



Mobile game design for the elderly: A study with focus on the motivation to play



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ABSTRACT

Since the average age of the world population is growing, applications that are appropriate for the elderly, taking into account limitations caused by aging, will be increasingly necessary. One of these applications is digital games, which can bring benefits to the elderly, particularly in the prevention and treatment of cognitive disorders. Based on this context, this study aimed to identify the main features that motivate the elderly to play mobile games. For this purpose, we developed a digital catalog of games or gamebook, which helped to identify the preferences of the elderly regarding game genres. After, we developed a game for smartphone, focusing on the elderly, which took into account the main features raised in previous activities. A group of old people played the game and after that, we applied a questionnaire and interviewed them, in order to determine the characteristics of the game considered relevant by them. We concluded that several factors influence the motivation of the elderly to play, however, the motivational characteristic more evident was that the elderly consider digital games as important tools to help in the treatment of cognitive disorders due to aging.

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1. Introduction

Several researches indicate that the world population is aging. The United Nations Department of Economic and Social Affairs (DESA) estimates that the world number of people over 65 years will increase from 530.5 million to approximately 1.5 billion, in the period from 2010 to 2050. Expressed as a percentage of the world population, these numbers represent 7.7% of the population measured in 2010, and 15.6%, of the estimated population for 2050 (UNITED NATIONS, 2013).

Despite the aging population, some society sectors still lack the creation or adaptation of resources for the elderly. With aging, the human being inevitably suffers various restrictions, which includes motor, perceptual, cognitive and psychosocial skills. Activities that require manual dexterity or memory, for example, become more difficult to perform (Vasconcelos, Silva, Caseiro, Nunes, & Teixeira, 2012).

A strategy that may contribute to mitigate these effects is the use of digital games, which can serve as tools to assist and

encourage the elderly to exercise physically and mentally, delaying the occurrence of diseases and thus improving their quality of life (Chen, Chiang, Liu, & Chang, 2012). These technological resources can help stimulate memory, improve motor coordination and exercise cognition (Buiza et al., 2009).

However, in general, current games have as target audience mainly adolescents and young adults, not considering therefore the elderly restrictions. Nevertheless, it is clear the growth in adoption of digital games by these people. In the United States, for example, the percentage of players over 50 years increased from 9% in 1999 to 26% in 2008 (Nap, Kort, & Ijsselstein, 2009).

Because of this demand, this study sought to understand the needs, preferences and motivations of the elderly which are related to games for smartphone. The study was focused on smartphones for several important reasons: they are more popular than desktop computers or notebooks; they are more affordable; in general, they are already used by the elderly; besides being a market trend nowadays (PEW RESEARCH CENTER, 2011).

For this purpose, we developed a digital catalog of digital games or gamebook, which aimed to identify the most appreciated game genres by the elderly. The results obtained with the use of the gamebook contributed to the development of a game for smartphone, which was used in an experiment to identify the main elements that motivate or that discourage the elderly to play.

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This work provides an important contribution about the grounds on which the old people may get used to playing games. The results may also contribute to the digital gaming industry aimed at the elderly, particularly as regards the definition of the basic requirements for the development of appropriate mobile games for this audience. It is important to highlight that knowing which elements may involve more the elderly people with digital games, can help to offer them games that can improve their quality of life and mental health.

In addition, this paper addresses a unique issue in Brazil and in other underdeveloped countries. No known work had been conducted before to identify the favorite game genres and the grounds on which the elderly from these countries can be brought to the habit of playing.

Another important contribution is about the platform. Few studies address the use of games for mobile devices by the elderly. Thus, this study also aimed to identify if mobile games may be of interest to old people. As mentioned above, considering this platform is important, as it is currently the most popular, even among the audience in question, and so, it may facilitate the elderly access to games.

Finally, this study has sought to assess the interest of the elderly in playing alone, as the Internet, the main medium that enables the dispute between a group of players, is usually not cheap nor can be easily accessible in underdeveloped countries.

This paper is organized as follows. Section 3 presents the methods and materials used; Section 4 presents the results of the use of a catalog of digital games which aimed to investigate whether the genres of games have an influence on the motivation of the elderly for playing; Section 5 presents and discusses the preferences of older people based on the use of a digital game for smartphone, developed specifically for the elderly; the last three sections present, respectively, the discussion, the main conclusions and the references of this work.

2. Related work

This section aims to provide the main concepts related to the subject of this work. It includes a brief contextualization of the inherent limitations of aging, a discussion about the importance of digital games in the current scenario, highlighting casual games, and the main characteristics of motivation that is necessary to the involvement of the elderly with games.

2.1. The elderly and their restrictions due to aging

The aging process is usually accompanied by physical or cognitive restrictions. According to Vasconcelos et al. (2012) and Charness and Jastrzemski (2009), diseases due to age may arise, which causes changes in motor, perception, cognitive and psychosocial skills, such as difficulty to focus on objects that are close or to see things in environments with low light.

With respect to cognitive changes, Czaja and Chin (2009) point out that memory, mainly the short-term one, and attention are usually the most affected abilities due to aging. This can directly affect the daily lives of the elderly, making it difficult for them to make decisions, solve problems, planning, among others. Charness and Jastrzemski (2009) claim that it is a challenge for the elderly to store and manage new information they receive. The authors also state that performing tasks in parallel, dealing with situations involving spatial aspects and language comprehension are also difficulty for the old people.

On account of changes in psychological and social behaviors, old people are prone to develop depression symptoms and identity crisis, because of their feeling of incapacity and the consequent loss of self-esteem (Vasconcelos et al., 2012).

These mentioned diseases and limitations must be considered in a digital game design for older adults. It is important that applications for the elderly have different characteristics from the ones developed for younger people, in order to soften the effects caused by aging.

2.2. Digital games and the elderly

Since the 1970s, digital games have been widely used by people, mainly as a leisure activity. In recent years, such use is growing faster and an increasing portion of the population has made use of this resource for a variety of purposes, not just for leisure and entertainment (Boyle, Connolly, Hainey, & Boyle, 2012).

According to Hsiao (2007), games are influencing many aspects of society, including social, economic, political and technological. Nowadays, gamers are not only young people. Digital games are widespread among people of different ages, genders and cultures.

Several studies show the advantages of playing games also during adulthood – even in old age. Ijsselstein, Nap, de Kort, and Poels (2007) point out that although the need of further studies, researches have pointed out that digital games can have positive impacts on physical and mental health of the elderly. In addition to the hormones released when there is a playful and pleasurable activity, games can be useful to cause mental stimulation, improve well-being and increase self-esteem whenever a gamer defeat an opponent or win an obstacle. Games can also improve the motor coordination of the old people (Ijsselstein et al., 2007). A study points out that even action games, which are not well appreciated by the elderly due to the speed of movement and intense interaction, can produce positive effects in older adults with regard to physical and mental health, helping to reduce the natural decline in cognitive skills (Zelinski & Reyes, 2009). Despite all these benefits, it is still necessary to study what characteristics motivate this audience to start and maintain the habit of playing.

2.3. Motivation

According to Sansone and Harackiewicz (2000), motivation is responsible for determining and guiding one's behavior to achieve a particular goal. Generally, these behaviors are associated with the interests, desires and satisfaction of an individual. Being motivated to do something makes a person spend more time in an activity.

Motivation usually happens through rewards or punishments basically in two ways: extrinsic motivation and intrinsic motivation (Frey & Osterloh, 2002; Sansone & Harackiewicz, 2000).

Extrinsic motivation is defined by Frey and Osterloh (2002) as one that is external to the subject, for example, a financial gain due to the completion of some task. Thus, one performs an activity to be rewarded or not to be punished for not doing it. Then, punishment or reward becomes a decisive factor to mobilize an individual, so that if such elements cease, probably he/she will not be so committed to achieve the goal. Note that, sometimes, extrinsic motivation provides a satisfaction that the activity being performed often does not. Therefore, a person may not like or may not have pleasure in what he/she is doing, but the reward (or the punishment) will motivate him/her to perform or not the task, regardless of his/her personal preferences (Sansone & Harackiewicz, 2000).

Intrinsic motivation, in turn, is related to a person's desires, interests, aspirations and tastes. It comes from internal factors of the individual. Thus, the reward is not crucial. The activity itself constitutes an engagement action to the individual (Sansone & Harackiewicz, 2000). According to Frey and Osterloh (2002), intrinsic motivation is related to happiness and personal satisfaction. It directly meets individual desires. For the authors, this type of

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