Active Ageing and the Role of ICT and Assistive Technologies: Reflections and discussion for their use in Portugal

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ABSTRACT

This paper aims to collect and discuss data about the role of ICT (Information and Communication Technologies) for the old people and active ageing. Because there is not known any kind of this research in Portugal about active ageing and ICT it is important to start with a literature review, present and reflect on the good examples and the recommendations gathered and published worldwide. The paper also aims to provoke within the Portuguese society a deep discussion towards the assumption of political decisions in order to include old people as a part of the «Knowledge Society». The Portuguese society is getting older so there is an obligation to provide conditions and policies for active ageing for the old people by the inclusion of ICT and/or Assistive Technologies.

Keyword: ICT/Assistive Technologies, active ageing, recommendations and policies, Portugal.

1. Introduction: Demographic challenge, active ageing and ICT/Assistive Technologies

The world is facing and experiencing an important demographic transformation: the unprecedented ageing of the population of almost all developed and developing countries, especially in Europe and in Japan as a consequence to both a combination of a low birth rate and increased longevity. This increasing presence of older people in society promotes a new scenario that means that we are living in a multi-generational society. In consequence the increase of ageing populations promotes an influence in global patterns in what concerns labour, capital markets, services and the traditional social support systems like health care and pensions in the most European countries and this trend which will be even more dramatical and serious in the next decades. The demographic structure of the population in Europe has been shifting seriously over the past few decades and the current predictions show that the trend towards an increasingly older population is likely to continue (Korupp & Szydlik, 2005).

In all the Member States of the European Union (EU) the current fertility rates are low. If birth rates continue to decrease as predicted, the proportion of young and old citizens will undergo a historic crossover. Besides this, the 'baby-boomer' generation (born between 1945 and 1965), which consists of a large number of people, has started to retire. A moderate projection of ageing in the EU for the period between 2004 and 2050 shows that

the population aged 65+ will increase by 58 million or 77% and that, at the same time, the working-age population will drop by 48 million or 16%. In the EU, this might mean that the ratio of people of working age would be two for every older citizen, instead of four working people at the present time. All EU Member States will experience an ageing population, though there will be some differences between them in timing, nature and scale. The global number of elderly people by 2020 is expected to exceed one billion, and there will be more older people throughout countries in the developed world than ever before.

As a consequence of the increase of the number of elderly people in the total population there is a growing need to adopt new services and new practices for supporting the elderly population in their everyday lives. The emergence of the knowledge society implies that every citizen must be digitally literate in order to be on a better footing in terms of equal opportunities in a world in which digital functions are proliferating (Czaja, 2007). Elderly people must be included in order to provide their inclusion because in the knowledge society, those who can use the new media are more advantaged than those who do not. While the possession of basic ICT skills is now taken for granted in the younger age groups, it is often the starting point for the older ones, especially those who did not use the new media in their profession. In today's society these persons are disadvantaged and this reality must be urgently changed (Cavalli, 2004).

There is clear evidence that this demographic change has implications for many areas of policy and practice, including that of ICT systems. These systems are becoming more and more a part of daily life, presenting valuable opportunities for supporting and engaging with older people. ICT and Assistive Technologies, in general, has become an integrated part in the life of many Europeans. Daily activities of the most of European citizens include online surfing on the Internet, taking photographs with mobile phones, sending text messages and a GPS device is now in most cars. The technological development is surrounding the society and is currently in a rapid transformation towards a whole new paradigm, where the PC as we know it is slowly changing (Czaja et al, 1993). This technological development will be integrated in our intelligent homes, our surroundings, and our clothes. Soon it will even be possible to integrate it into our bodies with the use of extremely small units: *nano-sized-technological devices*.

Governments, civil society and the industry need to work hand in hand to adapt and supplement some of the existing policies and practices so as to adjust to the new reality. ICT and Assistive Technologies can play a key role to harness the potential and facilitate the inclusion of all Europeans in today's society. It can substantially help improve social support systems and at the same time advance the quality of life and enhance the culture of all citizens in a wider sense in special for active ageing.

Although the numbers of the older Internet users grows, data gathered in April/May 2006, shows that already 59,5% of the population in Germany used the Internet at least occasionally, the number of older people not-using the internet (*offliners*) is still very large. In Germany the percentage of *offliners* in 2006 was 39% for 50-59 year olds, 64% for those aged 60 to 69% and 87% for those 70+. Similar situation exists in Austria. In Lithuania, the Internet/email usage for people over 56 years old is only 6.2% (the majority of them in Vilnius – 18.1%). Also in Spain, where only 3% of the elderly have some experience with the Internet, and nearly 90% of young people between 15 and 24 years old have used the Internet at some point, the difference in usage of the Internet between older and younger people is very large. However, older people are not adopting these technologies as rapidly as those in younger age groups. For example, in the UK, 82% of those aged 65 and over

have never used the Internet, compared with only 10% of those aged 16–24. This may be because older people find interactive systems unsuitable for their needs or difficult to use, due to differences in experience, capabilities, expectations and situations. This can make it difficult for them to participate fully in the information society and to enjoy many of the activities which are currently enjoyed by other people, and for the information society to benefit from their skills and experience (Xie, 2003). However, the majority of older people do not yet enjoy the benefits of the digital age, such as low cost communications and online services that could support some of their needs, as only 16% of EU citizens over the age of 55 have internet access.

Although computer use among older people is increasing, the challenges that they face often remain. Further work is needed to understand related issues and to develop more suitable and usable technology. One of the most difficult problems in adopting technology (ICT and Assistive Technologies) has been that user interfaces are often not well suited for elderly users, as growing old inevitably changes the physical and cognitive capabilities of humans (Gregor & Newell, 2001). As older adults progress through the natural ageing process, they experience some degenerative effects of ageing, which can include diminished vision, varying degrees of hearing loss, psychomotor impairments, as well as reduced attention, memory and learning abilities. Here, we examined a novel user interface paradigm in the context of supporting elderly users in their everyday lives (Stiglitz, 2002).

Up until now, elderly, disabled and people with chronic diseases have been left behind in the field of technological development (Dickinson & Gregor, 2006). The home entertainment business has been the main facilitator with the large global firms as main characters, developing products aimed at the digital homes. However, these are often only focusing on the young and middle-aged segments. It is however still a fact that the elderly of today and especially of tomorrow will live longer, be more active and most importantly will have a true desire for a life without dependency on personal assistance for as long a period as possible where ICT/Assistive Technologies will play an important role in their active ageing. As a welfare society we will therefore meet an increasing demand, where the elderly need to have the best and most modern technological possibilities available.

Quite often the demographic challenges are discussed in the media as a serious problem for social support systems. They are seen fairly negatively (as a "cost explosion"), which is one way to discuss this topic. The other way is to discuss the opportunities offered by ageing societies like, for instance, new markets for innovative applications and products/services for older people. Both ways can be combined and discussed in a third way. This would highlight the possibilities of preparing ourselves for the consequences of demographic change and shaping our ageing societies, instead of thinking that ageing societies will come on us like a hurricane and damage the heart of our civilization. Hence, the policy challenge is how to tackle the challenges and use the opportunities of the ageing societies in an intelligent way (Jimison et al, 2008).

2. Training older adults on ICT/Assistive Technologies: Barriers, problems, proposals and approaches

Chronological age is not a key determinant of cognitive ability and attempts at formulating a general theory of older learners may be a misguided effort. White and Weatherall (2000) write that 'defining a senior learner is problematic because no single definition satisfies everyone' (p. 381). Understanding the factors in aging that affect the ability of adults to

learn computer skills is the first step to designing and teaching computer classes for older adults. Due to the variety of differences in abilities and needs among the aging population, there is no simple formula for training older adults to use computers. Because of individual moderating factors such as health and attitude towards technology, there is no typical older adult.

Jones and Bayen (1998) noted that a lack of practice time is a barrier for some older adults who do not have computers and skills-learning support, resulting in a lack of confidence but they also suggest this is associated with limited literacy skills.

A prevalence of older adults in the Australian community with negative attitudes toward computers ranging from anxiety to technophobia is reported by Anyanwu (2004), Barnett et al (2000). Kubicek and Wagner (2002) point out that computers may no longer seem new technologies to large sections of the community, who have had prolonged access to them within the workforce or education systems, but to a person who has been outside of those institutions for ten years or more, they can be completely foreign. Barriers faced by older and younger adults accessing information and communication technology are not only those blocking physical access to computers and connection to the Internet, but also to appropriate and timely availability of training and support matching the special needs of older adults (Schneider, 2003).

Access to appropriate opportunities to learn about and make use of online technology was significant issues for participants in *Making the Connections*. There was some concern that generalist training initiatives are not always responsive to the learning needs and interests of older people. Negative perceptions of the learning capacity of older people by trainers represent a significant barrier.

Mentoring and peer support have been a key component of the learning models successfully applied in seniors technology initiatives across Australia (e.g. *Seniors-On-Line, Seniornet*, Australian Seniors' Computer Clubs Association) (LaVitola, 2003). The importance of integrating universal access considerations into community initiatives was also highlighted with incidence of disability increasing with age. Differences in the way younger and older adults learn involve the aging process. The most obvious difference is the physical aspect. As we age, there are physical declines in mobility, motor skills, vision, and hearing. The decline in motor skills affects the ability of older adults to use a keyboard and to control a mouse device. For example, the double-click function of a mouse will not work if the mouse is moved while clicking. Many older adults, however, have difficulty keeping the mouse stationary while trying to perform a double-click. Arthritis can affect their ability to hold the mouse and consistently click on the correct mouse button. Tremors and associated declines in motor ability caused by neural noise (signals generated within the nervous system unrelated to actual stimulus) affect their ability to accomplish fine-motor tasks such as positioning a cursor or holding the mouse still during a double-click task.

Some of these difficulties can be alleviated or overcome with adaptive and assistive technologies, which address the specific physical problems encountered using computers. For example, a mousing device which remains stationary, such as a trackball, may be easier for some older adults to maneuver than a regular mouse, which must be moved. Just because the input devices are difficult for a student to use, however, does not mean adaptive and assistive technologies should be offered during training to make computer use easier. What will they encounter outside of class? If they do not have a computer, but instead will be using computers in the library or somewhere else, they will be better prepared by training which uses the devices they will encounter (Hodkinson, 2008). If the primary

computer they will be using is their own, or one they plan to buy, students should be advised that alternative mouse devices are available, but are not standard equipment. Given the fact that adaptive and assistive devices will cost extra for their own computer, many seniors choose to learn to use the standard mouse, even if it is initially more difficult. Since part of learning to use a mouse device is to understand the concept of pointing and clicking in a graphical user interface, we believe initially learning the concept and skill on a mouse which they will typically encounter outside their own home is more valuable than offering an alternative which they may never encounter again (Zajicek, 2004).

The double-click operation is one of the most problematic for older adults. It was found that initially instructing older adults to click once to highlight an icon and then to press the Enter key to open the corresponding program gives them an easy alternative to remember. When we subsequently teach them about double-clicking, we remind them about pressing the Enter key if nothing happens when they double-click. Usually, just having that knowledge is enough, although most will still try to master double-clicking. Another strategy, useful for those who have difficulty holding the mouse still while clicking, is to show them how to use one hand to hold and move the mouse and to use the other hand to click the buttons. It may seem counter-intuitive, but for some older adults it is a welcome solution which enables them to continue.

Age-related changes in vision begin as early as middle age. As vision declines and older adults begin using bifocal or trifocal glasses, viewing the monitor becomes problematic because of the viewing distance, which may be between their close and distant vision points. Glare is also more of a problem for older adults due to changes in vision. Adjusting the monitor's tilt can reduce glare, but we have found that older students usually do not realize the monitor can be moved or adjusted. If they see the monitor moved and adjusted for them as they arrive for class, they realize a problematic monitor elsewhere can also be adjusted.

Age-related changes to the eye also affect the quality and amount of light that is seen, so that color perception is affected. Distinguishing between blues and purples becomes more difficult, and cataracts will make white appear yellow. The more contrast there is on a screen, the easier it will be for seniors to read. Unfortunately, when using World Wide Web sites in training, there is not much that can be done with the color combinations a site uses, or the standard colors of links and visited links, so it is important to keep these visual factors in mind when selecting web sites to use in training, and when designing web-based training (Morrell, et al, 2004). Changing the screen resolution can help, but if that option will not normally be available to them, it again becomes an issue of what they will be using after the class.

For older adults, written instructional material is a major part of the learning process. Two prominent researchers in the field of computer instruction to the elderly, Morrell et al (2004), have argued that the lack of adequate printed instructions is a major inhibitor to seniors learning to use computers. Drawing on their own research and the body of research on teaching computer skills to seniors, they advocate using both verbal and printed materials in training older adults to use computers. Our own experience, as well as others', verifies their conclusions. Written instructions, however, must be readable and understandable to older adults to be useful. In terms of vision related declines, text size and layout are critical. Research summarized by Morrell et al (2004) indicates font size 12 to 14 is preferable to smaller size fonts. A sans serif font like Helvetica seems to be the easiest to read. To accommodate vision related declines, as well as attentional and cognitive issues, discussed below, the format and structure of written materials should include relevant

illustrations, presented in discrete segments with simple language.

Age-related changes to the ear and central auditory nervous system affect not only what is heard, but also how well it is processed. Within the range of hearing, the higher pitches are the first to be negatively affected with age. The pitch of a typical male voice is ideal, but since it is the extremes which are most impacted, a woman's voice which is not in the higher pitches will be just as discernable to those with age-related hearing loss. In addition to pitch, the combination of increased neural noise and decreased ability to suppress external noise (stimulus which is unrelated to the attentional focus) degrades speech perception as adults' age (Newell et al, 2006).

Declines in attentional processes, discussed below, also affect the ability to correctly interpret what is heard. Slow, distinct speech is imperative, as well as blocking out, or at least minimizing, external noises. Even quiet chatting between students in an otherwise quiet room will have a negative impact on how much can be processed and retained by the others. Finally, since older learners need slightly more time to process speech and the new information they are hearing, it is important to allow time for processing what is said.

Lack of belief in one's own capabilities was one of the barriers mentioned e.g. by Dickinson and Hill (2006). This gets emphasised in a knowledge society where learning often takes place with new tools that are not familiar to the older learners, and require additional learning effort.

3. The importance of learning how to use ICT/Assistive Technologies and training courses

There are several ways in which learning how to use a computer and the internet might enrich and expand the life of older people. A few of the most convincing reasons may include the following items according to the research and opinions carried on by several authors e.g. Millar and Falk (2000), Czaja and Lee (2002), Fox (2004), Fry (2005):

- **Information:** Using the computer to do research can be rewarding and interesting. They can find out about your favourite hobbies and passions, however unique they might be, and discover that there are other people out there who share your interest. They can also research medical conditions and help yourself become better prepared for visits with your doctor. They can investigate items you want to purchase, find out what other consumers have to say about them, and comparison shop. They can find maps and directions to every conceivable location movie times and theatres, up-to-the-minute weather information, world news, sports scores and much, much more. Being able to use the computer and navigating the internet can expand your world of information resources tremendously.
- **Communication, Friendship & Connection:** Keeping in touch with friends and family through email will enrich their life. They will be able to hear and see what your children, grandchildren and good friends are up to on a daily basis without the expense of a large phone bill. Additionally, they can communicate with other people via email. They can resolve billing question with your cable company, find out about services at a local volunteer organization, track down old classmates, or request information from a national organization.
- **Employment:** Knowing how to use a computer can help them find a job. There are multiple resources on the internet to learn about jobs requirements, job openings, and

volunteer opportunities for more information. Additionally, computer skills will increase the jobs available to them.

- **Entertainment:** The computer can provide entertainment in a variety of ways. Games on and off, can be a fun way to engage their mind when there isn't anyone else around. Online magazines abound, as do newsgroups focused on particular topics. Information about work events, politics, sports and entertainment can provide their daily infusion of current events. Beyond the internet, the computer might become a great tool for a new hobby or interest.
- **Commerce:** Once they learn how, shopping on the internet can prove economical and effective. The internet allows them to compare prices quickly without running from store to store, research particular items, read reviews and commentary before buying, and have purchases delivered right to your door.

Specific techniques which address the issues involved in training older adults to use computers include (Czaja and Lee, 2002; Hodkinson et al, 2008):

- Make the class relevant. Adults, especially older adults, need a direct correlation to their lives to maintain interest. When they do perceive a direct connection to their lives, interest and learning will be instantly enhanced.
- Allow extra time to accomplish even simple tasks. Many older adults take computer training classes before getting a computer. Without the opportunity to practice new skills as they learn them, their new abilities will not be retained.
- Adjust monitors before each class. Take the time to set the monitor for each individual within a comfortable viewing range, and adjust the tilt to minimize glare.
- Speak slowly. Since hearing the higher pitches are the first to deteriorate in aging, the lower the pitch of the trainer's voice, the better.
- Speak clearly, with frequent pauses. Older learners need more time to process speech and the new information they are hearing.
- Use precise, unambiguous terms. Although relating new processes or techniques to prior experience is helpful for conceptual learning, always be aware of prior associations which may interfere with the cognitive processes of learning new terms.
- Locate the training in a room or area conducive to learning for older adults. The optimum location is a relatively warm room well away from noise distractions. If this is not possible, at least be aware of the attentional hurdles you will be up against.
- Keep the length of the class manageable for Seniors, based on the amount of new information they will be getting and allowing extra time to practice new skills.
- Set the time for the class as early in the day as possible. For older adults, the morning hours are generally their optimal time of day for memory processes.
- Provide printed material in an easy to read font, with appropriate graphics. Instructions should be comprehensive and explicit: do not assume they will retain knowledge of prior steps.
- Involve Seniors in their training. To whatever extent possible, have older students participate in goal setting and feedback for specific tasks, and in the entire course outcome.
- Partner learners with similar abilities, to increase motivation and reinforcement.

The importance of doing the practice exercises is strongly emphasized. Timing of those exercises is also important. Students should complete the exercise before the day of the next class (not the morning of the next class). Although some who do the exercises still have problems with the next class, those who do not do the exercise always have difficulty with the next class. Even a two day gap between computer sessions will result in loss of skills learned. While only one practice exercise is required, the students must be encouraged to do the exercises as many times as they can, especially if they have not mastered the mousing skills required for the next class (Czaja & Lee, 2002).

4. The future: active ageing with ICT/Assistive Technologies

According to the World Health Organisation, active ageing is 'the process of optimising opportunities for health, participation and security in order to enhance the quality of life as people age (WHO 2002). 'Active' refers to a continuous participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active or part of the labour force (p. 7)

Factors of active ageing include:

- Cross-cutting factors of culture and gender
- Health and social system: health promotion and disease prevention; curative services; long-term care; mental health services
- Behavioural factors: healthy life styles including e.g. tobacco and alcohol use, diet, physical activity, use of medications
- Personal factors: biology and genetics; psychological factors
- Physical environment: safe housing; prevention of falls; clean water and air; safe foods
- Social environment: social support; violence and abuse; education and literacy
- Economic factors: income; social protection; work (formal and informal sector) (p. 7)

According to the Action Plan on Ageing Well in the Information Society (EU, 2007b):

- Ageing well at work, as staying active and productive for longer with better quality of work and work-life balance;
- Ageing well in the community, as staying socially active and creative, improve quality of life and reducing social isolation;
- Ageing well at home, as enjoying a healthier and higher quality of daily life for longer, assisted by technology, while maintaining a high degree of independence, autonomy and dignity. (p. 8)

These three areas are linked to different learning needs for older people as jobs, living environments, social networks, and their own health change in old age. Learning is necessary for improving knowledge (e.g. learning health related issues) and for improving capabilities for practical tasks (learning to use new tools, such as online banking or learning new activities). Learning is also a rewarding activity in itself, improving the individual's social relations when interacts with, and learns from, others, be they young or old. (p. 8): "ICT can support learning in many ways, allowing more individual learning approaches; compensating for disabilities; and providing new opportunities to access information and services as well as to interact with other people and communities. However, it may also bring new obstacles. ICT are new for many older people today and the threshold for taking

up new tools and applications to begin new learning activities may be high. Attention should be paid to improve the usability of tools; access to the equipment; and to the types of learning opportunities provided. As the background and motivation of older people may differ from those of the other older people, as well as from younger generations, special considerations are needed to design ICT supported learning approaches that can provide relevant learning for all participants."

Technology is not something we can ignore in the new century, and we too would argue that technology should be at the heart of social policy [for older people] for several reasons. First, it is *intergenerational* in the sense that technology has the ability to improve the situation and quality of life for *all* people. Secondly, technology is important to a social policy of ageing because it pervades *every aspect of life* and has the potential for assisting with many of the 'traditional' problems associated with ageing… Thirdly, technology is *pluralistic and preventative*. It is about facilitating communication which can enable people, of whatever race, age or gender, to participate as citizens in decision-making and can empower people as they shop, vote and seek expert help 'on line' in all areas of policy. Technology can assist us to overcome some of the barriers already noted between conventional policy areas such as housing, health and social services, education and work, in order to create a 'seamless' service." (McMulli et al, 2007). The previous reflections, research, findings and the proposals constitute a starting point to reflect and to decide the best and appropriate strategies for Portugal.

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