hinder the adoption by older people of brain training applications.

Categories and Subject Descriptors

A1 [Introductory and Survey]

General Terms

Design, Experimentation, Human Factors, Measurement.

Keywords

Human Computer Interaction, usability, user needs, use cases, user-centered design, drivers and barriers, television, TV, mind fitness, brain training, cognitive training program, inclusion, elderly, older people.

1. INTRODUCTION

Population ageing is increasingly being recognised as one of the most salient social, economic and demographic phenomena of the near future [1]. It is estimated that by 2050, one-third of Europe's population will be over 60, compared to 13 percent who will be under 16 [2].

While the significant growth in the numbers of older people in nearly every country in Europe has been widely publicised, it is not sufficiently recognised that this growth also implies significant increases in the proportions of older people who remain healthy and active well into their seventies, eighties and beyond. In general, it is important to note that even healthy old age is accompanied by an accumulation of mild but progressive losses of efficiency in all sense organs [3].

In general, the older a person is, the more likely he or she is to suffer impairment in cognitive functions. According to Alzheimer's Disease International [4], in people younger than 65 years of age, dementia affects about 1 person in 1000. In people over the age of 65, the rate is about 1 in 20, and about 1 in 5 people over age 80 have dementia.

2. COGNITIVE TRAINING TO REDUCE AGE-RELATED DECLINE

Whilst cognitive decline becomes increasingly more common with advancing age, a growing body of research has investigated whether cognitive training may delay the onset of or even prevent the changes associated with such decline [5, 6].

The most famous study in this field was conducted by Ball [7] with a sample of 2832 participants aged 65 to 94 years. The results of this study indicated that computerised cognitive training programmes applied to older people resulted in long-term improvements in targeted cognitive abilities.

Although previous studies have shown that using brain training on a PC can help improve the quality of life as aging occurs, the majority of older adults is not computer literate and cannot benefit from the growing number of mind fitness training programs designed to preserve cognitive ability. Instead, older people resort to more passive ways of spending leisure time, such as watching TV, which tend to be risk factors rather than protective ones to cognitive ability [8].

3. RESEARCH PURPOSE

The research presented in this paper aims to investigate the use of computerized cognitive training via interactive digital television (iDTV) to ameliorate the declines associated with later life.

The purpose of this paper is to give an overview of the initial findings of research into the user needs that should be considered in order to specify requirements in the area of cognitive training for older people and the potential drivers and barriers to the adoption of brain training applications via iDTV. Inspiration is drawn from both existing tools used for cognitive training in computer environments and the literature on Human-Computer Interaction to inform specific applications for iDTV.

4. METHODOLOGY

We started investigating these objectives in two ways. First, we developed user scenarios with personas to brainstorm on what we envisage a brain training application should provide. Second, we conducted a series of preliminary focus groups with older people to collect information about the needs of older people and to investigate what can motivate or hinder them to adopt and use iDTV applications that help to improve some cognitive functions.

5. INITIAL FINDINGS

Based on the result of this research work, we learned that cognitive training delivered via iDTV may appeal to older people, especially for those who have little experience with computers and who lead a less active lifestyle. Many people of retirement age who face the challenge of what to do with their increased free time would be happy to use a friendly device such as the TV to keep their minds active. However, some oldest-old in our study (people aged 80 years and over) were more likely than their younger counterparts to be easily intimidated by new technology, especially if they have little or no experience of technology, and they may have difficulty in accepting new products that are difficult to use and understand.

Focus groups participants reported that they would like these applications to be used as means of social cohesion, to share activities with family members and friends, while providing privacy to individuals. In fact, whilst some older people reported a particular interest in maintaining close existing contacts with relatives and friends, others expressed their doubts about the idea of communicating with people unfamiliar to them.

The result of the focus groups also indicated that older people need to be constantly motivated and reminded of their goals. Besides the use of motivational feedback, additional information are necessary to support and coordinate their activity and assist the user in interacting with the system. Finally, while some older people like the idea of receiving feedback on their task performance, others made it clear that they would rather not know the extent to which their cognitive abilities were declining.

6. FUTURE WORK

A pen and paper questionnaire will be used to survey a large sample of older people. We plan to structure this questionnaire in several sections:

- An inventory of 40-50 attitudinal questions, designed to explore the attitudes of older people toward leisure activities and technology and to develop a typology of potential users of brain training applications.
- A series of 10-15 demographics questions, which will be useful along with the attitudinal profiles to create a rich picture of the potential user groups.
- Finally, a series of questions on the use and access of technology to test and further refine the key factors that may facilitate and prevent the adoption of such applications.

7. ACKNOWLEDGMENTS

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