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C. da Silva Santana, M. Soares Bernardes, editors, Proceedings of the 1st Brazilian Congress of Gerontechnology. Gerontechnology 2016;15(2):65-97; doi:10.4017/gt.2016.15.2.003.00
Short summaries of 19 of the 29 oral presentations at the conference, clearly show both the current (2016) situation and future plans of technology and aging in Brazil.

Keywords: Brazil, gerontechnology, quality of life, affordability

Assistive technology for people with dementia: A Brazilian view

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Keywords: assistive technology, dementia, gerontechnology

doi:10.4017/gt.2016.15.2.004.00

Background
The dementias comprise a syndrome that causes functional impairment. The disease is debilitating and impairs cognitive functions such as executive function, memory, attention, orientation, language among other cognitive abilities. Dementia is also associated with deterioration in emotional control and social behavior, leading to significant impairment in both instrumental and basic activities of daily living and to restrictions in social participation as a result of its debilitating action[1].
According to the World Health Organization an estimated 65.7 million persons with dementia are expected in 2030 and 115.4 million in 2050. Globally new cases of dementia each year amount to approximately 7.7 million[2]. Persons with dementia need long-term care for many years and, along with family members and society, they will be affected socially, financially and economically by the burdens caused by the condition.

Objectives
In the light of these demographic shifts and rise in the number of persons with dementia, there has been a growing interest in the early detection and management of debilitating chronic conditions, and also in technological innovations that can promote 'aging-in-place'.

Method
An array of assistive technology applications such as cognitive aids, environmental sensors, video and audio technologies, and advanced integrated sensor systems are under development for monitoring the health, safety and well-being of cognitively and functionally impaired individuals[3]. These innovations have the potential to improve the quality-of-care delivered to older persons with dementia at the home and in multidisciplinary healthcare outpatient clinics, but also in long-term care institutions for the elderly (LTCI). Such technologies also help to reduce the burden of family caregivers and contribute to the quality of the technical work of professional caregivers.

Results & discussion
These assistive technologies change according to the stage of the disease, in line with the shifting level of dependency and abilities of the individual during different phases of the disease. Assistive technology applications for older persons with mild cognitive impairment include cellular phone applications for memory, shopping lists and organizing daily activities, medication organizers with or without alarms, timing type kitchen alarms and aids for tasks of preparing meals and cleaning the house. Identification bracelets, personal alarms and other resources are of great importance, not only in terms of the devices themselves but also in procedural changes, e.g. aiding tasks, sequencing of steps such as in tutorials, memory aids, among others. Concerning assistive resources for older persons at a moderate stage of dementia, safety devices such as alarms coupled to smoke detectors, movement and fall sensors, biosensors, integrated sensor systems, and self-help devices for activities of hygiene, feeding and dressing may be needed. For more severe stages of functional impairment, devices include applications for safety, well-being, comfort and sensory stimulation of individuals that can regulate mood and behavior such as sensory mats and cushions. The assistive devices for the tasks of transfer between surfaces such as transfer/elevator, fall detectors, ergonomic bathing chairs and caregiver work aids can be useful.
Brazil faces the major challenge of producing, implementing and increasing the use of assis-

Johannes Doll before his audience in a session 'Research on digital inclusion, work and aging' (photograph by H.S.M. Kort)

tive technologies in the country. Most of these resources are currently imported and unaffordable for end users. There is a widespread lack of awareness by patients, family members and professionals of the existence of these resources which potentially can have major impact on the quality of life of elderly with dementia.
Although strides have been made in developing assistive technology devices, particularly regarding the development of ICTs and robotics, assistive, accessible and controlled environments; challenges remain in the fields of ethics and information technology. Issues related to the privacy of the subject monitored, involvement and duty of families and of the state in care standout. An increase in studies on assistive technology for persons with dementia is evident, with a rise in the number of national publications. However, the training of professionals in this field of knowledge is lagging. The production of national knowledge and funding of studies in this area are incipient.

Conclusion
In the future, it is envisaged that the products produced in partnerships between academia and business can meet the needs of the national market and expand the use of these devices, seeking to broaden the acceptance and use of technological resources in the care of the population afflicted by functional loss in the real world.

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Ageing and technology: Creating environments to support an ageing society (keynote)

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Keywords: AAL, Ageing-in-place, ICT
doi:10.4017/gt.2016.15.2.005.00

Abstract
Ageing populations have raised specific challenges, in terms of how best to support older adults to age-in-place i.e. to live independently at home and in the community. This is particularly important in developing countries, many of which are experiencing rapidly ageing populations, yet without the necessary investment or infrastructure in health and social care. There is increased recognition of the potential of assistive technologies to support the everyday lives of older adults including social participation, activities of daily living and lifestyle monitoring. This paper assesses the potential contribution of assistive technologies in supporting older adults to age-in-place, identifying some of the cultural, organisational and institutional opportunities and barriers to widespread adoption. The paper concludes by identifying gaps in current understanding and recommendations for the future development of assistive technologies if they are to become a more pervasive aspect of the home environment.

Background
The world population is ageing, with those over 80 projected to increase by 233% between 2040, compared to 160% for the population aged 65 and over and 33% for all other ages[1]. Brazil (as

a developing country) and the UK (as a developed country) are undergoing profound, albeit very different, social changes driven by the challenges of an ageing population. As a developing country, Brazil has the sixth largest population of elderly people in the world. The proportion of the older population (60+ years) increased from 4.7 per cent in 1960 to 10.8 per cent in 2010 and is expected to reach 29 per cent by 2050[2]. As a developed country, the UK population has been ageing since the 1870s (most rapidly between 1970 and 2000); recent projections indicate that the proportion of people aged 65+ will rise from 17.7% in 2015 to 23.5% in 2034 and the number of people over 85 is predicted to double in the next 20 years and treble in the next 30[3]. What is different is the speed at which the population is ageing across Brazil and the UK. The same ageing trajectory that has unfolded over more than a century in the UK (and other developed countries in Europe) will occur over two decades in Brazil. This has raised specific challenges in terms of how to support older adults to live a high quality of life, whilst finding solutions to reduce the health and social care costs of caring for an older population.

Ageing-in-place

The ageing-in-place agenda has been an important policy development in recent years, the objective of which is to support people to age at home and in the community, where older adults can retain a sense of independence, safety and belonging[4]. Realising these benefits is dependent on having supports within the home and community which support a high quality of life; i.e. ageing in the right place. There is widespread recognition that innovative approaches, including technological solutions, can help support the health and social care needs of an ageing population[5]. These interventions have the potential to promote the independence and well-being of older adults, whilst alleviating the demand on formal and informal care i.e. by providing older people with supports for active ageing, enabling self-care and self-management and facilitating the everyday social inclusion of older people.

Recent developments in the area of gerontechnology have centred on the design of technological innovations to enable 'active ageing' i.e. the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age[6,7]. Many older adults want to lead active and meaningful roles in old age and challenge the passive social role that society has placed upon them but often lack the supports to do so. Feelings of passivity in old age are symptomatic of the deficit model of ageing which has conceptualised old age as a period of frailty, illness and old age, concerned with the absence of ill health, rather than the promotion of healthy and active ageing[8]. Increased global life expectancy should be seen as a significant success, yet only if older adults are living more 'active, healthier' lives, rather than simply extending the period of frailty and dependency in old age.

Technological interventions can play an important role in enabling older adults to lead healthier and more productive lives, for e.g. through lifestyle monitoring, self-management and emergency response systems that enable the active participation of older people in society according to their individual needs, preferences and capacities and which encourage people to participate fully in community life[9]. The realisation that technology offers a potential intervention to support ageing-in-place has been evidenced in the emergence of ICTs and Ambient Assisted Living technologies.

ICTs and Ambient Assisted Living (AAL)

Information and communication technologies (ICTs) have evolved as a potential solution to improve the health, safety and social participation of seniors. These technologies utilize environmental and person-based (i.e. body-worn) sensors, and communication networks to provide important information on the health and care needs of seniors[11]. As well as clinical applications, ICTs offer huge opportunities for gerontological research, particularly in respect to the collection of real-time data on the daily lives and health behaviors of older individuals with a range of conditions[12].

Evidence suggests that ICT supports for older people can bring about significant benefits of care for older people, for example, to assist with diagnoses, treatment, consultation, and patient education[13]. Service providers have given positive feedback regarding the use of telecare technology in patient management, reporting stronger relationships with patients, better patient monitoring and potential for cost-savings[14,15,16]. Systematic reviews have highlighted the potential benefits of using telehealth to assist with the management of patients with chronic diseases, with significant reductions in hospital admissions and mortality rates, improved lifestyle behaviours, clinical outcomes and reduced healthcare utilization[17,18]. Studies have also shown that ICTs can be used to support self-management and monitoring in patients with a range of chronic conditions and can be effective in improving self-management skills, managing risk factors and improving symptoms[19,20].

Ambient Assisted Living (AAL) combines ICTs, stand-alone assistive devices and smart home technologies to help support older people to live independently within the community[21]. Technological interventions such as AAL offer a number of opportunities: to allow people to 'age-in-place' by increasing their autonomy, self-confidence

Two foreign key note speakers, Helianthe S.M. Kort (left) and Ryan Woolrych (right), with Marina Bernardes, a member of the organization team, in the middle (photograph by Helianthe S.M. Kort)

and mobility; to support health and functional capability; to promote active and healthy lifestyles; to enhance security, prevent social isolation and maintain the support network of the individual; and to increase the resource efficiency and effectiveness of health and social services[22].
It is possible to identify three generations of AAL technology for supporting older people[23,24]. The first generation is characterized by an alarm (e.g. alarm button on pendant) worn by the older person in the home providing them with the ability to raise an alarm (call centre or caregiver) should a problem requiring assistance arise. The benefits of these first generation community alarms include reduced levels of stress among caregivers, reduced hospital admissions, earlier hospital discharge, and delayed entry into long-term care facilities[25]. A key weakness is that if the person is incapacitated, or is not wearing the device for some reason, then they are not able to trigger the alarm. A second generation of technology uses sensors (e.g. device sensors or accelerometers) to detect potential emergency situations such as a fall or environmental hazard (e.g. flood or gas leak) and summon help without action on the user's part. Sensors monitor the person in their home and software analyses the data in order to automatically detect emergency situations[26,27,28].
Recent developments within ICTs have heralded a third generation of technologies[29], where computing systems and assistive devices can be integrated within everyday living contexts to provide a wide range of services, help and support to seniors who may require assistance in living independently. For example, environmental and wearable sensors can monitor vital signs or changes in mobility and activity patterns which may be indicative of changes in health status, while smart interfaces can provide information, support and encouragement to people in staying active and mobile.

Barriers to widespread adoption

Despite this evidence, the widespread deployment and mainstreaming of gerontechnological interventions has been low[30]. This suggests that there are a number of barriers to the adoption of technologies within the home environment. At present, there is still little hard evidence to suggest that technology-based products and services, particularly AAL, have had significant benefits to end-users or service providers[31,32]. To a large extent this reflects the relative novelty of the area and evidence about the effectiveness of technology is still emerging. However, three key criticisms can be raised in respect to the evaluation of gerontechnological research.
First, developments have primarily been technology-driven, without assessing how they impact on the everyday lives of older people and how it could positively enhance their quality of life. Importantly, there has been a lack of research into how technology can be integrated across different cultures. For example, attitudes to technology, everyday activities, familial relationships, living arrangements and care expectations are all culturally bound and will impact technological requirements. Technology, if it is to be successful, needs to reflect cultural sensitivities in its design, implementation and evaluation. This suggests that more user-driven research is needed across different national and cultural contexts; otherwise technologies will be ill-conceived and fail to meet the demands of the older person[33]. Technologies have tended to take a functional/needs-based approach to supporting older adults, rather than examining how technology can support cultural aspects of place i.e. as a tool for social engagement and participation across different community contexts.
Second, technology is often developed with the end user in mind, yet can impact upon various stakeholders in the care delivery process. There is a need to understand how new technologies can best fit with existing forms of health and social care delivery that the older person may draw upon. For example, an older person may engage with formal and informal care providers, local voluntary and community sector providers and more formal service providers. This care relationship might differ across countries where access to formal care is lacking and where there is emphasis on familial support. This potentially creates different technological requirements i.e. in terms of what older adults, family members and healthcare professionals want from the system. Technology needs to be seen as part of an integrated care solution tailored to meet the varying needs of the end user and different care providers[34].
Third, whilst systems have been developed to address specific conditions, technological developments have not been intuitive enough to adapt

to the changing needs of the person as they age. Technology has to be flexible and responsive to the requirements of the older people in terms of what they want from the technology. A 'one size' fits all approach is unlikely to be effective. Experiences of old age are not homogenous and needs are diverse, for example, by age, community context and household circumstances (those living alone). The challenge for technology is how to reflect this diversity, moving away from generic solutions towards flexible supports that accommodate the often complex and diverse needs of different groups.

Next steps: technology and ageing

These challenges need to be effectively understood and addressed in order to be able to achieve the successful deployment of gerontechnology and to fulfil the promises of improved quality of life for older people, people with chronic conditions and family carers, of better quality of care services, and to achieve increased efficiencies in service provision. Much of the technology development thus far has been funded through institutions in the developed world, and there is the tendency to assume that what works there will work elsewhere. This is misleading as financial, cultural and institutional supports will vary across different national contexts. In working towards this, technology development needs to adopt a more culturally sensitive approach to ensure functionality (needs, requirements), accessibility, usability, acceptability and fit to everyday life. For this to happen, older adults need to be more closely involved in the design, implementation and deployment of the technology.

There is also the need to address the issue of what constitutes effective evidence for the relevant stakeholders involved in the implementation of the technology. A randomised control trial might constitute evidence for physicians but not for end users who are likely to respond to 'softer' well-being benefits, such as independence, confidence and security. A broad evidence base is needed that convinces different stakeholders e.g. end users, professionals, technologists, commissioners. Moreover, there is a need to address the context within which this evidence is generated; small scale trials are more context-specific and may constitute evidence for local service providers and end users but can these be generalised/are they directly comparable across other contexts.

There is a need to scale-up small-scale interventions which can be achieved through various mechanisms: expand the geographical coverage of interventions from small-scale and local to city, regional and national, urban and rural; develop local capacity-building and support for delivering gerontechnology interventions; mobilise local providers (healthcare professionals, commissioners, formal and informal carers, service providers etc); identify how technology can compliment broader cultural, institutional and organisational practices. It is necessary for technology to be adaptable to changing cultural contexts, whilst ensuring that technology is standardised and simplified for widespread application. There is also a need to develop partnerships with providers and those responsible for healthcare delivery to ensure top-down support so that technology can become a deeply embedded institutional and organisational component of service provision. Here, the mapping of local health and social care delivery is necessary to establish where interventions can be optimally integrated to support stakeholders. Lastly, to address the economic challenges of an ageing population, mainstreaming technological interventions will require strong business cases which establish clear cost/efficiency savings for implementing them. This will require an understanding of costs/benefits in terms of hospitalisation, alleviating the burden on existing formal care delivery in the home, preventing long-term/expensive institutional care, as well as social and psychological impacts.

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Aging process assets and social dimensions of science and technology (keynote)

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Keywords: aging, science and technology and society, social gerontology

doi:10.4017/gt.2016.15.2.006.00

Background

Nowadays demographic transition is taking on unprecedented proportions. Whether it be the scientific and technological advances that have contributed to a reduction in fertility and mortality, the impact is on dynamic changes and / or lifestyle, and numerous multi-dimensional factors.

The aging process and all its diversity and complexity, is today the agenda for other academic and public agendas, bringing demands and challenges.

Demographic projections indicate that by 2050, over 20% of the world population will be 60+ years old, with a tendency to focus on Latin America, Asia and China[1].

Scientific and technological advances impact on longevity: on one hand contributing their innovations to the extension of life expectancy; and on the other causing the aging population to have desires, needs and prospects for the improvement of their conditions and quality of life. An octogenarian person, for example, born in the thirties of the twentieth century has been the object of various indirect influences during the course of his/her life. If one stakes out the technological revolutions of the contemporary world, one would undoubtedly suffer the impacts of atomic and molecular technologies, communication, and that of the space and nanotechnology revolution.

Objectives

With the demographic transition, several areas of scientific knowledge have been channeled in the direction of efforts towards a better understanding of this complex phenomenon, searching for answers and alternatives to the questions:

(i) How can we help people remain independent and active as they age?
(ii) How can we encourage the promotion of health and prevention policies, especially those directed at the elderly?
(iii) Can the quality of life be improved in the Third Age?
(iv) With an increasing number of people in the Third Age, will this cause the failure of our health systems and social security?
(v) How can we balance the roles of the family and of the state in terms of assistance to those who need care as they age?
(vi) How can we recognize and support the important role that older people play in caring for others?"[2p7].

Method

The expected answer is "through optimizing the opportunities for health, participation and security in order to improve the quality of life as people get older", as described by the concept of 'active aging'[2p13].

Results & discussion

The support for an understanding of this phenomenon is based on reflections found in the theoretical and epistemological contributions of a field of study known as Science, Technology and Society (STS). STS is an interdisciplinary field developed in the 1970s, and expresses a tendency for an "academic reaction against the traditional, essentialist and triumphalist conception of science and technology which underlies the classical models of public management"[3p119].

Synthetically, this field can be defined as a field of academic study, whose object constitutes "the social aspects of science and technology, considering both the social factors that influence the scientific and technological change and the social and environmental consequences "[3p119].

Historically STS is represented in three directions:

(i) in the context of research, indicating an alternative to academic reflection on the interactions of STS;
(ii) in the context of public policies, defending social regulation of the democratic mechanisms that facilitate decision-making on scientific and technological policies; and
(iii) within the education on STS, a prevalence of formal learning at the secondary and university educational levels, but with power in non-formal and informal learning.

The connections between these areas - research, public policy and education - potentiate reflection on the interfaces of science and technology in the active aging context, considering what is called 'syllogism STS' i.e. "it should promote the evaluation and social control of scientific and technological development, which means building educational foundations for a trained social participation, as well as creating institutional mechanisms to enable such participation"[3p127]. According to Bazzo et al.[3p127] "a) scientific and technological development is a social process shaped by cultural, political and economic factors, as well as by epistemic ones; b) scientific and technological change is a major determining factor that helps shape the ways of the institutional order of life; It is a public issue of primordial magnitude; and c) share a basic democratic commitment".

Prioritizing this aspect, the authors have been developing Núcleo Interdisciplinar de Estudos e Pesquisas em Gerontologia Social – NIEPGS and a Study Group on Health Policies and Practices, with investigations and interventions in active aging and public policy. This gives priority to the investigation of: the national agenda of health research; the production of knowledge about aging; lifelong learning and the development of social and professional skills; active aging through work; digital inclusion policies for older people; the dissemination of knowledge about health and aging; as well as the production, dissemination and critical analysis of health technologies in a broader perspective[4].

Conclusion

It is noteworthy that this universe of research, terotechnology, has been the subject of reflection and the development of products and processes, supporting the assumptions of the field of STS. The studies and research carried out also prioritize understanding and intervention, aimed at the production, circulation and dissemination of science and technology to promote health and active aging citizenship in this context. It concerns (i) analyzing the historical background; (ii) overcoming gaps and obstacles that researchers, professionals, managers, older people and citizens experience, in general, face; (iii) providing a view to promote alternatives for the social participation of scientific and technological development, products and services for aging, and (iv) implying building a guided educational bases for the democratic exercise and creation of institutional mechanisms conducive to such participation.

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Technology for longevity: Predictors for use of technology (keynote)

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Keywords: eHealth; older people; long-term care; biological aging

doi:10.4017/gt.2016.15.2.007.00

Background

Our world is aging rapidly. The rapid aging of the world is exceeded only by technology development. Not only the Western World is aging but also the up-coming economics such as the so called BRICS (Brasil, Russia, India,China and South-Africa) countries are aging. Especially rural areas are aging due to the migration of mostly younger cohorts to the urbanized regions. Currently 12.3% of the global population is 60 years old or older[1]. Aging of populations set challenges to the society, communities and individuals themselves. Aging is usually referred to as the chronological age or a person's calendar age. The chronological age is often used in relation to aging adults' well-being or to monitor the demographics of societies for policy, education and business. This age though gives us little to no information about older peoples well-being[2] or about their (potential) demands on the life domains. More information can be retrieved by knowing people's biological age. The biological age can be seen as the quality of cells, tissues, muscles and organs in our body, the replacement rate of all this in combination with the cognitive capacity of our brains. In daily practice this type of age is not easily set while asking people's calendar age might give you an indication of their well-being. The calendar age predicts the degree of the biological age on population level. Well known is that in general aging adults will experience barriers in society and limitations in daily functioning as they aged. Limitations in daily functioning are in instrumental daily activities, personal activities and the nowadays e-activities such as use of a smart-phone or tablet[3].

There is a pitfall using the calendar age to identify individual's needs, because of the diversity in longevity of people. A longer live goes along with a higher risk on chronic diseases. A longer live is also addressed as longevity. Aging is inevitable but on an individual level people can age gracefully without little or no limitations in life caused by their calendar age.

Calculations for the future by Johannes Doll in a session 'Research on digital inclusion, work and aging' (photograph by H.S.M. Kort)

Challenges

In Gerontechnology, a trans domain of technology and gerontology, challenges older adults might face during life, are structured along five life domains alongside the possible outcomes that technology might have. Gerontechnology was created to address the technology needs of all age cohorts across the life course and not just the needs of today's older people. This is achieved by establishing a framework for setting goals for technology for the different age cohorts across the life course in five domains[4].

Life domains that are distinguished in the so called Gerontechnology matrix are Housing & Daily activities, Communication & Governance, Health & Self-esteem, Mobility & Transportation and Work & Leisure. All live domains will be at some point provide challenges to for the everyday life of ageing adults. Technology interventions, to reach the goals set in these live domains, might be designed for enhancement and satisfaction, prevention and engagement, compensation and assistance or for care and organization[5]. Whether a life domain is experienced as a challenge depends on the goals set for quality of life by the aging individual.

The Gerontechnology matrix is based on the concept of quality of life as defined by Maslow's theory on hierarchy of needs. Needs start from the basic necessities (water, food and air) and rise to self-esteem, and then further to self-actualization, such as seeking personal growth[6].

Another way of addressing aging adults' challenges or needs on a global scale is the use of GAWI[1] domains. These domains include direct outcome indicators of older people's well-being namely Income security and Health status and those related to older people's capabilities, namely employment and education and the enabling environment of society. In this paper the focus is on health status while statistics about health are solid. Health status includes; healthy life expectancy at 60, expressed in the amount of years a persons has in good physical health from the (calendar) age set; life expectancy at 60 expresses the expected years to live and psychological well-being, subjectively assessed by the individual[7].

Needs for housing and care

Older people wish to age-in-place even when they experience limitation in daily activities due to biological aging. Aging-in-place means having an environment that supports older people to function in the way they wish. Ideally homes should be built in such a way to be suitable for all times life course (inclusive designed houses).

Unfortunately, in most countries houses are not suitable to live in when being old. "*Housing conditions have a significant and quantifiable effect on health. Many of the chronic health conditions experienced by older people have a causal link to, or are exacerbated by, particular housing conditions*"[8]. To give an example, well known is that older adults needs three times more light (>750lx) for visual functioning than younger people[9] . Well-designed homes for older people need to have minimal glare because the eyes off older adults recover slower from the effects of glare than younger cohorts[10]. Effects of glare can result in falling incidents.

Also zero-floor houses with no thresholds or barriers can prevent people from falling[11]. These houses support older people in their mobility and accessibility. In the Netherlands, 26% of the aging adults experiences limitation in their mobility and is dependent on mobility assistive devices[12]. Home modifications, in sense of light, lay-out and indoor environment contribute to minimize the risk factors for falls and consequently hip fractures and for other environmental related diseases[13].

Older people are also at risk for having a chronic disorder. The major occurring chronic diseases in the world, affecting older people are cardiovascular diseases, diabetes, cancer and Chronic Obstructive Pulmonary Disease (COPD)[14,15]. In the Netherlands 50% of the people between 50 and 74 years old have one or more chronic diseases. For those 75 plus or over the percentage increases up to 75%[16].

The demands for care increases world-wide. The highest volume of care is delivered by family

members next to care provide by care professionals. We do know however, that in the Western world the availability of high educated care professionals does not meet the demand. In the Netherlands the care demand increases with 2% on average every year. In 2040 nearly 25% of the Dutch working population, needs to work in healthcare to meet the demands for care[17].

Predictors for technology use

Technology is seen as a panacea to overcome the gap between challenges and needs of older people, the shortness of care professionals and the limited availability of family cares. Age-related needs are however rarely targeted by effective technology innovations because older human cohorts are more heterogeneous than are their younger counterparts.

Older adults have experienced greater diversity in technology use in their lives, and a greater variability exists in health and educational status, literacy, culture, abilities and skills. Older adults are less likely to use and adopt new technology. The high diversity among older adults reflects changes in the way they use technology with familiar tasks (e.g. digital vs. film based photography) and in the learning of novel technologies to accomplish new tasks originated by technology development (e.g. use of the Internet).

Incorporating the diversity of older people in product development requires a more systematic approach than commonly employed in technology-driven innovations. Technology adoption could be linked to wellbeing, personal characteristics or health status[18]. For example the miniaturization of user interfaces for smart wristwatches does not benefit all users. Differences in the adoption of smart watches among older adults may be attributed to differences in performance due to the biological ageing process linked for instance to changes in visual acuity or, impairments due to an eye disease (example: glaucoma which may prevent viewing text or icons on the watch face).

Health and education status and acculturation also have an impact on learning, just as age-related sensory and perceptual changes. All these phenomena have to be taken into account in the design, development and dissemination of services and products targeted towards aging adults.

Technology innovations are supposed to support care professionals as well in taking care of older people. Examples are ICT based-technologies to prevent falls at home and in institutions or smart home automation devices used for surveillance of nursing homes residents or residents in small scale care homes. eHealth applications for telehomecare are also being introduced in daily work of care professionals to monitor frail older adults who still live at home.

A recent study including 193 nurses showed that, nurses' willingness to use eHealth is predicted by its (i) perceived usefulness to the client, (ii) effort expectancy, (iii) social influence, and (iv) cost expectations. Also was seen that when nurses already had some experiences with IT-based care technologies, they are more willing to use eHealth for taking care of their clients[19].

For older adults self-care and usability of the eHealth application motivates them to use the technology at home[20]. Another study showed that major influencing factors for not using technology are the idea of lack of confidentially and the assumed lack of privacy[21].

Not only nurses' willingness and older adults motivation is a barrier for full implementation of technology innovations in healthcare. Also access to the internet and possession of a personal computer or smartphone in addition to the digital literary of the individual can be a barrier[22].

Another barrier for use is the willingness to pay for the technology enabled care. People are more likely to pay for eCare when it contributes to their well-being and independence[23]. The willingness to pay per additional QALY (Qualified Adjusted Life Years) increases with the probability that telehealth is cost effective; meaning reduction in equipment costs and full utilization is achieved. In due time eHealth or technology innovations will cost less, but reaching full utilization remains a challenge.

Conclusion: Attitude, education and training

A positive attitude towards aging adults, education and training will contribute to full utilization of use of technology innovations in healthcare. A study by Mansfield-Green showed that frequent contact with older adults results in positive attitudes amongst undergraduate students[24]. So spending time with grandparents is not only for fun but also good for the future.

Full utilization is in addition feasible when both aging adults and professionals have the opportunity to improve their digital skills. Several studies show that older adults do have interest to learn new technologies and in a Brazilian study more than 90% of the participating older adults had interest to learn how to use new technologies[25].

Also care professionals needs training in new e-technologies as well as our undergraduate students. Basic competencies relevant for providing care at a distance are: (i)ICT attitude and skills; (ii) Interpretation and analysis of eHealth data; (iii) Support and guidance; (iv) Communication skills; and (v) Privacy and confidentially[26].

These basic e-skills for professionals were further investigated and this resulted in the development of a eHealth framework consisting of 14 eHealth activities for community nurses[27]. This framework is currently being used in the education and training of undergraduate students in

nursing schools. In the near future the eHealth framework will be made applicable for training and education of other students, especially those in product and industrial design. This will contribute to well-designed technologies, which support older people in their daily lives and foster independence and active living.

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Technologies and active aging: Significance of interaction in the information age (keynote)

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Keywords: interaction and communication, social networking, interpersonal relationships

doi:10.4017/gt.2016.15.2.008.00

Background

For technologies, communication and information accessibility to older people is necessary to use in their modeling, developing and implementing mental models focused on the ability of these individuals to understand and realize the strategies that enable their social and digital inclusion. The appropriation of these technologies by the elderly should involve the articulation of three aspects: operational, machine language and pedagogical approach.

When interacting with technology, the senior refines your thinking about a problem situation, systematizing a description, implementation, reflection and purification. The interactive environment to assist the elderly to build new knowledge and ideas, assumes the presence of a mediator that causes conflicts and problematic situations, as learning, understood as the process for expanding the ability to assess situations and challenges.

Objectives

To develop interventions it is necessary to know the biopsychosocial aspects of the elderly and to examine if communication processes are established when these subjects interact while mediated by technology, that is, to clarify the weight of these aspects in technological interactions. To develop appropriate tools to the social and cultural characteristics it is necessary to understand the emancipatory potential of communicative processes, ie, the meaning of the interaction mediated by technology.

We understand that a communicative action is manifested in an interpersonal relationship when each regular subject its action in the interaction with rules of coexistence. The interactive-communicative process develops when consensuality recognized by the subjects both to the intelligibility of the content being discussed and in relation to the veracity of the interlocutors who are interacting[1].

Method

The research is a cross-sectional study of a qualitative nature. We analyze the meaning of the interaction by means of technologies, seeking to answer the question: How communicative experiences can contribute to the rescue of social welfare and to build interpersonal relationships? The survey was conducted with three groups of elderly in the city of Passo Fundo, Rio Grande do Sul, Brazil.

In the first group participated elderly people with symptoms of depression served by Community Health Agents Program; in the second, the elderly enrolled in computer workshops; the third elderly residents group in a long term care facility for seniors.

The qualitative study data were systematized in different categories of analysis. The inference of knowledge of the communicative processes was conducted through content analysis.

Results & discussion

The significance of the technology with respect to efficiency, facilitation, progress and communication, the results of the interviews were structured in two emerging sub-categories: (i) technology associated with their contributions and (ii) attitudes of detachment or approach.

Regarding the first subcategory, around 70% do not know the meaning of the words 'technology' and 'computer' or did not indicate justifications observing the presence of the perception of being something 'good' or 'important'. The visible gap between the world of life and inner motivation endangers a communicative exchanges that are raised from interpersonal relationships.

Some realize they are living in a period of intense and surprising transformations. They claim that these changes are occurring because there is a technical and scientific developments unfolding in the contemporary world. This evolution is far from the lives of some elderly because they do not realize the need to monitor these developments, nor even understanding its importance[2]. The representations are strengthened in that meet with support and social validation[3].

The problem lies precisely in the general mass of stimuli that should be appreciated, as all human beings, in order to achieve the welfare, were tasked to mobilize and divert all their cognitive and emotional apparatus for satisfaction of desires. Not having access to new technologies or not being able use it in full, puts more and

more elderly at a disadvantage on the conditions to live independently[4]. The technologies of communication and information mainly serve as communication mechanisms, acquisition of knowledge and participation in the world.

Conclusion
For these actions to be implemented, there is a need to propose methods to overcome issues relating to education and socialization of access to technology[1,5].

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Design for All: A proposal for inclusion and safe autonomy

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Keywords: design, elderly, usability, domotics

doi:10.4017/gt.2016.15.2.009.00

Background
Since ancient time, 1st century BC, Vitruvius[1] could be called the first scholar to develop the principals of design. Design appears through the informal work of the craftsmen, from there a sequence of developments were established by researchers from that era, having been these professionals therefore challenged in the conception of a product, even though, taking in consideration just to provide a mere artifact or the idealization of a space.

Objectives
However, attributing to these creations a purpose of use, as in the case of a simple tool or in the construction of residences and access ways, where took place the expression and performance of human activity.

Method
Migrating through the following centuries until the present day, one notes a constant search for technological evolution. Nowadays this area has been developed by the integration of multi-disciplinary work teams focusing on new concepts for developing product projects. It can be said that the primary aim of the project is to cater for the binomial relationship of the user versus product. Developing a product can directly be related to the need of constantly provoking creativity, and also appears as a need for continuous innovation and incorporation of new characteristics, resulting in an implicit design benefit on usability.

Results & discussion
This unsettlement translates into attributes that differentiate and add value to a product, and can amongst others offer the objective to guarantee the competitiveness of a product towards the consumer market, provided that the same fulfills their needs in harmony with a new social reality. We observe in the world statistical indexes the point of a significant demographical change. The results of these studies present an increase in the life expectancy and longevity as a consequence of the drop in mortality rate. It is considered that these facts can be related to advances in medicine, upgrading and use of technological resources, in the ministering of medicines and compounds, and also on the clinical attention[2]. Based on studies developed in the USA, at the Public Health School at Harvard, comparing conditions between 1990 and 2010 in a group of 187 countries, it was tested that the life expectancy had grown 05 years in average, however one of these years was subject to incapacity[3]. It has also been a challenging pursuit, via public policies guided by the recommendations established by the WHO, to establish standards for the improvement in the quality of life for social groups under risk or vulnerability, such as children, teenagers, people with disabilities and elderly people. It is estimated that the world population with 65 years or more could increase threefold as the statistics consider 516 million people retired in 2009 against a projection of 1,53 billion in 2050[4].

It is known that as a natural result of the ageing process, the senses and abilities of the elderly people can suffer a progressive decline, be it related to physical, sensorial, cognitive and or psychological aspects. On the other hand, through prevention programs based on proposals that consider improvements in the home ambience conditions and in the promotion on basic health, it could lead to a safe, active, and productive life in respect to the future of a predominantly elderly population. This intervention does not mean that this population is necessarily sick or incapable of managing their own lives. As a reflex of this increasing panorama, specific and pertinent demands would define the society conduct in respect to catering for the needs of this population, looking towards guaranteeing their autonomy and independence in the their daily activity tasks and practical lives, same as in the validation of their rights as citizens, promoting the inclusion of these people in the society avoiding their isolation.

Another aspect that strengthens this scenario, with the goal to supply this new social demand, takes place via the reduction in the fecundity, since statistical evidences had shown with the passing of the years that couples have less children, and this tendency will impact in the number of family forming members and possibly less availability to exert the function of caregivers in the future and especial for those who have family ties. As such, it will be in fact the growing need for elderly people to live safely alone at their homes, as established in the 'Estatuto do Idoso' (Elderly Statute)[5]; there are conditions that would grant them independence and safe autonomy in all the environments, specially domestic. The level of independence in this case is directly related to the condition that is established between the adapted and accessible environment to its user's circumstantial need.

Therefore, a safe autonomy can be affected if the environment does not provide what is necessary, by then interfering on maintenance and gaining individual autonomy that reflects in the capacity of managing their lives. In this scenery where the actors are the elderly people, not necessarily subject to any illness, it is expected that they could present some natural difficulty, such as sporadic loss of memory especially of declarative or procedural order[6]. Such conditions can many times be incapacitating, therefore these can be minimized and overcome in the sense of functional performance, when considering the use of accessories and resources incorporated to the environment in which these people live. These resources can be used by anyone, but also in a sense of being potential assistive, and come to work as a therapeutic tool with the objective to prevail over such situations faced by the elderly when executing their day to day activities such as those for example related to self-care.

Conference organizer Carla da Silva Santana in serious discussion on the future of Brazilian gerontechnology with Marcelo Castro, husband, economist and member of the organization team (photograph by Helianthe S.M. Kort)

Considering this matter as a goal to be achieve by developers, a new philosophy needs to be established for a developing process after the conception of a new product. It might represent an immense relevance by incorporating these characteristics and attributes to the design project for a building construction; domestic utensils; or products for communication and information technologies; and in living spaces concerning a system management of automation accessories denominated Domotics.

Presently, various international laws in the medical and social area support a global tendency for the use of Domotics. Its employment is seen currently in a more encompassing scope, not only as a means to provide simple comfort for the user, but point clearly towards solutions for domestic automation, providing a gain in autonomy for the individuals with a functional disadvantage and thus promoting a social inclusion[7]. These products can be considered common and find themselves available for any consumer, however it is recommended in this case, whilst the same are being idealized and designed, it is taken into account the change in the global population, with a view to catering for the great majority of individuals, independent of age, race, sex, social

economic condition, physical and or physiological limitations. For such, the development process and interface evaluation of these products should priories the principals of Universal Design as denominated in the USA[8] or Design for All as most commonly used in Europe[9]. This way, this vision towards conceiving a product that is closer to the user's needs, being also the final consumer, expands the scope of possibilities towards attending a growing consumer market, in this case the elderly population.

Conclusion

One concludes that in-permeating all the development process of these products, the premises that sustain the interests, of all the events in this chain, loaded with intentions, governed by ethics, in the spreading of information as to the guarantee of accessibility, in surpassing architectural barriers and attitudes present in society, allowing for a multigenerational approximation when incorporating the technology commonly present in the life of the younger ones, as a means of support for those who are older. In this stage of life that the fortunate people will probably reach, one should respect even more the human diversity, striving towards diminishing the difficulties imposed by the limitations which are particular to the raging process.

It is believed that whilst valuing the potential of repertoire and expertise of the elderly as a means of production and test field, the path is laid for the development of trustworthy studies related to usability when evaluating the interface between the elderly user and the innovative product. Offering access, primarily within the economical aspect, there should be considered studies in environments that are less favored and also socially and culturally challenging, such as that in developing countries where a large scale of the population is becoming elderly, so that it can become more accessible and less specialized just for a determined group of individuals but commercialized in a greater scale, better cost benefits, focusing sustainability and offering equal opportunities on a worldwide vision for use and acquisition.

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The constitution of the field of gerontology and differentiation technologies

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Keywords: differentiation technologies, gerontology, gerontechnology

doi:10.4017/gt.2016.15.2.010.00

Background

"From differentiation technologies to Debertianas [based on the ideas of the Brazilian social scientist Guita Grin Debert] theses": The provocation expressed in this sentence, obviously, refers to an interval of time, besides the need of brief lines. We know that in the late nineteenth century and early twentieth century, slowly and gradually, some movements have emerged in society, allowing us to say they were as 'initial rites' in the discovery process of old and old age.

Objective

The objective is to discuss the rationale and scope of differentiation technologies.

Method
Groisman[1] based on Katz[2] calls these markers of differentiation technologies that would be: (i) the development of medical knowledge; (ii) creation of retirement; and (iii) the emergence of the first asylums for the elderly. At the end of the 'brief twentieth century', there is the basic work of Debert[3] who shows us his view of aging in Brazilian society, presenting his thesis that aging visibility consists of three types of actors, namely: (i) the gerontologists, (ii) people older, and (iii) the media.

Results & discussion
Similarly, Prado & Sayd[4] refer to what they call creation of medical knowledge as one of the first markers of the field: "Regarding the constitution of geriatrics and gerontology as an area of knowledge of professional practice, go to the eighteenth century and early nineteenth century, when doctors did not distinguish old people from young people. Since then, profound changes have taken place inside the medicine, with repercussions on the concepts of disease and aged body and a specific discourse about senescence appeared in France from Bichat, Charcot and Broussais". The same authors, based on Groisman[1], indicate a second marker of this constitution process of the area, which would be the establishment of 'retirement' in the mid-nineteenth century. "Establish the right status to retirement, reason new subjective positions hitherto unthinkable in old age in history." Completing the reasoning of so-called 'differentiation technology' (based on Katz[2]), Prado & Sayd[4] relate to the 'old people asylums'..."oldness of the separation phenomenon in relation to begging". At the other end, at the end of the twentieth century, Guita Debert[3], the anthropologist, presents his understanding of the construction of a certain visibility of old age that would be built by these three types of actors, gerontologists, who studied the numerous issues of aging and old age; the older people, and only here I understand the endless discussions on demographics and finally the media where and when we can detect a possible end of the conspiracy of silence. Demographic evidence - almost obligatory in most studies of aging - can overshadow a more meaningful discussion of visibility, built by various social agents, it has been accentuated in recent decades. Presenting some of the gerontology areas constitution requires addressing various dimensions and the logic we have come to understand aging as a multidimensional phenomenon.

Conclusion
This interval between differentiation technologies and Debertianas Theses offered us many initiatives, among many paths, we quote: (i) Reference works; (ii) Councils of elders; (iii) Documents; (iv) Periodicals; (v) Postgraduate Courses; (vi) Entities linked to aging; and (vii) University Programs for the Elderly. I can imagine that the simple linear presentation of the emergence of these various indicators did not mean so much. I think rather that their varied backgrounds are an important starting point for the 'wave' that caused this 'web'. Hard to say what is most important. It can be seen that the gap between the 'differentiation technology' and 'Debertianas theses' deflagrate in our country for various types of protagonism. With them, everyone wins, the elderly of today and those who will soon arrive there.

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Digital inclusion of the elderly in Brazil and the impact of digital technologies in the daily lives of the elderly

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Keywords: elderly, digital inclusion, smartphone and tablet, mobiles, sociability
doi:10.4017/gt.2016.15.2.011.00

Background
The digital inclusion of elderly people in Brazil carries with it the necessity of first and foremost realizing how feeble in terms of statistics it is, making it barely existent; after that, we must think about how elderly people interact with digital devices, how it impacts on their everyday life, and we must also consider if those who had not unhindered access do really feel excluded.
For this discussion to take place, a text is demanded, built with ideas originated from different fields of knowledge that are presented in in-

terdisciplinary dialogue, socially-focused around aging and old age, being studied from the qualitative perspective by an area like gerontechnology. First and foremost, it is paramount to stress how necessary it is to respect the uniqueness of every elderly, and the diversity of their options, like a more contemplative living experience, without technologies, or their bigger or smaller difficulties when facing the specific lingo of the mobile handheld devices: characterized by verbal and visual concreteness, by multiple signs (initials, symbols, icons, graphic marks, English technical terms) an almost encrypted jargon to the non-acquainted with the technological advancements, and always made deeper in newer versions of last generation technology that replace the previous versions.

Objectives
(i) to recuperate the answers given by elderly people who were interviewed and pertain to the Open To The Elderly University (Pontifícia Universidade Católica – São Paulo), Brazil, which may reveal their position towards new mobile handheld devices: eases or difficulties for handling the devices, or even their disinterest in acquiring the digital expertise; (ii) to discuss possible alternatives that may facilitate the access to such digital devices in particular to elderly people who do not have the necessary conditions – especially economic – at their disposal.

Method
The sample consisted of answers to questions asked to 20 elderly people who go frequently to the PUC-SP, aged between 60 to 90 years old, men and women, with different levels of schooling, and with their functional capacity preserved. This study was preceded by the application of a pilot project with 10 elderly people which followed the same procedure to ascertain the validity of the questionnaire. This study was descriptive, cross-sectional, observational, and was accomplished from March to December 2014, with a scholarship of credit hours to the teacher-researcher, given by the CEPe Comission of Research, PUC-SP. The procedures of data collection predicted a final appraisal of the work performed, having received the application of a psycho-social-demographic questionnaire semi-structured with open-ended and close-ended questions about the access to the digital devices that allowed further analysis and qualitative interpretation.

Results & discussion
The elderly involved in this research had had previous contact, twice a week, with the research coordinator, between march and june 2014, when they expressed their ease, their difficulties and their interest or absence of regarding access to mobiles, receiving direct and individual guidance in which the knowledge was shared, allowing some elderly to improve their media literacy with the help of other elderly colleagues. It was ascertained by the data analysis that a significant part of the subjects here interviewed is competent in handling their smartphones and/or tablets, beyond the expectations of this research, exactly because they belong to a generation had, in the eyes of society's prejudice, as late and resistant to technologies.
Programs and apparatuses that facilitate the eased appropriation of this new technologies by the elderly people with difficulties or dependencies, are the ones that need to advance more rapidly, as a lot of elderly people have shown. And there is one very curious result: the elderly people that took part in this research have manifested their preference by acquiring skills in smartphones or tablets alongside their own course colleagues, reserving to family only the ostentation of their digital competence.

Conclusion
The present study shows that the necessary difference for the learning process allows, by its turn, that an elderly, if active and with his functional capacity preserved, gains a sufficient digital competence, e. g., starts to use with resourcefulness the digital devices just like any other person less aged, feeling, in this way, a part of the tech universe. Within this framework, the importance of understanding the elderly people's claims is acknowledged in favour of reflecting upon citizenship which is therein provided for them; a different position both in family and in society, setting off with their resourcefulness with the digital devices.
We need everyone to see the elderly for who s/he is in reality; it is not because s/he has become old that s/he has ceased to be a man or a woman with possibilities to update his/her self. We no longer live in times in which elderly people had to receive due attention from the society and the family and were excluded from the family life, the society and the technological advancement happening throughout the world.
It has been verified in this study, that, on one hand, digital competence of elderly happens alongside the digital natives, the younger people and the children. It is recommended that, on one hand, these elderly people are engaged in programs of creative activities, if possible intergenerational and that exercise continuously the mind, prepared by the University via mobile devices.
On the other hand, it has been verified how those well-intentioned speeches about the use of technology may sound trivial, if we don't stop to consider the situation elderly people face when they are removed from the educational-technological environment, pertaining to a more

Coffee break in the hall (photograph by João Henrique Rafael Júnior)

docile and frail social body. If projects to accommodate these elderly people were developed by the University, by social and public institutions, the social stigma of the elderly would be avoided, when they are considered digital illiterates, which may, in fact, bring serious social and subjective consequences.

Deservedly, because the access to cultural assets (like going to a concert, watching a movie on TV, using a smartphone) is a right of every Brazilian citizen, no matter their age. Aspects related to the matter of sociability allow for a happy togetherness with children and grandchildren, the latter becoming themselves facilitators of the digital inclusion of the former, in any media (computer, notebook computer, smartphone, tablet, e-book): the intergenerational sociability in this situation, when elderly people affirm they have activated their digital competences in devices such as smartphones and tablets with their families; the social sociability, exercised during courses given by the University – PUC-SP – when elderly people say they have learnt how to handle their smartphones, how to download apps, all with their classmates, showing, in this way, how updated they can be with their mobile devices.

The realization that a portion of the elderly people have reduced schooling and low digital expertise, especially in sight of the recent mobile handheld devices, makes the need to democratize the access to information even greater, placing bets in strategies of digital literacy that, on one hand, fight technophobia, on the other hand, reinforce socialization and citizenship of the elderly. The strong and ever growing presence of digital technology in everyday life and the physical, mental and behavioral dexterities required by them make them challenging practices for the elderly, especially considering the fact that they have been socialized without using these technologies.

Like so, the older adults will be able to take part of the so called in Latin America countries, 'prosumer culture' – a way to improve the elderly formation as autonomous citizens who are culturally proficient, not only reaching a level of manifesting demands and necessities facilitated online, but also exercising themselves in new productive activities, with income assessment and in a way that it is responsible, critical and creative.

Conclusion

To finalize, this study indicates that not only young people, but also elderly people, are the protagonists of a multiple communicational mutation, in the ways of knowing, being in the world, and consequently, in the uses of information and in the creation or incorporation of various codes, new formats and different languages, such as occurs in handling mobile handheld devices, smartphones and tablets.

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Social inclusion technology: The importance of closed captioning for elderly audience who suffer from hearing loss

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Keywords: television, closed caption, elderly, hearing loss.

doi:10.4017/gt.2016.15.2.012.00

Background

This article discusses the problem of hearing loss in the elderly and draws a parallel between the technologies available in the area to preserve the autonomy of the elderly by providing mental stimulation and well-being. Deafness is one of the most frequent problems of the population over 60 years old and it has led many elderly to social and family exclusion. The caption feature or closed caption in English can work as an im-

portant social inclusion agent for elderly people suffering from progressive hearing loss and that often has resistance to the use of hearing aids. It is a resource available on most TV sets that allows deaf children in literacy phase and the deaf ones interested in learning languages follow through text, the information provided by television networks. Sentences written in the image footer display information such as dialogues, texts narrated by presenters of live and/or recorded broadcasts, and information such as, a soundtrack and noise transmitted by the programs or movies. Many times closed caption is confused with the subtitle that displays the translation of what is being said in the case of programs or movies in another language. According to the IBGE - Brazilian Institute of Geography and Statistics[1], in 1960 the elderly numbered 3.3 million, representing 4.7% of the population. In 2010, the 'third age' corresponded to 10.8% of Brazilians, reaching the number of 20.5 million people. Therefore, in the next 20 years the elderly population of Brazil may exceed 30 million people, and it is expected to represent almost 13% of Brazilians at the end of this period. Along with the change in the Brazilian age pyramid it is the technological evolution and linked to it there is the digital inclusion.

Objectives

The International Plan of Action on Ageing of the UN (United Nations) Item 38[2] points out that "technology can be used to bring people together and contribute thereby to the reduction of marginalization, loneliness and age segregation". According to Decree-Law No. 5,296 of 02/12/2004[3], hearing loss is considered as the bilateral, partial or total loss of forty-one decibel (dB) or more, as measured by an audiogram. In the 2010 Census, conducted by IBGE, 45.6 million Brazilians (23.9% of the population) reported having some type of disability, and hearing loss reached 9.7 million people, 5.3% men and 4.9% women[1]. Relativizing the IBGE data in relation to the elderly, and people with hearing loss there will be a very worrying prognosis in the coming years.

Method

In this context, the extension activity: Lights, Camera and the Best Age in Action, have been held since 2013 at the Federal University of São Carlos (UFSCar), with the support of the Dean of Extension (PROEX) in conjunction with the Departments of Gerontology (DGero) and the Department of Arts and Communication (DAC). During the extension project experience it was possible to carry out a mapping of the main difficulties of accessibility faced by older people, while the IBGE statistics were analyzed.

Results & discussion

As a result, this work considered the participatory dynamics of the elderly in society as the realization of the continuous human desire to learn and communicate, and concluded that the images and gestures that one also uses to express themselves associated to the high technology existing in our society, allows the recovery of immediate and intuitive language, known as nonverbal languages: on television one can track the information through text, captions and images, as well as lip reading from actors and presenters, which concentrated into the text representation offer reasonable understanding of the message.

The data demonstrated the potential represented by television, and if carefully analyzed it reveals an important opportunity for social inclusion of the elderly population with hearing loss that do not have access to leisure, education, information except through television. By the time Law No. 10,098/2000[4] establishes the inclusion of subtitles in programs broadcasted by television networks, it provides for the hearing impaired, especially the elderly, the initiative to have access to television programming, main means of dissemination of daily facts and artistic and cultural events in our country.

Television is a daily companion for the elderly, relieving much of the loneliness they have been through. More than that, television is one of the main opinion makers, it sends through its broadcasts, information that is often the only reference for the elderly discouraged reading, and partially prevented from listening to the radio due to the gradual hearing loss. Maybe that's the secret to that many seniors prefer watching television to keep a verbal dialogue, as in the simple act of remaining hours in front of a screen is a mental stimulation that brings well-being, fun and complicity.

According to Moran[5] the means of communication develop sophisticated forms of sensory, multidimensional communication, integrating languages, rhythms and different ways of access to knowledge. Relativizing the problem of hearing loss in the elderly, with the technology of closed captioning and the concept of accessibility, it preserves the autonomy of the elderly and it guarantees:

(i) contact with new technology thus minimizing the deficit that may exist in this generation;

(ii) access, participation and adaptation of the elderly to technological change;

(iii) that the elderly population with hearing impairment become increasingly active; and

(iv) compliance with the Accessibility Law nº10,098 of 19/12/2000[4], which states that all open channels have 16 hours of closed captioning in its program schedule. From this perspective in 2015 it should have been produced 20 hours of closed captioning in television program-

ming grid, and in 2016 the law states that the entire grid of television networks should have this feature.

Conclusion
Even though the technology of closed captioning has been created with a focus on the deaf, it cannot be seen as unique and exclusive tool of the deaf. The caption today is the possibility of accessibility for the elderly and also ensures their autonomy, and contributes to the process of concentration, since it operates with three cognitive inputs: hearing, lip-visual, and textual. Health professionals such as occupational therapists, speech therapists, physiotherapists and doctors need to be aware of these assistive technologies that can improve the quality of life of their patients. Failure to comply with the law that ensures that access leads us to reflect on how to ensure that people, especially the elderly with hearing loss, have access to the benefits of science and technology, and thus provide the improvement of their quality of life.

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The use of technology in the learning process in an aging context

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Keywords: digital inclusion, life-long learning, STS (Science, Technology and Society)
doi:10.4017/gt.2016.15.2.013.00

Background
The educational processes and systems arising from social changes moved the European Union to reconsider the need for restructuring and rethinking new education policies. The year of 1996 was proclaimed the European Year of Lifelong Learning (LLL) as a way to maintain economic competitiveness and employability and also a strategy to ensure social inclusion and equalize opportunities. In 2000, the Lisbon European Council pointed that Europe entered a 'Knowledge-based age', implying knowledge-based social, economic and cultural issues. Willing to reinforce knowledge and successful economy, LLL follows along with it promoting more active participation and greater employability, resorting to all types of tuition and learning processes[1]. In November 2006, the Lifelong Learning Programme (LLP) was created with the main objective: "to contribute through lifelong learning to the development of the European Union as an advanced knowledge-based society, with sustainable economic development, more and better jobs and greater social cohesion, while ensuring good protection of the environment for future generations"[2]. Based on such thought, the population range that grows the fastest will be included through the concept of LLL in the actions aimed at the educational and formational work directed to youth and adults. The concept roots strong paths to formal and informal learning on work matters, when, within the context of the 'European Employment Strategy' (EES)[3], defines LLL as: "all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective".

Objectives
Therefore, in the context of LLL, the Universities of the Third Age play an important role in the tuition of adults and the elderly in Portugal and worldwide.

Method
One of its operations is the assistance of the 'facilitator' for the perception of the aging process.

Results & discussion
On these grounds, the myths and prejudices perpetuated by society, as "elderly do not learn anymore", "elderly are forgetful and therefore are unable to learn", "elderly have no interest in learning" will be discredited and people encouraged

A cultural presentation: Maracatu, Chapéu do Sol (hat of the sun) (photograph by João Henrique Rafael Júnior)

to change their way of thinking. It is also necessary to highlight that, in the process of learning, it is not only the memory that is being worked, but social and also emotional interaction aspects that are of fundamental importance. Once ensured that the LLL concept is broadcasted among the elderly by law, then the linking of the guidelines of this research is initiated: Technological Inclusion of individuals aging in a society of constant technological and scientific changes. Recognizing that the aging process is worldwide leads to enhancing a growing demand for innovation, particularly on new technologies of information and communication, called by some authors, as a development stage: Society and Technology. As a process related directly to the age of the users, it is thought that older people use less technology, however, this situation has been changing gradually as a significant number of elderly people are actually using or beginning to use it. In Portugal, almost all senior universities offer classes of technology use, which becomes the most popular among the elderly.

The recognition by the government and related entities, that understand the importance of the use of technology by the elderly, provides improvement in quality of life and greater participation of this population in society. Currently, the Internet stands out as the driver for continuous lifelong learning, by providing access to information, social networks, as well as preserving cognition and maintaining the autonomy of the elderly. Nevertheless, there are difficulties to be considered as emotional barriers that can turn the elderly more resistant when learning to use technology. So, for this learning to be effective, it is necessary for the elderly to develop skills to use computers and internet.

Conclusion

When thinking of this process, some concerns and questions are necessary, since it happens at an accelerated rate and technology and learning how to use it influence our socialization and our future, providing an active aging with quality of life, as, for example: who is the elderly population that has access to technology and in which way they learn to use it? These questions are covered in a PhD in program that seeks to match these issues between Brazil and Portugal, grounded on policies to the elderly developed in these countries.

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Marketing strategies for the Brazilian silver market: Communication and consumption

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Keywords: marketing, gerontology, communication, Brazilian older consumers

doi:10.4017/gt.2016.15.2.014.00

Background

The aging of the population in Brazil is changing the number of people in each stage of the life cycle. The age distribution is an important factor for understanding the purchase decision process of goods and services. The changing demographics can affect economic development because of the relationship between consumption, income and savings of citizens. This context challenges public and private institutions to make a quick adjustment in their business. Consumption has a significant role in the economy due to its stimulation of the productivity of the country and associated investments.

Objectives

This fact, in association with the product life cycle and the human life cycle, demand an effective communication process with the older consumers.

Results & discussion

However, many companies feel insecure to establish proper communication with this segment. The several characteristics relating to purchasing behaviour of the Brazilian older people are not well known and, therefore, marketing strategies have to promote an effective understanding of the Brazilian silver market to develop plans that establish consumer-brand identification. Advertisements, for instance, can be an important strategic pillar, given its potential to create a fruitful interaction with consumers by means of previously knowing the preferences and needs of senior citizens[1]. The lifestyle can be more decisive than age in their purchasing decisions[2]. This understanding is a challenge to marketeers who may consider that older people do not like new experiences, are skeptical, have fixed tastes, do not deal with new technologies and present a fixed brand repertoire[3].

As in Europe[3-5], the participation of the older actors and actresses in Brazilian television commercials is very small and often associated with negative stereotypes of old age. Young models are also more present in advertisements, even those produced specifically to promote the consumption of products for older people[5]. The objective of marketing activity remains more focused on youth in order to keep loyal customers[3].

Thus, marketeers do not seem to realize the present and future opportunities related to meeting the needs of older consumers[6]. This public is already the most important market segmentation in business related to travel, financial services and health care products[7]. In the business of aging there is a certain complexity to understand the silver market.

Many older consumers do not want to be classified as members of a different and isolated market segment. Probably, they consider themselves more active and healthier than previous generations[7].

In addition, cultural, social, personal and psychological factors make this segment very diverse. Therefore, marketing strategies need to consider this complexity through the reorientation of promotional activities that aimed at improving the service, value and loyalty[3].

When the market would give a proper focus on older people, the advertisements will be more aligned with the third era of marketing, in which the consumer market is analysed through a holistic view.

Conclusion

The Brazilian silver market context considers that: a dynamism of changes in purchasing behaviour of older consumers will soon be perceived by retailers and will be consequences of rapid generational changes after globalization and technological development; advertisements can reconstruct the imaginary of aging; stereotypes associated with aging can substantially reduce the consumption due to promote a wrong and unwanted communication; the advertisements for older adults may need frequent reflections related to the form and content of communication.

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Work, aging and technology

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Keywords: aging, work, technology

doi:10.4017/gt.2016.15.2.015.00

Background

The world lives today one of the greatest strengths of humanity and consequently a major challenge, if not the greatest, of the twenty-first century: the phenomenon of the increase of elderly population, in other words, the increase of longevity. The longevity indicator has risen to levels not seen before, reaching average life ex-

pectancy of about 85 years old. The increase in life expectancy, the decline in mortality and fertility rates, the increase in urbanization, advances in medicine and technology and migration, contributed to a new demographic regime, which consists of reducing the number of young and fast growing in the number of elderly[1]. According to the Yearbook data from the public system of employment, work and income (2010-2011), in 2009, 20.148 million people aged over 50 years were considered economically active in Brazil[2]. The major permanence of older adults in the labor market, forces them to participate in training programs to ensure their labor competence today. Technological advances in the workplace brings forth the question of the need for older workers to adapt to new technologies (table and laptop computers, cell phones and smartphones, tablets, multifunction devices), because, in most cases, the technologies available today were not part of the environment of today's workers aged over 50 years, when they received training for your career[3].

Thus, technological advances, changes in the pension system and the concomitant permanence of older adults in the labor market and their difficulties and the need for domain of new technologies, present an emerging issue of research that requires the deepening of further studies to understand this phenomenon in Brazil.

Objectives

Identify the difficulties of people aged over 50 years in the use of technology in the workplace and the strategies used by these people to remedy their difficulties.

Method

This is a quantitative, analytical, descriptive and cross-sectional study. For data collection, a socioeconomic questionnaire was used and the 'Questionnaire about electronic equipment used in the workplace, problems and strategies' developed by the authors of this study based on questionnaire about the experience with computers and technologies developed by Center for Research and Education on Aging and Technology Enhancement –CREATE[4]. The last mentioned questionnaire addresses a range of equipment used in the workplace. For data analysis was used a descriptive statistics method.

Results & discussion

The sample consisted of 25 workers (six men and 19 women) aged between 50 and 73 years and a mean age of 60.5 years, which use new technologies in their work. These workers currently hold positions as: administrative assistant; assistant; advice; agronomist; seamstress; contract logistics; aid pouch; foreign language teacher; university professor; insurance broker; librarian assistant; agricultural research; secretary; restaurant owner; social service; administrative manager; doctor; coordination of adult education.

Regarding the difficulties in the use of technology, 18 subjects reported difficulty in using the mobile device and these difficulties related to access the menu, add contacts, read and send messages, access the Internet, enable and disable the alarm, applications, photos, search number of contacts, change phone recording mode for memory card, synchronize information and copy and paste messages.

As for the computer 24 subjects reported difficulties in using this device. The difficulties are these: Settings; perform operations using the right mouse button; click an icon; manage folders; search for files; use the help system; use processors and text readers; use operations to copy and paste; open and close files; manage multiple windows and move between them; delete files; empty the trashcan; enter mobile devices; save files; create spreadsheets; use of financial management programs; using statistical packages and use different operating systems.

As for the copier (xerox/scanner), 13 subjects reported difficulties as scan documents and open in the computer, save scanned documents and send documents scanned directly via email from copies device.

Of the subjects, 21 reported difficulties in using the internet especially in relation to surfing websites, do searches on websites, access your browsing history, save as favorite, access favorites, save documents from the internet, make payments and online purchases and use specific working systems.

Regarding the use of e-mail, 13 subjects reported difficulties in relation to post, reply to or forward e-mail to a person or a group of people, attach files, create and manage folders, corporative emails and finding files on e-mail.

Regarding the use of the printer, 11 subjects reported difficulties in performing functions such as send documents for printing and print setting.

As for recording and playback devices, 13 subjects reported difficulties, such as: play and burn files to CD/DVD/USB drive.

Finally, nine subjects reported difficulties in using a multimedia projector, and these difficulties are related to connect the projector to a computer, project the image from computer to the projection screen and image setting.

In all devices the strategies most used by individuals to solve their difficulties were asking help for someone and trial and error. The difficulties presented by the workers can mostly be associated to the position held by them. Despite this association, we can see that the difficulties are present regardless of the subject's profession, leading us to verify the presence of the binomial technology and population aging.

Conclusion
The survey conducted in this study leads us to the finding that the subjects present many difficulties in the use of technology, and so, there must be investment in this aging population mainly in updating these individuals as the competencies and skills required to use new technologies, because these will remain active for a long period of time.

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Mobility aids for the elderly: Challenges and opportunities for the Brazilian market

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Keywords: elderly, mobility, assistive technologies
doi:10.4017/gt.2016.15.2.016.00

Background
Mobility is an essential function to perform the various activities of daily living, being a key factor for the general health condition, independence and quality of life. With the ageing process, the subject goes through a series of changes that, ultimately, can affect his/her ability to move satisfactorily and with safety and independence. These limitations may lead to the need of help from others as well as the use of Assistive Technology (AT) devices, with the aim of improving safety and autonomy in the ambulation.
Among the mobility aids, the most commonly used are walkers, canes and wheelchairs. Such devices differ in terms of the level of support, stability, freedom of movement and operation mode. These aspects should be taken into account when prescribing and provisioning mobility aids for the elderly.

Objectives
From an ergonomic perspective, for these devices offer proper conditions of mobility assistance, the design must seek to meet the needs and expectations of the users, considering the context - environment and activity – of real usage. This knowledge is important in the entire process of AT prescription and provision, contributing in a significant way to the acceptance and successful use of the device.

Method
This study aimed to discuss, from a design perspective, the challenges and the potentials for the improvement of the main mobility aids for the elderly.

Results & Discussion
Wheelchairs: auxiliary device for the seated mobility - Wheelchairs offer larger support and stability when compared to walkers and canes, but with less freedom of movement and locomotion. With the aging of the population, the number of elderly requiring wheelchairs increases and, in this context, this device plays an important role as a contributing factor to the mobility by encouraging their social participation and quality of life. Despite its widespread use, the wheelchair has been related to several problems, which affect the user's independence in various activities[1]. For the elderly, the use of a wheelchair has some specific issues that must be considered. The independent use of manual wheelchairs requires the user to apply forces on the rear wheels in a repetitive way (manual propulsion), which implies a biomechanical overload that, in long term, may lead to the incidence of upper limbs injuries. Considering that the ageing process has been related to a decrease in muscle strength, manual propulsion may have its efficiency reduced, thus facilitating the occurrence of injuries. Additionally, the spine flexibility also decreases with the ageing, which may limit the proper positioning of the subject in the wheelchair, thus affecting the users' comfort.
Despite the increasing variety of manual wheelchair models, there is still little differentiation in the design with respect to the mobility performance, mode of operation and also aesthetic aspects. In addition to the practical issues of use, both the aesthetic and symbolic aspects of the wheelchair design can also influence the acceptance and user's perceptions. It is important to note that the wheelchair, as one of the most representative AT devices, has social representations that may influence the users' acceptance and satisfaction, being perceived differently by

male and female users[2]. In this sense, there is still a gap in the Brazilian market for new proposals of wheelchair design that best meet the users' needs and expectations.

Mobility aids for the gait - The two most common devices to assist gait are the walkers and canes. The first is a mobility aid for people with motor problems related to limited ability of weight bearing and / or poor balance. This way, walkers are aimed to improve mobility by enhancing the stability, having the elderly as the main users. In its traditional configuration, the walker has four points of contact with the ground that increase both the anterior and lateral stability of the user during the gait. However, it changes the normal gait pattern and, consequently, requires additional attention of the user during the ambulation, as the user has to lift the device, put it ahead and take the steps to approximate again to the walker, thus starting a new gait cycle. In the Brazilian market, there is little variety of walkers, and the most commonly sold ones are: walker with fixed support; walkers with front wheels; and, more recently, walkers with seat that allow the user to rest during the locomotion.

Problems related to the discomfort, the need for maintenance and aesthetic issues in walkers design have been reported[3]. Future research aiming to characterize the mobility of elderly people with walkers may benefit from the knowledge on how the users really use their devices in the daily routine, supporting innovative proposals for the walker design that enhance usability, acceptance and user satisfaction with the device.

As the walker, the cane allows for the standing ambulation, but offers less stability and greater freedom of movement to the user, as it has lower contact area with the ground. Therefore, it has been mainly used by elderly people with certain instability when walking and who seek to reduce the risk of falling. Although many elderly people recognize that the use of canes can help to prevent falls, there is still reluctance on part of them to use these assistive devices[4]. Among the main reasons, it is highlighted the social representations of this AT, which draws attention to the need for a greater focus on the aesthetic and symbolic aspects of the design of these devices.

Conclusion

The mobility aids for elderly represent important resources for the promotion of independent, safe and satisfactory locomotion, and has the potential of benefit the users' social participation and quality of life. The products currently available in the Brazilian market offer different levels of assistance. However, there is little differentiation in the design, which may lead to problems in the usability, acceptance and satisfaction. In this context, new proposals of the design of mobility aids for the elderly must meet not only the practical aspects of usage, but also the aesthetic and symbolic aspects of the device.

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Assistive technology (AT) solutions for independence of older adults

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Keywords: daily living, function, assistive technology, occupational therapy

doi:10.4017/gt.2016.15.2.017.00

Background

Assistive technology (AT) is an interdisciplinary area of knowledge, encompassing products, resources, methodologies, strategies, practices and services that aim to promote the functionality related to the activity and participation of people with disabilities and reduced mobility, independence, quality of life and social participation[1]. It contributes to a satisfactory quality of life for older adults (with or without disabilities) like having the opportunity to come and go, access to sites, media and carry out daily activities independently and autonomously as desirable. One way to provide such conditions is the use of strategies that help and/or promote the functionality of these subjects, AT can contribute proactively to this fact. AT is considered a multidimensional concept and may be influenced by expectations, perceptions, attitudes and personal values[2]. Thus, when a device does not promote improved

user functionality and consequent quality of life, it is usually abandoned[3] and in the case of older adult population, whether active or fragile, we must be concerned with the correct evaluation and indication, promote the end-user training, and respect their routine, having in mind to bring benefits for themselves and/or their families. Sometimes the end user may not be able to use it in a way that will bring total functionality independence, but the little they are able to perform by themselves is very important to them. When we speak of end-users, in this case, we refer to older adults who have difficulty in solving practical aspects of everyday life. However, the term end users may sometimes also cover other people, such as family members or personal assistants, where AT is used in conjunction or as a tool to facilitate such assistance[4].

Objectives

Discuss the concept of indication of different equipment/technologies used to facilitate the activities of daily living and show AT for bathing and showering; use toilet and perform intimate hygiene; dress; feed; home care; and cooking.

Results & discussion

The successful use of these devices in daily activities requires training, skills and specific strategies well-targeted by the occupational therapist. With the natural decrease in functional capability occurred as a consequence of aging, as well as the presence of some type of disability that reduces some skills, the use of technological resources that facilitate the satisfactory completion of daily activities is needed. For a person with some incapacity to build a routine, based on the achievement of Activities of Daily Living (ADL's) as the ones related to personal care such as brushing teeth, bathing, feeding, dressing as well as the Instrumental Activities of Daily Living (IADL's) such as going to the supermarket, taking care of finances, using transportation, among others, there is a process that requires education, experimentation and discovery, which requires a certain time permeated by trust and technical knowledge.

With aging there is a decrease in postural balance, muscle strength, range of motion, fine motor and cognitive skills that make accomplishing daily activities more difficult. One way to enhance their performance in daily activities is to facilitate their realization, training and/or modifying how to carry out the activity and indicating assistive devices that enhance or enable the execution of certain tasks that are difficult or cannot be performed. The use of AT through changes and adjustments in tools, materials and equipment is likely to facilitate the manual function, increasing the participation of the individual in daily routine activities, such as preparing a meal, buttoning a shirt or signing a check[5].

Conclusion

Thus, to prescribe AT, whether commercially available or modified/made individually, we need to take into account items such as safety, design, cost, appearance/aesthetics, comfort, ease of application and removal, maintenance and hygiene. These products must be well planned and given the proper training for its use to be fully integrated into their daily life. We can`t forget that each one has its own history, pathology, capabilities and internal desires, that is involved in this adaptation process. So when there is an indication or the development of customized products, the therapist and the team (older adults/caregiver/family) can contribute to the requirements of the new equipment.

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Elderly users' perception of a remote program for assisted independence

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Keywords: telecare, elderly, perception

doi:10.4017/gt.2016.15.2.018.00

Background

First-generation telecare, which comprises a portable device and a monitoring center connected to a fixed telephone and has been used since the 1990s in countries that are more developed in the technological area. It was adjusted to the needs of the longevity reality, with the proposal of maintaining independence and autonomy, and improving functionality at home, as a tool for supporting care and self-care for aging subjects.

Objectives

In the light of the high impact of care for families, a growing number of unipersonal households among older people and the lack of adequacy to the demands of this population, the resource of assisted independence can fill in an important gap among healthy or frail older people.

Method

This is a longitudinal, exploratory, intervention study, using a qualitative and quantitative approach with the aim to assess the perception of older people of telecare service.

A pilot study was conducted for six months with two elderly participants aged over 70 years, who lived alone, had a fixed telephone, without reported cognitive or uncorrected sensory deficits, and two people of the support network, who were family members or people in whom the elderly participants trusted, older than 18 years, without reported cognitive or uncorrected sensory deficits.

The instruments used for data collection with the elderly participants were the Mini-Mental State Examination (MMSE), Pfeffer's Functional Activities Questionnaire, the Geriatric Depression Scale GDS-15, a socio-economic questionnaire, the Minimum Map of Elderly's Relationships, and a questionnaire of acceptance of technologies and telecare based on the Technology Acceptance Model – TAM.

During the period of intervention, telecare devices were installed in the household of the participants and telephone contact was made every fifteen days for collection of data on the device and the service. An initial contact was also made with the support network.

Results & discussion

Regarding the perception of safety of the elderly participants, they reported peacefulness, protection, and that they are certain they can find help whenever necessary, without reporting any change in their daily routine due to the use of the device.

According to the sensations reported, the participants fear bothering and becoming a burden to their families in case they activate the device and need help.

Another important finding is that when using the telecare device they fear demonstrating a decline in their functional capacity, evidencing that they need help.

Regarding the perception of usefulness and ease of use, the equipment was found easy to understand and handle, however, the participants are afraid of damaging or wetting it, which restricts its use in some domestic chores, or even use it incorrectly during their activities of daily living, not using the device close to their body when taking a shower, doing the dishes or during the night.

The participants did not adapt to the alarm design and were embarrassed at using it in public, even in the domestic environment. This reinforces the need for training users and explaining the adequate way of using the alarm. They stated that they do not need to show to anyone that they use it.

Although the participants accepted to test a new technology and realized its usefulness and the importance of being inserted in the technological world, barriers regarding difficulty learning and interacting with the technology do exist.

Conclusion

According to the perception of the elderly participants, the device design is important and has a direct impact on its use. It is necessary to provide simulation situations and training for better use of the equipment. A better explanation on when to use the device can broaden the sensation of safety and usefulness of telecare.

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Use of devices for home monitoring of chronic conditions

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doi:10.4017/gt.2016.15.2.019.00

Background
The high prevalence of chronic disease, especially among the elderly population, leads to a need for longitudinal and integrated care. Several actions have been developed in the sense of preventing and treating these conditions, including the facilitation of access to devices for home health monitoring, such as the glucometer and the digital blood pressure measurement device[1]. The possibility of managing one's own health at home contributes positively to handle the disease, since it prevents possible complications and includes the subject as co-participant responsible for the care actions. In order for this to be effective, patients must be well informed as for the appropriate use of these devices[2].

Objectives
This study was proposed to characterize the use of health monitoring devices by elderly people at home.

Method
This is a quantitative, exploratory, cross-sectional study (*Table 1*).

Results & discussion
Most participants were married (53%) and had up to five years of education (38%). Among them, 128 used a digital blood pressure measurement device and 62 used a glucometer. In total 44 of the 150 participants reported difficulties in using the digital devices (*Table 2*)
When the participants faced with difficulties they search for help from others (their spouse or children) or use a trial and error approach. In addition, some older people stated that they do not trust entirely the efficiency of digital devices for health monitoring, and this is more evident among users of the digital arterial pressure measurement device. Home health monitoring has been facilitated by the development of portable digital devices, which could be routinely incorporated in the daily life of people who suffer from chronic conditions in the search for the best way to handle their condition. The frequency of the monitoring actions will depend on the level of disease control, and for this reason it may vary from one subject to another.
Ease of access to these types of equipment sets a challenge in offering actions of instrument operation for the appropriate use of these tools, since well-informed subjects are capable of making better decisions regarding the management of their own health[3].
The older people in this sample mentioned difficulties in the use of devices. The glucometer, for instance, requires that the subject handles small objects, such as the lancet and the test strip, which can be a hard task for older people who usually present decreased tactile sensitivity, difficulty in fine and precise movements, decreased visual acuity, among others.
Moreover, it is necessary to understand the screen indicators and puncture their own finger timely so that the operation is not cancelled automatically.
Similarly, there are difficulties in the monitoring of blood pressure, which can be affected by many factors, such as the body position, the position of the device in relation to the body, environmental noise, and type of food ingested, all factors that can be controlled in order to obtain reliable results.
The use of technologies by older people, including healthcare technologies, can be very complex, since these devices usually have an unfriendly design, inadequate font size, insufficient lighting, technical language, among other hindering factors[4].

Table 1. Study method

Action	**Description**
Sample	150 adults (117 women, 33 men), 60 years or over, mean age 72; Without cognitive deficits; Without depressive symptoms; Who made use of home health monitoring devices
Instruments of data collection	Mini-Mental State Examination (MMSE); Geriatric Depression Scale (GDS); Socio-economic questionnaire; Questionnaire for classification of the use of healthcare electronic devices
Statistics	Descriptive analysis

Table 2. Study results; n=150 (117 women and 33 men), mean age 72 years

Parameter	Electronic device used	
	Digital blood pressure meter	Glucometer
Frequency of use	Only when feel sick (66%)	Regularly (73%)
Difficulties experienced	Checking the results after each measurement (12%); Finding the appropriate body position during the measurement (11%)	Use of the lancet and the test strips (21%); Checking the results stored (15%)
Independent use	85%	79%

In addition, cognitive, sensory and motor difficulties resulting from the aging process and the lack of familiarity with technological devices can make it difficult to perform a certain task.

Conclusion
These data suggest the need for investment in health education for older people who monitor their chronic conditions at home so they can participate with more autonomy and safety in their health-disease process.

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Effects of chiropractic care and interactive training game in oxidative markers and pain of elderly

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Keywords: chiropractic, aging, video games
doi:10.4017/gt.2016.15.2.020.0

Background
Musculoskeletal changes are presented as a major burden for individuals with pain when compared to those without pain, may appear up to 2.5 times the Emergency Rooms and 1.5 times more outpatient visits[1]. Chiropractic care is highlighted among the elderly, because it uses conservative treatments to different neuro-musculoskeletal changes. Another tool used is the interactive activity through video games, which can provide to elderly populations the possibility to interact with the machine, socialize with other generations, for a more active behavior and even be used as an incentive to practice physical activity.

Objectives
This study aimed to determine the effects of chiropractic and interactive training game in the perception of pain and oxidative stress markers on elderly.

Method
To evaluate the pain an analog pain scale was used. Blood samples were collected before the intervention and after it. Oxidative stress was examined through measurement of nitric oxide (NO) and by verifying the presence of thiobarbituric acid reactive substances (TBARS). The elderly were randomly divided into three groups: the control group (i) received no intervention; the chiropractic group (ii) received joint manipulation once a week; the combined group (iii) held with interactive training games twice a week and received joint manipulation once a week, the study lasted fourteen weeks. No sampling techniques or sampling calculations were used. The data were analyzed using the R language. The Wilcoxon test was used for data analysis. We considered $p \leq 0.05$ to be significant.

Results & discussion
Oxidative substances are more concentrated in our bodies as we age, they are known as potential mediators of neuropathic pain. Some neuromusculoskeletal changes affect neural function through the release of pro-inflammatory and oxidative substances, with a good chance of becoming chronic pain in adult and elderly[2-3]. The

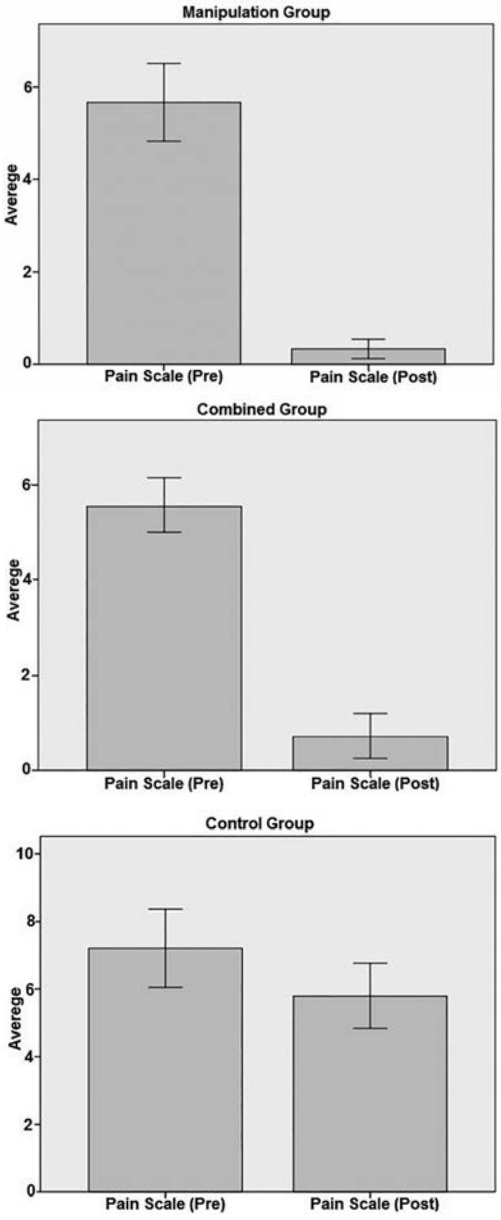

Figure 1. Test results of the three groups; Upper: joint manipulation pain perception decreased (p=0.027), oxidative stress markers lowered (p=0.019), Middle: joint manipulation plus training gaming: pain perception reduced (p=0.016), no changes in oxidative stress marker levels; Lower: controls, no significant changes

results of this study make clear the importance of chiropractic through spinal manipulation on pain relief and the reduction of oxidative stress levels. Many neuro-musculoskeletal changes can be handled by professional chiropractic, without excessive use of drugs or invasive interventions. Neck pain is one of the most common musculoskeletal disorders among the elderly and has considerable implications for the health and life quality in this age group. Evidence supports the use of manual therapy in combination with exercise for the treatment of these complaints[4].

Conclusion

Chiropractic reduces pain through neurophysiological mechanisms. Physical activity with games combined with chiropractic reduces pain but has no changes in oxidative markers, this finding may be related to the short time activity because initially physical exercise increases oxidative substances from the body.

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Measuring the results of different research protocols on multisensory stimulation

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Keywords: dementia, multisensory stimulation, aged

doi:10.4017/gt.2016.15.2.021.00

Background

Dementia is caused by the death of brain cells and, owing to its progressive nature, can lead to cognitive impairment, functional loss, neuropsychiatric symptoms, such as apathy, irritability, anxiety, depressed mood and aggressiveness, hampering therapeutic approaches using non-pharmacological resources. The Sensory Room, also referred to as the Snoezelen room or multisensory environment (MSE), constitutes a multisensory stimulation approach within environments that provide sensory experiences, in which primary senses are stimulated (sight, hearing, smell, touch, taste, proprioception and balance) via controlled interventions including music, lights, textures, massage and aromas. Multisensory stimulation has been used in different populations such as individuals with stress, hyperactivity, depression, children with neurodevelopmental delays, people with temporary or permanent acquired lesions and older adults[1]. MSE can be employed in different settings: special schools, hospitals, nursing homes and private clinics. With regard to interventions involving older adults with dementia, many patients respond positively to these stimuli, interacting with the environment, improving aggressive or apathetic behavior and mood.

Objectives

To carry out a comprehensive review of studies that have employed multisensory stimulation in older persons with dementia, with an emphasis on scientific evidence of the method.

Method

A comprehensive review study of the literature was carried out involving 34 publications ranging from intervention studies, randomized or otherwise, to literature reviews held on the main scientific databases incorporated in the Virtual Health Library[2] and the Capes Portal of Journals[3]. Studies published in the last twenty years were searched based on the study question: "What are the multisensory effects on behavioural and psychological symptoms of dementia in the short, medium and long terms?" The following descriptors were used: snoezelen, multisensory stimulation, multisensory environment, and dementia. The studies retrieved were classified using a semi-structured questionnaire devised by the authors to summarize the information. A descriptive approach was employed for describing data to pool the knowledge produced on the subject explored and report the evidence found by the authors.

Results & discussion

A total of 154 publications were identified (scientific articles, text resources, and journal articles). Eleven publications were excluded for not being scientific articles and a further 109 articles for involving multisensory stimulation in samples that were not older adults with dementia, such as experiments in animals, autistic children, people with neurological disorders, and interventions involving employees in institutions. After reading and assessment of the articles, a total of 34 scientific articles published between 1998 and 2016 were included. The methodological designs of the articles included were: 23 intervention studies, 9 literature reviews, 1 expert opinion and 1 pilot study proposal. In order to provide a better description of the design and effects of the multisensory stimulation sessions, intervention studies were focused (n=23) and results reported on the following aspects:

(i) sample site and break-down (*Figure 1*): the intervention studies were performed at long-term care institutions in European countries such as England, Germany, Spain, Portugal, as well as Australia, the USA and Canada. Participants were randomly selected and divided into a control group and multisensory stimulation group, while some studies included a third group with another non-pharmacological approach to com-

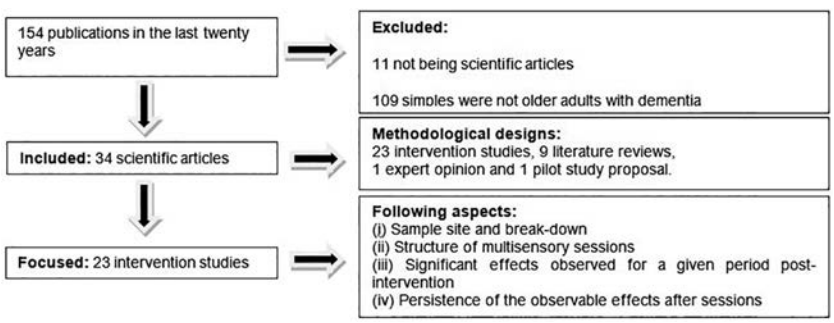

Figure 1. Sample size and break down

pare different interventions. The studies involved samples comprising older adults with moderate or severe dementia, with Alzheimer´s Disease being the main dementia type among participants. Sample sizes were as follows: 20-40 older adults (n=11 studies), < 20 (n=10), 41-100 (n=1) and 100-180 older adults (n=3).

(ii) Structure of multisensory sessions: the frequency of sessions ranged from: 1-2 times weekly (n=11), 3-4 (n=6) and 7 times (n=1); frequency not specified (n=5). For program duration: 3-6 weeks (n=5), 2-4 months (n=10), 6 months (n=1), 12 months (n=2), 18 months (n=1); 4 studies did not specify duration. Follow-up times ranged from 15 to 20 min (n=2); 30 min (n=8), 40 min to 1 hr (n=3); 10 studies did not report follow-up time.
(iii) Significant effects observed for a given period post-intervention: behavioural changes (n=10 studies), such as improved apathy, reduced agitation and greater interaction with the environment; improved control of mood and volition (n=2), improved communication with residents and professional team (n=2), among other observable factors (n=6) such as increased self-esteem, and decreased anxiety and depression. Three studies failed to find statistical differences.
(iv) Persistence of the observable effects after sessions was reported for the short term (n=10), medium term (n=4), long term (n=3); term not stated (n=3), where baseline time point for periods varied for each study or were unspecified; 3 studies recommended further investigations to determine effects over the long-term.

Conclusion
Multisensory stimulation represents a promising complementary therapy for management of dementia in older adults. However, some studies lacked methodological rigor and failed to specify information on session structure and long-term effects. No national studies on this subject were found for this type of population. Further studies with adequate methodologies and larger samples assessing the long-term impact of sensory interventions are warranted. In addition, sensory programs specifically structured for each stage and type of dementia should be conducted.

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Research priorities agenda for the health of the elderly: Reflections from the STS (Science, Technology and Society) social dimensions

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Keywords: elderly, research, science and technology, social dimensions

doi:10.4017/gt.2016.15.2.022.00

Background
The National Agenda for Health Research[1] is the result of an initiative of The Secretariat of Science and Technology and Strategic Input of The Ministry of Health. The trigger for this process was the discussion concerning the construction of a National Policy on Science, Technology and Innovation in Health started in 2003, a moment when Brazil obtained financial, political and operational support to advance in this segment. Strategies such as conferences and public consultations were used in the construction of the Agenda. It was a mark of great social achievement, a process that included the participation of society, as well as experts from different segments. Indicators and real experiences foster discussions that began in 2001 at the 1st National Conference on Science, Technology and Innovation in Health[2], and were consolidated in the 2nd conference in 2004[3]. The incorporation of Science and Technology in the Ministry of Health made the Agenda to become strategic, considering the need for a survey of the priorities for the investment of research resources and the alignment of basic and applied research with the health needs of the Brazilian society. The Agenda consists of 24 sub research agendas, and sub-agenda 06 regarding the Health of the Elderly stands out in this analysis, considering its importance in the Brazilian population profile. Two research projects were

established considering the Agenda, as triggers for this reflection, one a doctorate in progress and the other a master's degree work.

Objectives
The doctorate entitled 'The National Health Policy for the Elderly: a preliminary analysis from the field of Science, Technology and Society (STS) and the Theory of Social Representations (TSR)', aims to analyze the implementation process of the National Health Policy for the Elderly in the Regional Department of Health III - Araraquara / SP (RDH III), considering the theoretical contributions from the STS field and TSR, with the specific objective of analyzing government actions at the regional and municipal levels for the health of the elderly and their relationship with the Agenda.
The master's research project was entitled "The elderly in the agenda for health research priorities: a study of the STS field", and investigated knowledge and the use of the Agenda (Health for the Elderly) in the development of studies and research on gerontology and aging, considering the theoretical contributions from the STS field and Gerontology carried out by researchers in the RDH III region.

Method
The methodology of the doctorate research consists of document analysis and field exploration by way of semi-structured interviews with the articulators who implemented this policy.
The Master project is an exploratory and descriptive study developed in six stages using plural methodological procedures.

Results & discussion
The results indicated the presence of 14 groups of studies on aging and gerontology registered in the directory of research groups of CNPQ ("National Counsel of Technological and Scientific Development") acting in the public universities of the region under study. They showed a tendency to be interdisciplinary and included 11 leaders with different academic backgrounds.
It was found that the knowledge of the leaders about the Agenda was restricted, showing the need to prioritize the dissemination of this information. Despite being accessible, there was no evidence of greater insight and investigation using the Agenda as a reference. The Agenda was not used as a focus for discussion by the groups and some used other documents as guides to carry out their research.
A need for greater ownership and reflection on the Agenda was identified, especially for studies that consider the issue of the elderly and its dissemination, considering that it includes research priorities in the area. The insertion of this issue in the STS field of study is crucial, considering its objectives and contributions, especially in relation to the gaps and socio-historical dimensions of the process.

Conclusion
The need for adhesion of this subject-object is undeniable, and the development of science and technology in health, adjusted to the principles of the Unified Health System (SUS)[4], combined with the demands of the Brazilian society, could be considered one of the first exercises in setting up health research priorities in Brazil.
It is hoped that these reflections contribute to the discussion of health technologies in the field of gerontology, without the pretention or intention to present ANPPS (National Agenda for Health Research Priorities) as the only direction for the production of knowledge, but to question the scope of the agenda and its applicability, recognizing that the knowledge and actions of professionals, researchers and users are critical to the production of knowledge and the development of health technologies.

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