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SPANISH SENIORS WITH MULTIPLE IDENTITIES INTERACTING WITH ICT: STRUCTURAL, MATERIAL, AND SYMBOLIC FRAMEWORKS

MSc THESIS IN TECHNO-ANTHROPOLOGY, AALBORG UNIVERSITY

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Abstract

The present thesis unfolds the interactions between Spanish older adults and Information and Communications Technology (ICT). The interactions are analyzed through three different frameworks: unspoken interactions, political and economic structures that embed seniors' relations with ICT, and material or explicit relations observed in the fieldwork. The study attempts to shed light on the complex and intersecting identities held by the informants that influence ICT usage, while discussing the intersectionality theory and Star's work (1990). The methodology is qualitative and consists of interviews and observations of seniors, intervention in a senior center, and online ethnography before and during COVID-19. The results reveal feelings towards ICT, physical barriers, flawed and precise design standards, reasons to use ICT, and the political design playing a role in ICT usage. The thesis concludes discussing the theoretical and research implications.

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Contents

1. Introducing the research problem

We always go out together and he doesn't let me touch the phone because he says that I damage it. He says that anything I touch I bust it, I am afraid of touching everything! (Woman senior, Natalia, before COVID-19, 88 years old)

A couple of seniors[2] and I were talking about their different reasons, life's stories difficulties, and expectations experienced with their mobile phones. The woman then claimed not to feel confident to use the device, because her husband is the only responsible for the phone and does not help her learn to use it. This is only an example of what discrimination in technology may entail which is not only linked to age, but to other social identities that older people hold.

Max Weber considers that multidimensional realms determine human social life (Ragnedda 2017). The position of individuals is valued in terms of status, honor, and prestige and the sources of inequality are rooted in the economy –social class and material interests–, culture –status and ideological interests– and politics –power groups or parties–. (Ibid.) Among different types of inequalities, this thesis focuses on the one that appears in the technological realm, namely, in the use of Information and Communication Technologies –henceforth ICT–.

This thesis understands the use of ICT as a situated practice whereby studying the context of use is relevant along with individual's will. Bourdieu and Wacquant sought to overcome the dichotomy between agency and social environment by analyzing the ongoing relationships between them or *habitus* (1992). Bourdieu also conceptualizes the notion of capital –embodied forms of the social environment employed and held by a person– to understand the construction of habitus. The present thesis pays attention to the different forms of capital and social identities that older adults embody with ICT to understand it as a situated practice.

Digital inequality is the socio-economic gap that determines people's access to ICT (Mbero and Asare 2013). This inequality is partly symbolized in the diverse barriers that older adults experience with technologies which are present in different identities –gender, social class, race, age, social capital, etc.–. This thesis particularly looks into the identity 'age' and how it intersects with other types of identities. A theory that examines the interrelations of them is "intersectionality" which will be discussed in the theory section. To avoid the risk of categorizing older people in pre-assumed identities, this research reflects on its potential biases and the categories are formed inductively. The thesis will also explore networks and power relations that establish the design standards of ICT by observing and analyzing the technology based on Star's work (1990).

This thesis explores the necessities and forms that ICT take in the lives of older people, i.e. this work is a qualitative investigation that looks into the relational components that entail the experience of Spanish seniors with ICT. These interactions are viewed from three different angles: structure, symbolism, and material. The first studies the political

[2] People over 65 years old henceforth

and economic networks that embed the relations of the older participants with ICT, the second looks into the intangible and unspoken elements that embody the interactions and the latter focuses on the physical and explicit relations. It is noteworthy that this framework is not similar to the systemic distinction micro-meso-macro because the thesis' layers are horizontal, explorative, inspired by Clarke's and Friese's situational analysis (2007), and regard explicitly to present and absent elements of the concrete field of research. The structural layer however could be deemed as the macro, nonetheless, it simultaneously encompasses micro-processes that are equally relevant, as well as the silent and material elements that draw on structural elements.

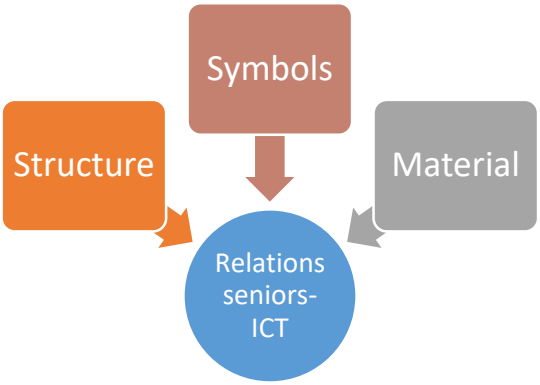

Illustration 1: elements at stake in the interactions between seniors and ICT

The research is done in collaboration with the Ageing Lab[3]. First of all, interviews and observations were performed to seniors holding phones-tablets, whose experience led to later intervene at computer's and smartphone's courses in a senior center until COVID-19 outbreak. The crisis confined the majority of people in Spain and it prompted the research to seek new directions. Therefore, the fieldwork continued and broadened by being involved in WhatsApp groups and performing phone interviews with older adults to examine how ICT helped them get over quarantine[4]. The different methods used have been useful to generate knowledge on the interplay between older adults and ICT while intervene in seniors' communities. The methods in this research have evolved as the given technologies varied, for that, this thesis gathers all by examining the interactions between Spanish older adults and ICT.

The interactions between older adults and ICT have been sufficiently studied, but there is not enough literature exploring this topic qualitatively in the Spanish context, as the research so far has been mainly performed quantitatively. Moreover, the interplay of older people's social identities in the use of ICT has not received great attention, and it has not been investigated yet with regard to Spanish older adults. These gaps elicit the focus of this research on the symbolic, structural, and tangible interplay of older people's social identities in the use of ICT.

[3] http://ageinglab.ctb.upm.es/

[4] It is noteworthy that this thesis does not only attempt to compare the results before and during COVID-19. This distinction is derived from an unexpected outbreak that triggered to continue researching the theme from different angles but whose main point is not to compare.

To sum up, the research question is: *how do Spanish older people with intersecting identities interact with ICT before and during COVID-19?*

The interactions are analyzed from 3 angles:

- Symbolic and silent relations –feelings, contradictions, observations, etc.– that ICT implicitly provoke in the lives of older people.

- Material and tangible interactions that the older adults described and were observable. These consist of design standards, communication tools, motivations, and physical limitations experienced in the use of ICT.

- Structural constraints which embed political and economic actants –corporations, municipality, power relations, etc.–, and determine ICT usage.

Social identities in this study refer to the contextual realities of the older people, which are –symbolic or material– enablers and barriers to ICT usage. The main assumption is that older people are not simply old, but they hold distinctiveness that this research addresses. The identities are explicitly or implicitly observed in the field concerning previous jobs, social participation, age, rural or urban origins, education, physical condition, gender, etc. I might unconsciously disregard some of their distinctiveness because of an own biased perception, for that, they are analyzed inductively and qualitatively.

The non-human actors in this investigation lie in ICT. Different technologies have been researched, however, they altogether are conceptualized as ICT. These are used to access, gather, communicate, and manipulate information (Asociación Europeyou, n.d.). ICT comprise hardware, software applications, and connectivity. They also encompass internet-enabled spheres, wireless networks, antiquate and cutting-edge ICT. (Ibid.) In particular, this thesis analyzes the role of landline phones, radio, television, smartphones and its apps, laptops, and computers.

2. Background of the study

This section reflects on the motivations to do this research, firstly by exploring the context of ageing in Spain and secondly the academic research done on the topic and the gaps in the literature.

2.1. Contextual reasons to study Spanish older people

Spain has contextual realities on ageing and technologies that are interesting to look into. The people's life expectancy in Spain is 83.9 years old, being one of the highest in the world, and the percentage of the Spanish population aged 65 and over is estimated to rise from 19.2% to 25.2% in 2033 (INE 2018). This means that, as the presence of older people increases, the relevance to study this population rises.

This thesis is partly centered on the reasons that exclude Spanish older adults in ICT usage because a large digital divide exists in Spain. In 2018, 48% of seniors between 65 and 74 years old did not use the internet whereas 98% of youngsters between 16 and 24 used it, however, this gap has been reduced by 27% since 2007 (Abellán et al. 2019). This digital divide is part of the interactions seniors-ICT which motivates this research to unfold it.

This thesis focuses on ICT because it holds the premise that ICT enable seniors to have active ageing. ICT have the potential to promote active and successful ageing in areas such as leisure, work, and health provision by preventing age impairments, supporting augmentation of abilities, and helping replace impaired abilities (Charness and Boot 2009; Castro-Rojas 2018). For this matter, Spain still should foster policies of active ageing, as the European countries with the most active older people are Sweden, Denmark, and the Netherlands, whereas Spain is the 18th in Europe–being men more active than women in most of the countries– (CCOO 2019).

ICT could help tackle loneliness by fostering the communication of the older adult. Loneliness is another social problem that affects Spanish seniors and this has been studied as an important factor that decreases life expectancy (Stolz et al. 2016). Data shows that 4.7 million Spanish people live alone and 42.5% are over 65 years old, and within those, 71.9% are women ("Boletín Informativo CRUZ ROJA" n.d.). The given social indicators can be discerned and it can be found that substantial differences lie depending on the 'identity of each older adult, for that reason this thesis unfolds these identities.

Autonomy, independence, health improvement, information retrieval, communication, etc. –elements of active ageing– might be some of the things that ICT enable, therefore this thesis is centered on what embody ICT in the lives of older adults from structural, symbolic, and material analysis.

2.2. Literature review

The following literature addresses the central elements of the technical research previously done on the interactions ICT-seniors. The review is organized in different clusters covering the aspects of the research problem: social identities that mediate in the use of ICT, use of ICT by Spanish older adults, theoretical models that analyze seniors' ICT adoption, reasons to use ICT, physical limitations, bad ICT design standards, recommendations to design for seniors and, finally, results of interventions in seniors' communities with ICT.

Some social identities facilitate more than others the use of ICT. Rice and Katz (2003) conclude in their research that people with high income, working full time, married, and with higher education use ICT more actively. These identities have been as well studied as enablers for seniors to use smartphones (Ma, Chan, and Chen 2016), while Kang and Maity (2013) state that low-income people use phones more frequently than wealthy people regarding SMS use. Tan and Chan (2018) reflect on Bourdieu's practice theory to study the disparities of ICT usage among older citizens in Singapore. They conclude that social and cultural capitals were fundamental to predict ICT usage because of participants' lack of education, supportive social networks, and linguistic skills.

In the Latin-American context, education –above income– was the most relevant factor to use ICT for older people (Gutiérrez and Gamboa 2010). Older people with rural backgrounds experienced technical and social barriers with ICT but gained independence and social engagement through ICT (Baker et al. 2017). Not only education or age regulate the use of ICT: frailty is considered an independent factor of age and education in a Finnish sample (Keränen et al. 2017). Furthermore, regular exercise and health literacy are valuable predictors for health information seeking through smartphones (Oh, Choi, and Kim 2018).

In the Spanish context and quantitatively, González-Oñate, Fanjul-Peyró, and Cabezuelo-Lorenzo (2015) discuss how the economic crisis in 2008 constrained the integration of Spanish seniors in ICT. Their survey showcased that the mobile phone is the most used device (81%) among Spanish seniors and it is used to keep in contact (69%), for entertainment (18%), to converse (10%) and only 2% for training and education. Furthermore, Rosales and Fernández-Ardèvol (2016) indicated that Spanish older adults use the calendar, notes, and address books more often than other generations and they use smartphones less often at home than young people. Both articles point to the rising relevance of smartphones for seniors.

Continuing with Spanish older people, Padilla-Góngora et al. (2017) found in their sample that male elders are more knowledgeable about ICT than female seniors. In their study, older users revealed an interest in ICT and their motivation increased when learning satisfied their needs, when it was practical, and in collaborative contexts. González, Ramírez, and Viadel (2015) discussed that larger involvement with computers lead to positive perceptions towards learning and even older users with elementary education and limited computer knowledge regard ICT positively as a means of connecting with people, entertainment, and keep posted.

Regarding theoretical models on computers' adoption by older adults, Wagner, Hassanein, and Head (2010) stress that research on this topic should focus on the "triadic reciprocality": seniors, computer use, and environments. Similarly, the Technology Acceptance Model (TAM) is widely used and assumes that people assess two components in technology: perceived usefulness and perceived ease of use (Kang and Maity 2013). Renaud and van Biljon (2008) push forward TAM and propose "Senior Technology Acceptance & Adoption Model" (STAM) with a focus on mobile phones. This model analyzes these elements: perceived usefulness, user context, intention to use, ease of learning and use, experimentation and exploration, confirmed usefulness, and actual use. Rejection is generally caused because of a bad experimentation and a feeling that the mobile phone is too difficult to learn (Ibid.).

Reasons to use ICT are forms that mediate the relations between ICT and older people. Many researchers have investigated that older adults use mobile phones to track their health (Ghaffari, Navabi, and Gannat Alipoor 2016; Kim et al. 2014; Morey et al. 2019; Anastasiou, Giokas, and Koutsouris 2015), as well as doing physical activity (Seifert et al. 2017). In addition, safety is one of the main triggers to use mobile phones as the senior can communicate in the case of getting lost, e.g. being especially useful for Alzheimer's users (Leo, Brivio, and Sautter 2011).

For seniors with chronic non-cancer pain, smartphones are worthwhile tools to enhance communication with their social networks, reducing isolation, and improving pain (Richardson et al. 2018). Chen and Schulz (2016) through a systematic review also acknowledge the benefits of ICT to tackle isolation, but they do not have the same effects on all types of seniors. Mobile phones allow seniors to live independently (Vicente and Lopes 2016) and to increase socialization (Ojembe and Kalu 2019; Preston and Moore 2019). Mobile phones also entail certain practices: the first person to call is the partner (Kurniawan 2007) and grandchildren usually teach seniors to use the devices (Mallenius, Rossi, and Tuunainen 2007).

Motivations to use landlines and mobile phones differ, while the first needs a stable location and are traditional devices, the second are movable and new. Landlines' frequency of use is better predicted by the social companionship of seniors than smartphones in a Slovenian sample (Petrovčič, Vehovar, and Dolničar 2016).

Tablets have been discussed by Magsamen-Conrad et al. (2015) who found that these are not commonly used by older adults compared to other generations. However, tablets that provide relevant information on social activities, nearby services, and facilitate communication with relatives are easy to be adopted by older adults (Loiseau, Boog, and Pelayo 2015). Tablets are used for social interaction, brain stimulus, and entertainment (Yasini and Marchand 2016) and as memory aids (K. Chen, Chan, and Tsang 2013). Tablets are also improve mood for older adults with dementia and foster their interactions with caregivers (Gilson et al. 2019). The well-being of frail seniors can also be improved through tablets by developing their online communication with their case managers reducing health care visits (Berner et al. 2016).

This thesis also explores the implicit or explicit elements that make older people refuse ICT. Among the design standards, low quality of interface is a predominant reason not

to use mobile phones and tablets (Abascal and Civit 2001; Petrovčič, Rogelj, and Dolničar 2018; Díaz-Bossini and Moreno 2014), especially among visually impaired seniors. Confusing price, complex menu, small screen, small font of characters, and small buttons limit the use of mobile devices (Mallenius, Rossi, and Tuunainen 2007). Furthermore, scarce evaluation of user needs and incomprehensible manuals are key shortcomings for the mobile industry (Ibid.). Phones also provoke a great readjustment of seniors' life routines (Ling 2008).

In addition to the barriers aforementioned, older adults face growing physical limitations over time. Cognitive barriers –memory and processing speed– are major limitations for the use of computers, plus users get frustrated dealing with them (Czaja et al. 2006). However, tablet computers have been explored as tools to improve these cognitive barriers (Chan et al. 2016). Other physical limitations are visual, motor control, and auditory abilities which deter a satisfactory use of ICT (Eek and Wressle 2011). Moreover, senior users with finger clubbing experience difficulties in standardized touchscreens (Xiong and Muraki 2016), so they suggest minimizing the use of small touch-buttons and flexion-extension in the touchscreens for elderly users (Ibid.). The mental barriers that seniors face with mHealth technologies involve privacy concerns, security, and safety (Chiarini et al. 2013) and low confidence (Mitzner et al. 2010) making seniors feel averse and frustrated with ICT. In this sense, seniors get lost, return to the top of the menu, and spend lengthy time doing tasks (Leo, Brivio, and Sautter 2011).

Recommendations to design standards for senior's phones have been elaborated by Barros, Leitão, and Ribeiro (2014): use the home screen menu as a constant point to return, display the app's categories on the first screen, the keyboard usage should be minimized, adapted wordings, wide space between items, icons along with buttons, and avoid positioning elements close to the edge of the screen. According to Petrovčič, Rogelj, and Dolničar (2018), phones with several functions are more user-friendly than those that integrate only basic features (calls, texting, SOS service, etc.). When functions are completed, clear feedback on that should include pop-ups (Harte et al. 2017). Warning symbols and tones should be evaded (Ibid.). Concerning tablets, Zaphiris, Ghiawadwala, and Mughal (2005) advise developers not to expect seniors to double click and detect small changes, not to include animation and scroll bars, important information should be centered, and colors should be used conservatively.

The intervention is one of the methodological tools of this thesis. Intervention processes with seniors have been discussed by Vaportzis, Martin, and Gow (2017) and Chan et al. (2016). They found out that engagement in tablet training was correlated with better processing speed, i.e. training helped delay cognitive deteriorations of the seniors. Training non-proficient older adults to use smartphones is useful to prevent early rejection and to increase engagement with the devices (Harte et al. 2018), also in the field of m-Health (Lu, Wen, and Chang 2017). Furthermore, seniors being trained with tailored interfaces learnt easily mobile phones (Bruder, Blessing, and Wandke 2014) and senescent people, reluctant to tactile devices, have been studied to eventually become receptive to tactile devices by tasks supported (Fortes, Martins, and Castro 2015).

As it is shown, the interactions of older adults with ICT has been sufficiently researched, however, the gap that addresses this qualitative study concerns the use of ICT by

Spanish older adults, as the research in Spain so far has been mainly done quantitatively. Moreover, the interplay of older people's social identities in the use of ICT is not a common topic of research, plus it has not been investigated yet among Spanish older adults, which triggers the focus of this thesis.

3. Theoretical stance

This section looks into the theory intersectionality to examine the interplay of older people's social identities and draws on Susan Leigh Star's work to discuss the networks that make up stable standards in the design of ICT.

3.1. Intersectionality

The theory 'intersectionality' is useful to analyze and interpret the social position of Spanish older adults because this position is entangled in diverse identities that provoke older adults to be discriminated or privileged in the use of ICT and the aim of unpacking this theory is to reflect on the social identities. It is worth to mention that intersectionality does not often look into age as an oppressed identity, but this work examines this identity along with others.

Intersectionality is an analytic tool rooted in Critical Race Theory and Black feminism that challenged the universality of gender and argued that Black women were oppressed also by class and race (Viruell-Fuentes, Miranda, and Abdulrahim 2012). Intersectionality does not only describe issues relevant to specific populations, but rather it is also an analytical framework for research and theory offering ways to grasp the complex causality that symbolizes social phenomena (Hancock 2007). The point of departure of intersectionality is to understand ethnicity, gender, age, etc., as being something done by people in interactions instead of the quality of an individual (Krekula 2007). The following illustration showcases different types of dominations that intersectionality traditionally analyzes not being bounded to these:

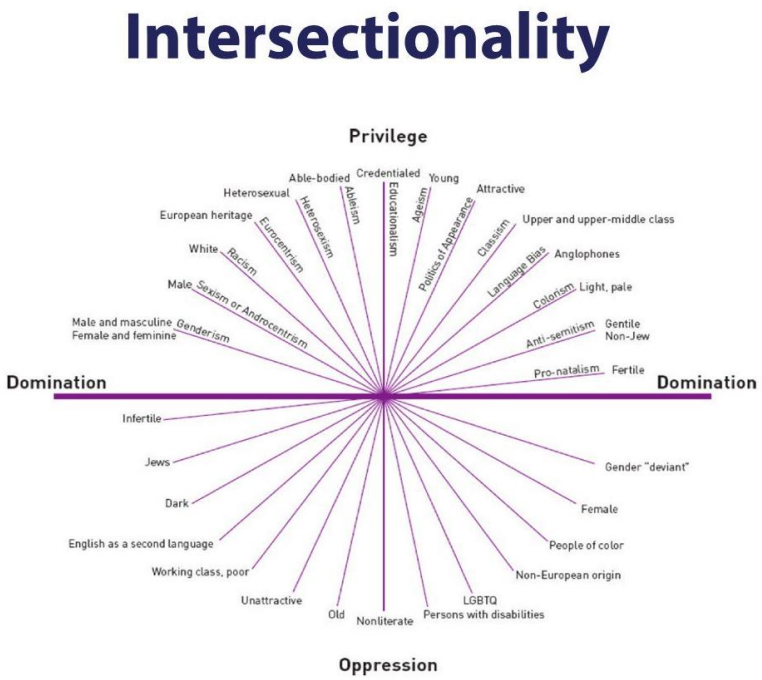

Illustration 2: different identities that intersectionality regards retrieved from "Intersectionality: A Critical Framework for STEM Equity," (n.d.)

Crenshaw (1996) introduced the term ‘intersectionality’ to deal with the marginalization of Black women in law, feminist and antiracist theory, and politics. She also used intersectionality to highlight how social movements and advocacy elided the vulnerabilities of migrants and disadvantaged communities. From then on, scholars have broadened the term engaging other power dynamics and social identities (Carbado et al. 2013). This engagement has enabled to push boundaries and bridge disciplines –also outside academia– and continuously re-build the theory (Ibid.).

Intersectionality conceptualizes that gender, race, and class are mutually constituted and altogether reproduce inequality. Intersectionality does not define discriminations as a sum of elements, but combined effects of practices, e.g. women of color are not discriminated against because race + gender, otherwise, they are holistically marginalized as ‘Black women’ (Crenshaw 1996). This analytical framework also acknowledges that some members with disadvantaged identities hold privileges, e.g. ‘middle-class Blacks’ and ‘White women’ (Cole 2009). This approach can be applied to some of the informants before COVID-19 who, regardless of being old, belong to privileged stratums. One of the assumptions of this study is that privileged identities may influence older adults embracing easier ICT.

Intersectionality is distinct from interlocking oppressions (Collins 2000). Interlocking oppressions refer to the macro-level that link systems of oppression: race, gender, and class. The notion of intersectionality denotes micro-level processes –identities and categories–, so how people take a social position with interlocking structures of oppression. Both together form domination. (Ibid.) To the theme of this thesis, older adults are not supposedly discriminated in ICT by a macro-level structure –e.g. economy– because, to my point of view, discarding older people in ICT design is actually contrary to economic interests of corporations. In contrast, older adults –illiterate, migrants, etc.– have social identities that exclude them from ICT, as ICT companies might be in a micro-level composed of other age groups.

Hulko (2015) also differentiates intersectionality and social location. The first is best understood as an analytical lens to view the social world as an entanglement of identities that make up an individual, whereas social locations refer to the amount of privilege that individuals hold on the basis of identities constructs. Intersectionality would be useful to analyze why older people are entangled in a set of identities and structures that symbolize ICT usage. For instance, a senior who is a rural immigrant, illiterate and woman –having lived in a society that has relegated her in care and home tasks– might have serious difficulties to get ICT into her life. Social locations would serve to analyze the privileged position of each older adult and examine its influences on ICT.

Age and disability are not often regarded in conjunction with race, class, and gender in intersectionality (Hulko 2015). However, the ‘double jeopardy’ notion –that stresses how subordinate positions are on top of each other– portrays the interaction of age and gender which makes women’s ageing more difficult than men’s (Krekula 2007). This notion comes from the field ‘social gerontology’ wherein older women are objects of research and one of its claims is that older women are often neglected in the gender debate. But social gerontology does not deem older women as a subject and disregards theoretical advances on ethnicity, class, sexuality, and disability. (Ibid.) Similarly to social

gerontology, ethno-gerontology centers on ageing experiences in different ethnic and racial circumstances in industrialized nations (Koehn et al. 2013).

Examples of the interplay of older adults and research on their identities stem from Cronin and King (2010). They utilize intersectionality to regard the complex lives of LGB older adults, their multiple identifications, and the present dynamics of power (2010). Their main idea is that an older LGB senior may experience triple discrimination which is related to heterosexism, sexism, and ageism. This population also faces difficulties in the social regulation of sexuality and the normalized model of ageing, while they have also positively developed their own ways of ageing. In my fieldwork, I have not encountered older people holding or exposing LGB identities. However, I did not address this theme in the interviews probably due to my own biased perception of older people whereby I did not expect older people to be LGB.

The intersection between ageing and ICT using the intersectionality lens has not been sufficiently researched. However, some examples are derived from Ratzenböck (2017) who explored identity negotiations of older women with ICT and how ICT can help older women resist against ageist and normative assumptions of seniors. Then, the digital divide has been studied by the privileges that reinforce and facilitate ICT usage in a Canadian sample of seniors (Fang et al. 2019), whose main finding is that age is not the sole determinant of ICT, whereas education, income, status, and gender also come into play. Moreover, Bourdeloie (2018), differentiating intersectionality and Bourdieu's theory of domination, chooses the first for its flexibility and reckons with power relations among French seniors using ICT. They come to the conclusion that gender and class –combined– correlate with age and merge patterns of ICT usage.

3.2. Networks and Standards

As intersectionality is based on the notion that multiple discriminations intersect, Star (1990) grasps this multiplicity and argues that people in intersecting worlds debate, translate, negotiate and simplify, turning out to be representations containing traces of multiple viewpoints. This section discusses her reflections (1990) and how they can be applied to the case of this thesis.

Star examines the role of technology standards in fostering marginality and explores why and how some human perspectives get over others in the construction of truths and technologies. Non-marginalized networks create and maintain standards in technologies because these deny multiplicity and contingency in favor of stability and unity. These networks disregard the ways that standards could have been 'otherwise'. To the present theme, the designers and engineers of ICT may design e.g. for people with visual disabilities –because it is a normalized standard for them– but they do not see older people as a target so their design discards them. This prompts the question who benefits from those standards because companies a priori would not economically profit from inaccessible designs or this might be just a matter that older people do not have enough voice in the mainstream.

Star argues that dichotomous divides are exclusionary: marginalized groups are not simply left out, but they are both in and out at the same time. This stance would interpret older people as not simply marginalized from technologies, but they are in a 'high tension zone' whereby they struggle for being inside. Nevertheless, other social identities would come into play, e.g. social class and gender. In my opinion, understanding the older person in a 'high tension zone' can conversely provoke that the older adult is not conceived as someone discriminated and, thus, is not helped.

Politics arise in connection with technologies when artifacts move from being 'neutral' to being marked objects –e.g. in the form of handicapped access– but this is deceptive as there are always misfits between standardized technologies and individuals' needs. In other words, there are particularities permanently subverting in relation with the standardized. ICT cannot include all particularities of older people as they embody many different identities –sexual orientation, gender, etc.–.

Analysis should move from the experience of non-users to the analysis that technologies are possibly contingent. The point of Star is not to reject standards, nor try to find technologies capable of including all kinds of particularities. Otherwise, she sheds light on a high tension zone that unfolds the properties of conventional and standardized networks. To this case, it is useful to see the networks that create non-inclusive technologies for older people and why and how they benefit from this. For designers, it can serve to trigger an inclusive product design –or contingency– that acknowledges multiplicity while recognizing the impossibility of endless flexibility.

4. Methodology

The methodology of this thesis comprises three stages which have been carried out since October 2019. The first stage includes observations and interviews which were useful to generate knowledge on the seniors' use of mobile phones and tablets. With an attempt to apply this knowledge, the second stage was based on intervention at computer-smartphone courses in a senior center until COVID-19. The crisis led to online ethnography through which participatory observation in WhatsApp groups and phone interviews with the same participants of the senior center were performed to know how they deal with COVID-19 confinement through ICT. This section enlightens the different methods that on one hand served to collect data to unfold the research problem, on the other hand, altogether targeted a bigger aim: bridge two fuzzy worlds, one is knowledge production and the other is to help older people.

Illustration 3: an overview of the methods performed

All data collected (transcriptions, pictures, and field notes) has been coded in NVivo. The software helps organize data and frame an investigation. Coding the data has been done by doing a thematic and processes analysis. The list of codes evolved over I analyzed more data, for example, an emerging theme not addressed in the interview guide was "Landline Phones", but the participants brought it up often. The language used in the interviews has been Spanish, so the given quotes in this work have been translated to English, although field notes have been directly written in English.

Generalizations are founded in the dominant patterns from the informants' interviews and observations of the field. The sample of informants is diverse and their insights are useful to be examined, as well as the selected and different methods enrich the quality of this thesis. Furthermore, the strategy has been chosen upon an in-depth analysis of the informants through qualitative methods.

4.1. 1st stage: interviews and participant observations

The methods performed herein were semi-structured interviews and participant observations with 15 seniors, held in October 2019. These methods were chosen because they aided me to get acquainted with the interactions between older adults and phones-tablets. The informants hold different identities and diverse ICT usages which are interesting to compare and examine in detail. 15 seniors and 1h7' spent with them were considered sufficient to enrich this qualitative investigation. This work is also situated in the internship carried out at Ageing Lab which was later published (Gomez-Hernandez, Villalba-Mora, and Ferre 2020).

The interviews were semi-structured to let the participant speak with freedom without going beyond the topic of research. Kvale (2007) defines interviews as conversations with structure and purpose. With an attempt to build rapport, I initially asked about participants' past experiences and their daily life. Then, the topic of discussion narrowed down firstly addressing technologies and secondly mobile technologies, as these were the focus of the research by then.

Interviews and observations were performed all at once, but observing, taking notes, and interviewing simultaneously was somewhat difficult. Spradley (1980) explains that ethnographers observe social situations composed of activities, actors, and a place. Once the observer grasps the social situation, he/she can link other social situations around by focusing on clusters of situations in one place, networks of actors' proximity, and situations of similar activities (Ibid.). The observations were sometimes nonparticipant not to interfere when the informant was using the mobile phone and allow error and success. Yet, other times my observations were participant, as the informants asked me few times how to use certain functions of the mobile phone so I had to intervene, while other moments, they got stuck doing a task so, without being asked, I helped them out proceed.

The interviews took place in quiet spaces where the participant was able to focus. Being familiar to the senior enabled me to conduct the interview at their houses, which allowed it to last longer and felt comfortable. Other interviews were conducted in neutral places (cafeteria, hospital, etc.) when the participants did not know me enough. The following field note reflects on the setting and comes from an interview that I had with a woman senior at the Hospital:

> Unfortunately, I really lack observation in a daily setting like her house!! Having an interview is great, but I would love to find out all this by spending a long time with her. (Field note, 1st interview with Ana)

Some interviews were performed with the older person and her partner at the same time, which on one hand limited the partner's speech, on the other hand, it enhanced the interview in terms of data. The seniors, in general, spoke on behalf of the couple and I did not perceive significant differences whether one spoke more. Furthermore, performing interviews in couples allowed not to overload the participants, as two interviews were held at once. Some interviews did not provide me with a lot of information regarding technologies because of time constraints, but for example one of them was basically spent listening to the priceless past life of the senior:

> But in this interview, the phone was secondary, her story was heard, which I consider more valuable right now. I got quite moved by her story (Field note of the 2nd interview with María)

Before the interviews, I asked the informants to bring their phones to see how they use a known device. I also brought an external tablet to the interview as it is not an easy device to carry and I assumed that most of them would not have a tablet nor know what it is. An example of how helpful is to use a known device:

> Bringing the phone definitely helped me deal with the interview in a more realistic scenario. I wouldn't have as much valid information as now without having used the phone in the interview. I think it would be just out loud words. (Field notes, 1st interview with Ana)

A consent form was signed by the informants and I made voice recordings to later transcript relevant parts of the interviews. The interviews lasted 1h 7' on average, in which around half of the time was meant to empathize and the second half to talk about mobile technologies. I used jottings to take notes of the field, the participant and methodological lessons. Jottings are short sentences or keywords to aid the researcher to memorize the situation (Bernard 2011).

4.1.1. Access to the participants

The first 4 informants were met through the SPRINTT project. This is a European investigation that, within Spain, happened at *Hospital Universitario de Getafe*. Its team was formed by doctors, nutritionists, and physiotherapists. Ageing Lab has had an earlier relationship with this team which enabled access to them. Initially, I came to two sessions to get to know the participants and then perform the interviews. They had a prior walk to warm up –so I walked along with them– and then physical exercises (zigzags, squads, etc.). In the beginning, I sat beside them waiting for the session to finish, but I eventually joined the activities as it was reasonable to build trust. I talked with different seniors every session and, when I felt we built rapport, we scheduled an interview. From SPRINTT, I got to interview 4 seniors until the project finished by mid of October 2019. The following picture is an own representation of the setting:

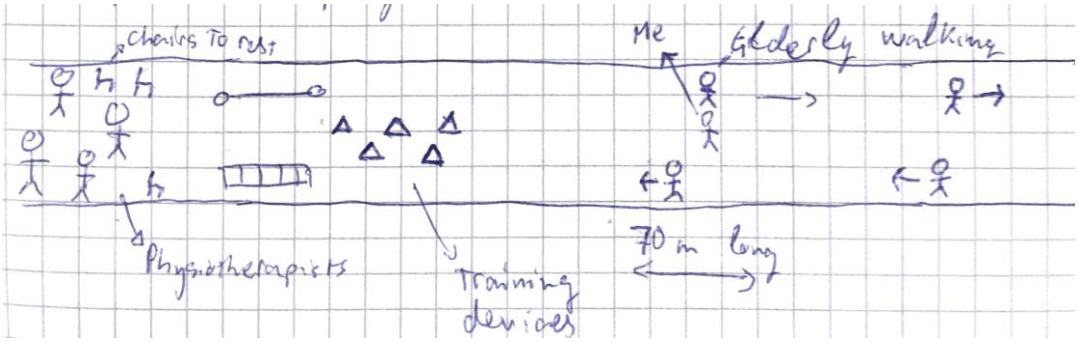

Illustration 4: corridor where senior participants of SPRINTT did exercises

When SPRINTT finished, I sought seniors in my network: they either live close to me or they are friends' and colleagues' relatives. With this strategy, 11 more older adults were interviewed. The prior condition was to belong to a low socioeconomic background, as people with this background is with whom Ageing Lab often works. But the informants eventually came from diverse contexts and it was difficult to measure their socio-economic background. To solve that, I considered analyzing the income statistics of their neighborhoods. However, I would have excluded participants with different identities useful to examine and I would have limited the research with deductive assumptions that I have tried to avoid. Thus, I decided not to reject and limit informants because of their

economic background. However, it is noteworthy that there is a majority of seniors coming from a disadvantaged background, also in the other stages.

4.1.2. Sample of initial informants

Table 1: sample of participants

Informants	Age	Previous jobs	Gender	Education level	Years Madrid	Social participation	Family bonds	Physical state
Ana	78	Housewife	F	Elementary	62	No	Strong	Fine
María	80	Cleaner	F	Elementary	60	No	Strong	Fine
José	83	Assembler	M	Elementary	60	No	Strong	Fine
Laura	88	Cleaner	F	Elementary	56	Yes: cognitive-physical	Weak	Fine
Pedro	70	Engineer	M	University	Always	No, active lifestyle	Normal	Fine
Elena	65	Administrative	F	Technical education	Always	No, active lifestyle	Normal	Fine
Félix	90	Taxi driver	M	Elementary	Always	No, IMSERSO	Weak	Fine
Natalia	88	Housewife	F	Elementary	Always	No, IMSERSO	Weak	Frail
Estefanía	81	Cleaner	F	Elementary	-	Yes: physical	Strong	Frail
Juan	82	Factory worker	M	Elementary	-	Yes: physical	Strong	Fine
Carmen	88	Administrative/ housewife	F	Elementary	Always	Yes, slightly	Strong	Frail
Alberto	68	Taxi driver	M	Elementary	50	Yes: physical	Strong	Fine
Esther	73	Director NGO	F	University	Always	Yes: vulnerable groups	Strong	Fine
Josefa	79	Director IT	F	University	Always	No	Weak	Fine
Nuria	66	Director IT	F	PhD	Always	Yes: civic	Weak	Fine

The names of the 15 initial seniors have been invented. The table contains the information that they expressed in the interviews and my observations. The mean age of the participants is 78.5 and there was a majority of women. 11 seniors had manual jobs in the past (taxi driver, housewife, etc.) and elementary education. Conversely, 4 informants had skilled jobs (director ICT, engineer, etc.) and higher education (university degree or PhD). Even though it does not appear concretely where they live because of confidentiality, all participants live in Madrid or outskirts. 7 are migrants from rural regions of Spain having lived a mean of 57.6 years in Madrid. I observed that 12 had functional capacity and 3 looked frail. 8 seniors indicated not to participate in public activities with other older people while 7 seniors reported participating in social activities.

4.2. 2nd stage: Intervention in a senior center

The second stage of the research was based on intervention in a senior center. The knowledge generated during the 1st stage served to teach me and consequently intervene in a community of older adults between January-February 2020 being the first time that I intervened as a research method. My initial purpose was to get more informants to carry out the research, so the managers advised me to attend the ICT

lectures to get to know the students and later interview them. However, attending the lectures did not simply consist of observing and keep quiet, otherwise I was somehow influencing the setting and the students. Moreover, I did not want to generate knowledge by itself, but to put it in practice, therefore, I decided to get into action and help. I observed and took notes besides intervening which proved that the boundaries of the methods were not so distinct.

The intervention consisted of being an assistant teacher in ICT lectures. I attended a total of 9 lectures: 6 for computer learning and 3 focused on phones. Out of these 9 lectures, 4 were for basic users and 5 for advanced users of ICT. Each level had a different teacher and there were roughly 9 students per class: mostly women at the basic level, while men were the majority at the advanced level. All students were Spaniards except for a woman who is from the Dominican Republic. From some talks with students, they were around 70 years old.

To have a general view, there are 213 senior centers in Madrid which promote active ageing, integration, participation, and belong to the Community of Madrid's administration. These are meant to elders over 60 and physical, intellectual, cultural, artistic, and leisure activities are organized.

4.2.1. Field

The senior center is called "Centro de Día José Manuel Bringas"[5] and it is located in a southern neighborhood in Madrid, Orcasitas. To have a broad view of Orcasitas, in 2018, the net annual income was 23.156 euros per household and it is within the 31% poorest in Spain and 10% in Madrid's region ("Experimental Statistics. Tables: Household Income Distribution Atlas" n.d.). Besides this economic feature, other factors are discussed in the thesis.

The senior participants live in the blocks –social housing– located in the vicinity of the center. The center's manager is a social worker and, in our first meeting, he explained to me that the center's participants are very active in terms of social and political movements. For example, I was going to attend a lecture, but the teacher warned me to better come another day because students were attending a rally[6] asking authorities to remove a poisonous material of their blocks:

> The seniors in this neighborhood are so active that they yesterday attended a rally against the politicians that are not doing anything to remove asbestos from the roofs of the blocks. In the lecture, the students began to talk about the past rallies and social movements that they were part of in the 80s and they still are.

[5] https://www.madrid.es/portales/munimadrid/es/Inicio/Servicios-sociales-y-salud/Direcciones-y-telefonos/Centro-Municipal-de-Mayores-Jose-Manuel-Bringas-/?vgnextfmt=default&vgnextoid=bf0066051361c010VgnVCM1000000b205a0aRCRD&vgnextchannel=2bc2c8eb248fe410VgnVCM1000000b205a0aRCRD

[6] https://www.elperiodico.com/es/madrid/20200219/vecinos-orcasitas-protesta-ayudas-asbestos-7855255

> They also talked about the social problems that dwellers face in this neighborhood: Orcasitas. (Field notes, 4th day at the senior center)

The streets in this area have names related to the 70s when the residents co-organized protests to ask for improvements in Orcasitas. Some of the street's names are *participation*, *associations*, *citizen's movement*, *solidarity's square*, *assemblies' square*, etc. The manager also described that the level of education is low and most of the dwellers come from rural Spain. The community of dwellers seems that, regardless of their disadvantaged economic background, they still are participative which makes them have a wide and bonding social capital. The latter might be related to the economic factor: as they have economic and social needs, they unite and work collectively. To get a glimpse of the neighborhood, these are pictures of the blocks and wall painting that are next to the senior center:

Illustrations 5: vicinities of the senior center

Despite being a public center, the majority of the staff comes from an outsourced company. The center is part of a building that also houses a public nursing home. As far as I could see, it has a cafeteria, a pool table, a computers' classroom, and a place to do physical exercises. The computers' classroom lacks a heating system, thus an old stove heats the room. There are 11 computers for an average of 9 students per class and, even though the computers are old, they work well. The only problem lies in the access to the internet, as many times the public Wi-Fi does not work.

Getting access to this center was achieved through a bureaucratic procedure in the administration. I have a close friend who works as a caregiver in the center, so she was the gatekeeper that provided me with the contacts of the managers. I began asking for access by mid of October 2019 and I did not get confirmation until the end of December. The manager and I had an initial meeting to get to know each other's purposes. Then, we arranged an official meeting with more participants where we agreed that in exchange for the fieldwork, we would organize activities for the center's staff and seniors at Ageing Lab. From that day on, I began to participate in two ICT courses, one for advanced users and another for elementary users, with two different teachers in each.

4.2.2. Intervention

The philosophers have only interpreted the world in various ways. The point, however, is to change it. — Karl Marx, 1845, Eleven Theses on Feuerbach

Interventions along observational methods have been long discussed in social sciences and Marx's quote reflects on the traditional conflict that arises between social sciences grounded on describing the world and those that intervene to change the state of play.

Zuiderent-Jerak and Bruun Jensen unpack interventions (2007). Interventions allow the researcher valuable insights into the processes of technological change and they differ from the study that merely describes a situation. Interventions' outcomes are often impossible to control, complex and risky, thus 'ethics of specificity' enhance sensitivity's researcher towards the practical and political consequences of transformations. Furthermore, interventions prompt enter in hybrid spaces with mutual influences and negotiations between agents (Ibid.). Even social sciences' grant proposals are progressively requiring scholars to elaborate on the practicality of research findings (Zuiderent-Jerak 2015).

Descriptive sciences and interventions might seem to have a dichotomous nature, however, Zuiderent and Bruun claim that this divide blinds the researcher to the multifactorial dimensions of any investigation (2007). This division is rooted, on the one hand, in the fear of contamination by practice, on the other, the fear of irrelevance. Descriptions inevitably constitute a type of intervention as they allow research to link with agendas and concerns. Zuiderent-Jerak ultimately proposes 'engaged social science' as a rigorous and relevant strategy to overcome the dualism of critical and objectivist scholars (2015).

My initial purpose was to become familiar with the students and then carry out individual interviews and workshops to learn mobile phones. However, the coronavirus crisis hampered this strategy, thus, I settled for the data that I collected from my participation up to that point. As my initial focus was on mobile technologies, the last lectures of the courses centered on mobile phones instead of computers. Moreover, the teacher was not warned about my presence which elucidates a slightly flawed organization, but teachers and students were glad for receiving some extra help from me.

In the first lectures, I only wanted to observe, but later I realized that I could help students out with their tasks while observing and writing notes down. The participants received assignments from the teacher such as writing emails, download YouTube songs, use Drive, prepare documents in Word, etc. My role was to sit in a spare table, offer help, or wait for the students to call me. The students were very active and used to interrupt the teacher often with questions, yet they were concentrated. This attitude in my opinion comes from an insecure attitude doing their assignments. The lectures lasted 1h 30' and there were no breaks between them, so it was tiring when I attended two in a row. The next illustrates my role in the senior center:

> Overall, I think my presence is being useful, as I am helping them out, without of course leading the class or disturbing the teacher. As soon as I stepped out of

> the class, the elders began watching me surprised by seeing a young guy in the nursing home. Then, I approached to some guys who were playing French billiard and they got shocked by my lack of knowledge –I have always played American billiard and I didn't know this type–. (Field notes, 1st day at senior center)

This intervention, on one hand, has been useful for a group of seniors learning ICT, on the other hand, has shed light on the relations that seniors hold with ICT. In this sense, my intervention is close to the term 'engaged social science' that bridges two apparent different epistemologies: observational and interventional social sciences (Zuiderent-Jerak 2015). In my background, I have been trained to do observational studies, but this thesis has taught me that the boundaries between them are fuzzy. In my opinion, researchers –while observe, interview, or survey a person– transform a piece of reality by changing the person's mindset, revealing findings, or disturbing people's lives.

4.3. 3rd stage: online ethnography during COVID-19

When COVID-19 spread around Spain, all citizens were confined and the crisis hit especially older people. One of the derived problems of confinement for older people was lengthy isolation. I initially did not want to research how elders were dealing with confinement, as I had enough data from the intervention and interviews to understand the meanings of ICT in older adults' lives. However, the ease to reach participants, my organization, and controversial moment convinced me to incorporate it. With a controversial moment, I mean that COVID-19 was such a critical moment that research on how to provide older people with means to tackle confinement was needed. I considered that ICT could be those means, so the research focused on how ICT was helping them or not in terms of communication, health information, entertainment, information retrieval, etc. The outbreak was also a stimulating moment to try different methods out, as online ethnography. Incorporating this angle has ultimately enriched the work by analyzing ICT in a unique reality and has given a broader picture of the relations of older adults with ICT.

At the beginning of the outbreak, the main teacher of the senior center got me into two different WhatsApp groups –one for advanced students of ICT and another for elementary–. Later, I did short phone-interviews with some of these seniors. In WhatsApp, the seniors and I kept chatting about how we are doing, solved riddles and games, exchanged videos and pictures to keep motivated during confinement, etc. WhatsApp is the most popular communication app in Spain and it allows chatting between individuals or in groups, sending voice messages, pictures, videos, and documents. In addition, we occasionally had videoconferences by the online platform 'Jitsi' whereby 4 or 5 of us gathered to talk.

Staudacher and Kaiser-Grolimund (2016) wrote about the ethnographic role of WhatsApp in a community of Tanzanian older adults. This app enabled them to overcome the social and geographical conditions of the older people, as researchers could digitally follow ideas and people. Since contacting informants is easy, WhatsApp helps reduce informants 'drop-outs' during an investigation. It also supports understanding the field as a 'network' rather than as a 'location'. Another positive aspect

is that WhatsApp can democratize the relation between informant and researcher, but it can conversely blur the boundaries between researcher and informant misinterpreting friendships or information. (Ibid.)

Following on their work (2016), WhatsApp nonetheless entails risks, as the collected data only represents a group of active participants, in this way it can reproduce a digital divide between non-users and users. Secondly, WhatsApp might only provide narrowed information to the researchers, missing an in-depth analysis, and, unlike offline fieldwork, a continuous relationship is difficult to stop after the research is completed. Finally, they advise researchers to reflect on their own role in the groups of WhatsApp and how they can influence the setting and answers. (Ibid.)

I am still a member of the WhatsApp groups but I have been less active over time. This resonates with the challenge of being a member because of research or because I am a friend of them. Yet, I plan not to leave the groups after the research is done. One problem in my case lies in the fact that I have not done an in-depth analysis of WhatsApp, because it has not been the main research tool and I have not known the participants for so long. A fact that showcases this is that I do not know some members in person and I do not have them in my list of contacts. Furthermore, this hinders understand the field as a network rather than just as a platform where to collect some relevant data from time to time. Being a member of these groups has also made me be online almost all my time, as this app is not like Slack or Gmail where one answer only in working time. The elder can see if you are online and it is 'culturally' impolite not to answer relatively quick, especially from informants that I am using in my research. Nevertheless, it has been a worthwhile tool that provided interesting insights examined in the analysis and it helped overcome the challenge of doing ethnography in COVID-19.

Apart from WhatsApp observation, I had 9 phone calls with the participants. First of all, I asked in the chat group who would be willing to have a short call with me to talk about confinement and technologies. 7 students of advanced level accepted the call and 1 from the elementary course. This could mean that either elementary students do not trust me as much as advanced students or that advanced students pay more attention to the chat and participate more in activities as such. Then, I also had a call with a senior who was a colleague's relative. If I had insisted somewhat more, I think I would have got more informants. However, I settled for the informants because of time constraints. Moreover, I felt committed to carrying out the interviews with the people that replied to me back as I did not want to make any of them feel neglected.

We conversed about how they are coping with COVID-19 confinement through ICT. The phone-interviews lasted around 20 minutes and I transcribed its relevant parts. Even though I knew most of the informants from previous lectures, phone-interviews challenged the intimacy that interviewer and interviewee build in offline spaces. Some conversations were cold and others more synergic. This type of interview also posed the difficulty that visual dialogue was absent, thus occasionally misinterpretations and overlapped conversations happened.

4.4. Ethical considerations

'The field' involves a wide range of actors with whom the researcher has a relationship. In this sense, the researcher must produce encounters with actors from which to create material to analyze, but which are not at the expense of the actor. This approach leads to thinking about *the ethics of encounters*: formulate what behaviors are right and wrong (Thrift 2003, 2). However, there are no easy answers about what is right and wrong. Ethics is a pragmatic question of how one in action contributes to the stretch of expression of the world or prolongs its capture. The researcher has to think through the numerous dilemmas that continually infest his/her practices. (Ibid.)

In this investigation, all real names have been anonymized, so random names have been made up. A consent form has been signed by the interviewees and they allowed me to record the conversation for later transcription. The voice recordings, photographs, and transcriptions were archived in encrypted storage units, following the indications of Aalborg University[7], that only me have access to the informant's data. The form consent explained to the participants that their participation is voluntary and their data is subject to be deleted anytime they wish.

For the intervention, I got a confirmation from the managers of the center to attend the lectures, although I do not have a written consent from the senior participants. In our first encounter, the teacher, students, and I agreed that I would attend the lectures, observe, take notes, and help them out with their tasks. I took pictures of the seniors' mobile devices for which there was no written consent either but spoken consent. To process the data of my field notes, all names have been anonymized.

Some ethical challenges arose in the interviews. For example, the seniors' grandson –a friend of mine– took me to the seniors' house and he was present in the interview. I began asking questions relating to family bonds and this made the grandson feel awkward. After the interview, he asked me to send him the voice recording and because of my relationship with him, I mistakenly shared the recording. However, as soon as I realized my mistake, I stopped sharing the document and requested him to delete the archive in case he downloaded it, which he accepted without hesitation. In relation to his presence, on the one hand, was beneficial to allow me access, on the other, hindered the interview:

> The fact that my friend was present throughout the whole interview, could help make his grandparents feel in a safe environment. However, I could feel that he was not feeling very well with some of the responses of his grandparents. All of a sudden, the couple criticized their sons and relatives for not meeting the needs of them, for not visiting them frequently and having a quite distant relation with the family. This private information made the grandson feel awkward, or maybe the seniors brought it up to motivate my friend to visit them more often. So if he wouldn't have shown up for the interview, they would have not talked about this information. (Field notes, interview with Félix and Natalia)

[7] https://www.studerende.aau.dk/gdpr/gdpr_english/

During the intervention, I faced difficult situations in which I did not know how to react. In an ICT class, a woman senior –who seemed to have depression because of her husband's death– began to sob and to tell me how much she misses her husband. She could not focus on the tasks and I tried to make her forget about it and get her back to the computer. I did not want to be cold with her, but at the same time, I thought that learning ICT would empower her to overcome depression. Other awkward encounters happened with an informant that I probably had not comforted enough. He –crying– claimed that increasingly gets blank dullness which makes him unable to solve things. When an anthropologist asks questions, some sensitive data can be touched and it is challenging to see what role the anthropologist must play in that case: either to go ahead with the interview or to help the person. After the interview, he asked me for a copy of the consent form and I drove him and his wife to a restaurant. In exchange, he offered me some money that I refused.

Another challenge came up when a participant of the advanced course got some notifications in his phone screen from a WhatsApp group of Vox's supporters –Spanish far right-wing party–. I could not avoid looking at it and it surprised me to meet a student with such ideas in a neighborhood as Orcasitas. Despite my efforts not to prejudge him, my relation with him got slightly biased. Nevertheless, he was nice to me in general. For example, after a lecture, he told me some stories about his experience as a former soldier in Morocco and invited the teachers for a coffee, which proves that political ideas do not define entirely a person.

Other ethical issues arose when an informant suspected that the interview was meant to sell her a phone. This made me think that getting trusted by Spanish elderly people is tough, especially if they do not know me enough. I also perceive that the older adults who are going through current economic struggles or previous difficulties tended to distrust me more than other informants more privileged.

4.5. Situational analysis

Situational analysis is used to gain an overview of themes, processes, and actors that emerged in the fieldwork and help guide this thesis, but first of all, it is necessary to understand that situational analysis comes from grounded theory. Grounded theory has been focused on analyzing qualitative data to enlighten the actions of participants in a particular situation (Glaser and Strauss 1967). Clarke and Friese (2007) acknowledge the strengths of grounded theory, although they argue to push grounded theory further around the postmodern move. While modernism stressed generalization, universality, stability, and rationality, postmodernism shifted emphasis to complications, instabilities, situatedness, and fragmentations. Clarke and Friese then suggest situational analysis (2007) whereby the conditional elements of a situation need to be detailed in the analysis of them as these elements constitute the situations, not merely frame them. Everything in the situation both affects and constitutes everything else: things and people, discourses, humans and nonhumans, fields of practice, controversies, symbols, organizations, institutions, etc. Then, macro/meso/micro levels dissolve in light of presence/absence and forefront the full situation of inquiry.

For that, Clarke and Friese suggest situational maps as these display the major elements of situations and incite analysis of relations among them (2007). These maps are projected to discuss and grasp the messy complexities of a situation in their variations and dense relations. When researchers are dealing with “analytic paralysis”, situational maps are used to get the researcher moving in and around the data. Furthermore, the experiences of doing the research should be used as data for building these maps. The relational analysis takes each element and its relation with others, then the nature of the relationship is examined. These maps generate breakthrough thinking which is the main analytic goal of research. Furthermore, the maps are firstly messy which are then ordered.

The next drawing illustrates the messy map of the elements that have constituted this thesis. The transcriptions of the interviews and field notes have been the basis to build the maps. First of all, there are non-human elements that together form ICT and are linked with a blue line. The explicit discourses constructed upon the non-human actants are linked with a black line and the silent-symbolic elements that entail older adults-ICT are connected by a pink line. Then, the implicit socio-cultural elements are linked with a light brown line and have framed all the research. The political and economic elements are the structural factors associated with a purple line. The human elements –participants of this research–, debates, spatial, and temporal are not connected per se but are linked to certain ICT, socio-cultural and structural actants.

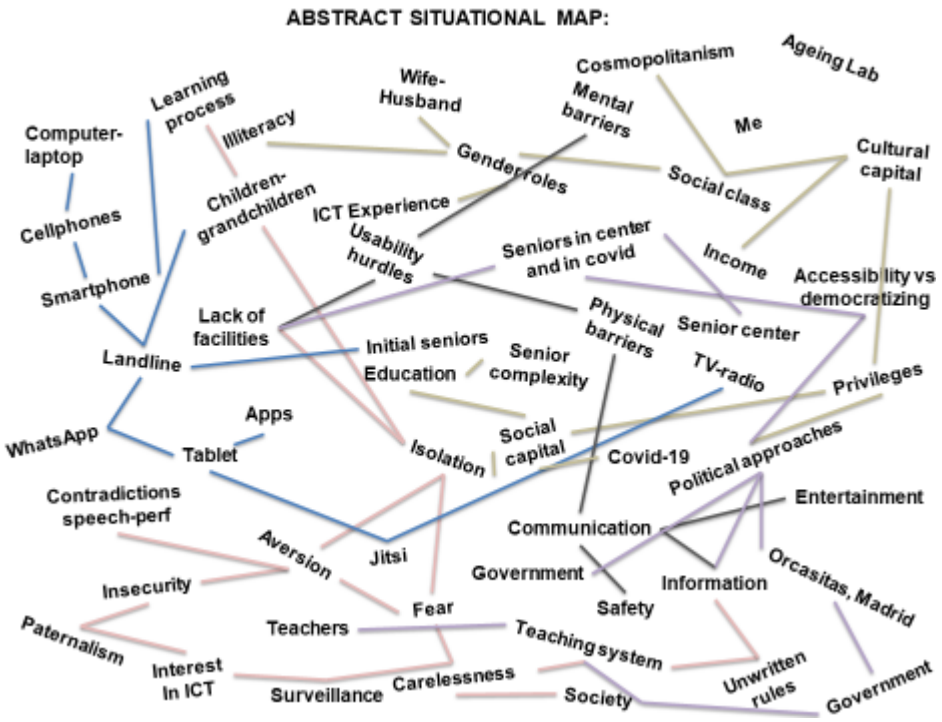

Figure 1: first messy map of the elements that constitute the research. Template retrieved from Clarke, Situational Analysis 2e

Then, an ordered version of the map is in the next table. The goals of these maps have been to frame the analytical section of this thesis, i.e. to help me recognize which are

the major elements and connections between them. It has also been worthwhile to find the research question of this thesis.

Table 2: an ordered version of elements that constitute this research. Template retrieved from Clarke, Situational Analysis 2e

INDIVIDUAL HUMAN ELEMENTS/ACTORS	***NONHUMAN ELEMENTS ACTORS/ACTANTS***
15 initial and diverse seniors; seniors in the senior center; teachers; seniors during COVID-19; me as an assistant, participant, observer and interviewer; seniors' sons and grandchildren; wife-husband.	Cellphones, smartphones, tablets, computers, laptops, landline phones, WhatsApp, TV, radio, Jitsi, Facebook, camera, transport app, health apps, newspapers apps, other apps.
COLLECTIVE HUMAN ELEMENTS/ACTORS	***IMPLICATED/SILENT ACTORS/ACTANTS***
Senior center, Ageing Lab and firm, SPRINTT, government, ICT stores.	Fear, insecurity, carelessness, , loneliness, patronizing relation son-senior, contradictions speech-performance, unwritten rules, teaching system, discriminating identities
DISCURSIVE CONSTRUCTION OF NONHUMAN ACTANTS	***MAJOR ISSUES/DEBATES***
Barriers (usability, design standards, physical –hand tremor, finger clubbing, low vision, frailty– and mental barriers –memory, speed–), surveillance, information retrieval, adversity, associated practices, motivations (safety, communication, entertainment, independence), big or absent interest in ICT	Am I leaving out identities of older adults and am I pre-assuming some identities? How complex older people are? Where were the identities more emphasized? Is a socio-economic approach actually relevant to ICT usage? Does ICT facilitate or hinder seniors' lives? Should design be accessible or should we train older adults to use normalized standards? Why networks create this design –economic profits, ignorance, etc.-? Why is the State concerned about older adults' learning ICT? Will adults around 50 use so good ICT when they reach 70? Is there an inevitable deterioration that hinders ICT usage?
SOCIOCULTURAL/SYMBOLIC ELEMENTS	***POLITICAL/ECONOMIC ELEMENTS***
Social capital, social class, political activity, rural background, low or high	Lack of facilities in the senior center and in seniors' homes. Economic constraints

education or cultural capital, absent or large work experience with ICT, gender differences, income, cosmopolitanism, privileged vs non-privileged, all seniors live at home. I tried not to pre-assume them.	of participants. Social and political history of Orcasitas. Which ICT tackle digital divide? What is the economic interest?
TEMPORAL ELEMENTS	***SPATIAL ELEMENTS***
Before and during COVID-19	Spanish, Madrid, Orcasitas context.

From this, I find three layers of the research conflicting with each other but, at the same time, interrelated. The 1st layer encompasses the symbolic or silent relations between ICT and older adults: fear, contradictions, unwritten rules, gender roles, etc. The 2nd layer addresses the tangible or explicit relations: physical limitations, ICT usability hurdles, reasons to use ICT, etc. Finally, the 3rd level spans the political-economic-structural elements that determine the interactions: lack of facilities, COVID-19, economic limitations, debates, etc.

5. Unfolding the relations seniors-ICT

> There is a woman senior, the one who is depressed, who doesn't understand how to use WhatsApp very well. She thinks that every message she gets in the group is directed to her, thus she answers with the same voice recordings every time: "*Fulanita*, I have seen your message, I am alone waiting for my son to come, ala, bye bye" regardless of the content of the message. She sometimes sends voice recordings crying and saying how lonely she is now. I remember from the lectures that she was one of the lowest skilled with ICT. I called her today and told me that she is very bad due to her husband's loss a few months ago –the same reason that she brought up during the lecture ICT–. (Field note during WhatsApp participation in COVID-19)

I met this woman in the senior center, who simultaneously embodied structural, tangible, and symbolic interactions with WhatsApp. During COVID-19, she had perceptible typing difficulties, so she used voice recordings instead. Furthermore, it seemed that she did not grasp some of the app's unwritten elements: not need to reply to every message in the group. She also faced structural –gendered and educational– disadvantages, yet unspoken: illiteracy, widowhood, depression due to her late husband, she lived alone, and she was very low skilled in ICT because her husband was in charge of ICT. She proved it every day in the group chat.

The latter is an example of the interactions that older adults embody with ICT. This section discusses these interactions from different angles –structural, explicit, and symbolic– and it also attempts to unfold the research problem: *how do Spanish older people with intersecting identities interact with ICT before and during COVID-19?*

The analysis is divided into 3 sections. The first focuses on the symbolic-silent relations that older people personify with ICT, then the second chapter addresses the explicit-tangible elements, and finally the structural factors that embed ICT and older adults by facilitating or constraining their relations. Throughout the analysis, it is paid attention to the diverse social identities of the participants and how these affect ICT interactions. The two periods –before and during COVID-19– are not explicit points to compare, but these are points of reference to address the statements.

It is noteworthy that the analysis contains, crossed or separate, quotes-field notes from the interviewees, field notes of the intervention in the senior center, and quotes-field notes of the research during COVID-19. The devices most regarded during the fieldwork were smartphones, so the analysis has a special focus on these. Cellphones, landlines, and tablets are addressed to a lesser extent. The computer's use was observed in the senior center and regarded in the interviews during COVID-19, besides radio and TV.

5.1. Symbolic-silent relations

This section enlightens the unspoken interactions that older adults hold with ICT, by looking beyond elements easily recognizable or regarded in the fieldwork. Some of these

symbolic elements are loneliness, surveillance, safety, fear, low self-esteem, apathy, inconsistencies, communication, etc. that arbitrate the relations between older adults and ICT.

5.1.1. Surveillance and paternalism

Surveillance is linked to paternalism and both are silent components that implicitly influenced on the informants. In the context of this research, I observed a strong patronizing relation between son-daughter and elder when it comes to surveilling them. Sometimes this relation has been more explicit than symbolic, however, this relation embodies a cultural interaction that to my point of view is very widespread in the Spanish context, but not for all types of seniors. This is seen in the fact that sons and daughters teach elders how to use the devices, buy them, check the bills, tell them what to do, etc. Most of the informants before COVID-19 used the former mobile phones of their grandchildren and adult children, and 9 informants were taught by their relatives to use the phones. An example that illustrates the paternalism:

> My son tells me not to take the phone, but to call. (…) Everything is set up by my son (…) I have orders from my son, the tablet is to play, the phone not. (Carmen, widowed woman, before COVID-19)

Before COVID-19, several seniors did not use to take the mobile phone on the street so as not to be monitored by their children, otherwise, sons would call them, geo-locate, etc. Other informants acknowledged being obliged by their children to carry the mobile phone outside to be safe. Ana explicitly regarded this surveillance, she is a widow so her sons take care of her and she is very reluctant towards ICT. This symbolizes that ICT disturbs her life more than it helps, due to her sons:

> I do not take the phone outside, otherwise, they know where I am. They have you controlled. When I am home, they never call me, but when I am out, they call me. (…) My sons nag me a lot. If something happens to me, the hospital will call my sons and as they are all day with the phone, they will see. I often neglect the phone on the table. (Ana, widowed woman, before COVID-19)

Regarding surveillance before COVID-19, two women seniors were concerned about it with a different approach than Ana. Josefa, who can be considered as a privileged informant due to her vast experience with ICT, is truly adverse towards geo-localization apps like google, acknowledging that this perception is derived from her work experience in the ICT sector. In parallel, Nuria –who also holds a large experience with ICT and could be labeled as one of the privileged– is really concerned about the hazards when technologies trace users, but she perceives it as a toll:

> I consider it as a collateral drawback in my age. It's like a toll to pay to use google. Or you are camouflaged in flight mode. At my age, I think I benefit more than I risk (Nuria, before COVID-19).

In these cases, surveillance symbolizes a direct relation between ICT and user, unlike the previous examples that include son-daughter as mediators. In other words, for Ana and Carmen, a strong component related to social capital lies in her interactions with ICT which is absent in Nuria and Josefa because no relatives arbitrate their relation with ICT. Moreover, Josefa and Nuria are also cautious with social networks because they do not feel the need to show their private life.

Josefa's and Nuria's concerns make me doubt whether these would be common among older adults without such experience and education in ICT because I think this ultimately influences on being worried about these issues. However, COVID-19 might have triggered to think about this, as the interplay of surveillance and ICT has appeared more often in the crisis. Inversely, I cannot imagine Nuria and Josefa being monitored by their sons with ICT because they hold such a privileged experience that would not make it possible.

5.1.2. Feelings towards ICT

> I was in the metro and I counted 10-12 people with the phone. (…) You can't say good morning to anybody because they are with the phone (Ana, woman senior, before COVID-19).

ICT entail different moods and feelings that informants approach depending on their identities and positions in society, for instance, the last quote is a negative perception of what ICT provoke in society. Most of the initial informants before COVID-19 had an adverse approach towards ICT and deemed several hazards: replacement of face-to-face communication, addiction, etc. At the same time, some of them felt impossible to get on the track of its rapid transformation.

Pedro, Esther, Josefa, and Nuria –who use ICT regularly and could be labeled as privileged– still were somewhat reluctant towards ICT. They have previously worked in tech-organizations, hold higher education, and demonstrated to use the smartphone and tablet properly. Except for Pedro, they are all women, which means there is no preponderance of men over women when it comes to ICT usage, at least among the privileged informants. This resonates with one of the conceptualizations of 'intersectionality': the existence of privileged people amongst the unprivileged –white women, wealthy blacks, etc.–. These informants, despite their age and gender, other identities come into play: social class, work experience with ICT, education, etc.

Before COVID-19, another common feeling towards mobile phones was that these enable them to be safe, as elders can be in contact when going out. However, during confinement, safety was not so deemed as before, because seniors are allegedly safe at home. To understand how safety is perceived by older people, the following quote exemplifies how a woman ascribed meaning to her phone in relation to her partner, in a way showing a difference in gender. This couple hold a cellphone for each, they are non-frequent users of ICT, did not have tech-jobs, nor higher education:

> Because of the stroke, they advised us to have one phone for each, as he sometimes goes for a walk while I cook and tidy up the house, and the walk takes too long, then I call him and he tells me he is with so-and-so. (Estefanía and Juan before COVID-19)

Throughout the COVID-19 period, the seniors of the center deemed a positive perception of ICT. It seemed that being confined was a trigger to use ICT, while for others the perception of ICT had not changed as they used ICT regularly before. It is noteworthy that the informants in confinement held previous knowledge and a symbolic interest in ICT which could provoke their optimistic perception. As an example, a man elder mentioned the utility of ICT namely to tackle isolation and to communicate with his sons:

> If it wasn´t because of technology, I wouldn´t be able to talk with my sons and nothing. This (COVID-19) would be way worse without technology. It comes to be useful to talk and see each other too, although by video-call. (Francisco, interviewed during COVID-19, man elder)

Other feelings that arose concurrently were low self-stem. The informants who preferred to keep their cellphone over a new smartphone reported a lack of self-confidence to learn the latter. They blamed their age and felt self-assured with their cellphone due to its simplicity. Connecting simplicity and low self-esteem, an informant said: *I asked him for a phone for rednecks, to call and receive calls* (Alberto, man elder, before the outbreak). This feeling was only common amongst the unprivileged informants who did not have substantial enablers to have a smartphone. Low self-esteem also holds a strong gendered component, for instance, Natalia manifested to be afraid of doing something wrong with the mobile phone because of her husband:

> We always go out together and he doesn't let me touch the phone because he says that I damage it. He says that anything I touch I bust it, I am afraid of touching everything! (Natalia, woman senior talking about her husband, Félix, before COVID-19)

Besides low self-esteem, frustration emerged in the senior center when a participant got irritated learning the smartphone of his wife –he was the only student in the elementary course without owning a smartphone–:

> One of them is getting really frustrated with the smartphone. He doesn't have one so he is using his wife's, he is not used to these devices. I told him to stay calm and do not lose motivation because of errors. I don't seem to convince him, so next time he says he is not going to bring his smartphone to class because he gets stuck in every step, which is not true. He says he prefers a classic phone. (Field notes, 6th lecture, elementary level)

Alongside frustration and low self-esteem, fear to try new things was commonly found amongst the unprivileged informants. In the senior center, I noticed that the students used to follow step by step the indications of the teacher which reveals that they were afraid of improvising. This can be derived from the former strict school system during Franco's dictatorship, wherein one needed to meticulously follow the teacher. Another

feeling that came up in the interviews was a fear to get cheated. In this regard, Laura related her cellphone with fraud: *as the cellphone entails so many frauds, I don't want to get into trouble* (Laura, woman senior, before COVID-19). Besides that, a man senior showcased dread to test new apps during COVID-19 because of economic –being charged– and cultural barriers –fear on the internet–:

> I haven't tried anything new on the phone, I am a bit scared because you might get into a place where you bust something or you are charged (Francisco, interviewed during COVID-19).

Other informants reported feeling careless with ICT. Some seniors regarded carelessness as a lack of excitement with ICT. Carelessness was linked with low self-esteem: *as we know we can't manage them, as we can't remember data, we haven't worried about this* (Estefanía and Juan, before COVID-19). Other informants deemed carelessness with tablets, as their grandchildren already have them and they do not need them.

Two opposite examples of carelessness stem from Josefa and José. Josefa –having large work experience with ICT and is a frequent user– acknowledges having such an "absolute dependence" to her smartphone that she cannot go out without it, while José –without experience with ICT and who uses the phone only outside– places his cellphone on a table aside from the entrance gate not to neglect it as he often does.

Finally, blaming one-self has been very concurrent among the participants. This was found in an unwritten element that consists of not deleting everything when one mistakes in the keyboard. I observed it many times in the senior center: the students used to delete the whole text when they wrote something wrong, instead of moving the cursor to type the exact number or letter right. Then, when I advised them to do it my way, they blamed themselves rather than claim a non-friendly design. I believe that if the student would have a more privileged position –in terms of class, gender, ICT knowledge, etc.– he or she had not blamed him-herself. Another example of self-criticism –which can be understood similarly as ICT controlling the elder– was regarded in an interview: *the phone is too patient with me* (Carmen, woman senior, before COVID-19).

5.1.3. Contradicting speech and performance

The informants have symbolized some contradictions throughout the fieldwork. When they were asked about the differences between a smartphone and a cellphone, they claimed not to know. However, they proved to be aware of the differences over the course of the interview. It seems that they answered what was expected from them: lack knowledge on questions related to ICT.

Despite the seniors showcased adverse attitudes towards ICT or told that they did not know many functions of the device, I experienced other inconsistencies in this. For instance, Pedro and Elena declared to use their smartphone only on holidays, later acknowledged to use it only when notifications pop up, and finally declared to use their smartphones only before going to sleep. Other informants alleged not to be aware of

what a smartphone is in spite of having one. It seemed that the informants pretended to show a reluctant attitude towards ICT, regardless they proved good performance and frequent usage of ICT. I reflected on this in one of the first interviews:

> I am starting to realize that if I ask the elderly a direct single question about technology use, they tend to tell me that they don't know or they don't use it. But when I ask follow up questions or ask them to show me, they actually know what I mean! They are quick to say NO to me! But if I make them think a bit, they prove to know well. This may be due to very low self-confidence. (Field note of the interview with Laura and José before COVID-19)

Other inconsistencies arose when Ana declared to feel confident with her smartphone but constantly repeated that technologies are not her thing, falling ICT into disuse. In parallel, Alberto regarded no difficulties with his cellphone while acknowledging them:

> With this phone, I don´t have any difficulty. I don´t know how to write messages. My sons save contacts. (…) I don´t use the menu and I can´t delete the messages. Later, my daughter gets rid of them. (Alberto, man elder, before COVID-19)

The inconsistencies aforementioned might be a result of a general perception of seniors with ICT. Youngsters and adults do not expect older people to handle ICT properly, thus seniors reject these technologies and eventually embrace the perception that they do not have knowledge of ICT nor use them, regardless they actually do. Nevertheless, I do not think these inconsistencies are connected to a certain social profile or identity since diverse informants –Pedro and Elena, Laura, and José– have shown this. On the other hand, it might be connected with low self-stem which is more common among the unprivileged informants.

5.2. Explicit-tangible interactions

This section addresses the bodily components that entail the interactions between ICT and older people. These have been explicitly regarded by the informants or were easily observable. The interactions of this kind encompass the devices possessed by the participants, physical limitations that hinder ICT usage, the usability flaws and facilitators of ICT, and explicit motivations to hold and use ICT.

5.2.1. Revealing ICT possession

Illustrating the possession of the devices is useful to analyze an explicit interaction, which also reveals to what extent older people interact with ICT. In the 1st stage of the research, all informants held a phone, excepting a couple that has one for both. Only half of the sample had smartphones and 5 participants reported having a tablet. The usage time of ICT was 14.4 years on average, with a large disparity. The frequency likewise varies: half of the sample use the phone at least once a day.

Regardless of the unprivileged participants' background in the senior center –low experience with ICT, social class, etc.–, almost all had a smartphone. This might be due to a prior interest in ICT which triggers them to have an updated device and because of a bodily reason: their young age, 70 approx. Likewise, some advanced students own a laptop or a desktop at home. These students were well-versed with ICT in the course and had a large interest in ICT which may prompt them to have a computer. In these cases, while the social class does not seem to be so predominant, other factors may be relevant like the motivation to keep connected to society. Later, all interviewed older adults during COVID-19 had a smartphone, 3/9 had a tablet and 5/9 declared to hold a computer –which I cannot connect to social identities due to a lack of observation nor I do not know them so well–.

Tables 3: possession of devices amongst the interviewees in 1st and 3rd stage

Before covid	Phone	Smartphone	Tablet	Years of use	Use frequency
Ana	Yes	Yes	No	22	x
María	Yes	No	No	8	x
José	Yes	No	No	8	x
Laura	Yes	No	No	10	Once 15 days
Pedro	Yes	Yes	Yes	20	On holidays
Elena	Yes	Yes	Yes	x	On holidays
Manuel	One for both	Yes	No	x	Once a day
Natalia	One for both	No	No	x	Once a day
Estefanía	Yes	No	No	2	Twice a day
Juan	Yes	No	No	1	Twice a day
Carmen	Yes	Yes	Yes	x	Not often
Alberto	Yes	No	No	7	Once a day
Esther	Yes	Yes	Yes	30	Constantly
Josefa	Yes	Yes	Yes	20	Constantly
Nuria	Yes	Yes	No	40	Constantly

During covid	Phone	Smartphone	Tablet	Computer
Teresa	Yes	Yes	No	x
Lola	Yes	Yes	No	No
Leire	Yes	Yes	No	Yes
Begoña	Yes	Yes	Yes	Yes
Luisa	Yes	Yes	No	No
Francisco	Yes	Yes	No	Yes
Jesús	Yes	Yes	No	Yes
Antonio	Yes	Yes	Yes	Yes
Pilar	Yes	Yes	Yes	x

5.2.2. Physical limitations

The physical conditions of the seniors were easily observable and influenced to a great extent on ICT usage were. These encompassed low vision, limited memory, finger clubbing, and hand tremor.

Before COVID-19, I observed that 10 out of 15 seniors faced serious bodily barriers. One of them is limited memory that hinders remembering the steps to do different functions in their phone and to recall phone numbers. In the senior center, several students could not remember their emails' passwords. For example, one of the students was illiterate and had the password written down in a paper and, when logging in, she wrote the word 'password' beside her actual password, showcasing that she had great literacy barriers. An informant claimed in confinement that she often forgets the necessary steps to complete things in her tablet and attributes it to her age. Moreover, a man elder complained about his limited memory that he got after a stroke:

> I always carry my sons' and daughters' number phones –he began to sob not knowing why–. I get blank dullness and a moment arrives when I cannot solve

> issues. (…) He had a stroke –wife says–. (…) I remember her phone number, but not my sons'. (Man elder, 9th informant before COVID-19)

Besides limited memory, low-vision was a common hurdle and this was mainly due to myopia and cataracts. The older adults with this barrier struggled to find things on the phone screen. Low vision also forced them to wear glasses while using their mobile phone. Others declared to have deafness that hampered them to hear calls and listen to the caller's voice, on top of that, one reported having vertigo.

Another relevant limitation was that many older adults had a real poor thumb performance, as a result of finger clubbing and hand tremor. They did not use to click accurately on the touchscreen or keyboard: *her main problem is that she struggles with clicking on the right button* (…) *This makes her miss the app often and have to return back to the initial steps* (Field notes of the interview with Carmen before COVID-19). Seniors with these limitations used to have manual jobs, which symbolizes an interplay between social class and health condition. Another example stems from a woman who used to be a seamstress –tough job concurrent among women– all her life which limit ICT usage. She faces triple discrimination in terms of social class, gender, and age:

> A woman states that her fingers are thicker than mine because she has worked as a seamstress all her life and has had many problems with her hands because of that. That makes her struggle with typing on the keyboard. (Field note of the 3rd day at the senior center)

Moreover, most of the older adults could not type in their phone with two thumbs. In the senior center, many older adults struggled to click twice on the mouse and keep it still because of hand tremors. They moved the mouse while clicking so they could not enter in the different applications of the computer. It was also confusing that, by the mouse, the senior needs to click once or twice depending on the computer app, folder, etc.

5.2.3. Reasons to use ICT

Motivations are relevant and explicit mediators of the interactions between seniors and ICT, otherwise, they would not use the technologies.

Some of these motivations are health tracking, for example, to set up reminders for medicines and to make appointments to the doctor through the public healthcare app "Cita Sanitaria Madrid". In the elementary course of ICT, some of the participants already had this app downloaded and found it really useful, whereas others did not have it. In confinement, two women used healthcare apps to delay non-urgent appointments with the doctor to avoid the risk of infection at the hospital: *I got appointments cancelled, they warn me by email or messages through the healthcare app. I also arrange appointments for my neighbor* (Lola, woman senior, in COVID-19). Healthcare apps can in a way replace children supervising the seniors' health, because they are often in charge of sending reminders about appointments, medicines, etc. –a common thing in Spanish families–.

Besides health, most of the seniors reported that communication with their children was a determinant reason to use mobile phones. In Spain, there are strong and close kinships among relatives, for this reason, the mobile phone might be a worthwhile device for them. Drawing on communication and isolation, a couple of seniors –with higher education, previous tech-jobs, and frequent users of ICT– highly valued the utility of smartphones and compare it with the landlines:

> Now you look dumb if you don't have a phone, you're isolated. If it wasn't for the phone, I wouldn't have communication with many friends. Because the landline phone is not used by anyone. (Pedro and Elena before COVID-19)

Regarding the used apps by the smartphones' holders before the outbreak, for instance, Ana –despite she is averse to all kinds of technologies– is also a huge fan of football and follows the last updates of Real Madrid through *Marca*. Carmen, in the app MyTaxi, requests taxis to visit her husband in his nursing home. In spite of their elementary education and former manual jobs, they are active users of their smartphone and Carmen of other ICT. These cases contradict the assumption that elementary education and former manual labor prompt a non-use of ICT. In other words, social class, gender, etc. can help older people embrace ICT, however, motivation –e.g. to follow your team– or belonging to a strong social network –e.g. by visiting your husband– can be better predictors of ICT usage.

Smartphones' owners, in the interviews, expressed to have these devices because of beauty and usefulness. These informants simultaneously rejected to go back to their cellphones. In this way, it seems that smartphones, regardless of their usability problems, solve more problems in seniors' lives than cellphones. This idea leads to the question of what solves the digital divide, it seems that seniors do not need simple or out-of-date devices, but training. For instance, Ana, despite being very critical towards ICT, rather keeps her smartphone:

> I like more smartphones than the classics, it's another style, not that brick, it's more practical, you can save it in the pocket. And I stare at phones in the stores, to see how beautiful they are (Ana before COVID-19)

Apart from smartphones, other ICT came into play, yet not so relevant. For instance, tablets were mostly covered among the informants before COVID-19 as it was the focus of the research by the time. Elena, along with her partner, uses her tablet to seek information on recipes, trips, fashion, transport, and weather. She utilizes the tablet more often than her husband –Pedro– who prefers the computer. I perceived a gender disparity since Pedro defined the computer as a more sophisticated artifact than the tablet, for that reason, he handles the first.

Following with tablets, Carmen is a frequent user of her tablet and other ICT. The tablet for her is worthwhile to listen to the radio, listen to audiobooks, play board games, read online newspapers, navigate in Amazon, access to Facebook, and watch gossip videos of the Spanish kings on YouTube. She also connected her political views to her tablet, as she uses it to play Solitaire and asked me how to remove the kings of the game because she cannot withstand kings: *How can I get rid of the kings? –she was playing*

solitaire and I tell her that I can't play that game– (…) I can't stand the kings –laughing– (Carmen before COVID-19). Carmen prefers her tablet over her smartphone because it is bigger and has a lot of entertainment. In confinement, Antonio deemed his tablet comfortable and he mainly utilizes it in the toilet to play Sudoku and read the news. Besides, Begoña declared to use her tablet more often due to her longer spare time. Before the outbreak, Esther –frequent user of ICT– distinguishes the different functionalities of her smartphone and her tablet:

> I use the tablet less, although when I am in the room I use the tablet. So as not to drain the whole battery life of the phone, I use the tablet. I use the phone for calls and the tablet to look at a few apps and some programs, as I already have it and I have to use it. The tablet is not hard for me to use, as well as the phone, both are *Samsung* (Esther, woman senior, before COVID-19)

In relation to landline phones, seven informants before the outbreak declared to have a preference for them over mobile phones. Those seniors deemed landline phones as less difficult and with a longer shelf life than mobile phones. In addition, they are used to landline' numbers and two informants remarked on landline's cheaper flat rate than on their mobile phones. A woman senior reported that, when she feels overloaded by WhatsApp messages, she switches to her landline phone. In general, landline users were reluctant towards ICT, plus they were not very familiar with them. These seniors, interviewed before COVID-19, were the 'unprivileged' as they did not hold experience nor ICT education, which might be the factor to keep using landlines.

In contrast to landlines' users, Félix and Natalia –cellphone holders– believe that calling by their landline phone is more expensive and Nuria –active user of ICT– uses her smartphone over her landline phone because she can have numbers saved in the first. In confinement, the seniors did not report using landline phones, while they talked a lot about their smartphones.

5.2.4. Communication tools mediating before and during COVID-19

COVID-19 was a structural element that influenced the experiences of older people with ICT. However, this was not the case with the communication tools –WhatsApp and Jitsi– that mediated the quarantine, as this communication was personified in palpable relations of the informants with ICT and, to a lesser extent, symbolized unwritten interactions.

WhatsApp is one of the most relevant apps to Spanish holders of smartphones, as it serves to communicate with people of their age group and with other generations. I observed that all participants in the senior center –both elementary and advanced ICT– were familiar with WhatsApp. Nevertheless, the elementary students used voice recordings because they struggled with typing messages, probably due to design hurdles but, more importantly, many of them were illiterate and had several spelling mistakes in WhatsApp. As mentioned, most of them lack studies and came from rural Spain in the 60s when these regions were truly undeveloped.

During COVID-19, WhatsApp was truly relevant for the seniors, the teacher of the center,

and me. It worked as the mediator to know about each other and to tackle isolation. The informants also reported using WhatsApp calls to keep in touch with their relatives and friends. Besides that, Pilar deemed another functionality: *WhatsApp is what I like most, I write and nobody heats my head*. (Pilar, woman senior, during COVID-19)

During the confinement and in WhatsApp, we shared riddles, games, pranks –as the next pictures–, computer exercises, and shared how we were doing. The Dominican elder very often sent religious videos, and the social workers of the center shared by WhatsApp this video[8] to motivate the senior community to stay home. For example, Luisa reflected on one positive relation between the app and COVID-19 –strengthening bonds with neighbors–:

> We communicate more on WhatsApp with my neighbors, every day we say *good night* and *good morning*. We are a bit more united for coronavirus. Before, we didn't see each other in a week. (from the crisis) we will get something positive. (Luisa, advanced ICT, woman senior interviewed during COVID-19)

Illustration 6: pranks and messages of support during COVID-19 in WhatsApp[9]

The advanced students of ICT participated more in the games and tasks than the other group since they could handle better ICT, however, everyone shared equally how we were doing. Furthermore, when I asked who would be willing to have an interview over the phone, most of the respondents were from the advanced level.

However, WhatsApp and Facebook were perceived by some informants as channels whereby fake news easily spread, thus some of them rather retrieve information from newspapers: *fake news is sometimes sent (in WhatsApp) and I like to look into the newspaper to check if it's real. Most of it is fake news* (Teresa during COVID-19). Other negative perceptions were deemed by Teresa who complained about WhatsApp notifications that pop up constantly in confinement because the users were actively asking how everybody was doing:

> It overwhelms me when I am watching TV and receive WhatsApp messages constantly, good morning, good evening, etc. It sounds and you don't know if it is

[8] https://www.youtube.com/watch?time_continue=91&v=2ECi154qNco&feature=emb_title
[9] (1) I have so much free time at home that, instead of putting the chickpeas to soak, I put them in the shower one at a time. (2) The smile is a virus that gets transmited from heart to heart, stay home, love and nostalgia, very good morning.

an important thing or not. Many times, I don't even open it. (Teresa, woman senior, during confinement)

WhatsApp was only meant to text, but we wanted to see each other. That is why COVID-19 triggered the use of Jitsi –which allows videoconferences with unlimited participants– . I thought that students would enjoy videoconferencing in confinement, so the main teacher and I set up a couple of talks by Jitsi. This app was troubling especially for the elementary students, as only one took part, which might be a result of participants' fear to try new things. Inversely, advanced students seemed excited by Jitsi, even a couple of them asked me afterwards to set up an online room for their families. Later, the main teacher wanted to maintain using Jitsi with students to try different apps out and this was the only new app learnt in confinement for many students.

Illustration 7: one of the talks by jitsi.org with advanced students of ICT

However, Jitsi posed difficulties for some users. I initially sent them the link to the call by our WhatsApp chats. As most of them do not hold computers, they used their smartphones to log in, but through these, the Jitsi app is needed to be downloaded. I did not take this into account before setting up the call and some people struggled with the interface's language when downloading it whose information was in English. This embodies two problems, one is that the designers' network of Jitsi pre-assume exclusive standards –they expect everybody to know what the English term 'download' means which does not work at least in the socio-cultural reality of these informants–. The other structural difficulty lies in the lack of computers at seniors' homes that would have eased the connection and what I think it is derived from a lack of economic resources and cultural barriers with ICT.

Following with Jitsi, the few who held a computer typed the link in google and missed an accent in a word, so they could not log in initially. On top of that, none of them had WhatsApp installed in their computer to click on the link directly, which might have seemed more obvious for young-middle age people to have. Eventually, most of the seniors went through the process, except for a couple who were excluded because of this and could not connect to the call. In the call, the participants were not used to videoconferences, so many conversations overlapped and it was hard to understand each other. This unwritten rule –not speaking while another speaks in online calls– was not known by them.

5.2.5. Smartphone's standards facilitating and hindering its usage

The design standards of smartphones were explicitly hindering and facilitating its usage. It was something tangible and perceivable and had a big influence on the manner that interactions between smartphones and seniors personified. This section discusses these standards looking into specific software, hardware, and smartphone models.

One of the positive hardware applications deemed by the participants was the camera. This is only possible to use in smartphones though and, in the 1st research, those with smartphones generally belonged to upper stratums. Despite being very critical towards ICT, Josefa acknowledged the value of the phone camera for those who are skillful photographers. With different identities, Félix and Natalia –holders of a cellphone for both, reluctant to ICT, and belonging to the lower class– have a spare smartphone only for taking pictures. Pedro and Elena appreciate that smartphones allow them to take pictures of their granddaughter and remarked its usefulness to prove once their leaky roof to the insurance company. Moreover, most of the participants of the ICT courses knew how to use the camera, although almost none of them in the elementary course could record videos.

Continuing with hardware features, Ana, holder of a Samsung Galaxy S3, considers its screen well-sized and with a proper interface quality. Other informants –owners of smartphones– have no difficulties using basic functions such as calling, hanging up, etc. A male participant, from the advanced course of ICT, was relatively fast in his iPhone 7 and he could see properly the screen as he had a big font and good-looking letter. This participant had the best mobile phone among his classmates and I wonder if his good performance is either due to iPhone's user-friendliness or he is skillful with smartphones and therefore buys an iPhone to fulfill his needs.

In contrast, a negative feature in the hardware was found in the small size of the interface and keyboard. Ana had low vision and ignored how to regulate the letter font in the sports app *Marca*, so she was guided by the logo of the teams. Furthermore, she could not type properly in WhatsApp, so she used voice recordings instead.

Regarding the hardware of Sony, Carmen sometimes takes unintentional photos of her feet and finds the menu highly complex. Another woman participant in the center had a Sony and its letter-size was very small. She asked me to change the size and we got very confused by the way the phone calls it – 'font-size' instead of 'letter size'– it seems that the designers used a literal translation instead of using an intuitive translation to Spanish. Moreover, the parts of the screen closest to the edge barely worked, thus she could not use certain letters of the keyboard nor do other functionalities.

With regard to voice recordings, in the elementary ICT course, several older adults did not know how to send voice recordings and pictures through WhatsApp and they were happy for grasping it. As appears in the next picture, I also observed that seniors got confused with a design feature of WhatsApp: two microphones appear next to each other –one for sending voice recordings and another to transcript the voice of the user–. This was especially problematic for people with hand tremors or finger clubbing. Regarding

the keyboard in WhatsApp, Carmen said the following which is correlated with physical conditions:

> I don’t know how to type in the phone since the keyboard is too small and when I click on “a” it gets in capital A or a number is displayed or I exit from the app, I don’t know how to type in WhatsApp. (Woman elder, Carmen, before COVID-19)

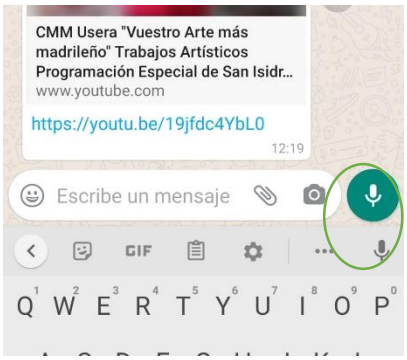

Illustration 8: a screenshot of WhatsApp’s interface with two microphones next to each other

In relation to software, the students of the advanced level managed their smartphone fairly well. However, when writing emails, they often got out from the app and lost track of the emails, so the professor taught them how to reach the drafts folder. I think this was due to the small size of the touchscreen and hands’ conditions which make them click inaccurately. Another senior student had an LG smartphone whose information was displayed in English, despite the system was set up in Spanish, which was confusing for her.

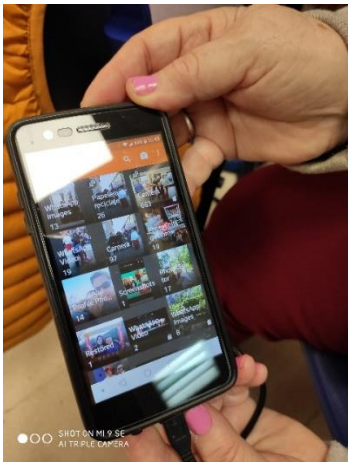

Illustration 9: senior's smartphones with information displayed in English

In addition to the latter, several participants had only access to an online gallery which made it impossible to use without connection. Other participants did not find the healthcare app –Quirón Salud– intuitive, whereby one can make appointments and deliver information to the doctor. One was unsure about what information had to be provided to log in: *I have the app but I still have to fill the data, I don’t know which number I have to type, whether the social security or blue card* (Leire during COVID-19). The examples from the last two paragraphs showcase that several apps do not have

accessible standards, because of language or confusing features that do not probably grasp the socio-cultural reality of the seniors.

Combining software and hardware, Carmen manifested several usability troubles with apps and her smartphone –Sony XA1 Ultra–. Amazon always asks her to create a new account every time she logs in which prompts her to buy through her tablet. Moreover, once she was sending a voice recording by WhatsApp and forgot to stop it, without being warned. She also complained that she does not get notified when the phone tariff ends or when she neglects to hang up. In MyTaxi, she once typed the wrong direction that could have increased the cost of the journey:

> We carry the phone to call a cab for my maid and me, she drives me nuts. She can't handle my phone because she has a different one. One day she argued with the taxi driver because we had written Granada instead of Madrid, 3 hours away from here. (Carmen accompanied by her maid, before COVID-19)

Star's work (1990) has significant ideas in this regard. She argues that no technologies can involve all particularities, but it is still relevant to enlighten the networks that design without acknowledging multiplicity in favor of stability. I have analyzed 'the exclusive standards to illuminate how the design could have been 'otherwise', however, I cannot observe the networks that design these technologies, so I can only make assumptions of why it is designed in a certain way. Analyzing these standards prompts the question of whether smartphones and their apps are contingent. I believe that the apps and hardware analyzed in this section are useful for older people, that is why I paid attention to their design features. However, other cases illuminate that ICT is contingent, e.g. because of surveillance.

5.3. Structural embeddedness: political networks and economist design

This section reflects on the political networks that arise in the design of facilities in the senior center and in a 'senior-friendly' cellphone which affect substantially and embed the relations that older people hold with ICT. The premise of this discussion is that the institutions and corporations do not consider multiple types of older adults' identities, instead, they unify 'one stable design' for all, which to my view it is derived from economic purposes.

5.3.1. Decision-making process in the senior center

The senior center holds flawed facilities that excludes people with diverse identities. In the advanced course, a woman senior was handicapped and she could reach neither mouse nor keyboard properly from her wheelchair. She constantly needed her husband's help and could not follow the teacher's assignments. Furthermore, she did not want to move to the elementary lectures, because she wanted to be beside her husband. This showcased that the ICT classroom at the senior center is not accessible for handicapped people. Apart from this woman, Esther has a brother who is also handicapped and she complained about the absence of accessible phones for people like her brother as he only needs a phone for calling. It is, however, a political decision to adapt the design of

the senior center and this defect has probably prevented several people from using the facilities and learning ICT. As the decision-makers of the center and municipality do not probably face these barriers, this idea has not even been considered.

This resonates when Star (1990) argues that the design becomes political when 'neutral' artifacts get marked objects in the form of handicapped access. This ICT classroom is not even neutral as it does not enable people with diverse conditions to use the facilities. Based on this argument and as a future suggestion, the senior center could attempt to adapt its facilities by making the place friendly for handicapped people and all types of identities –being aware that it is unrealistic to design for all–.

Apart from the design of the classroom, the way of teaching ICT is also a political element that affects the way seniors progress their learning. Understanding the reality of the students, this element should be changed. During COVID-19, the main teacher sent computer exercises to do in Word and Excel by WhatsApp. These tasks were only completed by a few members of the advanced group, as the rest of the students do not own computers at home and it would be challenging to do it through their smartphones. Computers are in general more expensive than smartphones, while smartphones are more widespread than computers –rather meant for people with interest and experience in ICT–. Therefore, during the intervention in the ICT lectures, I doubted the relevance of computer lectures in comparison with smartphones lectures:

> They started by writing emails, then I wonder, do they need it? People around 75's need an email account? Maybe if they want to buy online stuff, but not sure whether for other things. (…) A woman saif that she was more interested in learning mobile phones rather than computers that she does not have at her home (…) Seniors say that phones are easier to handle than computers, I believe this is because they are more used to it. (Field notes of different days during the intervention in the senior center)

The latter indicates several things. First of all, computer lectures are not practical and these could be rather centered on smartphones which could make students more engaged. The problem also lies in seniors' economic barriers and lack of experience in ICT which make it difficult to afford and adopt a computer. Change the way of instructing is not entirely in the hands of the teacher though, as this is a political decision. Without having approached the managers, I believe that they are not considering the socio-cultural experience of the students and it seems that they decide without the consent of them, what can be considered undemocratic and patronizing.

The fact that the municipality is not taking into account seniors' needs is also shown in the municipality's Wi-Fi. As it is scarcely seen in the next picture, when Wi-Fi did not work, a tiny 'x' appeared on the top of the Wi-Fi symbol. For older people with low vision, this was truly challenging to notice, so they often did not know where the problem lied. The municipality's Wi-Fi had other drawbacks:

> The lecture started by firstly connecting to the public municipality's Wi-Fi. It is really hard to do it, because every two weeks one needs to log in again typing their number phones, password, etc. The portal sends you a different password

and the portal doesn't remember the last times you logged in. The Wi-Fi portal is not really adapted to elderly people, because in smartphones one needs to go back and forth to the messages box, copy/paste the password, go to the website… It is really unnecessary. This should be taken into account by the municipality. (Field note of the 5th day at the senior center)

Illustration 10: smartphone of a senior that cannot connect to public Wi-Fi

Based on Star's work, it is relevant to unfold the networks that prefer stability –having a unique Wi-Fi design for all kinds of people– rather than having an accessible Wi-Fi for people with multiple identities. The decision is in the hands of the political power that, for now, is neglecting a user-friendly design. Acknowledging that I have not approached the political network, it seems that they do not invest so much effort in the public senior center. This is maybe due to the area, Orcasitas, which has been traditionally abandoned. Furthermore, the center is not a profitable entity and decision-makers may not have close bonds with the center.

Continuing with a socio-political analysis, an example stems from the use of a transport app. In the senior center, I helped a few participants to learn *EMT Madrid*, as it is useful to know when buses arrive and not to wait. Many older people were not aware of this app and found it truly useful. The area of the center is not well communicated, as there are no metro stations nearby, so they often need to take buses. As mentioned, Orcasitas has been traditionally neglected, for that reason, asbestos still lies on their roofs, houses are old, etc. Nevertheless, *EMT Madrid* is helpful as a short-term goal for Orcasitas' dwellers. Moreover, in the interviews before COVID-19, many informants remarked on the usefulness of *EMT Madrid*, e.g. Josefa said that if the bus does not arrive soon, then she uses the time to walk to the next bus station which derives in a better health condition.

Another political angle stems from information retrieval. This mediated the relations between ICT and seniors, especially in COVID-19. Some informants distrusted social networks to retrieve information, so they got informed by online newspapers. Other users preferred TV or radio for this matter, as TV or radio is on all day long at their homes. For instance, Luisa considers TV trustworthy and she likes to listen to doctors on TV in the evenings. Other seniors were not keen on TV, because it shows biased statistics and overburdens audience with information about coronavirus:

> TV lies to us many times, e.g. with *Severo Ochoa*. (…) They tell us what they want us to know. There is so much information about coronavirus (…) It overwhelms me. (Interview with Teresa, woman senior, during COVID-19)

In addition to the latter, the outbreak prompted a polarized political scenario. People spent more time at home and they were more likely to consume information. In this regard, older people can be an easy target for fakes news as they do not often handle information sources on the internet as good as other age groups. The students of the senior center however have a certain experience with ICT and, in general, are politically active which might prevent them from getting trapped by fake news. An example of the polarized scenario came up during a videoconference on Jitsi in which a fan of the alt-right wing party argued with other students about the necessity of criticizing the government nowadays:

> I perceived they didn't get along that much, as when we talked about politics. We talked about food, neighborhood and even politics –which could end up bad because ideas are polarized in this group of seniors–. (Field note of the 2nd conversation in Jitsi with center's participants)

Regarding the critical time that we are living, I believe ICT can help older people in COVID-19 to reduce the pressure from isolation and keep them connected. COVID-19 has worked as a structural factor that has influenced the relations between older people and ICT and its forms may or not continue over time. For example, in confinement, several older adults used more often voice recordings in WhatsApp so they learnt new functionalities. However, not all seniors have been able to enjoy ICT, because of the economic and socio-cultural constraints aforementioned.

Finally, an issue that is derived from the ICT lectures is the motivations that trigger institutions to be concerned about seniors learning ICT. A reason can be that the government wants to incorporate older people in the technological transformation of society which I deem very positive. Playing the devil's advocate, the decision-makers may attempt to create consumers of ICT and to aid business. Moreover, regarding health, ICT may also enable active ageing to eventually reduce healthcare costs which ends up benefiting older adults and the welfare system. To sum up, I cannot be certain about the reason of the government to invest in teaching ICT, but I consider it important to unfold.

5.3.2. Political target and usability of Alcatel 2008G

The design of Alcatel 2008G has a political and economic component that influences the relations between older adults and the cellphone. Among the initial interviewees, there were 5 holders of this device out of 15. These users deemed some positive aspects of it: ease to unlock, mute, call, take a call, and dial numbers –in case they had no low vision–. This cellphone has big buttons, numbers, and a screen that facilitate the aforementioned functions. It only costs around 40 euros and it is recommended as a senior-friendly device in Spanish phone stores.

Illustration 11: Alcatel 2008G

In contrast, this device posed big usability problems for its owners. It is worth to mention that the owners were not skillful with ICT, did not have higher education, nor belonged to a higher class. Regarding the keyboard, the letters are too small and there are three letters in each number which makes texting truly difficult. The informants also narrated the challenge to find a person in the list of contacts. In addition, Estefanía and Juan asked me to teach them how to find the messages inbox and we saw that they had 64 messages unread. After I taught them, I suggested them to call instead of text. Furthermore, the couple was not aware that the direction-key points to left, right, up, and down, apart from pressing OK. They told me that they cannot see the letters properly and asked me if it is possible to write with spelling errors. Moreover, Félix and Natalia sometimes switch on the flashlight accidentally and cannot turn it off.

The problem does not simply lie in the usability, but it lies in its target and how it is branded as a senior-friendly cellphone. This cellphone is marked for seniors with tight budgets and this marked object distinguishes users: low-income seniors and without ICT knowledge have the Alcatel, and the rest of older people with higher experience in ICT and bigger budget hold a smartphone. In addition, it is not reasonable that phone stores and big corporations market it as a senior-friendly phone. It is first of all not profitable for them that seniors eventually reject ICT because they do not grasp Alcatel 2008G. Secondly, corporations –not just Alcatel, but Vodafone, Telefonica, etc.– still targets a 'low-income and low ICT skilled population' with an out-of-date device that it does not incorporate basic applications such as having a usable direction key, list of contacts and messages inbox, videoconference system, google, etc. Especially in COVID-19, this cellphone might have been more a problem for the older people than a facilitator.

6. Conclusions

The previous section unfolds the interactions of complex older adults with ICT, before and during COVID-19, looking into this framework: structural, explicit, and symbolic relations. This section summarizes the main findings which are compared with other research. Secondly, a theoretical discussion according to the findings is included and, finally, limits of my research and future lines are exposed.

6.1. Research's main findings

With regard to the silent relations between ICT and older adults, patronizing attitudes connected to ICT surveillance have been found in the mediation that children play in the lives of seniors which differed from the privileged informants who regarded surveillance as being geo-located. In addition, ICT is generally understood as a means of being safe –aligned with Chiarini et al. (2013)– yet there is a common reluctant approach towards ICT. In contrast, the students of the senior center had a positive perception towards ICT due to their prior motivation, which is associated with the Spanish research by González, Ramírez, and Viadel (2015). Low self-stem, fear to try new things, frustration and blaming oneself were elements symbolically determining ICT usage among the unprivileged informants –women, inexperienced in ICT, and lower class– which resonates with Mitzner et al. (2010). Another unspoken component was their inconsistent ICT usage and speech, which stem to my view from a societal perception of seniors as unable to handle ICT which seniors finally embrace as their own.

Other relations that were observed or regarded by the older adults are defined as explicit or material relations. One of the perceivable elements is that all students in the senior center had a smartphone, while half of the initial informants had one. Tablets and computers were less common and only those with interest in ICT or with privileged identities had a computer or/and tablet. Similarly to Eek and Wressle (2011) and Xiong and Muraki (2016), physical limitations encompassed low vision, limited memory, auditory barriers, and poor thumb performance which the latter is associated with an unprivileged background in terms of gender and social class. The motivations to use smartphones cover aspects such as health tracking –aligned with Ghaffari, Navabi, and Gannat Alipoor (2016)– and communication, while tablets are used mainly for entertainment which is in line with Yasini and Marchand (2016). Furthermore, landline phones are regarded positively by the informants without experience in ICT and belonging to the lower social class.

Following with tangible relations, WhatsApp and Jitsi were helpful during COVID-19 but posed difficulties for seniors with poor thumb performance and with educational and computer's access barriers. The design standards of smartphones were positively deemed in the camera and in cutting-edge devices, but negative features were found in the small size of interface and keyboard, in WhatsApp, in devices containing information in English, and in problematic apps like Amazon, MyTaxi and healthcare apps. Moreover, seniors do not need out-of-date devices to adopt ICT as Petrovčič, Rogelj, and Dolničar (2018) also suggest. In this regard, tablets are found as proper means to tackle the digital divide as they have a big screen and were regarded positively by the informants.

The structural elements that embed the ICT relations with seniors were political and economic. The senior center excludes handicapped and visually impaired seniors by its flawed facilities. Furthermore, the center's teaching system ignores the socio-cultural reality of students who do not hold computers and would be more interested in learning smartphones. Taking into account seniors' socio-cultural realities, *EMT Madrid* comes to be a relevant app to them. These elements are political because the responsible authorities of improving them are the municipality and center's managers. Then, COVID-19 is a structural realm that has politically polarized seniors and this population may be vulnerable to the spread of fake news through ICT. Finally, the design of the 'tailored phone' for seniors –Alcatel 2008G– goes against the interests of seniors, as it does not solve their low adoption of ICT and mark their social profile, despite corporations commercialize it as a senior-friendly cellphone.

6.2. Theoretical discussion and implications

The three layers used to analyze the interactions of ICT and seniors –structure, explicit, and silent– are inspired by the situational analysis done upon the elements that surround and constitute this investigation and by Clarke's framework (2007). Her framework served to enlighten clusters that I had not considered, e.g. silent or structural actants. The thesis' framework resonates with the triadic reciprocality exposed by Wagner, Hassanein, and Head (2010). However, their scheme analyzes seniors, environment, and computer use which differs from my analysis whereby seniors and ICT usage cut across the structural, symbolic, and tangible layers. Besides, STAM and TAM group more elements but these do not go beyond technical interactions.

The interplay of the three types of relations is found in the elements that belong to all of them at the same time. For instance, gender, level of studies, and social class are systemic elements that determine seniors using ICT in terms of economic and cultural access to technologies, however, they are simultaneously symbolic identities that make seniors get discriminated or privileged, while playing a palpable role in the interactions with ICT.

Regarding the flaws of my analysis, the thesis' framework may however leave out some relevant elements concerning the interactions ICT-seniors. In particular, a qualitative study of the policy-makers' networks or ICT enterprises could have enriched this thesis by examining their influences on ICT usage. This work has nevertheless limited to observe some of their outcomes in ICT design and the facilities in the senior center. Moreover, I have utilized my own conceptions of silent, tangible, and structural layers which entail biases that not everyone may agree with.

Besides the analytical framework, this thesis holds the premise that older people have complex and infinite intersecting identities influencing ICT usage, which is based on the key idea of the intersectionality theory. Furthermore, privileged identities have been demonstrated as enablers of ICT usage. Understanding the identities as intersecting help grasp ICT usage not just as a matter of age, but as a multi-factorial relation with age, class, gender, etc. However, despite my efforts not to pre-assume informants' identities, I might have failed in doing so. I did not explicitly ask the informant in which identities he or she fits, but the ones exposed in this work come from my direct observation. For

instance, the Spanish label has been used as a central identity, however, this label may mislead the conceptualization of the senior, since being a Spaniard might not be relevant to ICT usage.

The latter leads to a shortcoming in intersectionality and my work: categorizing people may not be a good idea, because informants may not feel represented in the categories and the process can dismiss other relevant identities, e.g. the LGTB identity. Yet, reflecting on infinite identities or not categorizing is not practical for sociological-anthropological work because categorizing facilitates the understanding of the subject and his/her actions in an aggregated and comparative manner. Nevertheless, in the case of doing so, it is better performed inductively. It is also difficult to analyze qualitatively which identities reign over others in the use of ICT. I was sometimes unsure whether gender or class was more relevant to each informant. For this matter, statistical analysis may be more accurate, however, this type of analysis works deductively i.e. assuming identities beforehand which I have aimed to avoid.

Intersectionality could be more complete if it would use the term capital (Bourdieu and Wacquant 1992) rather than identity, as the first denotes an accumulation inherited or acquired through socialization, whereas identity does not entail the process through which has been formed. Furthermore, intersectionality understands society as binary: privileged-unprivileged, oppressor-oppressed, etc. This idea can misrepresent the fuzzy relations in society, e.g. a middle-class woman senior, even though she may contribute to reproducing the system, does not per se oppress a low-income woman senior. In addition, utilizing the term 'privileged' can deceive the perception of the informant, as for example, a 'privileged senior' can be unprivileged for unknown factors that are not regarded in my categorization, such as belonging to a minority. My point is that society is not a zero-sum game wherein people continuously fight to get a bigger piece of the cake.

Regarding the latter, Star (1990) can better address this facet as she attempts to shed light on the 'high tension zone', whereby discriminated groups are not simply left out nor inside, but they are situated in this zone fighting for being inside. However, this understanding can end up in conceiving the person in an abstract form by which is not targeted as discriminated and is not helped. The theoretical implications of Star are also to illuminate the networks that design without recognizing multiplicity over stability. However, in this research, it is difficult to find the particular networks that mediate the process of design. Star as well reflects on the politics that arise when artifacts are marked with a certain type of user, e.g. in Alcatel 2008G, and reflects on the importance to think of how technologies could have been 'otherwise' and incorporate marginalized groups. This work, however, does not explore how design could be 'otherwise' since this thesis enlightens existing ICT and its flawed design traits.

Another reflection from Star is to analyze whether technologies are contingent or not. In this regard, older people better lack ICT if using technologies ends up e.g. in political and sons' surveillance or becoming an addicted consumer. Thinking of ICT as contingent is nevertheless a point that I have been struggling with because I have assumed that ICT was necessary for older people. This thought is derived firstly from COVID-19 which has been a critical period whereof older people were isolated and, to my view, needed ICT

to communicate and get informed. Secondly, the digital divide in Spain is high which makes me takes a stance in favor of ICT as a necessary short-term goal for Spanish older adults to get integrated into the society. With a parallel example, I do not ideally support the need to work to have minimum life standards covered as this is a matter of human rights. However, in the meantime, I deem necessary to teach people the skills to get a job because it is a necessary short-term goal to survive. To sum up, it is reasonable to deem ICT as contingent and to think of long-term goals, as long as other 'basic problems' are solved like having granted access to ICT.

6.3. Futures lines and limits of the research

This investigation has focused on seniors over 65 years old, but their caregivers and their children have not been explicitly approached. As they mediate the life of older adults, they could have relevant insights on the use of ICT. A future line of research, then, could incorporate them as informants. Moreover, all seniors of this research live at their homes, so this thesis lacks seniors living at e.g. a nursing home, which elucidates that another future line could focus on seniors in co-living spaces as ICT may play a different role in these. It is noteworthy that nursing homes in Spain have been controversial spots during COVID-19 as these lacked necessary facilities and ICT could have eased seniors' lives, therefore an investigation on this matter comes to be relevant. Furthermore, the informants had, in general, proper functional capacity, thus future research should deem how frail seniors interact with ICT.

Another future line of research can attempt to predict if adults around 55 years old –using ICT properly– will maintain/improve their ICT capacities within 20 years because they currently hold a certain experience with ICT. Otherwise, it is possible that they worsen their ICT abilities due to an inevitable physical deterioration, and ICT may also change so rapidly that these adults may not be able to handle them. This study can be useful for designers to know the prospects of design for older people.

The limits of doing online ethnography and interviews have been discussed in the methodology section. With regard to my intervention, the process has not been very lengthy due to COVID-19 and it has taken place in two different groups of students. This has prompted that my relationship with the senior students was not very deep and the opposite could have enriched this work. Nevertheless, one of the main lessons is that the boundaries between the methods performed are permeable, thus bridging interventional and observational techniques will likely improve any research. Furthermore, there is no observation that does not implicitly interfere or change the state of play, as in the thesis' interviews, so, in a way, we are always intervening.

Future methods to be tested with older adults could be co-design ICT with them. But this needs to take into account a transversal debate that appears by designing with seniors. On one hand, the design is claimed to be participatory, as seniors ultimately will live with the technologies, so they actively need to be part of the process. On the other hand, it is important to acknowledge the limits of Spanish seniors, such as physical hurdles, economic and educational barriers, lack of time and willingness, etc. that make the participatory design difficult to be accomplished leaving space for other people to build

ICT. A tension lies between both positions and to find a common ground is complicated, however it is important to illuminate this tension.

6.4. Recommendations

Recommendations for designers and engineers are to understand that older people are highly complex, thus their designs should recognize their multiple identities while acknowledging that there will always be unfit particularities subverting in the product. Furthermore, older people do not have enough voice in the mainstream and struggle to claim a bad design, therefore, designers can incorporate older people in the design process being aware of the ethical dilemmas that this may entail. It is also important not to stigmatize older people by targeting their technologies as only meant to elders. Companies should consider the contingency of their products, as older people may eventually reject all ICT if they find that ICT are not suitable to their needs and expectations.

Suggestions to policy-makers are to invest and provide better ICT facilities at public senior centers and at elders' homes, as if older people learn ICT properly, they can better cope with quarantines, reduce their isolation, and enhance active ageing. Society, including seniors, should not reproduce ageist attitudes, namely in relation to ICT, as seniors ultimately embrace them and reject ICT. Finally, it is necessary to understand that older people are not only old, but they hold complex identities which are good to assert to get a plural society.

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