Too old for technology? How the elderly of Lisbon use and perceive ICT

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Abstract

The elderly have traditionally been an excluded group in the deployment of Information and Communication Technologies (ICT). Even though their use of ICT is increasing, there is still a significant age-based digital divide. To empower elderly people's usage of ICT we need to look at their patterns of usage and perceptions. To understand how Lisbon's elderly people (65 and above) use and perceive mobile phones, computers, and the Internet, we surveyed a random stratified sample of 500 individuals over 64 years of age, living in Lisbon. Of those surveyed, 72% owned a mobile phone, 13% used computers, and 10% used the Internet. The quantitative data was followed-up by ten qualitative (semi-structured) interviews. The implications of the results are discussed herein.

Aging, ICT, and Ageism

Grey societies: Defining the new “olds”

An aging population has become a demographic trend of the majority of developed societies, such as Japan, the USA, and Europe (Cf. Moody, 2006). But it is becoming progressively a trend in developing countries as well: the elderly populations are now growing more quickly in developing countries than those in developed countries (Shrestha, 2000). The aging phenomenon is generally attributed to the improvement of health conditions, living standards, and the decline of mortality and fertility rates (Cf. Moody, 2006). Generally, society uses age to define roles and positions in the social structure: societies distribute resources based on socially constructed ideas of what “aging” is (Morgan & Kunkel, 2006). Most developed countries legislatively set the age of 65 as a cutoff to define an elderly, or “senior”, person - associating the chronological age (years lived or years after birth) with the statutory retirement age at which one may legally begin to receive pension benefits (WHO). With the increase of life expectancy rates, those who were once considered “old” are now considered “young” (or at least “not so old”): between 1800 and 2000, life expectancy at birth grew from approximately 30 years to a global average of 67 years (Riley, 2001).

There are, of course, different life expectancy rates across the globe. For instance, data for 2010 shows that Afghanistan is the lowest ranked country with a life expectancy rate of 45, while Japan is top ranked with a life expectancy rate of 83.5 (UN, 2010). It is difficult to define a common limit for the age when a person becomes old, and so there is still no global standard criterion. The majority of European Countries use 65 and over as a cutoff, while the World Health Organization (Cf. WHO) and the United Nations use 60 and above (Cf. UN, 2008). But both organizations use the elderly dependency-ratio: a statistical measure that refers to the elderly as someone of 65 years of age or above.

The process of aging is also subjective: individuals with the same age can have different physical and mental abilities, which may or may not be related to the length of time they have been alive (Cf. Sharkey, 1987). To tackle the heterogeneity of chronological aging, other indicators emerged. From the literature, the commonly used non-chronological indicators of age are:

- Functional age
- Perceived age
- Social age
- Cognitive age

Functional age, referred also to as biological age, relates to physical and cognitive capabilities of an individual, and it’s based on the concept of frailty (Graham, Mitnitski, Mogilner, & Rockwo, 1999). This concept is still subjective, but as evidence shows the scientific validity of the functional age depends largely on the variables/biomarkers used to define it (Anstey, Lord, & Smith, 1996). Recently, a new frailty index considers a set of twenty deficits (symptoms, impairments, and disabilities) that include loss of functional activities, global health condition, and behavioral problems – from hearing loss to difficulty of going out or bathing. The index allows an estimation of frailty and fitness, by comparing the number of deficits present in an individual with the mean number of deficits present in other individuals with the same chronological age (Mitnitski, Graham, Mogilner, & Rockwood, 2002).

Perceived age, also referred to as subjective age, refers to either an individual’s self-perceived age (i.e. what age an individual feels rather than what age he/she is) or the age others perceive that one has (others-perceived age). Some physicians use this measure as a general indicator of a patient's health. It is still a subjective measure, but research has shown that the elderly with younger age perceptions had better psychological functioning (Linn & Hunter, 1979), coped better with health recovery, and reported lower levels of perceived disability (Boehmer, 2007). An “older perceived age” may even be an initial indicator of aggravation of health in older people.
Social age is a way of defining people’s age according to social and cultural experiences. In the case of the elderly, these experiences include, but are not limited to, retirement, widowhood, and becoming a grandparent (Science Encyclopedia). Social age is normally used as a functional classification to characterize life cycles (Gerber, Gross, Signorelli, & Morgan, 1980).

Cognitive age is a type of self-perceived age that is framed by four indicators: feel-age, look-age, do-age, and interest-age. These indicators correspond to the four dimensions of personal age suggested by Kastenbaum et al. (1972). To ascertain each, a person will be asked a question such as: “Which age group do you feel you really belong to: twenties, thirties, forties, fifties, sixties, seventies, or eighties?” and so on for look, do, and interest (Barak & Schiffman, 1981). Each answer (20’s, 30’s, etc.) corresponds to a specific numerical value, which can be then compared to chronological age. Both Barak & Schiffman (1981) and Eastman & Iyer (2005) found that there is a positive association between chronological age and cognitive age. This scale has been mainly applied in consumer research, but it may be reflecting a societal preoccupation with youthfulness (Eastman & Iyer, 2005).

The above definitions of non-chronological indicators of age are not yet entirely reliable or fully used in the field. In our research, while recognizing that the chronological indicator is also limited, we define a senior citizen as someone with a chronological age of 65 and above. Another influencing factor in using this definition was that the Portuguese statistics office also defines a senior as a person of 65 and above (INE, 2010a).

"Don't leave a laptop around an old woman"

Information and Communication Technologies (ICT) can contribute to the improvement of the quality of life of the elderly: “The Internet seems well suited to the needs of the elderly, as a fairly sedentary population with considerable leisure time, especially for social networking, hobbies, and services as the home delivery of groceries” (Norris, 2001:84). In addition, ICT can help to reduce their dependence and promote active aging. And even though the elderly’s use of ICT is increasing, there is still a significant age-based digital divide (Czaja & Lee, 2007).

According to the Eurostat's data on Internet usage (2011), in 2010, 37% of individuals between 55 and 74 years of age used the Internet on average at least once a week, in the 27 countries of the European Union. Comparing to 90% of the individuals between 16 and 24 years of age, and to 73% of individuals between 25 and 54 years of age. But Eurostat includes in the same age group people between 55 and 65 years of age – a population that is an active part of the labor force – with people above that threshold. We argue that this group (people in the 55-74 age range) is too heterogeneous. Considering that the life expectancy rate at birth in the European Union (27) is around 80 (82.2 for women and 76.1 for men – data from 2007)[1] (Eurostat, 2010), we also argue that this type of surveys might be neglecting a significant age cohort.

The elderly are commonly depicted as technophobic. The Oxford dictionary (2010) defines a technophobe as “a person who fears, dislikes or avoids new technology”. This characterization of the elderly might be related to the fact that the elderly are the age group with the lowest ratio of computer and Internet usage, but might also be related to a preconception or a stereotype. We can find evidence of this stereotype in popular culture, from a plethora of cartoons to commercials and videos where the elderly and their use of computers are ridiculed. “Old people use a computer: The Game Show” or “Don’t leave a laptop (sic) around an old woman” available on YouTube are some among many.[2]

Technology is not the only possible source of prejudice for the elderly: there is a set of more general negative and positive stereotypes. This set is a mixed labeling of stereotypes that involves socially desirable and undesirable traits (Fiske, et al. 2002). The elderly are labeled as “incompetent” and “warm” (Cuddy, Norton, & Fiske, 2005; Fiske, et al. 2002). This mixed perception – high perceived “warmth” and low perceive “competence” – is related to what is defined as paternalistic stereotypes (in opposition to envious stereotypes). The paternalistic stereotypes describe out-groups that are not able to harm members of the in-group (Fiske, et al. 2002). The social relationships within groups affect the perceived stereotypes. Groups that are seen as more competitive are also seen as less warm (Cuddy, Norton, & Fiske, 2005; Fiske, et al. 2002).

The current evidence indicates that these stereotypes are not only symptomatic of a western world; they are pervasive and cross-cultural. An international Stereotypes Content Model (SCM) study concluded that students in Belgium, Costa Rica, Hong Kong, Japan, Israel, and South Korea as more warm than their than competent (Cuddy, Fiske, & Glick, 2008). The elderly were also associated with low status and non-competitiveness. And this was reflected even in Asian cultures that are perceived as more collective and focused on the Confucius’ filial piety, such as Hong Kong, Japan, and South Korea.

Moreover, the idea that the old ruled tribal societies seems to be idealized. As the British anthropologist Mary Douglas states, “Often when we read of decisions being taken by the village elders we find that “elder” is a misleading rendering of a world meaning “fully responsible adult male”…The elders are vigorous men in their late 40s. Even where the people are ruled by a council of elders it is thus possible for the really elderly men to carry no weight” (Douglas, 1963:13, as quoted by Fennel, Phillipson, & Evers, 1988).
The stereotypes that are used to characterize the elderly seem to persist in the social structure (Cf. Cuddy, et al., 2005), being deeply rooted in the mainstream discourse. For example, the Portuguese have a well-known idiom “burro velho não aprende linguas” (an old donkey can’t learn new languages), which is functionally equivalent to the English “you can’t teach an old dog new tricks”. Although age affects health, sensory functioning, and cognition, these seem to be generally overrated, especially in older adults/young elderly (Pasupathi & Löchenhoff, 2004).

Literature in the field of work and productivity shows that age affects working skills: job performance seems to decrease around the age of 50 (Skirbekk, 2003). The loss of productivity in aging populations is more visible in tasks involving problem solving, learning, and speed. In tasks where experience and verbal abilities are essential, older individuals maintain a high productivity level (Skirbekk, 2003). But there is also a body of research that challenges the perceptions of the older workers as unhealthy, prone to physical decline, absence, and ineptitude (Cf. McCann & Giles, 2004). Employers rate better older workers in attendance, punctuality, and even performance. And they are less hurt in the job than younger workers (even in risky professions as the police or firefighting) (McCann & Giles, 2004). It is worth remembering that John Glenn, former astronaut and US senator, went out into space for the second time when he was 77 years of age[3]; or that the 76-year-old Gloria Steinem continues to give lectures and speak about feminism and gender equality. In her book Doing Sixty and Seventy, Steinem talks about aging, prejudice, and the social condition of older women (Steinem, 2006). These might be outliers, or not, so we need further research in this area.

This prejudice against older people, or ageism as defined by Butler (1969), has social, cultural, and economic consequences, as it stigmatizes and discriminates the elderly. It creates a “weirdization” and a pathological vision of the elderly that suggests inferiorization, disabilities, and patronage (Fennel, Phillipson, & Evers, 1986). It is not, therefore, strange to notice that ageism is also affecting the digital world.

An aging population undoubtedly brings social and economic challenges, starting with an age-based dependency, but the focus on the costs of an aging population ignores the social and economic contributions of older citizens. A study conducted by Vaus et al. (2003) concluded that Australians over 64 years of age make a valuable economic contribution to their society through out the time they spend in voluntary work and in unpaid care for their families and communities. The authors estimate that this work done by the elderly corresponds to approximately AU$39 billion per year (Vaus, Gray, & Stanton, 2003).

Silver surfers?

So, how accurate are the claims that the elderly are technophobic or incompetent with ICT? Research indicates that age is one of the main factors of the digital divide. Computer and Internet usage are negatively correlated with age (Norris, 2001; Rice & Katz, 2003), creating a “grey digital divide” (Millward, 2003). But, does this mean that the elderly are afraid or cannot engage with ICT?

Several studies have been showing that the elderly are willing to use ICT and can use it with proficiency (Cf. Czaja & Lee, 2007; Malta, 2008). For instance, Malta’s research (2008) on the elderly and late-life romantic relationships, online and offline, has been debunking the idea that the elderly are asexual or technologically inept. However, in general, the elderly face several obstacles: physical problems that limit their ICT usage; lack of a computer with Internet access; and even lack of general interest in ICT (Czaja & Lee, 2007).

Research has also shown that when teaching the elderly to use computer programs, the type of training and the system design make a significant difference (Naumanen & Tukiainen, 2007; Czaja & Lee, 2007). Involving the elderly in the design of the products and an adequate training may be critical to improve the engagement of elderly users. Researchers and teachers need to acknowledge that the elderly are a very heterogeneous group, but that age increase is correlated with some losses in cognition, namely a decline in the so-called fluid intelligence (Czaja & Lee, 2007).

General Fluid intelligence (Gf) is defined as “the ability to reason and to solve new problems independently of previously acquired knowledge” (Jaeggi et al., 2008). Gf is crucial for a great number of cognitive tasks and it is one of the most critical factors in learning. Gf includes working memory, prospective memory, concentration, and spatial cognition, which decline with age (Jaeggi et al., 2008; Czaja & Lee, 2007). Gf has, therefore, a significant impact on technology adoption and usage (Czaja & Lee, 2007). This means that the elderly will be slower when learning new skills or performing some tasks.

But there is new evidence that the Gf performance can be improved by training, even though there is no data or evidence specifically for the elderly (Jaeggi et al., 2008). The crystallized intelligence (Gc), which is related to life experience and acquired knowledge, tends to increase or remain stable with age (Czaja & Lee, 2007). And Gc can be valued “asset” in ICT learning and usage.

In terms of mobile phone usage, studies show that people over 60 make limited usage of mobile phones, having them mainly for emergencies – mobile phones provide the elderly with some assurance, as they can call someone when needed (Kurniawan, Nugroho, & Mahmud, 2006). The elderly seem to avoid some functions of mobile phones, like SMS and other advanced features, because the devices are not user-friendly: the displays and buttons are small and difficult to see (Kurniawan, Nugroho, & Mahmud, 2006).

Comparing Internet and mobile phone usage, Internet non-users are older and with lower income, while mobile phones non-users are less likely to work full-time, have lower income, and...
are less likely to be married (Rice & Katz, 2003). It’s interesting to note that the veteran Internet users were younger, more educated, and with higher income, while the veteran mobile phone users were older, more likely to work full time, and more likely to be married (Rice & Katz, 2003).

Too old for technology? The project

Aging and ICT in Portugal

As of 31st of December of 2009, the resident population in Portugal consisted of 15.2% young people (less than 15 years of age), 66.9% people of working age (15-64 years of age), and 17.9% elderly people (65 or more years of age). The Portuguese aging ratio has increased significantly in the last decades: in 1990, it was 68.1; in 2000, 102.2; and in 2009, it reached 117.6 (INE, 2009). This latest aging ratio differs by gender: 95.7 for men and 140.6 for women (INE, 2009a). In 2009, the life expectancy rate at birth was 78.88, and the life expectancy rate at 65 years of age was 18.19 (INE, 2010a). In a downward trend, in the same period, the crude birth rate was 9.4 (live births per 1000 inhabitants), which was the lowest ever in Portugal (9.8 in 2008); and the general fertility rate was of 38.7 (INE, 2009). These indicators show that Portugal is facing an aging population, as a result of the increase of longevity and the decline of fertility.

In what concerns ICT usage, and starting with mobile phones, in 2009, 88.7% of Portuguese individuals used a mobile phone (INE, 2009). The profile of the computer and Internet Portuguese user is presented in table 1.

Table 1: Profile of computer and Internet users in Portugal, 2009 (%)

| Gender    | Computer | Internet |
|-----------|----------|----------|
| **Total** | 55.4     | 51.1     |
| **Gender** |          |          |
| Female    | 50.1     | 46.2     |
| Male      | 61.0     | 56.2     |
| **Age**   |          |          |
| 16-24     | 94.0     | 89.3     |
| 25-34     | 82.1     | 79.2     |
| 35-44     | 66.9     | 62.4     |
| 45-54     | 46.7     | 40.6     |
| 55-64     | 32.0     | 27.7     |
| 65-74     | 12.7     | 10.4     |
| **Education** |        |          |
| Less than secondary education | 39.7 | 34.3 |
| Secondary education | 94.3 | 92.2 |
| Higher education | 97.0 | 95.7 |
| **Occupation** | | |
| Students | 99.5 | 95.3 |
| Employed | 66.4 | 61.3 |
| Unemployed | 52.6 | 48.0 |
| Retired and other inactive | 19.7 | 16.9 |

**Source:** INE (Statistics Portugal), 2010b

In terms of Internet and computer usage, in 2005, 3.5% of Portuguese people between 65 and 74 years of age used a computer and 2.3% used the Internet. In 2009, 12.7% of Portuguese people in this age group used a computer, while 10.4% of the same group used the Internet. This shows that the elderly people’s usage of ICT is increasing, despite still being the most info-excluded group (INE, 2010b). The same trend occurs with mobile phone usage. The elderly have the lowest usage rate and are the only age group where the possession of landline phone is higher than that of a mobile phone (Obercom, 2009).

The project

Aiming to understand how the elderly use mobile phones, computers, and the Internet, we conducted a study with individuals over 64 years of age living in Lisbon, Portugal. Our main research question was “How are the elderly using ICT?” and our sub-questions:

- Are the elderly using mobile phones, computers and Internet?
  - What is the type of usage?
  - What are their motivations to use it?
  - What are their attitudes towards ICT?

We didn’t define any *a priori* hypothesis, as our aim was to limit our preconceptions of how the elderly use and perceive technology.

This study was based in a mixed methods approach, combining quantitative and qualitative techniques. Through a two-phase sequential study, first, we surveyed a representative sample of the elderly of Lisbon, and second, we conducted ten qualitative interviews.

Locale

The city of Lisbon is the capital of Portugal, counting with 479,884 inhabitants, 116,022 with 65 and more years of age (36.2% are male and 63.8% are female). The next table (see table 2)
compares some general national and regional demographic data.

### Table 2: Selected demographic indicators: Lisbon vs. Portugal (2009)

| Indicator                          | City of Lisbon | Portugal |
|-----------------------------------|----------------|----------|
| **Age (%)**                       |                |          |
| 0-14                              | 14.6           | 15.2     |
| 25-64                             | 61.2           | 66.9     |
| +65                               | 24.2           | 17.9     |
| **Gender (%)**                    |                |          |
| Female                            | 54.6           | 51.6     |
| Male                              | 45.4           | 48.4     |
| **Aging Ratio**                   | 165.9          | 117.6    |
| **Life expectancy rate at birth** | 79.03          | 78.88    |
| **Life expectancy rate at 65 years old** | 18.51         | 18.19    |
| **Old-age dependency ratio**      | 39.5           | 26.7     |

Source: INE (Statistics Portugal), 2010

The indicators presented above show that the city of Lisbon has an older population than the Portuguese average. More visible is the aging ratio (165.9 vs. 117.6) and the old-age dependency ratio (39.5 vs. 26.7). The latter gives us the ratio of the number of people aged 65 and above to the number of people in the working age (15-64 years of age).

Lisbon is also the Portuguese city with the highest computer and Internet usage: in 2009, 57.9% of the households had a computer, and 54.1% of the households had Internet access (INE, 2010b).

### Data collection

#### Survey

Using a random stratified sample, we collected 500 questionnaires of Portuguese people over 64 years of age, living in Lisbon, Portugal. The survey was conducted between May and December of 2008. The questionnaires were administered face-to-face in the interviewees’ household. To select the households we used the random route technique and a table of random numbers that gives us the house and floor (when applicable). Only one person per household was interviewed. Nine trained interviewers from the Institute of Social and Political Sciences, Technical University of Lisbon administered the questionnaires. The survey provides information about how people are currently using mobile phones, computers, and the Internet, their perception about ICT, their social networks, and leisure.

The stratified random sample was drawn out of the 53 local councils that form the city of Lisbon, and four strata were defined according to the number of inhabitants. Sociologically, the strata are homogenous, because the smaller local councils correspond to the old part of the city, with fewer inhabitants, while the more peripheral ones correspond to the new areas of the city, with a higher population. Inside each stratum, the local councils were randomly select to compose the sampling points. We only selected local councils that afforded at least ten interviews. In the final phase of the sample design, we used quota sampling by gender and age, following the demographic structure of the city of Lisbon. The survey data was analyzed using IBM SPSS Statistics 18.

Considering the demographics of our survey sample (N=500), 60% were female, 40% were male. Mean age is 74.34 (SD = 6.453), and participants range from 65 to 95 years of age. Roughly half of the survey participants were married (51.8%). The remaining respondents were widowed (36%), single (7%), or divorced (5.2%); 80.8% are parents and 61% have grandchildren. More than two-thirds (43.4%) lived with a partner, while more than one third lived alone (38.8%). In terms of education, 6% had no formal education, 79.4% had less than secondary-level education, 2.6% had secondary-level education, and 10.4% had higher education. In terms of occupation, 83.2% of the participants were retired, 2.4% were still working, and 11.4% were retired, but still working.

### Qualitative Interviews

Using a mixed methods approach, we also conducted ten qualitative (semi-structured) in-home interviews in 2009. The interviews were done after the survey, as we wanted to explore qualitatively the results of the questionnaires. Interviewees were chosen at random in the city of Lisbon, using a convenience sample method. The interviews yielded information about personal networks, ICT use, and attitudes towards ICT. The interviews were coded and analyzed with NVivo 9.

Considering the demographic of the interviewees (N=10), the age ranged between 68 and 88.
The level of education ranged from no education to University level education. Five of the interviewees lived alone, four lived with family members, and one lived at an elder care institution.

Results

Of the survey respondents, 72.4% had a mobile phone and used it regularly (at least once a week), 13.2% used a computer, and 9.8% used the Internet (also regularly). Of the ten interviewees of the following-up qualitative phase, eight used a mobile phone, and four used a computer and the Internet (or had used it before). Types of usage, reasons to use and not to use, and general perceptions of these ICT are explored in the next sections.

Mobile phones

Considering mobile phones, 72.4% of the survey respondents have a mobile phone. Of these 72.4%, 58.8% are women and 41.2% are men. Assessing it proportionally within the gender group, 71% of the female sample and 74.5% of the male sample have a mobile phone. The Pearson chi-square shows that there is no significant gender difference in ownership of a mobile phone, $c^2 (1, N = 500) = 0.74, p = 0.391$.

In terms of education, 81.2% of the mobile phone owners have less than secondary education, while 5.3% have secondary education, and 13.6% have higher education. Education is significantly related to the ownership of a mobile phone ($c^2 (2, N = 497) = 16.70, p = 0.000$), although it is a moderate relationship ($V = .183$).

The two main reasons to acquire a mobile phone were personal decision (32.8%) and family request (30.4%). The main reasons to use a mobile phone were to talk to family (40.2%), to talk to friends (24.9%), and for emergencies (21.8%). The main reasons for not using a mobile phone were: "don't need it" (34.2%), "don't know how to use it" (21.7%), and "it's expensive" (17.4%). It is worth stating that 4.8% think they are too old to use it.

Of the ten interviewees, eight had a mobile phone. Half of the mobile phone users only use it to receive calls from family members. The other functions seemed more complicated:

- "I only know how to receive calls, I just have to press the green button. As simple as that.
  Ana (70 years old, no education, retired servant, lives alone).

- "I only answer calls, the rest is complicated."
  Carlos (74 years old, retired physician, lives alone).

Despite preferring the telephone, one of interviewees (Ana) says that she doesn’t forget the mobile phone for two reasons: first, it allows her to be always in contact with her family; second, the mobile phone has pictures of her and her grandchildren, which also makes her feel closer to her family. The mobile phone represents what can be defined as a family “memory box”, allowing for the intergenerational sharing of memories in the digital age.

Of the other half, only one participant didn’t know how to make calls: Joana (84 years old, 4th grade, retired domestic) says that she has the numbers memorized in her mobile phone (speed dial), set up by her son, who offered her the device. However, she rarely calls anyone, receiving calls frequently. Her granddaughter taught her how to send SMS, but she doesn’t have patience for it, because it is hard to see and type in the mobile phone keyboard. Joana’s perception of the mobile phone experience is interesting as she reports that the mobile phone makes her feel safer as she lives alone and it is great for emergencies, but adds:

- "I only use the mobile phone at home. Imagine me using it in the street. Speaking alone to my hand... people would think I’m crazy!"

Only one of the interviewees makes a full use of the mobile phone: Rui (68 years old, retired engineer) says he can’t live without his mobile phone, using all its functions, from SMS to Internet access. He also pays his bills through the mobile phone.

The two non-mobile phone users report not needing a mobile phone, as they already have a landline telephone and they feel it is enough for them. But they had a positive image of mobile phones, praising its convenience and usefulness. The only downside was the price – they thought mobile phones were too expensive.

Computer usage

In terms of computer usage, 13.2% of the survey respondents use regularly (at least once a week) a computer: 51.5% are women and 48.5% are men. Proportionally within the gender group, 11.3% of women use a computer, whereas 16% of men use a computer. The percentage of respondents that use a computer does not differ by gender, $c^2 (1, N = 500) = 2.28 (p = 0.131)$.

In table 1, we can see that the education level seems to be of particular importance in the characterization of these ICT users. In the case of our survey sample, 47% of computer users have less than secondary education, while 9.1% have secondary education, and 43.4% have higher education. It is worth recalling that our sample has, in general, 3% of respondents with secondary-level education and 10% with higher education. Evidently, education is significantly
associated with computer usage, \( (c^2 (2, N = 497) = 98.27, p = 0.000) \). Education has a strong effect on computer usage \( (V = .445) \), stronger than in the case of mobile phone ownership.

Considering types of usage, 44.8% use it to go online, 24.1% to write texts, and 8.4% to play. The majority of the respondents have a personal computer (83%), while the rest uses a computer in their family houses (3%) or in public places with computers and Internet access (7.6%). The main reasons for not using a computer are: not knowing how to use it (38.8%), no need to use one (23.5%), and cost (11.1%) and age (11.1%).

Of the ten interviewees, four use a computer, and two own one:

- One of the interviewees (Carlos, 74 years old, retired physician, lives alone) bought a computer when his wife died, because he felt lonely and needed a distraction. He mainly uses it to manage photographs, as he recently bought a digital camera. He says it’s a good tool, because he doesn’t have to develop all the pictures, so he believes it to be cheaper in the end.
- Another interviewee (Rui, 68 years old, retired engineer) learned to use a computer at work, before retiring. Because of his occupation as an engineer, Rui used a significant amount of technology. ICT were, therefore, already embedded in his life. This interviewee can be considered an “early adopter”, reporting having a pager even before it became popular in Portugal. Concerning his computer usage, Rui says that he loves to explore it and has learned a lot on his own. He has a scanner that he uses to scan old family pictures as well as photos from Angola, where he served during the Portuguese Colonial War. He also adds to his collection of army pictures by contacting friends who he served with in the army. He says this is a good excuse to organize gatherings with them. Rui seems to be an outlier, although education is associated with computer usage.
- Taking advantage of some institutional Portuguese programs for digital literacy, Rita (88 years old, 4th grade, retired store clerk) is learning to use the computer at a municipal parish centre. She seems really happy about it, as it is, in her own words, an opportunity to finally learn. She immigrated to Africa, where she lived for 22 years, and to Brazil, where she lived for 18 years. According to Rita, these experiences made her more open-minded about life and learning.
- Similarly, Joana (84 years old, 4th grade, retired domestic) does not have a computer, but she attended an IT course at the IT municipal centre, encouraged by her neighbour. She liked it and she goes back to the centre, once in a while, to go online. But lately she hasn’t been there frequently, as “sometimes even the Internet is boring”.

The six non-computer users report not having or not using a computer because they don’t need one and lack the knowledge to use it. They think, nevertheless, that computers are positive, five of them mentioning that their grandchildren use it for learning and for school.

**Internet usage**

Looking at Internet usage, 9.8% regularly use the Internet – of these 9.8%, 55.5% are women and 44.5% are men. Proportionally within the gender group, 9% of the female respondents and 11% of the male respondents go online. There is no significant statistical association between Internet usage and gender, as the Pearson chi-square indicates: \( c^2 (1, N = 500) = 0.980 p = 0.322 \).

In terms of education, 37% of Internet users have less than secondary education, whereas 63% have secondary education or higher (10.2% have secondary education, 53.1% have higher education). Just like with computer usage, education and Internet usage are significantly related, \( (c^2 (2, N = 66) = 8.11, p = 0.017) \). Education has a large effect on Internet usage \( (V = .350) \).

The Internet is mostly used to search (25.4%), to send emails (21.2%), and for leisure (13.2%). The majority of users are not new to the Internet: 44.9% have used it for more than three years, while 12.2% have used it for less than six months. There are some issues with the way we designed this survey question, because the choice of response was restricted to five options (from less than six months to more than three years). In the end, almost half of the respondents selected “more than three years”, so we were not able to accurately gauge how long these people had actually been using the Internet for beyond three years.

These Internet users think that the key dangers of the Internet are exposing children to harmful content (29.5%), fraud (16.3%), and robberies (15.5%).

The main reasons to not use computers are: not knowing how to use it (44.7%), no need (43.5%), and lack of access to a computer (11.8%).

Of the ten interviewees from the qualitative phase, the four that use a computer, also use the Internet:

One of the interviewees, which is the most avid Internet user, Rui (68 years old, retired engineer), is in the process of turning his digital file of the Angola pictures into a website. He is a daily email user, using it mainly to share photos and messages with his family, friends, and colleagues. In his own words: “The Internet is an amazing new world and I’m happy to be part of it”.
The remaining three Internet users are still in a learning process or feel that they still have a lot to learn. For instance, Rita (88 years old, 4th grade, retired store clerk) is learning how to use a computer and the Internet. She goes online every time she can, to check the news and pictures from Brazil, where she lived for 18 years. She doesn't have a computer with Internet access, so she uses it at her relatives' house, at the library or at the municipal parish, where she is attending the IT course. The other interviewee, Carlos (74 years old, retired physician, lives alone), attended IT classes at a Senior University and knows how to check the news and videos on the Internet, but still feels he's a beginner and he's still overwhelmed by this "new world". Likewise, Joana (84 years old, 4th grade, retired domestic) finished her IT course, but she goes to the IT municipal center once in a while to check information about her village, to search in the archive, and to check the news.

Of the non-users, it is worth noting that although they don't own or use a computer, two of them use the Internet indirectly. We refer to these as faux users: a person that considers himself or herself a non-user but intermittently uses a technology with assistance of others.

The first of these faux users was Ana. Ana has a daughter and a baby grandchild living in Paris. She has never met her grandchild in person. Ana sees pictures of them on Facebook. She has never met her grandchild in person. Ana's family members in Portugal setup the computer and the Internet for her so she can communicate with her family in Paris:

"In these moments, there is always someone with me at the computer, because I'm afraid of touching something and ruin it. I can't read, so I don't know what the words mean. But I can see them and talk to them. And they can see me and talk back to me... it's amazing."

The second of these faux users was Clara (74 years old, 4th grade, retired domestic, lives with husband and three grandchildren). One of her grandchildren, Matilde is studying abroad, in Milan. Clara speaks regularly with her grandchild through Skype, a peer-to-peer video conferencing program. Ana's family members in Portugal setup the computer and the Internet for her so she can communicate with her family in Paris:

So, these faux users are making indirect use of these technologies and benefiting from them.

The remaining four interviewees do not have any type of contact with the Internet. One was not really sure what the Internet is – "Is it like a Television?" asks Jorge (83 years old, 4th grade, retired construction worker, lives with wife). The other three recognized the value of the Internet, especially through what they hear their grandchildren say, but they also talk about "dangers". The non-users spoke about what they hear on TV: a great number of stories about fraud and pedophilia. The majority thinks that parents should be more careful about their kids' usage of this technology.

**ICT usage and perception**

Comparing the usage of the three ICT (see table 3), we can conclude that mobile phones are mainly used to talk to family and friends, and for emergencies. Computer is mainly used to go online and the Internet is mainly used to search, but also for social interaction purposes, such as sending emails. The main reason for not using mobile phones is "don't need it", while the main reason for not using computers and the Internet is: lack of knowledge of how to use it. Age and cost are also reported as a reason to not use a computer, and not having a computer is reported as a reason to not use the Internet.

**Table 3: Reasons to use and not to use mobile phone, computer, and Internet (survey results)**

| Mobile phone | Computer | Internet |
|--------------|----------|----------|
| N= 362 (users) | N= 66 (users) | N= 49 (users) |
| N= 138 (non-users) | N= 434 (non-users) | N= 451 (non-users) |

| Reasons to use | Reasons to use | Reasons to use |
|----------------|----------------|----------------|
| -To talk to family (40.2%) | -To go online (44.8%) | -To search (25.4%) |
| -To talk to friends (24.9%) | -To write texts (24.1%) | -To send emails (21.2%) |
| -For emergencies (21.6%) | -To play (8.4%) | -For leisure (13.2%) |

| Reasons not to use | Reasons not to use | Reasons not to use |
|--------------------|--------------------|--------------------|
| -Don't need to use it (34.2%) | -Don't know how to use it (38.8%) | -Don't know how to use it (44.7%) |
| -Don't know how to use it (21.7%) | -Don't need to use it (23.5%) | -Don't need to use it (43.5%) |
| -Cost (17.4%) | -Cost (11.1%)/ Age (11.1%) | -Don't have a computer (11.8%) |

Aiming to assess the perception of these ICT by the elderly, in the survey, we asked participants if they agreed or disagreed (3-point Likert scale) with the three following statements:

1. Elderly people should learn how to use computers and Internet.
2. Computers are essential for the development of the country.
3. The Internet is essential for the development of the country.
In the first case, 61.8% of the respondents agreed that seniors should learn how to use computers and the Internet, while 21.6% disagreed, and 16.4% neither agreed, nor disagreed. In the second case, 76.8% of the respondents agreed that computers are essential for the development of the country, 7% disagreed, and 16% neither agreed, nor disagreed. Finally, considering if the Internet is essential for the development of the country, 67.4% agreed, 10.2% disagreed, and 22.2% neither agreed, nor disagreed. It is important to emphasise that the "neither agree, nor disagree" response gets higher percentage than the "disagree" one in the two last statements. This might mean that the respondents are not fully aware or don't fully grasp the impact of these technologies.

In general, from the quantitative findings, the elderly mostly have a positive view of these ICT, not appearing to be technophobic.

From the ten interviews, we were also able to explore some perceptions of these ICT. The interviewees (users and non-users) had a positive view of the mobile phones, associating it with family proximity, convenience, and considering it a tool to prevent loneliness and social isolation. Computers were associated with knowledge and leisure. The Internet was associated with services, social interaction, family proximity, and dangers (frauds and paedophilia). In general, even the non-users, acknowledged the importance of computers and the Internet for learning and social interaction. At the same time, all the interviewees addressed the perceived dangers of Internet usage. As Rui (68 years old, retired engineer) puts it:

"It's like everything else. It has really good, and really bad things. Depends on how you use it and who is using it."

Conclusion

This study allowed us to understand the type of usage and perception of ICT by the elderly of Lisbon. While most of the respondents had and used a mobile phone, the majority did not use computers or the Internet. The lack of functional literacy in ICT was the main reason to not use a computer or the Internet. Education was significantly related to mobile phone, computer, and Internet usage. Education levels might be, therefore, an important factor to explain the low adoption of these technologies by the elderly. The lack of necessity was also a reason, even if relatively less reported than the functional literacy. Interesting enough, age was also pointed as a reason for not using a computer (even though comparatively a minor reason, 11%).

Despite the low usage of computers and the Internet, the perception of these technologies by the respondents was mostly positive. For 62% of the survey respondents, seniors should learn how to use a computer and the Internet. In addition, the majority also agrees that computers and the Internet are essential for the development of the country (77% and 67%, respectively). In the interviews, we could find a positive image of these ICT, even for the non-users. The dangers of the Internet were recognized by all the interviewees, but never conceptualized as an obstacle or a motive to prevent its usage.

The majority of the elderly of our study didn't think they were too old for technology and didn't perceive or present themselves as technophobic. However, they faced a significant amount of difficulties: lack of digital literacy, lack of access to a computer, and problems of accessibility and usability. Lack of confidence related to age was also noticeable in some of the interviewees:

"I know I am old but I think I could learn how to use the computer...I don't know, maybe not because I'm so old. But sometimes I think, if my little grandchildren can learn it, why can't I?"

Clara (74 years old, 4th grade, retired domestic, lives with husband and three grandchildren)

So, ageism might even be contributing to elderly people's lack of motivation and confidence in using these technologies. Moreover, 78% of our survey respondents think the elderly suffer from active discrimination.

Finally, two ideas worthy of further research came out of our study. First, we witnessed in some of the cases the value of inter-generational relationships: it was the grandchildren that encouraged grandparents to adopt new technologies. The grandchildren would show and explain their grandparents how to use different devices. Second, the idea of faux users: two of our interviewees reported that they didn't use a computer and the Internet, yet their family would setup it up for them, and so they could talk to family members and friends through the Internet. They wouldn't, however, touch the keyboard or feel that they could use it on their own, while feeling that they were having an engaging social experience.

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Endnotes

[1] In 2030, life expectancy at birth in the **EU27** is expected to be 85.3 years for women and 80.0 years for men (Eurostat, 2010).

[2] [http://www.youtube.com/watch?v=khhC5UkiNd4](http://www.youtube.com/watch?v=khhC5UkiNd4); [http://www.youtube.com/watch?v=OdXnCE8MGW0](http://www.youtube.com/watch?v=OdXnCE8MGW0)

[3] [http://www.nasa.gov/centers/glenn/about/bios/glennbio.html](http://www.nasa.gov/centers/glenn/about/bios/glennbio.html)

[i] All names used in the text are pseudonyms.