Chapter 3
Graceful Ageing: Exergaming as a Means to Delay Mental and Physical Decline among the Elderly

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ABSTRACT

This chapter provides a review of pilot studies and clinical trials which have been performed to date on serious gaming (exergaming) for the elderly. It is a novel pre-emptive approach to help maintain seniors physically and mentally fit, maximising the time for which they are capable of living independently at their own residence. Several studies are reviewed which show that this is a beneficial arrangement for both the elderly and the national healthcare system. We argue that by using exergaming it may be possible to pre-empt and delay the most common ailments that typically force the elderly to -often reluctantly- leave their residence and seek admission to a nursery home: dementia, arthritis, stroke and cardiovascular disease. Finally, we suggest possible next steps and focal points for pre-emptive exergaming geriatric research and conclude that much larger clinical trials are required to obtain conclusive results about the efficacy of this novel approach.

INTRODUCTION

Population ageing is a global phenomenon with substantial socioeconomic impact on several aspects of society, particularly healthcare provision. The key thesis presented in this chapter is that exergaming, a new technology that combines serious gaming with physical and mental exercise, can help maximize the time seniors can live independently in their own home before having to move to a nursing home for specialized support. This prospect is often popular with elderly citizens and mutually beneficial for healthcare systems. Exergaming systems can both motivate senior citizens to exercise and provide healthcare professionals with data indicative of their level of physical and mental fitness, allowing them to target their interventions and support more efficiently.

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BACKGROUND

An Ageing Population

Elderly adults over the age of 65 are the fastest growing demographic group globally, expected to reach 1.5 billion by the year 2050, out of a total of approximately 9 billion people. The proportion of elderly citizens is non-homogenous across different nations: statistical data show that three out of the top four most aged populations in the world can be found in Europe (Beard J. R et al., 2012).

In 2010 Japan had the most aged society with 23% of its population being over 65 while Italy, Germany and Greece follow it in the global ranking. Seniors in these European countries account for 21%, 20% and 19% of the total population, respectively. At the other end of the European spectrum, Slovakia, Cyprus and Ireland are the least aged European countries with an elderly percentage of 13%, 12% and 11% respectively. (UK Office for National Statistics, 2011)

While the phenomenon of population ageing is global, a total of 18 countries appear to be bucking the trend altogether. The UN Development Programme (UNDP) however considers these countries to be statistical outliers, given that the generations which are currently alive constitute the most aged human population in history ((United Nations Development Programme, 2005).

By comparison the USA, the world’s largest economy, has a ratio of 13% elderly citizens. The three largest emerging economies, China, India and Brazil, are among the world’s least aged countries: seniors account for 8%, 5% and 7% of the population, respectively. (UK Office for National Statistics, 2011)

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The aforementioned UNDP report portrays a clear correlation between the level of economic development in a country and the percentage of elderly citizens in the population. For instance, countries in the “Low Human Development” category clearly have the lowest elderly population share on average, out of a total of 177 countries listed. This is the result of multiple factors, among the most significant of which are an increasing life expectancy (including lower infant mortality) and reduced birth rates.

Increasing Strain on National Healthcare Systems

The implications of a rapidly ageing population are socioeconomically significant: a proportionally smaller workforce has to sustain increasing numbers of pensioners, while medical and social insurance infrastructures will necessarily have to adjust placing more emphasis on diseases of old age. Even in western countries where population ageing is not the primary concern, rising healthcare costs, increasing demand and mounting expectations pose novel challenges for policy makers, at a time when various other factors are placing a strain on public budgets (Commission on the future of health care, 2001).

Part of the solution to these and future aging-related social challenges is likely to involve helping senior citizens to maintain their physical and cognitive skills (graceful ageing), while empowering them to continue living independently within the community (Bovenschulte M & Huch M, 2010). Apart from the obvious benefits of better targeted healthcare delivery, the required technological developments and infrastructure changes can be combined to help provide more efficient personalised healthcare for elderly citizens (Cristiano Codagnone, 2009).

From Home to Nursing Home

A large survey (n=2438) funded by the UK Ministry for Health (Netten, Darton, Bebbington, & Brown, 2001) provides an indication of common contributing factors influencing the decision of senior citizens to seek admittance to a public nursing home. Apart from the scarcity of survey data for other countries, studying the admittance data from public nursery institutions in the UK can provide insights also useful for other EU and