The Educational Potential of Technologies for Older People
Reflections on the Well-being

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Abstract: Worldwide life expectancy has increased over the last century. In Brazil the population over 60 years was approximately 10% in 2009, and it is expected to increase to 29% in 2050. This increase in life expectancy leads us to consider strategies that can assist in maintaining the quality of life during the ageing process. One strategy that must be considered is the health education to the elderly, so we construct a web application – Active Ageing TV – that is based on the reports of World Health Organization, and on the use of gerontology education to facilitate the learning process, and on the use of techniques to design according to specific characteristics of older audience. To validate our application, a survey was conducted with seniors who participated in a course of digital inclusion in Brazil, during 2009 to 2013. We used "Profile of Individual Life Style" instrument to evaluate the lifestyle perceived by the participants. Our findings indicate that seniors are looking for a preventive behavior, but information is necessary to assist them to make right decisions for a healthy lifestyle.

1 INTRODUCTION

Worldwide life expectancy has increased over the last century. In Brazil the population over 60 years was approximately 10% in 2009, and it is expected to increase to 29% in 2050 (IBGE, 2013). This increase in life expectancy leads us to consider strategies that can assist in maintaining the quality of life during the ageing process (Veras, 2012).

Human ageing is a universal, progressive, and gradual process. This process is different for each individual. There are a variety of factors that affect this process: genetics, biology, social factors, environment, psychology, and culture (WHO, 2002). Gerontology is "the scientific study of old age" and consists of the integration of conceptual linkages across the biological, psychological, and social processes of aging (Alkema and Alley, 2006).

In Brazil, gerontology is still considered a new science (Valadares et al., 2013), and is concerned with the implementation of actions aimed at improving the quality of life of those who are ageing to ensure autonomy and independence. In turn, educational gerontology refers to the use of a teaching method to facilitate learning in older adults through the exploration of the potential of this age group (Ala-Mutka et al., 2008; Ianculescu and Parvan, 2011; Kececi and Bulduk, 2012). In this sense, continuing education requires a combination of opportunities to encourage the promotion and the maintenance of quality of life for the elderly.

According to the Ministry of Social Welfare and Assistance in Brazil, "Ageing is a normal and dynamic process, and it is not a disease. While ageing is an inevitable and irreversible process, chronic and disabling conditions that are often observed with advancing age can be prevented or delayed, not only by medical interventions, but also interventions in social, economic, and environmental aspects" (Brasil, 1996, p. 1).

The term "active ageing" was adopted by the World Health Organization in 1990, and it is based on the recognition of human rights of older people and in the United Nations Principles of independence, participation, dignity, care, and personal fulfillment (WHO, 2002). The broad concept of quality of life points to the need to consider the aspects valued by the elderly related to overall well-being such as health, life satisfaction, and psychological well-being within the social and

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physical environment in which they live. Therefore, it is important to encourage a healthy lifestyle through a balanced diet, regular exercise, social interaction, enjoyable occupational activity, and mechanisms to mitigate the stress and avoiding smoking, alcoholism, and self-medication.

Self-care should be seen as the creation of new opportunities to respond to life in a safe and healthy way. For this reason, the issues addressed in educational activities must involve more than diseases and risk factors. Ageing, sexuality, leisure, family relationship, and social rights of the elderly, as well as numerous other factors that illustrate the needs and interests of the older population, are dimensions of life that must be considered to promote self-care (Sousa and Assis, 2012). The behavioral change to a healthy lifestyle is a key ingredient to encourage active ageing.

This paper is organized as follows: section 2 shows the literature review on health education; section 3 presents the Active Ageing TV application; section 4 the methodology used to test the comprehension about the content of Active Ageing TV is explained; and in section 5 are presented the concluding remarks.

2 HEALTH EDUCATION

Brazilians are living longer and this means that the Brazilian society needs to promote programs for the prevention and maintenance of health for the elderly. Because the promotion of such programs has not occurred, the ageing process of the Brazilian population is now largely characterized by the progressive accumulation of losses of functionality in activities of daily living (Veras, 2012). The trend is evident in the growing number of seniors who are functionally disabled and have poor health. The most common problems in elderly people are Alzheimer's disease, depression, osteoporosis, and falls. These problems show the need for an emphasis on health promotion and prevention of frailties (WHO, 2002).

According to Kececi and Bulduk: “the main objective of health education is to provide individuals and society with assistance so that they can lead a healthy life through their own efforts and actions. Therefore, health education supports and develops all kinds of individual learning processes. Similarly, it makes changes in the beliefs and value systems of individuals, their attitudes and skill levels; in other words, it changes their lifestyles” (Kececi and Bulduk, 2012, p.160).

The World Health Organization suggests that early education in life combined with opportunities for lifelong learning can help people to develop skills and confidence to adapt and maintain independence as they grow older. Learning is necessary to improve understanding (for instance, learning related to health issues) and to enhance capabilities for practical tasks (learning to use new tools like online banking or how to use assistive technologies to compensate for lack of functionality), and learn new activities.

The motivation to learn for elderly people depends strongly on the purpose of the learning outcomes, and also in how much they consider themselves able to achieve these results (self-efficacy). The commitment to meaningful activities for the elderly contributes to good health and satisfaction with life and longevity (Ala-Mutka et. al., 2008; Kececi and Bulduk, 2012; Ianculescu & Parvan, 2011; Serbim et. al., 2012). The success of health promotion can be evaluated by measuring to what extent the intended objectives can be achieved by target audience.

3 ACTIVE AGEING TV

We build a web application based on the WHO Active Ageing reports (WHO, 2002), conventions established by the field of educational gerontology (Alkema and Alley, 2006), and the use of style guides for interactive Digital TV for the elderly (Rice and Alm, 2008). The platform selected for this version of Active Ageing TV (Figure 1) is web based. Today smartphones, tablets, connected televisions and computers are all web receivers, which allow a greater range of choice by seniors.

Figure 1: Active Ageing TV (Envelhecimento Ativo TV) avaiable at http://envelhecimentoativotv.weebly.com.

Active Ageing TV focuses on information about active ageing and activities recommended for the

elderly. Videos were used with content that includes physical exercises and strategies that guide seniors to make changes at home to meet their safety needs. Information about social networks and senior communities are also provided to give social opportunities for the elderly.

Active Ageing TV aims to inform and to provide resources in a variety of methods on how to maintain independence and quality of life during the ageing process, or, in other words to promote self-care to the elderly. So, to achieve this purpose the videos used were about the behavioral determinants defined by WHO (WHO, 2002) like:

- Physical activity – regular practice of moderate physical activity is essential for good health and to preserve independence of the elderly, helping reduce the risk of falls and related injuries (Figure 2).

Figure 2: Physical activity (Atividade física).

- Healthy diet – the maintenance of a balanced diet rich in calcium can reduce the risk of injury in the elderly (Figure 3).

Figure 3: Healthy diet (Alimentação saudável).

- Use of medications – the elderly tends to consume greater number of medications than younger people. As they age, people develop different mechanisms for the absorption and the metabolism of medications. If the elderly do not take their medications as prescribed by physicians, their risk of falls and side effects may be affected in different ways (Figure 4).
- Risky behavior – the choices that people make and the actions carried out can increase their chances of falling, for example, to climb ladders, to wear ill-fitting shoes, to bend over to perform everyday tasks, to run without being aware of the environment, or to avoid using artifacts to support mobility such as canes or walkers (Figure 4).

Figure 4: Stay tuned (Fique atento (a)).

- Social interaction – incentive to stimulate social interaction and conduct occupational activity as an enjoyable way to relieve stress and prevent depression and isolation (Figure 5).

Figure 5: Social interaction (Convívio social).

- Harmful habits – clarification about the consequences of harmful habits like smoking, alcoholism, and self-medication (Figures 2, 3, 4, 5).

In the Active Ageing TV application the user can access four modules: healthy diet (Figure 3), physical activity (Figure 2), social interaction (Figure 5) and stay tuned (figure 4). Each module has four videos extract by Youtube about the

proposed content, and a section “Know More” that consists of a list of sites with more information about the subject of study, and a section “Interactive Test” that is a form to collect data about the user behavior on that aspect.

The videos used were selected from the reliability of its producers, such as universities, government or broadcast TV programs with affairs on health and wellness. One of the criteria was that the protagonists of the videos would be the elderly, and that the videos used were of short duration to allow a discussion on the subject after its display. This strategy makes a personal call to the elderly to participate actively and think about their behavior in health maintenance.

4 METHODOLOGY

We used qualitative and quantitative research methods focusing on the behavioral determinants adopted by elderly and its influence in their quality of life. The 12 seniors surveyed were 60 years or older and attended a course designed for digital inclusion at the Federal University of Rio Grande do Sul, Brazil between 2009 and 2012. We proposed a Quality of Life course during four weeks in November to December of 2013.

The seniors that have participated of our research have an age average of 68 years. The group encountered two times a week to study and discuss about modules of Active Ageing TV. Each elderly assisted the proposed videos individually and, after that, all participants were invited to explain and discuss with the whole group about what they learned, what they already do to achieve a healthy lifestyle and the strategies they used to do that. The researcher assumed the role of mediator in this educational practice, and it was created a participative environment in which everyone felt comfortable to show his/her ideas (Serbim et. al., 2012; Sousa and Assis, 2012).

After watching all modules, each subject was seen separately one per week, seniors were asked to reflect on their lifestyle. For this we used two instruments: (1) the "Profile of Individual Life Style" instrument (Both et. al., 2008) and (2) an individual semi-structured interview based on the behavioral determinants of active ageing (WHO, 2002).

The Profile of Individual Life Style Questionnaire (Both et. al., 2008) known as "The Pentacle of Well-Being", with a conceptual basis for evaluating the lifestyle of individuals or groups. This instrument consists of 15 questions, divided into the following factors: nutrition (factor 1), physical activity (factor 3), preventive behavior (factor 4), social relationships (factor 5) and stress management (factor 2), without regard to socio-economic factors, genetic heritage, political beliefs and other factors that may influence the results.

Of course the ideal would be that all items were completed at maximum level (corresponding to 3 points on the scale). Scores in levels zero (0) and one (1) indicate that the individual must be guided and helped to change his/her behavior in the items assessed, since they pose risks to his/her health. The general idea is to allow the person to identify positive and negative aspects in his lifestyle, getting information and opportunities to make decisions that can lead to a life with more quality.

In our research we applied the instrument individually and the senior received a copy of his/her responses to check what points he/she is doing well and the points he/she has to make efforts to get better results. The meanings of the responses are as follows: [0] never, [1] sometimes [2] often and [3] always. The results indicate that diet and physical activity should be improved. Like most of group is living alone (8) or has a problem of movement (4) or sedentary lifestyle. It demonstrates the difficulty in maintaining a varied diet or frequent physical activity.

Table 1: Factor 1 (Nutrition).

	[3]	[2]	[1]	[0]
a. Your daily diet includes at least 5 portions of fruit and vegetables	31%	23%	31%	15%
b. You avoid eating greasy foods (fatty meats, fried foods) and candies.	8%	46%	46%	0%
c. You do 4 to 5 different meals a day, including full breakfast.	31%	15%	39%	15%

Table 1 shows that 31% of group has 5 portions of fruit and vegetables in their daily diet. On the other hand, 46% sometimes avoid eating greasy foods and candies, and 8% always avoid this kind of food. Another factor that must be improved is the number of meals a day, 39% sometimes do 4 to 5 meals, and 15% never do that. These outcomes were reinforced with the speech of one senior: “*with the video I will try to insert more vegetables at meals; as I have reflux, I'm adapting my diet and I have already*

noticed better results; I started walking with a water bottle in my purse... ".

Senior's speeches often lead to this: "*You think you know a lot, and maybe you know, but you do not practice; things we already know but it's always great to reinforce them; the elderly has resistance, he/she is more stubborn, but if explain the change and its benefits he/she can start to improve*".

Table 2: Factor 3 (Levels of Physical Activity).

	[3]	[2]	[1]	[0]
d. You realize at least 30 minutes of moderate to intense physical activity, continuously or cumulatively, 5 or more days a week.	15%	31%	39%	15%
e. At least twice a week you perform exercises that involve muscle strength and stretching.	23%	46%	23%	8%
f. In your day by day, you walk or you pedal for transportation and preferably use the stairs instead of the elevator.	15%	23%	54%	8%

In Table 2 we can see that although the elderly group performs physical activities, they do not do it in the frequency of five or more days per week. But, 23% perform exercises that involve muscle strength and stretching twice a week. And, we can see that sedentary lifestyle is represented in 54% of individuals that sometimes use to walk or to pedal for transportation, and prefer the elevator instead of the stairs. After looking at the results a senior said:

"*I'll promise to myself to start walking, because when I doing exercises I felt good and I did not need to take medicine for cholesterol that I need today*".

Table 3 shows that the group has a preventive behavior. They know their blood pressure, their cholesterol levels and they are looking to control them. But if the elderly look for to have a healthy diet and better levels of physical practices, their outcomes must be better. And Table 3 show too that the group don't smoke and drink alcohol with moderation, and they use seatbelt and never drink alcohol when they are driving.

Regarding to preventive behavior an elderly said: "*videos gave many tips on mobile, the height of the bed, etc., there are things that I already do, but I learned a lot, how to protect wires, take off rugs, things that can cause accidents. As I live alone I need to take care of myself*".

Table 3: Factor 4 (Preventive Behavior).

	[3]	[2]	[1]	[0]
g. You know your blood pressure, your cholesterol levels and you are looking to control them.	46%	54%	0%	0%
h. You do not smoke and you drink alcohol in moderation (less than 2 daily doses).	76,9%	7,7%	7,7 %	7,7 %
i. You always wear your seatbelt and if you drive, you respect traffic regulations, and you never ingest alcohol when driving.	85%	15%	0%	0%

In Table 4 we can see that seniors have an active participation in social life with family, friends and community service.

Table 4: Factor 5 (Quality of Relationships).

	[3]	[2]	[1]	[0]
j. You find yourself surrounded by friends and you are satisfied with your relationships.	77%	23%	0%	0%
k. Your leisure includes meetings with friends, group sports activities, participation in associations.	85%	15%	0%	0%
l. You try to be active in your community and you feel useful in your social environment.	67%	25%	0%	8%

Table 5 presents that they reserve at least five minutes to relax by day (69%). And in the most cases they can hold a discussion without change their mood, even when they are contradicted (54%). But, on the item of the balance between work and leisure we can see that the group has some difficulties to do that. Perhaps due to their creation that has always prioritized the work and effort in place of leisure.

Regarding the use of videos as course material, a senior said: "*Is interesting because you see the video, you can assimilate the teachings more. I get more attentive than if I have to read... I have history of falls and the information of the videos was very*

useful... I started to decrease the sugar and salt in meals, and I started buying more fruit".

Table 5: Factor 2 (Stress Management).

	[3]	[2]	[1]	[0]
m. You take time (at least 5 minutes) every day to relax.	69%	23%	8%	0%
n. You hold a discussion without changing your mood, even you are contradicted.	15%	54%	31%	0%
o. You balance the time devoted to work with the time devoted to leisure.	15%	39%	46%	0%

The data considered here show a positive influence that Active Ageing TV application performs in quality of life and adoption of a healthy lifestyle by seniors.

5 CONCLUSIONS

This paper presented a web application to help to promote active ageing and adoption of behaviors by the elderly that lead to a healthy lifestyle. Our project was submitted to the Ethics Committee in Research of the Federal University of Rio Grande do Sul and was approved in accordance with the report number 137.267 in 2012.

Active Ageing TV application differs from others by using the educational approach as a strategy to inform and to educate the elderly, therefore encouraging them to become responsible for maintaining their own health throughout life. This is based on the concept of active ageing, as defined by WHO reports. Our intention is to disseminate the behavior determinants of active aging policy to help seniors to maintain their autonomy, independence, quality of life, and a healthy life expectancy. Our contribution focuses on the development of an application that seeks to encourage the adoption of guidelines for active ageing from the user perspective by promoting greater awareness of the importance of certain activities and lifestyle to improve the quality of life.

In fact, the lifestyle is one of the most important factors for maintaining health as well as to promote the extension of longevity of the population.

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