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Editors

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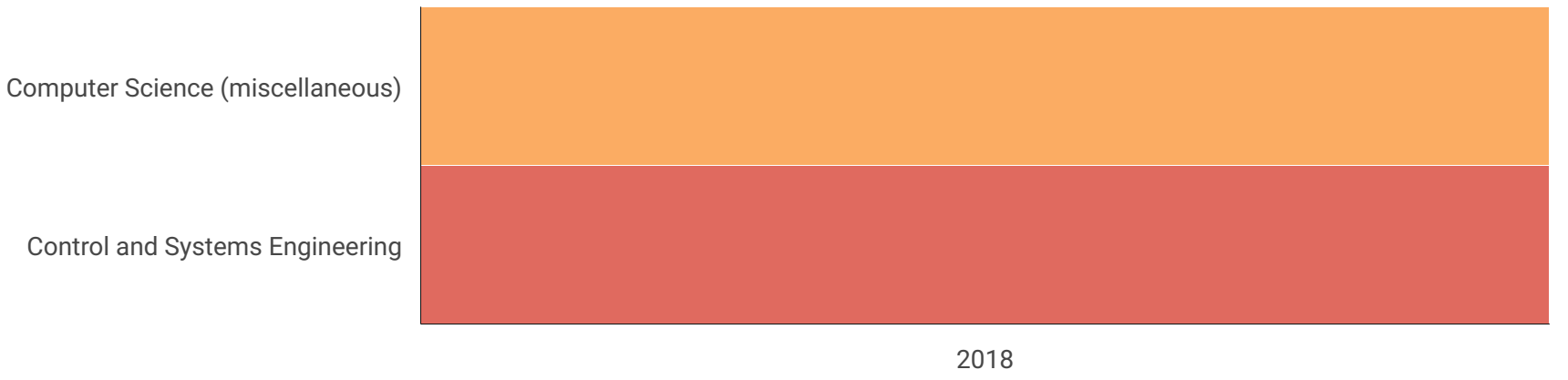

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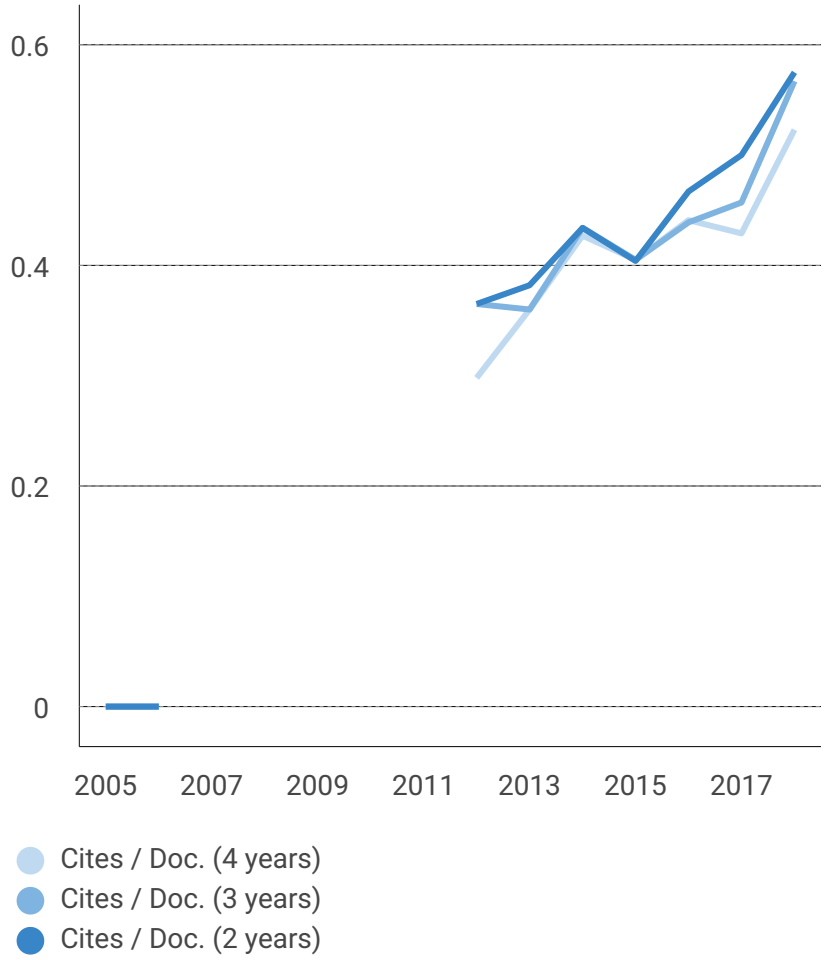

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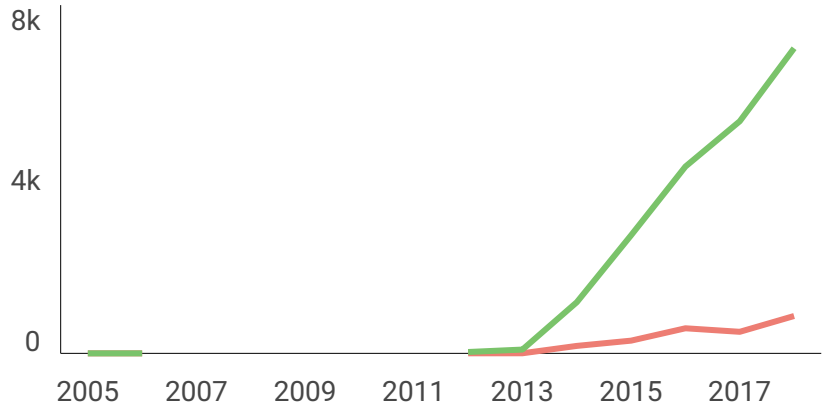

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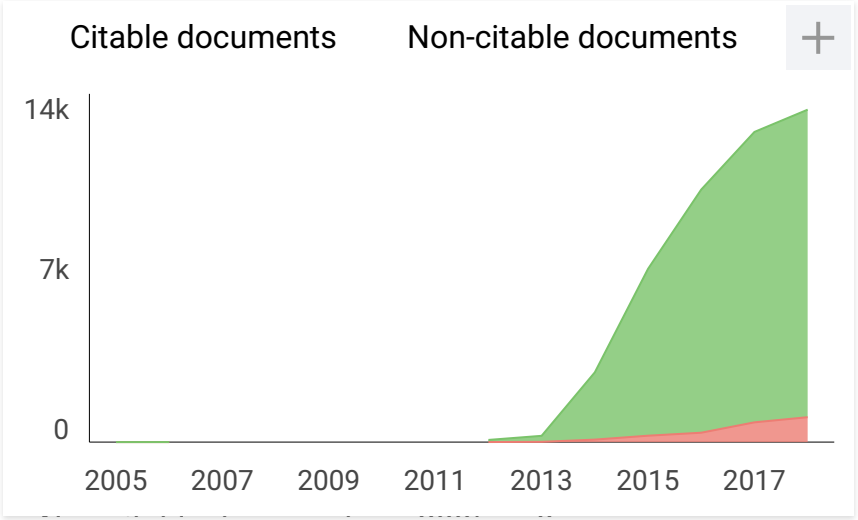
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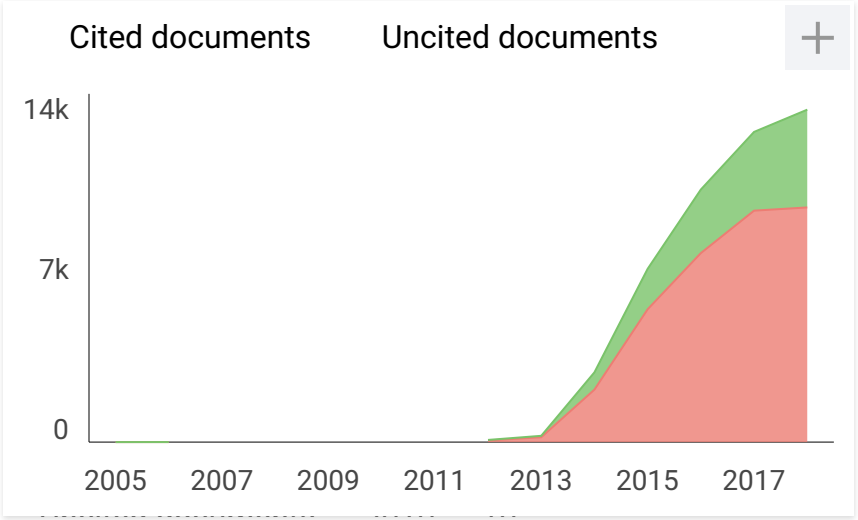
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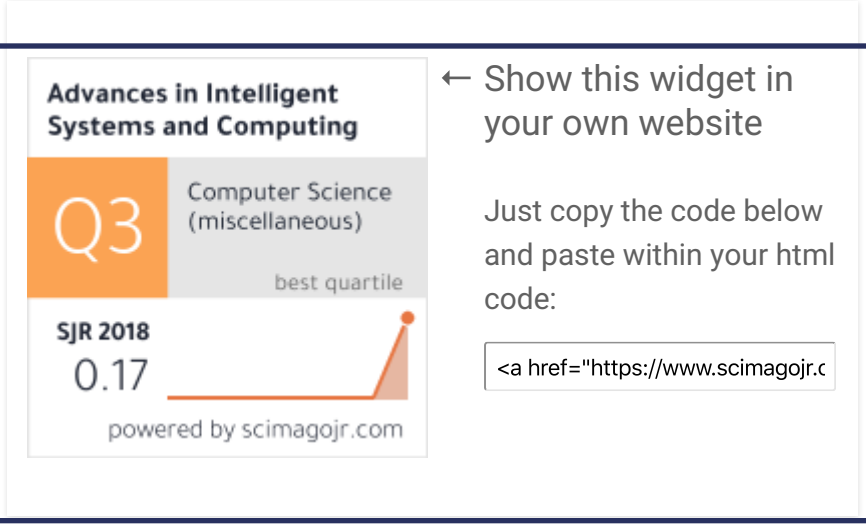
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Evaluating of Mobile Applications and the Mental Activation of the Older Adult

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Abstract. This article describes how ICTs have changed the ways of socializing among people. Especially the elderly. Thus, an experiment was presented that allowed evaluating 25 older adults in courses using ICT. A qualitative methodology is applied to analyze in particular the situation experienced by older adults in relation to the use of technologies, their experiences at the end of the computer course and how it influences them in their daily lives. Results are obtained derived from taking the technology courses, as well as answering a questionnaire before and after the course. The result shows that the technology allows any adult is able to use a computer, smartphone, tablet among other devices as long as you have patience and do not suffer from any health impediment that prohibits it.

Keywords: Older adults · Aging · Tablet · Computers · Technology

1 Introduction

In traditional societies the elders had a prominent and leading role in the orientation of their respective societies. They were respected, revered, and obeyed in their role as counselors and guides to the community; they were considered repositories of the wisdom gained and accumulated throughout their life. In [1], mentions in his article that this situation changed radically. In today's technologically consumed societies, particularly in underdeveloped countries, the vast majority of the elderly are victims of helplessness. From the moment they cease to be part of the productive apparatus or have an active professional life, it seems that they cease to be part of society.

Because physical abilities change with age, it's important that mobile app developers design smartphone apps with impending health challenges in mind.

As more elderly community members rely on smartphones for communication, information gathering, and entertainment, and as more adults begin using mobile apps as they age, the question app developers need to consider is, "What can be done to make interactions with mobile apps easier for older users?"

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Mobile app developers should consider psychological and physical characteristics of elderly people when they're designing mobile apps. Some easy factors to consider in the design process include: contrast, labels, formatting, navigation, and cues [2].

2 Related Work

The forms of socialization have changed in an accelerated way, in part, due to the advancement of Information and Communication Technologies (ICT). Years ago, people only communicated through phones, letters or face to face. Today, communicating in this way seems inconceivable and all this thanks to the technologies that we have at our disposal that give us opportunities to be able to be connected with family or friends thousands of kilometers no matter where in the world we are. Through platforms or social networks, one can have contact with other people, known or unknown, for work reasons or simply looking for friendship [3].

The use of Information and Communication Technologies (ICT) is undoubtedly the key component that best symbolizes the change of time we are living. One of the challenges facing the information society is, in addition to improving the technology needed to get access to high quality content and information resources, to ensure that this access reaches a majority and on equal terms to the entire citizen.

It is a verifiable fact that ICT have, to a large extent, changed the way people relate to each other, it is also evidence that these devices are not available to the entire population, there is the so-called digital divide, not only for economic reasons, but, in our concrete case, for reasons related to age and the limited training that some older people have in this area. In this sense, and with the exception of this limitation, never before has information and knowledge been available to any individual, having certain powers to search for information and the necessary technological resources, every person can self-fashion. This is the characteristic of today's society; In the past, information was only available to a few.

Older people, like any other group, have different limitations, both physical and training level for the use of ICT, but it is more the interest shown by many of them to be up to date in this information society, by what we can say, that there are more possibilities than the limitations that have [4].

Older people have surpassed the most common ages for training and work and as a result, their learning opportunities are limited and their needs for use are limited, as opposed to young people. Many older people have not been born in the new technological era and therefore they need to learn these new innovative tools and their coping strategies, which in turn translates into fears and insecurities; On the one hand, they have to start thinking about issues that were previously unknown and, on the other, they perceive a lack of capacity in learning these tools.

There are numerous studies that have focused on the relevant role that these new technologies have in the new technological society. Many of the Research has focused on knowing the role that different variables, well related to the context, with the technologies or with the beneficiaries of them, have on the access and uses that can be made of them [5, 12].

The treatment of ICT and older adults is generally part of the lines that deal with inequalities or gaps in the information society: all authors start from the recognition of the disadvantage of this group in relation to digital technologies. The consideration of the elderly group within the "digital excluded" or as "late adopters" and the recognition of the importance of technologies in different areas, provides a framework to base the convenience in the adoption of the same or raise it in terms of social inclusion: "ICT become for the elderly as an opportunity to remain integrated into society" [6]. In that sense, digital inclusion can be registered as a transversal dimension for social integration according to the principles in favor of older persons already enunciated in 1991 by the United Nations: Independence, Participation, Care, Self-Realization and Dignity [7].

The consideration of the benefits that ICTs can provide for the quality of life of the elderly is present in the authors who highlight them as an opportunity. Most of the studies in relation to these issues specifically refer to the Internet, however today ICT devices are almost inseparable from the Internet, so in this case it has been decided to assimilate them.

At the present time, around 10% of the world's population are aged 60 years and over, but this is set to increase to about 20% by 2050. Globally, the 60–79 and 80 plus age groups are growing the fastest. While the population worldwide is growing at around 1% per annum, the number of people aged over 80 is growing at 4% per annum and by 2050 it is expected that people aged over 60 will outnumber children aged 14 and under. In much of the world, the number of children has already peaked and is now declining. Moreover, the phenomenon of population aging is not limited to developed countries.

The aging of global populations presents many challenges, not least how services can be improved in order to enhance the health and quality of life of older people in the context of limited financial resources both at the individual and governmental levels. In view of this, there has been growing recognition of the potential for ICTs to improve services and enhance the well-being and social participation of older people [8].

Technology now supports or streamlines many day-to-day activities. This continued technological development is occurring alongside the aging of global populations, creating opportunities for technology to assist older people in everyday tasks and activities, such as financial planning and connecting with friends and family. New technology also has the potential to provide timely interventions to assist older adults in keeping healthy and independent for longer. Older adults are slower to adopt new technologies than younger adults, but will do so if those technologies appear to have value, for example in maintaining their quality of life. To make technology more age-friendly, it is important to understand the advantages and disadvantages that older adults perceive in using it. We therefore explored older adults' familiarity with and barriers to using technology [9].

Mobile technological devices such as tablet computers (commonly referred to as tablets), a type of portable computer that has a touchscreen, are becoming increasingly popular. The number of adults aged 65–74 years using tablets to go online more than trebled in recent years in the UK, going from 5% in 2012 to 17% in 2013. However, this percentage remains low compared with younger age groups (e.g., 37% of adults aged 25–34 years used tablets to go online in the last 3 months [9].

The use of mobile devices reaches all age brackets equally and the attraction for these devices is the same for someone over 65 years old as for a millennial. In fact, according to the annual report of the Society of Information in Spain, published by the Foundation Telefonica, Internet users over 65 have significantly increased the use of the Internet: 14.3% use instant messaging weekly, a 52.5% of them buy online and 27.2% see or listen to multimedia content through mobile [10].

The new technologies have seen difficulties to implant in the third age, since it is a public that has not grown with them and does not know how it works; however, it is increasingly consolidated in the population over 60 years old. This digital divide has been reduced in recent years [11].

3 Experimental Design

3.1 Method

3.1.1 Experiment Sample

For this study, a group of 25 seniors was taken at their convenience, who have been part of the course: full adults learning new technologies, taught in the FCA UABC Tijuana. In addition, 2 geriatric doctors were interviewed to obtain their medical point of view about the benefit of the use of technologies by the elderly.

3.1.2 Instruments

Older adults were given a survey to know about their knowledge about the technologies, also what sports and leisure activities they like.

For the geriatric doctors an interview was used where the purpose was to obtain information about the needs of the elderly, and the opinion they have about the use of ICT by that sector of the population.

3.1.3 Procedure

The research methodology in this study is applied, qualitatively, through the case study modality. The interest is focused on the investigation of a phenomenon, population or general condition. The study does not focus on a specific case, but on a certain set of cases for the analysis of social reality, and represents the most relevant and natural form of research oriented from a qualitative perspective. This study focuses on a particular situation, which is the situation experienced by seniors in the elderly regarding the use of technologies, their experiences at the end of the computer course and how it influences the same in their daily lives.

The sources of data collection will be the testimonies of the elderly participants and assistants to the course taught at the Faculty of Accounting and Administration, UABC, Tijuana, Mexico. The interview and survey were used as data collection techniques (Fig. 1).

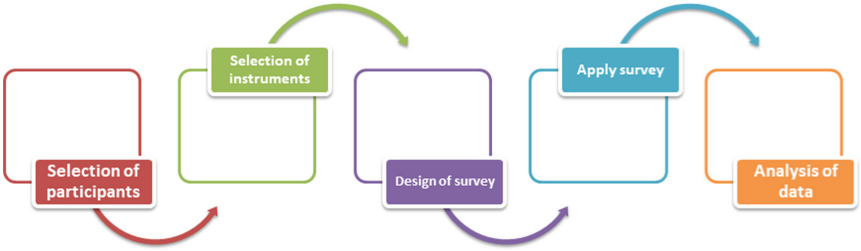

Fig. 1. Experimentation methodology

4 Results

The 92% of the older adults surveyed use mobile devices, and 67% express that it is not complicated for them to use them, one of the reasons is that they have difficulty reading or writing on a keyboard of their phone or tablet as indicated by the 42%, as shown in Fig. 2.

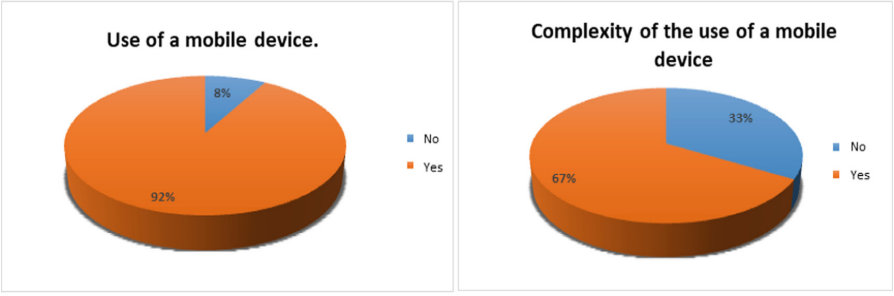

Fig. 2. Result of the use of mobile devices

Most of them (83%), express not having experience when installing mobile applications, however if they use them, and prefer the applications referring to social and health networks, however, 21% show interest in entertainment applications. What they expect from applications is that they are free, that allows them to learn new things, that is easy to use, that provides a benefit and that allows them to be in contact with family and friends, as shown in the Fig. 3.

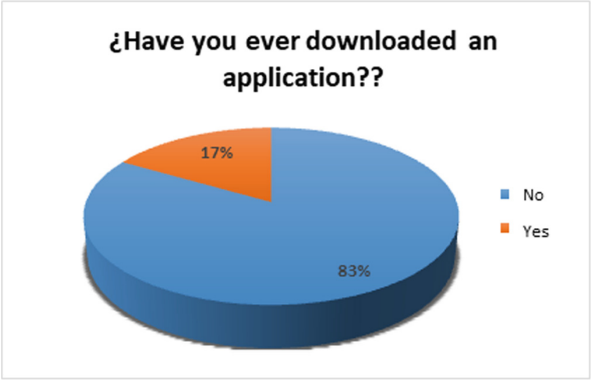

Fig. 3. Result of the experience of mobile devices

In order to consider mobile applications that focus on physical activities, some questions were asked that allowed to know the following: 64% of the respondents do not perform physical activity, and 36% that if they do, they prefer to walk, swim and do yoga, as shown in Fig. 4.

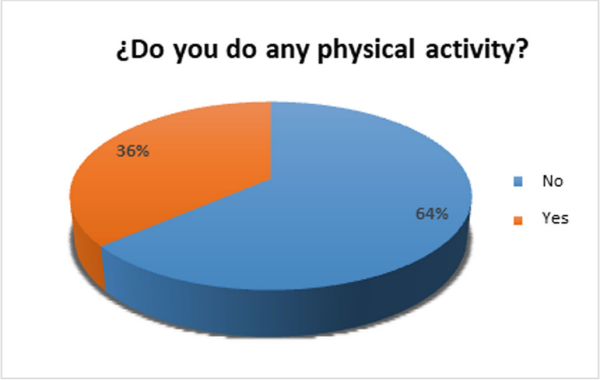

Fig. 4. Results of physical activities.

The 80% show interest in having an application that allows them to perform aerobics or yoga, as shown in Fig. 5.

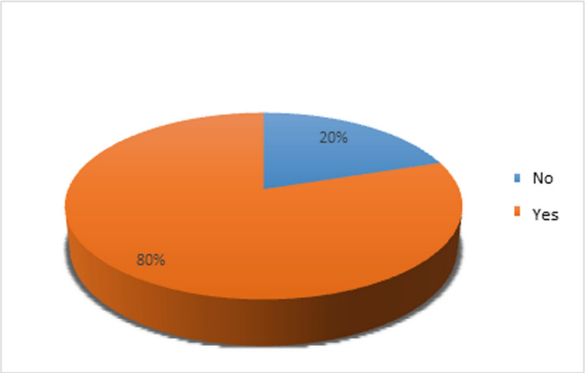

Fig. 5. Results interest in having an application

In another section that deals with what seniors prefer in terms of games or recreational activities, what stands out is games of mental agility, casino, letters, educational and creativity and drawing.

When questioning about the readings that they prefer, there is no answer that stands out with great percentage difference, there are several preferences, among them are: personal improvement, science and technology, novels, mystery, adventure and romance.

When interviewing the geriatric doctors, it was possible to complement the information obtained by the elderly, first, we must understand that a geriatric doctor is a doctor specialized in caring for the elderly and fulfills the mission to detect early and diagnose diseases, as well as to prevent possible sequelae. Its main function and responsibility is to educate family members and caregivers of the preventive or curative areas of old age, as well as physical and cognitive rehabilitation. They also contribute to the improvement of the health of the patients by educating the patient and the primary caregiver about the disease and/or present diseases and how to prevent secondary complications. It is common and well known that, when entering this state of deterioration, the older adult is more prone to suffer from certain diseases or that those already suffered complicate a little more Diseases such as mixed dementia, Alzheimer's dementia and other dementias, diabetes, hypertension, depression, dyslipidemias, sleep disorders, anemia, osteoarthritis, malnutrition, falls syndrome, some of them susceptible to improvement. All these in addition to damaging the health of the person damage their quality of life, causing the adult to become isolated or really feel like a burden to others.

According to the information gathered from the interviews applied to the geriatric doctors on the use of applications by older adults. The biggest challenges that these doctors face every day are to take care of subsequent or first-time patients who lack care on the part of their relatives, with advanced and poorly cared for diseases or who come for a second opinion about a diagnosis, especially in the cases that in public institutions tell them that there is nothing to do. Many times the patient of subsequent visit is willing to go to the consultation to talk about their ills, their mental deficiencies.

Those who expect to see them solve their problems or diseases that have been dragging on for some time.

That is why it is considered vital to acquire a lifestyle where physical activity and a good diet is essential, is the basis for all pathology and staying active brings benefits both for your health, to control anxiety, to rest in a way more appropriate, and control their comorbidities, as well as interact with other people, various health institutions manage or have groups of activities for seniors.

Regarding the use of technology by these, there is a mistaken belief that they do not have enough physical and mental capacity to incorporate into their daily routine, due to certain limitations, or that they do not use it because they are not interested, but it's not like that, it's often due to the fact that they do not know how to manipulate it and they do not have someone who has the patience to teach them. In addition to this the fact that the device does not have favorable characteristics for the recurrent use of an elderly person suffering from a bone disease that allows him to dominate or perform different movements or the simple deterioration of sight over the years, as well as The loss of memory can make them forget the procedure of searching for something on the web or how to make a call from the cell phone. Leaving behind the benefits that the good use of this could provide. In addition to making them feel that they belong or that they are part of the new society, it serves as a good distractor, thus contributing to their emotional health by keeping them occupied in things of interest to them, be it entertainment, information sources, or helping them acquire new ones knowledge.

Technology is a tool that everyone uses and now everything revolves around it, and if they do not learn to use it, they will be misplaced. Any adult is able to use a computer, Smartphone, tablets among other devices as long as they are patient and do not suffer from any health impediment that prohibits it.

However, the excessive use of these devices in addition to causing damage to the health of the elderly, damaging their vision, decreasing the quality of sleep contributing to the development or increase of anxiety, be more irritable, and aggravate depression. Over information and the simple way to maintain contact with other people through this medium could cause an addiction by unleashing the aforementioned. Most devices and applications are created without taking into account the needs of this sector of the market and are often somewhat complex, or impossible to use taking into account that certain elderly people have little or no education. That is why it is important to implement simple applications that allow you to stay physically, mentally and socially active. Some of the applications that doctors recommend and that could benefit from preventing cognitive impairment are those of messaging, memory games, alphabet soup, news, and electronic books, since they test memory, mental agility and concentration, keeping the mind active and stimulated, helping to have a better retention of information in the short term. Regarding the applications that encourage physical activity, it is essential that they be simple in such a way that allows them to adapt it to their daily activities and that motivates them to perform more physical activities taking into account their capacity, visual and joint limitations of each patient. Following the instructions on physical exercises by means of an application and not of a particular instructor would not cause conflict as long as they contain clear images and illustrations or descriptive videos.

5 Conclusions

It is important to consider the complexity involved in assisting older adults in their different personal and, in some cases, professional activities. There are a large number of non-deterministic variables that can influence the appropriate assistance for them.

As a future work, a modeling based on agents will be carried out that allows to have an abstract representation of the different scenarios presented in real life, as well as to simulate some hypothetical cases this in order to evaluate all the variables involved in the interaction.

The model will allow the intelligent and adaptive application to be developed, having an impact on a better sensitivity to the context, anticipating the emerging changes. The application will be adapted according to the behavior and characteristics of the user derived from the HCI. There will be different interaction scenarios that allow different work dynamics to be carried out based on predefined themes or objectives to be met. These objectives and themes will take an evolutionary sequence, allowing the user to progress in a greater degree of content and adaptability.

The applications to develop must contemplate adaptive behavior skills such as conceptual, social and practical. The adaptive difficulties of limitation, social intelligence and practice must be considered. The application must allow the user to develop the practical intelligence that allows the self-sustaining capacity to be independently promoted, even considering the deficiency of physical aptitudes.

The application should promote social intelligence by understanding social and behavioral expectations of others, achieving a better adaptation of behaviors in social situations. The application will be a guide for users helping to develop these skills, without age being an obstacle.

Additionally, the use of this application will allow achieving a better adaptation to the changes that occur in aging, the adaptive content of the application will allow to develop coping strategies to old age.

Finally, all the direct and indirect variables must be considered, in order to feedback and update the application with an amplified universe. Likewise, it is necessary that the case study with a more significant sample, a minimum sample of 500 to 1000 individuals in different interaction scenarios. This will help to understand in detail the context of study, as well as make the decision to make the application more specific, in order to give follow up to health problems, and exercise the mind, daily activities.

On the other hand, we have to involve groups of expert nurses, doctors, psychologists, psychiatrists, anthropologists, and pedagogues that help us to better understand the behavior and activities of this elderly. In order to make the relevant options demanded by those involved in different scenarios under different circumstances.

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