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Types of Older Adults ICT Users and the Grey Divide: Attitudes Matter

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Abstract

In a context where the proportion of older people increases, research related to active aging and digital technologies has generated a wide debate and numerous investigations aiming to implement new public policies. Usually these are based more on “classic” gaps than on the so-called “grey divide”, which focuses on perceptions and attitudes. To capture this dimension, a questionnaire was designed on uses, learning, and ethical, motivational and attitudinal aspects. A field work was carried out aimed at the population of the Autonomous Community of Madrid between 65 and 80 years old, with quotas of age and sex, with a total of 785 cases, with a sampling error of 3.5% for a p=95%. The results indicate that, given the specific uses made by the elderly, they are marked by the ubiquity of the cell phone, which is basically used to communicate, to alleviate loneliness and to stay active. Thus, through a cluster analysis we have been able to elaborate a typology of users according to attitudes and perceptions (grey divide) allowing us to better characterize the levels of technological adoption in a wider set of factors.

Keywords: active aging, grey divide, attitudes; perceptions, technological and digital divide.

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Introduction

Research on active aging and digital technologies has generated extensive debate and research in recent times (Koh, 2016; Sixsmith & Gutman, 2013). It seems that ICT can help manage the growing demographic aging present in many countries by facilitating innovations in public policy interventions and design (Loureiro & Barbas, 2014). However, inequalities and difficulties in access and use of technical devices as well as their potentials have marked in many cases the agenda of social intervention. Active aging programs are completely dependent on the relationship of the elderly with the socio-technical environment and even more so today, marked by social distancing (Hacker *et al.*, 2020, Boulton *et al.*, 2020). It is usually considered that the elderly, despite having managed to handle technologies and having obtained certain technical skills, make a somewhat special use of digital communication, lacking as much predisposition or skills as the young (Hunsaker & Hargittai, 2018). That is, they make a different adoption and gradual appropriation of current technologies compared to other population groups. This difference or inequality with the remaining population has been called the “grey divide” (Friemel, 2016; Quan-Haase *et al.*, 2018) as different to the classic digital divide. The digital divide, today, depends on other factors such as educational level, professional career and access to work, in addition to cultural level and social and family background (Arias, Lirio, Alonso & Herranz, 2018)

It is considered that even though the resources and knowledge available have increased, attitudes of certain resistance and disinterest in the use of technology and the possible empowerment it produces predominate within this group of elders (Knowles & Hanson, 2018). The debates on the final causes of this gap do not cease to be an interesting space of theoretical and practical discussion for social sciences and social policies.

Therefore, it is very pertinent to analyze the uses and attitudes of older populations to assess the types of existing users and the potential of possible technological innovations for active aging. As a result, it is possible to identify the characteristics of the populations most and least receptive to this type of program. This research seeks to address what are the different types of older users of technology and where are the barriers to such use. Far from thinking about classic inhibiting factors of the digital gap - focused on material or economic resources - we will focus precisely on the distances produced in the grey divide by fears, distrust, mistrust and perceptions. Recently, the more accurate models on the digital divide just give a lot of importance to those variables (Ragnedda, 2017; Ragnedda & Muschert, 2017; van Dijk, 2012, 2014). In our case, we focus on the self-perceptions of the elderly as users, how they identify themselves and what confidence they have in ICT. The reason is that we think they are a relevant key to the understanding of the use they make of technology. Although positive attitudes are always greater than negative ones (Mitzner *et al.*, 2010, Sánchez-Valle, M., Abad, M. V., & Llorente-Barroso, C., 2017), denying the image of the

older technophobes, there are still self-perceptions that limit the commonest or unbiased use. In other words, how elderly people represent themselves socially limits technological practice in a world where the stigma towards aging persists. In fact, what is interesting from previous studies is that in addition to being able to observe a very varied typology of elderly's attitudes towards technology those are very dependent on certain types of applications and very little on others (Quan-Haase *et al.*, 2018). That is, the question is not the lack of use of the digital but the selective and partial use. In addition, the elderly are constantly comparing themselves with technologically adapted younger generations that weigh down and conditions their own learning (Quan-Haase *et al.*, 2018).

Even more, because of these representations that oppose the young as “digital natives” against the elderly as “digital immigrants” (Prensky, 2001), not always there is a real picture of what is happening now. Nor do we have a real account of the transformations that are taking place in this dynamic field.

This article presents a research carried out in Spain in 2018 where we try to study empirically the phenomenon. For that, it was required to elaborate a survey oriented only to the population over 65 years old (while the National Institute of Statistics or Eurostat reaches the whole population spectrum and age range). In addition, a sufficiently high sample size (N=785) has been achieved (comparing with other previous research) and questions have been designed to investigate directly these topics. At least in Spain, previous studies usually have been based on secondary data from the National Institute of Statistics, whose methodology shows serious limitations: changing questions, many topics are addressed at once, questions aimed at all ages and not specific to older people, among some difficulties (Colombo *et al.*, 2015; Román-García *et al.*, 2016). What was relevant, therefore, was to design a survey study with a sufficiently large sample covering a wide range of ages and situations, and where the questionnaire questions were directed at addressing this issue. Likewise, the survey was complemented with a series of in-depth interviews to obtain extra information.

Literature review

In recent decades there has been a process of widespread access to and use of digital technologies accompanied often by an uncritical view that they contribute to human well-being and development (DiMaggio *et al.*, 2004; Selwyn, 2016). This extension, as noted in the literature on digital divides, has been uneven across geographical areas, but also among people based on their gender, age, economic or educational level (OECD, 2001; Pick & Sarkar, 2016). On the other hand, and perhaps more relevant now for Western contexts, different modes of use and appropriation of technologies are produced, depending on previous socioeconomic inequalities (van Dijk, 2012). As a consequence, a new dynamic of inequality is produced since these forms of appropriation condition and regulate opportunities

and lifestyles (van Dijk, 2014). In these terms, the notion of the “grey divide” was coined (Millward, 2003) as the asymmetry affecting older people on their access to and use of technology. Today, however, many authors question if differences in age are the main causes of these gaps (Van Deursen & Helsper, 2015; Neves *et al.*, 2018) or whether each age group should be treated homogeneously. Bergström (2017) differentiates the elderly into two groups, pointing out an important difference to the detriment of the oldest, but adds that, along with age, educational level is a very influential factor. A review of the factors that condition technology adoption can be seen in Hustad *et al.* (2019).

Other authors emphasize precisely that elderly are not a unique population group (Rivoir, 2019), but that their diverse life paths have led them to different modes of relationship with digital technologies. Quan-Haase, *et al.* (2018) propose a typology of older users based on two variables: skills in use and the number of online activities they perform, resulting in six different types or profiles. The most important achievement of this work is that the association between skills and connection is not linear, but more complex relationships are manifested. In addition, the incidence of age in the digital gaps loses importance over time, mainly due to the incorporation of people who have already integrated digital technologies in their professions or in more favorable circumstances to the group of elders.

The effects of the appropriation of digital technologies can present an advantage. Chen & Schulz (2016) highlight that, in the case of rural areas where the elderly have lower educational levels, they consider the use of the cell phone as a personal achievement that improves their perception of independence and happiness. In this line, Quan-Haase *et al.* (2018) try to demolish the myths of the gray gap by warning that older people want to be connected and would like to develop new digital skills, but sometimes feel overwhelmed. For all these reasons, several initiatives are being developed to include this group, considering it a source of advantages in their quality of life. The technological connection using the smartphone provides the elderly with an instrumental support that facilitates emotional support (Hsu & Chang, 2015). And its use is related to a greater perception of well-being in the case of the elderly in China (Chai & Kalyal, 2019).

However, not all elders have similar attitudes about digital technologies (Fox & Connolly, 2018). In some cases, reasons for not using digital technologies are related to the handling of discourses in line with technological determinism, with cyber-pessimistic positions that point out that ICTs have caused the increase of loneliness and the end of the community (Kania-Lundholm, 2019). The study of the perceptions, assessments and representations of technology can provide us with suggestive clues and working hypotheses about these issues.

In the line of negative attributions to technologies, we find that the elderly have seen their relationships with younger people altered by cell phones, since they continually check their devices, making them feel a decrease in intimacy and satisfaction in communication (Kadylak *et al.*, 2018). Without getting into the

changes in social interactions, the fear for computers plays a fundamental role in the use of digital technologies (Chen & Chan, 2014; Niehaves & Plattfaut, 2014). For many older people, these are stressful, not only because of the difficulty in learning, but also because of the anxiety for failing when they are most needed (Cotten *et al.*, 2016).

Lack of interest in technologies are intertwined with lack of technological skills (Millward, 2003). This relationship between perceived utility and use is evidenced in many works based on the application of models of senior technology adoption (de Veer *et al.*, 2015; Kadylak *et al.*, 2016; Peek *et al.*, 2014). Although the use of ICT is believed to bring benefits, a negative perception of aging leads to lower adoption of digital technologies (McDonough, 2016). In these cases, older people find age-related excuses for not using ICT, such as poor mobility or poor vision (Castleton *et al.*, 2020). Women are more influenced by this negative perception, while men are more affected by experiences of age discrimination (Choi *et al.*, 2020). Caspi *et al.* (2019) warn of the danger of older people using digital technologies, as they can shift their own perceptions by assuming stereotypes such as technologies are not for older people, even if performance is not bad. However, when there is an adaptation of applications such as social networks to daily routines, self-perception of the elderly, especially with regard to their social relationships, improves (Cornejo *et al.*, 2013). The positive relationship between Internet use and self-perception is found in other works that observe a greater life satisfaction, in general (e.g.: Lam & Lam, 2009; Lelkes, 2013)

Methodology

This research is based on the use of a quantitative methodology through a telephone survey in order to have access to the entire elderly population of the Community of Madrid (city and 15 other municipalities, covering urban and rural areas), avoiding geographical displacement and reducing the economic and temporal cost (Wright, 2005). In exchange, we are aware of the possible loss of quality of some responses due to the non-presence of the pollster. Nevertheless, this technique and this type of study are frequent and have been carried out previously at the national level, although with smaller samples (Román-García *et al.*, 2016).

In the Spanish context, the majority of previous studies carry out secondary data exploitation from official sources, such as the “Survey on equipment and use of information and communication technologies in homes” of the National Institute of Statistics (INE). These data refer to Internet access and devices and the uses made of them, but does not contain information about attitudes and perceptions of the elderly. On the other hand, there are studies with tailored questionnaires, but usually directed at people attending support programs for the use of the Internet, and therefore do not include the general population (Abad-Alcalá, 2014; Peral-Peral *et al.*, 2015; Tirado-Morueta *et al.*, 2020).

In our case, the questionnaire was designed using as reference several surveys of national scope from official statistical sources, such as the aforementioned “Survey on equipment and use of information and communication technologies in homes” (INE, 2002-2018) and the studies of the Center for Sociological Research CIS 3128 (February 2016) and 3131 (March 2016). The result was a pre-coded questionnaire of 4 blocks and 17 questions, some with multiple answers or multiple sub-questions. The dimensions studied are: 1) the context of use; 2) training and learning; 3) uses of digital technologies and 4) ethical aspects, motivations and attitudes, in addition to questions of socio-demographic classification. After obtaining the data matrix, analyses were carried out with the computer program SPSS v22 and with the free software R v3.3.2 and v3.5.2.

The field work was carried out by telephone from March 26th to 28th, 2018 and was addressed to the population between 65 and 80 years old of the Autonomous Community of Madrid (Total population between 60 and 79 years old: 1,185,535). A sample of 785 cases was obtained with quotas of age (65-69 years 38.6%, 70-74 years 32.7% and over 75 years 28.75) and sex (56% women and 44% men) with a sampling error for a confidence level of 95%, was 3.5%.

Finally, it should be added that, although the study focuses on the population of Madrid, given that Spain is a country in which aging is particularly high (the percentage of the population over 65 grew 2.8 points between 2008 and 2018 according to Eurostat) and 19.1% of the population is over 65, we believe that the results may be relevant. Not necessarily to generalize, but to consider factors that may be similar in other countries with similar habitats to those of the province of Madrid, predominantly urban and with a rural population close to the core of the capital.

Results

First, we proceed to briefly describe some of the most relevant results found through univariate statistical analysis. This will serve to give us a general idea of the way in which the older population approaches and appropriates digital technologies. Later, in the next section, the data derived from the survey will be used to elaborate a typology of users through clusters and factorials.

Devices and uses

The device most used by the largest respondents, by far the most, is the cell phone; more than 80% use it daily. In comparison, the use of computers is very limited: only 24.3% use laptops and 14.3% use desktops. Tablets are other frequently used device, even though 70.3% of the participants claim never to use it. As for connections, it is clear that most do so through private services. More than half, 54.3% already use a home connection (ADSL, fiber, etc.) and a slightly

higher percentage (59.6%) usually connect with their cell phone. These data show that the older ones already follow the general guidelines and trends of mobile connection (Yang & Lin, 2019) leaving other devices in the background.

With regard to knowledge of the different types of applications, Table 1 shows that the best known are Whatsapp and those related to communication and entertainment. In contrast, there are a number of other elements that are unknown to most.

Table 1. Most unknown applications

Type of APP	%	
Office Software	50.3	
Health	47.4	
Shopping and banking	37.8	
Mobility (maps, transportation, etc.)	38.6	
Virtual social networks	35.2	
Multimedia	34.4	
Games	33.6	
E-mail	29.3	
Whatsapp and/or messaging	9.4	

The set of applications that they do not know allows them to glimpse a typology of uses that will gradually take shape, mainly around communication and changes in forms of communication. An example of these changes is the lack of knowledge of e-mail, a technology that can be considered “old” and of relatively professional use, by 29.3% of the sample; and the fact that 72.2% frequently use messaging applications such as Whatsapp. Continuing with the previous pattern, communication is the most frequent use, but it refers to communication with acquaintances and family members (43.8%). Other uses that stand out in the category of daily use are Reading news, newspapers or journalistic information (25.5%) and searching for and obtaining information on topics of interest (19.1%). The functions that cover these applications occasionally, in the case of being used are Leisure and Entertainment (27.1%), Restoring contact with people (18.1%), and carrying out administrative procedures (13.9%).

In reference to training and knowledge acquisition, such as computer learning, for example, there are many participants who point out self-learning as the main learning method (73.8%) as opposed to courses (44.7%). In addition, there is also a high proportion of older people who have been trained with the help of their relatives (37.9%) or friends (17.5%). In general, there is a high degree of disagreement with the need for more training courses (56.7% against and 12%

in favor), an option that is not perceived as desirable or necessary. Nor is the relevance of learning more tools clear (48.9% disagree despite 22% agreeing). On the other hand, the idea of using the devices with family or close friends does produce greater security and acceptance.

In other words, what could emerge from the analysis so far is that despite having an Internet connection at home, cell phones are most used devices; that the main use is to communicate with people, specifically with close people, and although in a lesser extent, to get information about their interests and news. And that within this area, there is a certain need for training or informal and family/friendly and close accompaniment with detriment of formal and informal learning.

Perceptions of ICT

The field of assessments and perceptions interested us particularly. There is a clear tendency to value positively a series of benefits provided using ICT: updating, closeness to other generations, less isolation, obtaining information, continuity of learning, self-knowledge, intellectual activity and security, etc. That is, many of the answers are close to the objectives expressed by the ideas of active aging and all these dimensions are recognized and chosen mostly as “Quite important”. However, there is not the same degree of general agreement, being the most important ‘avoiding isolation’ and ‘remaining intellectually active’ and the less valued ‘security’ and ‘obtaining information for well-being’. Figure 1 presents the items ordered by response rate for the option “Quite important”.

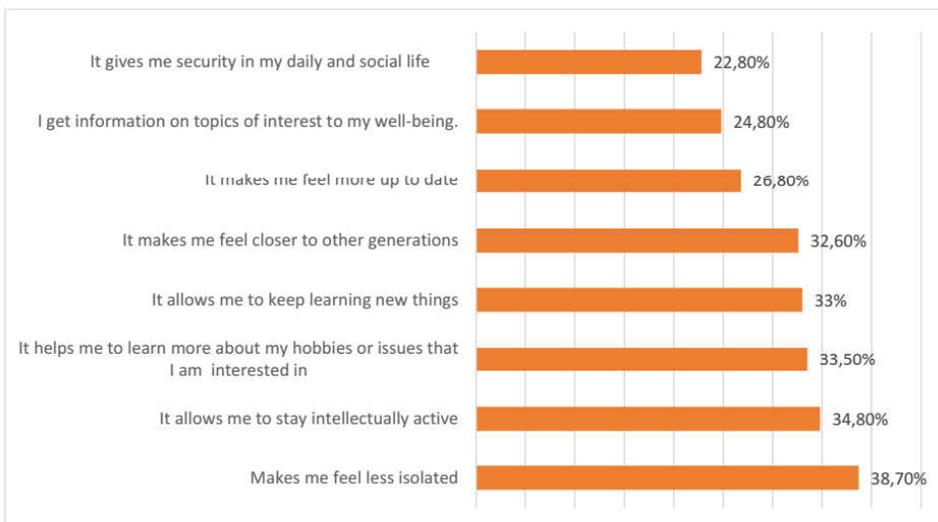


Figure 1. Perceptions of ICT use benefits

In this way, the perceived benefits could be divided into two large groups. The first would be higher perceived benefits. In it, two dimensions stand out above the rest: 1) avoidance of isolation and linkage with other generations and 2) intellectual activity that involves learning and knowing. On the other hand, in the second group, security or well-being are not the main perceived as so beneficial. Although accepted as such, they are well below in preference (up to 16 percentage points). In this sense, there seems to be a somewhat instrumental perception of technology--serving to connect and learn-- but there is no strong appreciation of the concrete benefits related to one's life, nor is safety, the last of all perceived benefits, given high appreciation.

Finally, it is worth talking about security and issues directly related to fears and attitudes of distrust. A simple overview of the results shows that there is a rather unequal perception of safety in the use of technology between more classic activities (making calls and sending messages) and more recent or contemporary ones (using social networks or online shopping). In this gradient of perceived security there are several activities where the degree of security and insecurity is quite balanced.

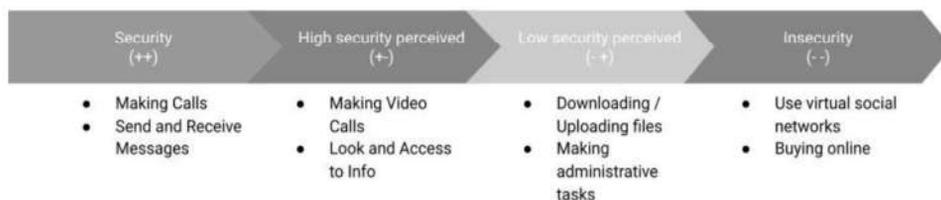


Figure 2. Perceived security using ICT among older adults

Many of these results are consistent with some earlier studies in which the profile of older users is much more complex than previously considered; where (self)perceptions and attitudes modulate uses--or their absence--and digital practices (Gatti *et al.*, 2017; Urban, 2017).

Clusters and profiles

In order to deepen the analytical objectives, we opted to work with a battery of questions related to the self-perception that elders have about their use and activity. First, a two-stage cluster was designed to see the quality of the result and to have an idea of the quantity of clusters. The quality turned out to be sufficient and the best fit were in 3 clusters and. In fact, we consider this to be the configuration that provides the greatest explanatory potential. Therefore, we proceeded to group the cases using the K-Media method, forcing the creation of 3 clusters according to their "self-perception". *Table 2* shows the final characteristics of each group.

Table 2. Final cluster centers

Rate from 1 to 5 the following aspects related to your use of digital technologies	1 (N=153)	2 (N=272)	3 (N=278)
Your Knowledge	1	2	4
Your Skills	1	2	4
Your interest or motivation	1	2	4
Your comfort with them	1	3	4
Your general satisfaction	1	3	4

Depending on the results, cluster 1 group the users with the lowest self-perception in all items. Cluster 2, in the middle range, focuses on somewhat low scores in 'Knowledge, Skills and Interest/Motivation' (a 2) but somewhat higher scores in 'Comfort and Satisfaction' (a 3). And finally, Cluster 3, the users with the highest self-perceptions, has high scores (a 4) in all dimensions. We will now describe with more detail users of each of these self-perception clusters according to socio-demographic variables:

Cluster 1: People with a "LOW self-perception" regarding their skills in the use of ICT. The lowest of all profiles were are people mainly belonging the older age bracket (over 75 years), although 50% are from the other brackets, with a low level of education. They tend to live more alone, but mainly with other people from their family nucleus, but without a partner. That is, they are people without a partner who either live alone or with family members. Finally, the size of the household reflects this situation, although it is difficult to advance yet a precise characterization of this situation. Mainly they do not use the Internet, or they do so through ADSL and cell phones. Paradoxically, they are included into the profile of people who learned more than the others, to use the cell phone through courses, although in terms of learning all their values are below the average. Regarding the use of devices, practically the mobile is the only one they use, and to a much lesser extent than the other profiles. Desktop PC follows but as a very secondary feature. They are perfectly aware that they are not adequately trained (in an overwhelming majority), but they do not want to receive any more training in this regard. They are the most reluctant group to be trained or to learn. And they also do not feel safe when used with the younger generation/family members. Considering the type of uses, frequency and safety; all the people in this cluster are low-intensive users, who almost all do not perceive any benefit in the use of ICTs and feel unsafe in their use (when they use them, of course). In addition to low self-perception, these people hardly use ICTs and have the lowest contact with the younger generations.

Cluster 2: "Comfortable, confident and more disinterested" people regarding their skills in the use of ICT. In this profile, the "evolution" of the age variable is more clearly seen already, with 40% of people under 70 years of age, and if age increases, percentages decrease. Their educational level is average, concentrating on secondary education, with similar percentages of primary education and vocational training cycles. They live with their children and partners and in families that are more typically nuclear for their age (between 2 and 3 persons) to a greater extent than the previous group. In terms of housing variables, they are clearly in an intermediate situation between the solitude of the previous group and the greater family fabric of the next group. Regarding Internet access, practically all of them have Internet access, mainly through cell phones, followed by ADSL, although it is interesting to note that 8% use public networks. Focusing on self-learning, with respect to the cell phone, the composition of the family nucleus and their relationships is clearly seen, because they mainly learn through their children and other family members, followed by self-learning. It makes sense that there is an initial family learning and then they learn by themselves, counting on the support of their relatives when they need it. It is interesting that this same dynamic applies to the use of laptops, but there is a much greater presence of the courses. Intuitively, we could say that, depending on their educational level and family nucleus, they are people who learned to use the PC in their work life, and those who continue using it and learning do so mainly through their relatives/children. Regarding the uses, they practically use the cell phone and not the rest of the devices. And 93% uses it daily. Although 77% do not think they have adequate training in the use of ICT, only 22% would like to receive some form of training. Although a 28% would like to know more to get more out of ICT. And, just a 44% feel more secure when using them with other relatives, it is indifferent for a very relevant percentage (22%) and for a 26% it is not like that. Considering the type of use, frequency and security; they are mostly intensive users, although 35% of them are not. They continue to use it mainly to communicate, although 35% use it for more things. Regarding the benefits of ICTs, 51% think they have them while almost 49% see little benefit. In short, these percentages, which fluctuate a little around 50%, make 60% feel confident in the use of ICT, probably due to the characterization of being accompanied and having a relational network, as well as a higher education than in the previous case.

Cluster 3: People with a "HIGH self-perception" regarding their skills in the use of ICT. This is a profile under 70 years of age and with a higher education. 30% have college degrees and 81.2% have a secondary education or above. They live with their partner, or with their partner and children and all of them are independent (there is no one who lives "without a partner with other relatives") and the percentage of loneliness is also the lowest of all. This is reflected in the composition of the household, being the most nuclear of all around 2 and 3 people. Internet access rates are like those of younger populations, with 77% ADSL, 86%

mobile data and a very high 73% use of public Wifi networks. Regarding mobile learning, the subject matter of the courses is still minimal, and while a third of them learned with their children and/or other family members, the vast majority did so on their own. With respect to the PC, the previous dynamic of having learned through courses and, above all, self-learning, is accentuated. Regarding the use of the devices, the use of the mobile is constant, and although 45% never use the laptop, the other half uses it at least once per week, with more than 30% using it in a daily basis. Finally, the use of the TABLET happens for a similar percentage, 42, at least weekly %. Accordingly, most of them consider that they have adequate training with respect to ICTs. They would not like to receive training courses either, but they are the group most likely to receive them, while at the same time they would like to continue learning new uses to get more out of ICT. Finally, this is a profile of wider and more intensive users of ICTs, who use for a much wider range of purposes, just as most of them maintain that ICTs bring many benefits and feel secure in their use.

Based on this data, model profiles of each of the conglomerates were prepared in order to carry out in-depth interviews. As the following table shows, the ideal types of each of the clusters show very clear social situations (according to socio-demographic variables) in which gender, level of studies, living situation and size of the household, learning method, etc. are very significant.

Table 3. Characterization of the final groups

	CLUSTER 1	CLUSTER 2	CLUSTER 3
Sex	Woman	Both sex	Man
Age	More than 75 years	65-74 years	65-70 years
Educative Level	Primary Education	Secondary Education	Higher Education
Household Type	Alone / without partner or with other family members	With a partner (with or without children)	With a partner and children
Household Size	1-2	2-3	2-5
Internet domestic connection	No	Yes/No	Yes
Habitat	Rural and Urban	Mostly Urban	Urban

Discussion

Agreeing with what Gil-Juarez, Feliu & Vitores (2012) point out; it is very important informal experience with technologies as a critical factor in the development of technological skills, aptitudes, and interests. Therefore, studies such as ours, which focuses on the self-perceptions of older people, are of special interest. Life experience and the need to be in contact with other people is a factor that nowadays still contributes to the use and mastery of new technologies (Paz, García, Fernández & Maestre, 2016).

As Rivoir (2019) emphasize, the elderly are not a unique population group, and we need to have in mind their diverse life paths that make elderly have different modes of relationship with digital technologies. Educational level, professional career and access to work, in addition to cultural level and social and family background (Arias, Lirio, Alonso & Herranz, 2018) have a strong incidence in the appropriation and use of technology.

Our proposed typology presents some characteristics in common with those of Quan-Haase (2018) Maab (2011) and Birkland (2019). The first one is designed on the self-perception in the use of ICT and the variety of different activities they perform. The second is produced from the way in which the elders have apprehended ICT, the use they make and the meanings attributed. Three of them have in common that experiences with digital technologies in training and work environments are the main key to acquire a higher level of self-perception of use. Likewise, those who have less confidence in their use are also those who use them less and who are less connected to other generations. However, they contrast in their elaboration since both have been made from qualitative data with reduced samples in specific environments. The one presented in our work arises from a representative sample, with the additional advantage of generating more concrete profiles. Then, the significance of clear socio-demographic variables is observed, such as gender, or household size, which facilitates the orientation of active aging programs considering these features.

Conclusion

There are few updated empirical studies regarding the self-perception of the elderly in the use of technologies. This study presents recent empirical contributions in which the importance of attitudes, self-perception and security issues, fears, distrusts, and variables are highlighted beyond socio-demographic features. It shows special interest in the importance of self-perceptions that correlate with the profiles of lower use.

The results show three distinct profiles for older population that can be used to guide ICT-mediated active aging programs. In this way, programs can be

modulated according to most specific audiences with their characteristics. The perceived ability and confidence in using different ICT tools has to be framed in the participant's biography. One of the basic issues to consider is what relates to ICT training, since the lower profiles are those who have attended training courses the most and, on the other hand, because most of them are not interested in attending this type of formal activities. On the other hand, previous skills and the possibility of close and informal learning produce more engage and interest in the participants. The challenge is to produce this informal context and spaces were elder people can critically learn ICT.

Recommendations

In reference to the results and the ideas exposed in this paper the suggestions below were offered;

- New analysis on the uses and attitudes of older populations to assess the types of existing users and the potential of possible technological innovations for active aging.
- As the use and appropriation of technologies by the elderly is not homogeneous, it is necessary to adapt the actions developed in relation to technology and elderly according to different user profiles, with different realities, needs, interests and trajectories.
- Provide guidelines for practitioners that works with elderly about the knowledge, use and appropriation of technologies by elderly.
- Develop training programs tailored for the different profiles of elderly considering their trajectories and previous experiences.

References

- Abad-Alcalá, L. (2014). Diseño de programas de e-inclusión para alfabetización mediática de personas mayores. *Comunicar: Revista Científica de Comunicación y Educación*, 21(42), 173-180. DOI: 10.3916/C42-2014-17
- Alonso González, D., Sádaba Rodríguez, I., D'Antonio Maceiras, S. A., & Díaz-Catalán, C. (2019). *Innovation and Active Aging in digital environment dataset*. DOI:10.5281/zenodo.3742827
- Arias Fernández, E., Lirio Castro, J., Alonso González, D., & Herranz Aguayo, I. (2018). Acceso y uso de las TIC de las mujeres mayores de la Europa comunitaria. *Prisma Social: revista de investigación social*, (21), 282-315.
- Bergström, A. (2017). Digital Equality and the Uptake of Digital Applications among Seniors of Different Age. *Nordicom Review*, 38(s1), 79-91. DOI:10.1515/nor-2017-0398
- Birkland, J. (2019). *Gerontechnology: Understanding Older Adult Information and Communication Technology Use*. Emerald Publishing.

- Boulton, E., Kneale, D., Stansfield, C., Heron, P., Hanratty, B., McMillan, D., ... & Todd, C. (2020). Rapid review of reviews: what remotely delivered interventions can reduce social isolation and loneliness among older adults. *London y Manchester, UK: EPPI-Centre y NIHR Older People and Frailty PRU*.
- Caspi, A., Daniel, M., & Kavé, G. (2019). Technology makes older adults feel older. *Aging y Mental Health, 23*(8), 1025-1030. DOI:10.1080/13607863.2018.1479834
- Castleton, A., Cid, A., & Silva, D. (2020). 'For older folks like me, these things are over us...': The challenge of embedding tablet computers in everyday life within a geriatric hospital in Uruguay. *Educational Gerontology, 46*(4), 167-181. DOI:10.1080/03601277.2020.1720321
- Chai, X., & Kalyal, H. (2019). Cell Phone Use and Happiness Among Chinese Older Adults: Does Rural/Urban Residence Status Matter? *Research on Aging, 41*(1), 85-109. DOI:10.1177/0164027518792662
- Chen, Y.-R. R., & Schulz, P. J. (2016). The Effect of Information Communication Technology Interventions on Reducing Social Isolation in the Elderly: A Systematic Review. *Journal of Medical Internet Research, 18*(1), e18. DOI:10.2196/jmir.4596
- Choi, E. Y., Kim, Y., Chipalo, E., & Lee, H. Y. (2020). Does Perceived Ageism Widen the Digital Divide? And Does It Vary by Gender? *The Gerontologist, 60*(7), 1213-1223. DOI:10.1093/geront/gnaa066
- Colombo, F., Aroldi, P., & Carlo, S. (2015). Nuevos mayores, viejas brechas: TIC, desigualdad y bienestar en la tercera edad en Italia. *Comunicar, 23*(45), 47-55. DOI:10.3916/C45-2015-05
- Cornejo, R., Tentori, M., & Favela, J. (2013). Enriching in-person encounters through social media: A study on family connectedness for the elderly. *International Journal of Human-Computer Studies, 71*(9), 889-899. DOI:10.1016/j.ijhcs.2013.04.001
- de Veer, A. J. E., Peeters, J. M., Brabers, A. E., Schellevis, F. G., Rademakers, J. J. J., & Francke, A. L. (2015). Determinants of the intention to use e-Health by community dwelling older people. *BMC Health Services Research, 15*. DOI:10.1186/s12913-015-0765-8
- Dijk, J. A. G. M. van. (2012). The Evolution of the Digital Divide—The Digital Divide Turns to Inequality of Skills and Usage. *Digital Enlightenment Yearbook 2012, 57-78*. <https://research.utwente.nl/en/publications/the-evolution-of-the-digital-divide-the-digital-divide-turns-to-i>
- Dijk, J. A. G. M. van. (2014). Impact: Why Digital Skills are the Key to the Information Society. En A. J. A. M. van Deursen y J. A. G. M. van Dijk (Eds.), *Digital Skills: Unlocking the Information Society*. Palgrave Macmillan US. DOI:10.1057/9781137437037
- DiMaggio, P., Hargittai, E., Celeste, C., & Shafer, S. (2004). From Unequal Access to Differentiated Use: A Literature Review and Agenda for Research on Digital Inequality. *Social Inequality*.
- Fox, G., & Connolly, R. (2018). Mobile health technology adoption across generations: Narrowing the digital divide. *Information Systems Journal, 28*(6), 995-1019. DOI:10.1111/isj.12179
- Friemel, T. N. (2016). The digital divide has grown old: Determinants of a digital divide among seniors. *New Media y Society, 18*(2), 313-331. DOI:10.1177/1461444814538648

- Gatti, F. M., Brivio, E., & Galimberti, C. (2017). "The future is ours too": A training process to enable the learning perception and increase self-efficacy in the use of tablets in the elderly. *Educational Gerontology*, 43(4), 209-224. DOI:10.1080/03601277.2017.1279952
- Gil-Juárez, A., Feliu, J., & Vitores, A. (2012). Género y TIC: en torno a la brecha digital de género. *Athenea Digital. Revista de Pensamiento e Investigación Social*, vol. 12, nº 3, 3-9.
- Hacker, J., Vom Brocke, J., Handali, J., Otto, M. & JohannesSchneider, J. (2020) Virtually in this together – how web-conferencing systems enabled a new virtual togetherness during the COVID-19 crisis, *European Journal of Information Systems*, 29:5, 563-584, DOI:10.1080/0960085X.2020.1814680
- Hsu, H.-C., & Chang, W.-C. (2015). Social connections and happiness among the elder population of Taiwan. *Aging y Mental Health*, 19(12), 1131-1137. DOI:10.1080/13607863.2015.1004160
- Hunsaker, A., & Hargittai, E. (2018). A review of Internet use among older adults. *New Media y Society*, 20(10), 3937-3954. DOI:10.1177/1461444818787348
- Hustad, E., Hansen, J., Skaiaa, A., & Vassilakopoulou, P. (2019). *Digital Inequalities: A Review of Contributing Factors and Measures for Crossing the Divide. LNCS-11701*, 505-519. DOI:10.1007/978-3-030-29374-1_41
- Kadylak, T., Francis, J., Cotten, S. R., Rikard, R. V., LaRose, R., Makki, T. W., & Tsai, H. (2016). Extending the STAM: The role of habit in the acceptance of technology. *Gerontechnology*, 15(0), 39-39. DOI:10.4017/gt.2016.15.s.612.00
- Kadylak, T., Makki, T. W., Francis, J., Cotten, S. R., Rikard, R. V., & Sah, Y. J. (2018). Disrupted copresence: Older adults' views on mobile phone use during face-to-face interactions. *Mobile Media y Communication*, 6(3), 331-349. DOI:10.1177/2050157918758129
- Kania-Lundholm, M. (2019). Slow Side of the Divide?: Older ICT Non- and Seldom-Users Discussing Social Acceleration and Social Change. *Digital Culture y Society*, 5(1), 85-104. DOI:10.14361/dcs-2019-0106
- Knowles, B., & Hanson, V. L. (2018). The wisdom of older technology (non)users. *Communications of the ACM*, 61(3), 72-77. DOI:10.1145/3179995
- Koh, Y.-S. (2016). A Exploratory Study on the Digital Aging Policies as Solutions for a Aging Society. *Journal of Digital Convergence*, 14(11), 115-123. DOI:10.14400/JDC.2016.14.11.115
- Loureiro, A., & Barbas, M. (2014). Active Ageing – Enhancing Digital Literacies in Elderly Citizens. En P. Zaphiris y A. Ioannou (Eds.), *Learning and Collaboration Technologies. Technology-Rich Environments for Learning and Collaboration* (pp. 450-459). Springer International Publishing. DOI:10.1007/978-3-319-07485-6_44
- Maaß, W. (2011). The elderly and the Internet: How senior citizens deal with online privacy. In *Privacy online* (pp. 235-249). Springer, Berlin, Heidelberg.
- McDonough, C. C. (2016). *The Effect of Ageism on the Digital Divide Among Older Adults*. DOI:10.24966/GGM-8662/100008
- Millward, P. (2003). The «grey digital divide»: Perception, exclusion and barriers of access to the Internet for older people. *First Monday*. DOI:10.5210/fm.v8i7.1066

- Mitzner, T. L., Boron, J. B., Fausset, C. B., Adams, A. E., Charness, N., Czaja, S. J., Dijkstra, K., Fisk, A. D., Rogers, W. A., & Sharit, J. (2010). Older Adults Talk Technology: Technology Usage and Attitudes. *Computers in human behavior*, 26(6), 1710-1721. DOI:10.1016/j.chb.2010.06.020
- Neves, B., Waycott, J., & Malta, S. (2018). Old and afraid of new communication technologies? Reconceptualising and contesting the 'age-based digital divide'. *Journal of Sociology*, 144078331876611. DOI:10.1177/1440783318766119
- OECD. (2001). *Understanding the digital divide*. OECD. <https://www.oecd.org/sti/1888451.pdf>
- Paz, C. L., García, N., Fernández, J., & Maestre, G. (2016). El uso de las TIC en adultos mayores en Maracaibo (Venezuela). *Opción*, vol. 32, nº 12, 169-188.
- Peek, S. T. M., Wouters, E. J. M., van Hoof, J., Luijkx, K. G., Boeije, H. R., & Vrijhoef, H. J. M. (2014). Factors influencing acceptance of technology for aging in place: A systematic review. *International Journal of Medical Informatics*, 83(4), 235-248. DOI:10.1016/j.ijmedinf.2014.01.004
- Peral-Peral, B., Arenas-Gaitán, J., & Villarejo-Ramos, Á.-F. (2015). De la brecha digital a la brecha psico-digital: Mayores y redes sociales. *Comunicar: Revista Científica de Comunicación y Educación*, 23(45), 57-64. DOI:10.3916/C45-2015-06
- Pick, J., & Sarkar, A. (2016). Theories of the Digital Divide: Critical Comparison. *2016 49th Hawaii International Conference on System Sciences (HICSS)*, 3888-3897. DOI:10.1109/HICSS.2016.484
- Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. *On the Horizon*, 9(5), 1-6. DOI:10.1108/10748120110424816
- Quan-Haase, A., Williams, C., Kicevski, M., Elueze, I., & Wellman, B. (2018). Dividing the Grey Divide: Deconstructing Myths About Older Adults' Online Activities, Skills, and Attitudes. *American Behavioral Scientist*, 62(9), 1207-1228. DOI:10.1177/0002764218777572
- Ragnedda, M. (2017). *The Third Digital Divide: A Weberian Approach to Digital Inequalities*. Routledge. DOI:10.4324/9781315606002
- Ragnedda, M., & Muschert, G. W. (2017). *Theorizing digital divides*. Routledge.
- Rivoir, A. (2019). Personas mayores y tecnologías digitales. En A. L. Rivoir y M. J. Morales (Eds.), *Tecnologías digitales* (pp. 51-68). CLACSO; JSTOR. DOI:10.2307/j.ctvt6rmh6.6
- Román-García, S., Almansa-Martínez, A., & Cruz-Díaz, M.-R. (2016). Adultos y mayores frente a las TIC. La competencia mediática de los inmigrantes digitales. *Comunicar: Revista Científica de Comunicación y Educación*, 24(49), 101-110. DOI:10.3916/C49-2016-10
- Sánchez-Valle, M., Abad, M. V., & Llorente-Barroso, C. (2017). Empowering the Elderly and Promoting Active Ageing Through the Internet: The Benefit of e-inclusion Programmes. In *Safe at Home with Assistive Technology* (pp. 95-108). Springer, Cham.
- Selwyn, N. (2016). Reconsidering Political and Popular Understandings of the Digital Divide: *New Media y Society*. DOI:10.1177/1461444804042519
- Sixsmith, A., & Gutman, G. (Eds.). (2013). *Technologies for Active Aging*. Springer US. DOI:10.1007/978-1-4419-8348-0

- Tirado-Morueta, R., Aguaded-Gómez, J. I., Ortiz-Sobrino, M. Á., Rodríguez-Martín, A., & Álvarez-Arregui, E. (2020). Determinants of social gratifications obtained by older adults moderated by public supports for Internet access in Spain. *Telematics and Informatics*, 49, 101363. DOI:10.1016/j.tele.2020.101363
- Urban, M. (2017). 'This really takes it out of you!' The senses and emotions in digital health practices of the elderly. *Digital health*, 3. DOI:10.1177/2055207617701778
- Van Deursen, A. J., & Helsper, E. J. (2015). A nuanced understanding of Internet use and non-use among the elderly. *European Journal of Communication*, 30(2), 171-187. DOI:10.1177/0267323115578059
- Van Dijk, J. A. G. M. (2012). The Evolution of the Digital Divide—The Digital Divide Turns to Inequality of Skills and Usage. *Digital Enlightenment Yearbook 2012*, 57-78. <https://research.utwente.nl/en/publications/the-evolution-of-the-digital-divide-the-digital-divide-turns-to-i>
- Van Dijk, J. A. G. M. (2014). Impact: Why Digital Skills are the Key to the Information Society. En A. J. A. M. van Deursen y J. A. G. M. van Dijk (Eds.), *Digital Skills: Unlocking the Information Society*. Palgrave Macmillan US. DOI:10.1057/9781137437037
- Wright, K. B. (2005). Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. *Journal of Computer-Mediated Communication*, 10(3), 00-00. DOI:10.1111/j.1083-6101.2005.tb00259.x
- Yang, H.-L., & Lin, S.-L. (2019). The reasons why elderly mobile users adopt ubiquitous mobile social service. *Computers in Human Behavior*, 93, 62-75. DOI:10.1016/j.chb.2018.12.005