

Re-thinking Human-Computer Interaction Research and Design with a Growing Ageing Population

Widening contexts of technology use, changing the
subject and object of design

Valeria Righi

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DIRECTORS DE LA TESI

Prof. Dr. Josep Blat & Dr. Sergio Sayago

DEPARTAMENT DE TECNOLOGIES DE LA INFORMACIÓ I
LES COMUNICACIONS



To young people,
who will one day become 'older'

*e, con il cuore, a
Ettore, Giovanna e Fabio*

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Abstract

This dissertation analyses, reflects on, and re-thinks the way in which Human-Computer-Interaction (HCI) research is conducted with a growing ageing population. This dissertation draws upon a 5-year research-through design study that combined ethnography and participatory design to explore the use and design of technologies aimed to enhance the social life of older people in civic contexts. The findings show a varied, proactive, dynamic and mutually shaping relationship between older people and digital technologies. This dissertation argues that this relationship challenges current ways in which older people and technologies are theorized within HCI. The results highlight the relevance of considering the communities in which older people interact in their daily lives in order to better understand their relationship with interactive technologies and design new digital artefacts that they find worthy of appropriation. By drawing upon the findings and theoretical discussions of dominant approaches in HCI research with older people, the dissertation proposes a re-formulation of fundamental aspects of thinking about and conducting HCI research and design with a growing and heterogeneous ageing population. Central to this re-formulation is to (a) widen the *contexts of ICTs use* by conducting more HCI research in civic contexts, (b) change the *object of design*, shifting the focus from defining the features of a technological artefact to fostering a mutual shaping relationship between technologies and everyday practices, and (c) re-think the *subjects of design* by moving from designing “for older people” to designing for “situated communities”.

Resumen

Esta tesis analiza, reflexiona y reconsidera la forma en que la investigación en el campo de la “Interacción Persona-Ordenador” (IPO) con personas mayores se ha estado realizando durante las últimas décadas. Esta tesis se basa en 5 años de investigación a través del diseño (*research-through-design*), combinando etnografía

y diseño participativo para explorar el uso y el diseño de tecnologías destinadas a mejorar la vida social de las personas mayores en entornos cívicos. Los resultados muestran una relación variada, proactiva, dinámica y mutuamente condicionada entre las personas mayores y las tecnologías digitales. Esta tesis sostiene que dicha relación desafía el discurso actual utilizado para teorizar sobre la relación de las personas de edad avanzada y las nuevas tecnologías. Los resultados destacan la importancia de considerar las comunidades en las que las personas mayores interactúan en su vida diaria con el fin de comprender mejor su relación con las tecnologías interactivas y diseñar nuevos artefactos digitales que realmente sean apropiados por los mayores en su vida diaria. Partiendo de los resultados de este estudio y discusiones teóricas sobre los enfoques dominantes en la investigación IPO con las personas mayores, esta tesis propone una reformulación de los aspectos fundamentales de reflexión y desarrollo de la investigación y el diseño IPO con una población anciana heterogénea y en constante crecimiento. Temas centrales de esta reformulación son: (a) ampliar los contextos de uso de las TIC, realizando más investigaciones IPO en entornos cívicos, (b) modificar el objeto de diseño, desplazando el enfoque de la definición de las características de un artefacto tecnológico, por el impulso de una relación de condicionamiento mutuo entre tecnologías y prácticas cotidianas, y (c) repensar los sujetos del diseño, sustituyendo el concepto de diseñar "para las personas mayores" por diseñar para "comunidades situadas".

Resum

Aquesta tesi analitza, reflexiona i reconsidera com s'ha estat realitzant la recerca amb persones grans en el camp "Interacció Persona-Ordinador" (IPO) durant les darreres dues dècades. Aquesta tesi es basa en 5 anys d'investigació a través del disseny (*research-through-design*), que combina l'etnografia i el disseny participatiu, per explorar l'ús i el disseny de tecnologies destinades a

millorar la vida social de les persones grans en entorns cívics. Els resultats mostren una relació variada, proactiva, dinàmica i mútuament condicionada entre la gent gran i les tecnologies digitals. Aquesta tesi sosté que aquesta relació desafia la manera de teoritzar la relació entre les persones grans i les TIC en el marc de la IPO. Els resultats destaquen la importància de considerar les comunitats en què les persones grans interactuen en la seva vida diària per tal de comprendre millor la seva relació amb les tecnologies interactives i de dissenyar nous artefactes digitals que la gent gran vulgui utilitzar en la seva vida quotidiana. Tenint en compte els resultats d'aquest estudi i les discussions teòriques sobre els enfocaments dominants en la investigació IPO amb les persones grans, aquesta tesi proposa una reformulació dels aspectes fonamentals de reflexió i desenvolupament de la investigació i el disseny IPO amb una població anciana heterogènia i en constant creixement. Temes centrals d'aquesta reformulació són: (a) ampliar els contextos d'ús de les TIC, mitjançant la realització de més investigacions IPO en entorns cívics, (b) modificar l'objecte de disseny, desplaçant l'enfocament de la definició de les característiques d'un artefacte tecnològic cap a una formulació en la que la relació entre tecnologies i pràctiques quotidianes és de condicionament mutu, i (c) repensar els subjectes del disseny, substituint el concepte de “dissenyar per a la gent gran” per “dissenyar per comunitats situades”.

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1. INTRODUCTION

This dissertation addresses the important issue of Ageing & Information and Communication Technologies (ICT), which is receiving growing research and public attention due to the implications of an ever-increasing ageing population and role of ICTs in our daily lives in multiple facets of society. In particular, this dissertation deals with Ageing & ICT within the field of Human-Computer Interaction (HCI), which is a multidisciplinary area “concerned with the design, evaluation, and implementation of interactive products for human use, and with the study of major phenomena surrounding them” (Hewett *et al.*, 1992, p.5). This dissertation analyses, reflects on, and re-thinks the ways in which HCI research and design with older people has been conducted. In this dissertation, I argue that the most predominant HCI discourse regarding the development of technologies for a growing ageing population is built upon three main premises. Firstly, older people tend to be conceptualized as a well-defined group of users. Typically, individuals aged 60+ are lumped together and labelled as older people (or older adults, seniors, elderly people). They are also singled out by a set of needs, skills and practices, which do not seem to change (significantly) over time. Secondly, technologies must i) help them to cope with some problems (especially those brought about by age-related changes in mobility and social isolation), and ii) fit in with their everyday practices. Older people should be comforted rather than challenged by new technologies. Thirdly, the family and health condition of the older person are the most predominant themes of much HCI research concerned about,

or carried out with, them. While this HCI discourse, and the implementation of these three premises in a growing number of studies, have enabled us to better understand the relationship between older people and ICT, this dissertation lays out a re-formulation of fundamental aspects of thinking about and conducting HCI research and design with older people. Central to this re-formulation is to:

- widen the *contexts of ICTs use*, by conducting more HCI research in civic contexts, in which a myriad of everyday situations, social practices, interests and actors are involved, and thereby addressing more elements of the third wave of HCI research,
- change the *object of design*, by shifting the focus from defining the features of a technological artefact to fostering a mutual shaping relationship between technologies and everyday practices, so that older people can be comforted, but also challenged and stimulated by new technological developments in their everyday lives
- re-think the *subjects of design*, by moving from designing “for older people” to designing for “situated communities”, wherein technologies are appropriated.

This dissertation draws upon a five-year research-through-design study conducted within the framework of two R&D projects. Over this period of time, I have conducted classical ethnography (Fetterman, 2010) and Participatory Design (Schuler and Namioka, 1993) in order to (a) explore the everyday use of mainstream Internet technologies (e.g. Facebook, blogs, Google, Google Maps) by older people, and (b) the design and appropriation of novel ones (in particular, digital games and online help exchange platforms) aimed to foster positive and active images of this segment of the population.

This dissertation consists of five papers, four of which (three conference papers, one journal paper) have already been published, and one is, at the time of writing this document, under review in the

International Journal of Human-Computer Studies. Hereinafter, I use the code ‘Paper X (where X means 1, 2...)’ to refer to them.

The remainder of this introductory chapter is organized as follows. In Section 1.1, I give an overview of the main research and design activities carried out and the methodological approach adopted. In Section 1.2, I provide a succinct account of the main contributions this dissertation makes to HCI. In Section 1.3, I briefly discuss the relevance of the contributions and some of their implications for HCI. Finally, in Section 1.4, I present the structure of this dissertation.

1.1 Research and design activities, methodological approach: overview

1.1.1 Ethnography and participatory design in two R&D projects

This dissertation builds upon the ethnographical and participatory design activities I have conducted within two R&D projects, Life 2.0¹ and WorthPlay². *Life 2.0* was an international project partially funded by the European Commission under the Smart City programme. Life 2.0 ran from 2010 to 2013 and involved universities, IT companies and older people associations from 4 European countries (Spain, Italy, Finland and Denmark). The project aimed to generate new opportunities for social interaction by building new services that enable older people to connect with people living in their local area. In Life 2.0, a social networking

¹ LIFE 2.0: Geographical positioning services to support independent living and social interaction of elderly people (CIP ICT PSP-2009-4-270965) http://cordis.europa.eu/project/rcn/191746_en.html

² Proyecto CERO (funded by Obra Social “la Caixa” and FGCSIC) WorthPlay: worth playing digital games for active and positive ageing. <https://worthplay.upf.edu/>

platform was developed to enable older people to offer their knowledge and skills to neighbours, and to keep abreast of social events, commercial services and assistance available in their local area. *WorthPlay* was a 2-year (2012-2013) international CERO project aimed to conceptualize, design, and evaluate digital games that are sufficiently appealing, meaningful, and playable in the everyday lives of older people with mild-to-moderate age-related changes in functional abilities. In *WorthPlay*, an online gaming platform (<http://worthplay.upf.edu/game/>), was developed to allow older people (and members of their social circles) to both create and play different types of online quiz games.

Both projects were roughly structured into four main phases: analysis, design conceptualization, development and evaluation. Central to the *analysis* was a 6-month ethnographical study, which was designed to understand the everyday life of those older people who agreed to participate in the projects (hereinafter, participants), their ICTs use (in *Life 2.0*) and playing practices (in *WorthPlay*). During this ethnographical study, I observed and talked to participants while they were taking ICTs courses in an adult educational centre and playing digital and analogue games. In the *conceptualization* phase, which was grounded in the initial results of the ethnographical study, I carried out different types of participatory design activities, ranging from playful activities in which participants played simulated games to brainstorming workshops, wherein they were invited to envision future scenarios by means of storytelling and personas. The *evaluation* phase drew upon participant observation (DeWalt and DeWalt, 2010). I observed and talked to older people interacting with the web-based social networking platform (in *Life 2.0*, 19 months) and the online gaming platform (in *WorthPlay*, 3 months). Appendix I presents a full list and description of the research activities.

The research and design activities were conducted in Àgora³, a 30-year-old adult educational centre located in a highly populated, and low-income, neighbourhood in Barcelona. Àgora aims to promote social inclusion and engagement amongst those people living in the local area that are at risk of social exclusion, such as immigrants, people coming from scholastic failure, older people and people with disabilities. Àgora regards *learning* as the key instrument for achieving these goals. Àgora stands out for its commitment to the promotion of democratic participation amongst its members. All decision-making spaces are open to their members, who are encouraged by the staff to run courses and take part in the management of the centre. Àgora adopts a dialogic learning methodology, which is learner-centred and based on egalitarian dialogue, transformation and solidarity (Aroca, 1999). This highly participatory culture helped me to deepen my research and design activities, since my participants were accustomed to taking on an active role in that community - by making suggestions, comments, critiques and new proposals.

Although Àgora was the primary setting in both projects, over the course of my PhD research, I developed an interest in exploring the (potential) impact of the digital artefacts developed in Life 2.0 and WorthPlay in other civic contexts. For instance, with the aim of disseminating the Life 2.0 project, and understanding the potential pool of interested users, I conducted interviews and demonstration activities in a variety of settings with several community actors, including cultural associations, activists groups, elderly activities centres, and representatives from district, municipality and regional government. In WorthPlay, we evaluated the platform in two computer clubhouses, one in Madrid (Spain), and the other in Dundee (Scotland), and in public events in which neighbours who did not belong to Àgora participated. Moreover, and as a result of a successful WorthPlay-related activity conducted in a book-reading

³ <http://edaverneda.org>

club in Àgora, which is discussed in Paper 4, I decided to conduct the same activity in another neighbourhood in Barcelona. My objective was to understand the extent to which the strategies and challenges adopted in the previous experience could be scaled up, as well as the process of adapting both the technology and design concept to another type of community. This is a recent and ongoing research initiative, which is outlined in Paper 4.

Three hundred and ninety⁴ participants were involved in the two projects (120 in Life 2.0, 310 in WorthPlay and about 40 in both projects). Forty percent of the participants were fairly engaged in the research and design activities, as they participated in them on a regular basis for at least 6 months. The rest of the participants took part in some research activities more sporadically. About 28 participants were involved in both projects until completion, which allowed me to establish a long-term relationship with them. Participants ranged in age from 55 to 81 (average, 68) and all of them were enrolled in different courses in Àgora.

The profile of the participants was characterized by a wide diversity of interests, life experiences and previous knowledge of ICTs, which, in part, were determined by the type of courses they were enrolled in (ICT classes: 70%; literature or others types of courses: 30%). About 98% of the participants were pensioners and their previous jobs ranged from social workers, salespersons and IT workers to shopkeepers, industrial workers and housewives. Their educational level was also diverse, ranging from participants who

⁴ The numbers presented in this paragraph should be considered as a well-reasoned approximation. In fact, the particular contexts (e.g. open public events) and the nature of some research activities (e.g. informal activities with people coming in and out) hindered a more rigorous track of the number of participants and their personal information. Also, asking personal information in informal meetings was not always consonant with the ordinary ways of conducting the activities in Àgora. More accurate information were gathered through formal interviews and questionnaire with some participants, in informal conversations with the participants who I have been regularly meeting over long period of time, and by asking some general statistics of the Àgora members to the secretary staff of the educational centre.

(a) hold a university degree (approx. 3%), (b) completed primary education (until 16 years) (c. 87%), and (c) did not finish primary education (10%). The vast majority of participants were able to conduct daily living activities on their own. Most of the participants were socially active. They participated in several cultural and physical activities (e.g. singing, dancing and hiking), in addition to attending Àgora classes on a weekly basis. While my participants cannot be regarded as ‘vulnerable’, there were bereavements and some long absences from people who experienced health problems during the course of the study.

Apart from the ethnographical activities conducted within Life 2.0 and WorthPlay, in which I participated actively, I also conducted ethnographical research that was not particularly related to these projects. I did so in order to understand better the community (i.e. Àgora) and the relationship between older people and technologies. From 2010 until 2015, I attended, on a weekly basis, ICT courses offered in Àgora and took part in several activities organized in the centre. I participated in language courses as a learner and in the organization of dancing events. I also participated in cultural gatherings, such as the Days of Cultural Integration, where people engage in active and open debates, and share homemade food. In October 2011, I set up a Facebook group with 49 participants – approximately 60% of them were also involved in the Life 2.0 activities. In 2014, I joined a WhatsApp group, which is managed by 25 of them.

The data corpus of this dissertation is composed of fieldnotes I took during and / or immediately after the aforementioned activities. Fieldnotes were analyzed in a recursive and inductive way (i.e. without trying to fit the data into pre-existing coding schemes), by using thematic analysis (Braun & Clarke, 2006). Further methodological aspects are provided in the body of this dissertation.

1.1.2 Doing research *through* design and ethnography

This dissertation is grounded in ethnography and design. Within HCI, there are multiple, and intertwined, definitions of design and ethnography, all of which can be discussed at two levels, the *empirical* and the *conceptual* (Dourish, 2014). In the former, design is conceived of as a process of product engineering focused on the aesthetics, shapes, graphics... elements of the tangible/digital artefact, and ethnography is seen as “a process of going out and finding facts lying around in the world, dusting them off, and bringing them home to inform, educate, and delight” (Dourish, 2007, p.4). From this point of view, ethnographers are expected to inform design by producing a detailed account of people’s needs, abilities and skills. This account is also expected to include implications for design and technical requirements. In the latter, the conceptual level, design is understood as a research method that “uses projection and making as tools for learning about people, technologies and the world” (Gaver, 2014, p.163 - see also Zimmerman and Forlizzi, 2014). Ethnography, however, is widely regarded as an interpretative and analytical practice, which produces implications for design “in the form of consequential, profound, and direct guidance for how to think about the issues in question” (Dourish, 2007, p.13).

In order to understand better the strengths and weaknesses of the contributions to HCI made by this dissertation, it is worthwhile to reflect on how these different definitions have been approached over the course of my study and how they are reflected in the results.

I started my research by being concerned about *what* to design. This is accounted for my participation in two R&D projects intended to develop new / different technologies. At the beginning of my PhD, I focused on functionalities, features, and visual aspects, as well as accessibility and usability. Thus, my ethnographical (and design) activities were conducted at an empirical level. I aimed to understand older people’s needs and practices. I also intended to comprehend how my participants interacted with contemporary

ICTs in order to help me decide *what* to design and *how* to do it. Papers 1, 2 and 3 show this stage of my research.

While I was evaluating the use of the developed technologies in Life 2.0 and WorthPlay in real-life settings, the socio-cultural circumstances that determined the extent to which the artefact was adopted, adapted, interpreted, or rejected, caught my attention. I started to focus on the design assumptions that were implicit in the initial design framework, on how technology and older people are theorized and approached in design. Thus, the value of the knowledge produced at that stage of my research transcended the particular technology that was being designed (Dourish, 2007). This knowledge was more about re-framing the way of thinking about the research topic (i.e. conceptual level). This is why the results and contributions of this thesis (in Papers 4 and 5) encompass other topics than those explored in the projects, such as what elements and rules a worth playing game for older people should have, which are addressed in publications and project deliverables (e.g. Sayago et al., 2016; Righi et al., 2013).

Coming back to the role played by design and ethnography in my dissertation, I consider that design enabled me “to extend the ability to investigate and acquire new knowledge” (Storni, 2015, p.76), because it widened my research from describing and analysing existing practices/realities to exploring future and potential ones. Ethnography, by contrast, encouraged me to push the boundaries of my analysis by fostering new questions, developing new interests, challenging implicit assumptions and prompting me to re-formulate my research. The contributions of this dissertation, which are summarised in the next section, can be classified into the conceptual level of ethnography and design, although they contain some traces of the empirical level too.

1.2 Overview of the contributions

In this section I summarise the four main contributions this dissertation makes to the field of HCI research and design with older people.

Contribution 1. Older people using *mainstream* technologies in civic contexts: evidence and importance

Older people are often described as individuals with few opportunities for socializing, because of - amongst other aspects - age-related changes in physical abilities and shrinking social networks. Technologies, especially social media, are widely regarded as a tool capable of compensating for older people's social isolation. Consequently, and as stated in a recent review of HCI studies with older people (Vines, 2015), much research attention been given to supporting family communication through ICTs. A small number of studies have portrayed older people as "*more socially proactive and autonomous—as individuals engaged in using social media and engaging in regular social activities with others—*".

Although there are reasons to believe that older people are unlikely to be engaged in social media – for instance, the predominant view of older people in today's society portrays them as uninterested in and / or unable to use ICTs - this dissertation presents a different picture. Much as keeping in touch with relatives via ICTs was a key motivation for my participants to start (and keep) using these technologies, the scenarios described in this dissertation are of a different typology. For example, my participants followed the Facebook page of local associations in order to keep abreast of upcoming events. They also uploaded videos and photos about an event that took place in the neighbourhood to Facebook and shared them with friends who had participated in that event. Participants also joined Facebook to see the photos uploaded by the manager of the hotel where they stayed at on their summer holidays.

The results highlight the willingness of my participants to use those digital technologies that *everyone else* uses (e.g. Facebook). Social inclusion is very important at different levels:

(a) changes in the healthcare public system (e.g. “*what is it going to happen if in a few years the only way to make an appointment to my GP is through a web page?*”) and ways of paying taxes (e.g. “*I don’t want to stand in a queue for paying the electricity bill if I can save time and do it online!*”),

(b) knowing more about the lives of their younger relatives (e.g. “*I want to know what my children are talking about when they comment on photos on Facebook*”),

(c) establishing social relationships within wider contexts (e.g. “*I want to be able to see and comment on the photos uploaded by the manager of the Hotel at which I spent my summer holidays*”).

Thus, this dissertation widens the context of ICTs use. This context is defined when we set out to explore the relationship between digital technologies and older people. In addition to family and health, and using computers and the Internet at home, this dissertation shows that older people use technologies in a myriad of social situations and do so for different purposes, mostly related with their willingness to remain socially connected - and not only with their relatives. I therefore claim that there is room for widening the design of new technologies for this user group. In this respect, this dissertation presents new conceptualized technologies that support older people’s social interaction within local groups (e.g. peer-to-peer learners, members of a book-reading club). I argue in Paper 4 that this widened use context encouraged us to re-conceptualize older people, moving from thinking of them as individuals ‘anchored’ to their immediate micro-environments (e.g. ageing in place) to seeing them as active members of wider socio-cultural and political contexts (e.g. neighbourhoods). Contribution 4 elaborates on these concepts.

Contribution 2. Key ingredients of interactions in online civic contexts: thoughtful, selective, trust and dynamic

As stated in (Bloch and Bruce, 2011, p.2), “comfort in digitally communicating with family and friends is not the same thing as comfort with online participatory culture as a “public sphere” that invites active content creation and the expression of opinions in less private online spaces such as government or newspaper blog sites”. Thus, widening the context of use should also entail exploring which type of contribution and participation older people are willing to make in these situations. Previous studies have suggested that older people mainly take on a passive role in social media (e.g. access information rather than producing new content) (Pfeil et al., 2009; Brandtzæg, 2010; Bloch and Bruce, 2011). Other studies have pointed out that older people can also be active creators of digital videos, which they share with their relatives and friends via Social Network Sites (SNS) (Ferreira, 2015). This dissertation expands on this active role by showing important barriers that prevent older people from participating fully in SNS, revealing how these obstacles are overcome, and delineating traits of the type of participation that comes out of this active role.

In keeping with previous studies (e.g. Lehtinen, 2009; Gibson et al., 2010; Xie, et al., 2012; Leist, 2012), this dissertation shows that privacy concerns and a general lack of relevance are two barriers that prevented most of my participants from becoming involved in online communities. Yet, initial negative attitudes towards *popular* SNS were turned into more positive or neutral ones by adopting strategies, which eventually lead to technology adoption, such as *learning* how to manage privacy settings and the friends’ list, and using the tool for *useful, selective and thoughtful participation*. The type of communication that my participants established through SNS is similar to the type of communication (i.e. one-to-one, one-to-few) they establish via e-mail. The key difference lies in the additional advantage brought about by the features supported by

online community platforms (e.g. “*I can send to a friend an entire photos album in Picasa with just a single message*”).

Regardless of their strategies to overcome barriers, their presence in online environments tends to be invisible: the profile pages of most of them are almost empty and they may not reply to messages targeted at them. My results confirm findings of previous studies (Bloch and Bruce, 2011), which reported that older people are not eager to participate in discussions taking place in online spaces that are opened to everyone (e.g. newspaper pages, YouTube). My results show that information sharing and reciprocity to online communications mainly happen in face-to-face conversations, and that trust is a key component for promoting older people’s participation in online contexts with people who do not belong to their close social circles.

This dissertation shows that older people’s online participation needs to be understood *over time* so as to comprehend the evolution of their attitudes and learning strategies, and explored in conjunction with *offline* interactions, in order to i) unveil the extent to which using SNS impacts on their daily communication, given that not all the interactions occur in the online sphere, and ii) develop a deeper understanding of what motivates and fosters online participation amongst this user group.

Contribution 3. Re-positioning technology: beyond users’ needs, interface issues and expected use

Central to the dominant approach to design technologies for older people is to “*fit*” technologies to their needs, which tend to be related to their health condition and / or social isolation, caused by the ageing process. To achieve this goal, the design process starts by gathering user requirements by means of, for instance, (contextual) interviews, ethnographical observations and focus groups. The designer therefore creates a list of fairly well-defined

needs and translates them into design concepts⁵. Thus, these design concepts are developed and evaluated against (more or less) well-established parameters. This process is iterated until the designed technology meets the defined requirements.

This approach to design falls into the classical User Centred Design (UCD) movement, which originated in the 80s out of the need to get users involved in the design process⁶ in order to adjust products to people, rather than forcing users to adapt to the product by changing their behaviours. Within this UCD approach, older people are thought of as users who “have to be comforted rather than challenged by new technology” (Peine et al, 2014, p.204). This new technology is conceived of as the main object of design, which has to be fine-tuned so that it fits *well* within existing practices.

Although UCD has played a pivotal role in building more useful, usable and effective technologies, UCD has some limitations. By conceptualizing innovation strictly in terms of new technological developments, UCD “*downplays [...] the story of people who may be less interested in artifacts per se and their novelty, but more concerned about how to use all available resources, including interactive technologies –irrespective of whether or not they are “novel”- to further develop their practices and improve their*

⁵ It is worth mentioning that this translation from users’ needs to design requirements is not free of assumptions. Researchers, especially from Science and Technologies Studies, have argued that what ends up being acknowledged as “older people’s needs” is also generated and influenced by funding actors goals, market objectives and designers’ own experience (Östlund et al., 2015, Hyysalo, 2006; Iversen, 2014). Even a careful consideration and involvement of users does not avoid generating implicit user representations (Akrich, 1995). Indeed, (Hyysalo and Johnson, 2015) argue that all variety of sources of user representations should be acknowledged and taken into account in the design process.

⁶ Studies adopting a human-centred design approach have involved users in different ways. For instance, while in many UCD studies the role of users in the design process has mainly been to provide information on their routines and needs, other more participatory approaches, which generally fall under the domain of Participatory Design, have promoted a more active participation of users, involving them as co-designers, partners and drivers of the design process.

environments” (Kaptelinin and Bannon, 2012, p.287). Moreover, “*Trying to optimise fit on basis of knowledge about use and users, we risk trapping people in a situation where the use of our designs has been over-determined and where there is not enough space left to act and improvise*” (Redström, 2006, p.123). This dissertation provides empirical support to this main limitation of UCD. This dissertation also challenges, in three different ways, the vision that has dominated the development of technologies for older people within HCI thus far.

To begin with, this dissertation shows that the way in which my participants make use of ICT cannot be attributable solely to a need for solving personal problems. Rather, their ICT use is motivated by personal interests, which are prompted by social interactions. This motivational factor portrays my participants as proactive users of technologies. They decide what technology to use, why, when and how. Whilst previous studies have generally configured technologies use, like social media, for older people as a way to tackle loneliness (e.g. Vines et al., 2015; Rodríguez et al., 2009; Doyle et al., 2010; Alaoui et al., 2012), most of the scenarios discussed throughout this dissertation show that my participants do not use online communities as the primary source of social engagement, but as a supplementary means for already established face-to-face interactions. This indicates that the use of technologies is *dialogic*: a dialogue is established between everyday needs, practices, interests... and the opportunities opened up by a new digital artefact. The design of new technologies could therefore aim to foster and trigger new dialogues. Take, for example, the dialogue generation discussed in Paper 4, wherein I discuss the results of the book-reading club activities and the Life 2.0 project: new practices amongst the participants were created as a result of exploring what opportunities the mutual help platform and the gaming platform did provide them with. These new practices (i.e. creating literature routes in the city centre and the self-organized group on smartphone use) are different from what the designers had initially envisioned –

support or help exchange. Moreover, the developed technology did not play a central role in conducting these new practices.

The second way in which this dissertation challenges the dominant vision is by showing that in my design journey, I ended up designing much more than technology functionalities and user interfaces. In Life 2.0, the object of design was the material/digital artefact (i.e. the Life 2.0 platform and the tablet devices to access it) as well as the social arrangements that were needed to give meaning to it (i.e. community-building activities carried out in order to promote the sharing service). In WorthPlay, the object of design was both the gaming platform as well as different ways of using that platform within established contexts and practices. In both cases, technology and social arrangements are the objects of design: *what* we designed can be regarded as socio-material assemblies (Bjögvinsson et al., 2012), where technology and practices are mutually re-shaped.

The third way in which this dissertation challenges UCD when it is applied to older people is that the meaning of the technology envisioned by designers was re-interpreted by my participants. In other words, the meaning of the technology was modified and untied to design/research vision and goals (see Paper 4). For instance, the mutual help service in the Life 2.0 platform was turned into a knowledge sharing service, because my participants were much more interested in learning than in receiving support to conduct everyday activities – the initial vision of designers. Similarly, the literature routes supported by smartphones were not regarded as games – the goal of our research in WorthPlay - but as engaging and extraordinary learning activities. The meaning of the technologies was therefore an achievement rather than something imposed to users by the initial designers' visions.

As opposed to current HCI research with older people, in which the focus is on technological aspects that need to be fine-tuned to meet well-specified goals related to their everyday practices, this dissertation argues that older people are able to give different

meanings to technologies, and that these meanings might not always correspond to the goals defined/envisioned by designers / researchers. This dissertation also shows that older people's practices might change over time as a result of appropriating a new technological development. Thus, technologies and practices shape each other. To better understand this interplay, it is useful to re-think the subject of design, which is the fourth contribution of this dissertation.

Contribution 4. Re-thinking the subject of design: from individual older people to situated communities

Rephrasing Paul Dourish in his seminal *What we talk about when we talk about context* (2004), in this dissertation I discuss the following question: *when we talk about older people in HCI, do we talk about whom?* 'Know *thy* user' is key in good HCI research. Thus, the question discussed in this section is of paramount importance. The answer, however, is more elusive. Older people are generally defined, within HCI and other strongly related disciplines, such as Psychology, as people aged 60 and beyond. HCI researchers have also acknowledged that older people are a highly heterogeneous user group, especially as far as their experiences, abilities, health status and skills are concerned (Gregor et al. 2002; Czaja and Lee, 2007). However, previous researchers have also argued that HCI tends to portray older people as a homogeneous category, i.e. a user group with common interests, abilities and needs (e.g. Gaver, 2010; Vines, 2015; Light et al., 2015, Durick et. al, 2013; Damant and Knapp, 2015). So, when we talk about older people, do we talk about a heterogeneous or a homogeneous user group?

When it comes to designing technologies both discourses are problematic. The homogeneous one encourages us to characterize the group of older people according to a fairly common set of needs, interests and abilities, which do not take into account the wide diversity of people's life experiences that can determine interests, motivations and uses of ICTs. The heterogeneous discourse, which

provides a more realistic picture of older people, seems to remain stuck on trying to provide a heterogeneous description of a category which is supposed to be easy to identify, despite the fact that defining it is not straightforward. For instance, some studies regard chronological age as the main including/excluding criterion, while others focus on abilities (Gregor et al. 2002), or on life stages (Laslett, 1991), or on transitions between different life stages (Wildevuur et al., 2013). If we move from HCI to sociological disciplines, the definition of the category of older people is much more faceted. For instance, social and cultural gerontologists support the thesis that old age is a social construct defined by everyday practices (e.g. using computers) and discourses (Degnen, 2007; Phillipson, 2008, Peine et al., 2015).

This dissertation does not aim to provide a clear-cut answer to the question of how older people should be defined in HCI and on what characteristics we should focus (e.g. life experiences, abilities, skills, needs). Instead, this dissertation, which assumes that HCI is interventional – that is, HCI aims to make an impact of people’s lives through technologies - encourages HCI researchers and designers to address the question raised at the opening of this subsection by *avoiding regarding older people exclusively as a large group, the age range and the characteristics of which must be defined in order to target design activities.*

I started my PhD research by thinking of older people as social actors (Sayago, 2009) embedded in civic contexts. These civic contexts encouraged me to re-think my design goals and better understand the results. Indeed, what characterizes these contexts is not the chronological age of the participants⁷, but their goals and interests. The contexts in which the design study was conducted (e.g. a group of ICT learners, the reading book club) are better

⁷ It is worthwhile to note that there were people from 55 to 81 years old within the same group of participants (e.g. the core group of Life 2.0 participants). Hence, I worked with individuals belonging to the “older” (60-75) and the “old-old” (75+) segments of the older population.

understood as communities of interests and practices, i.e. a group of people that are engaged in collaborative practices and share common interests (DiSalvo et al., 2013).

While other researchers have claimed that older people can be considered a community of identity, seeing age as common identity classifications (DiSalvo et al., 2013, p. 184), this dissertation argues that this classification can also be highly problematic when it is adopted in design studies. Although my participants did not refuse to admit that they were older people⁸, this perspective turned out to be useless during the design process. In Paper 4 and Paper 5, I argue that the driving force of the design process was the concrete interests of the group of participants involved in it: the designed technology acquired meaning only when it was conceptualized for that specific community, which is both homogenous (e.g. in terms of goals and some specific interests) and heterogeneous (e.g. in terms of chronological age, life experiences and other interests). Indeed, participants in Life 2.0 and WorthPlay acted primarily as members of Àgora. They were quick to point out that they were not representative of the “older people” group. It is worth noting that this is not the only way to look at our participants. For instance, some of them are members of local dance groups; thus, they also act as dancers – and not only as ICT learners.

This dissertation argues for a more attentive conceptualization of the term “design for older people”, where the subject of design (i.e. older people) should be understood with respect to the common elements that characterize and unify the group/s they belong to. An important implication of this way of conceptualizing older people in participatory design activities is that designers should go where ‘the action is’ - in the communities in which they dynamically and contingently act in their everyday life, rather than setting up a group

⁸ For instance, our participants often talked about their personal experience with technology as something that is common to people of their age, as it could be noticed from the use of the “we/us” in the extracts of participants’ voices reported in the papers.

of people according to chronological age and asking them to come to their offices. This is not to say that compensating for age-related declines is unnecessary. However, coping with accessibility / usability issues should not be done in a vacuum.

A final reflection this thesis invites to make is that the boundaries between age groups are less evident within ‘everyday communities’. This encourages us to see design activities across age, rather than targeted only at one age range. The dissertation also sheds some light on the possible challenges in this type of design. It points out that designing across generations needs to be framed within a well-defined and shared goal. The risk might be to build intergenerational tools that do not adequately support different users’ goals. An example of this conflict, which emerged from my results, is the case of Facebook, where the interests and uses of the tool by grandchildren and grandparents collided making the latter feel unease (e.g. *I don’t care about what my friends’ nephews write in his wall...this guy should be at school now*). Reaching age-integration models may be a matter of degree, and requires detailed consideration of eventual differences in goals and interaction practices amongst age groups.

1.3 Relevance and some implications of the contributions

Previous HCI research with older people has mainly focused on compensating for age-related changes in functional abilities. Consequently, this body of knowledge has downplayed other aspects that characterize older people’s lives. By thinking of older people as active individuals embedded in civic contexts, this dissertation challenges the ‘compensation approach’ of previous research and calls for addressing other elements of their lives (e.g. social interactions, interests, etc.) in HCI research and design. This widened perspective is consistent with the third wave or paradigm of HCI research (Bødker, 2006; Harrison et al., 2011) and, as I argue in the final chapter of the dissertation, it opens up new design

opportunities. This dissertation also encourages design researchers to address other aspects than those which predominated in the first and second HCI waves / paradigms, such as cognitive models, efficiency and efficacy. I encourage HCI researchers and designers to envision scenarios in which older people use technologies in civic contexts, in which there are plenty of actors, situations, interests and practices, despite having largely been overlooked, because by doing so, we can ‘make an impact’ on older people’s lives.

Over the last two-three decades, older people have primarily been operationalized in HCI research and design (and in other fields) as a user group defined by their chronological age. Noteworthy examples are the categories widely known as the oldest-old (85 and over), old-old (75-84) and young-old (65-74). This dissertation argues that the usefulness of this categorization is limited when we aim to design technologies to be appropriated by older people. This dissertation invites to look at the communities in which older people already interact: situated communities become the new subject of our design. I believe that this community lens is in accordance with the way in which cultural gerontologists has pushed the definition of old age beyond chronological and medical criteria, and towards cultural personal identities. Looking at communities helps us to realize and understand the identities that people construct in their everyday interactions in the social contexts in which they participate and take these identities into account in design and research activities. What older people are, or feel they are, has seldom been regarded as a design aspect to be addressed in HCI design.

Techno-determinist approaches abound in HCI design with older people. Common to these approaches is that they often lead to technologies which have been developed on the basis of designers / researchers assumptions, and that hold great potential for shaping and enhancing older people’s lives. However, this dissertation has shown that this approach is not as useful as it could be. The real meaning of the digital artefact manifests itself only when older

people appropriate and adapt it to their real interests and everyday practices. Thus, the technology goal / meaning can hardly be fully envisioned beforehand. Nor it can be entirely defined in evaluation activities limited in time and scope (e.g. usability tests). This dissertation argues that designing technologies that older people find worthwhile to use is about staging opportunities for enabling existing practices and new technologies to shape each other over time. This conceptualization of design is in line with recent ways of thinking about design (e.g. Karasti and Syrjänen, 2004; Ehn, 2008; Bjögvinsson et al., 2012). I argue that embracing this vision can help us enrich techno-deterministic approaches by presenting the ‘other side of the coin’, and stimulating a dialogue between both of them.

1.4 Structure of this dissertation

The body of this document consists of five papers. Four of them have already been published: *International Journal of Public Information System*, ACM C&T (Communities & Technologies), CIRN Conference on Community Informatics, and a workshop on user-centred trust in NordiCHI. One paper is under review in the *International Journal of Human-Computer Studies*. The articles are grouped thematically into two chapters, each of which is preceded by a summary of the results.

Chapter 2: Older people’s use of Internet technologies in online civic contexts

This chapter presents the ethnographical study of the use of mainstream Internet technologies by older people. The chapter consists of three published papers. Paper 1 focuses on the use of technologies in relation to the tendency towards e-government. Paper 2 focuses on the use of Social Network Sites within the context of local communities. Paper 3 dwells on trust issues that influence online participation of older

people. The results presented in this chapter are related to Contribution 1 and Contribution 2 of this dissertation.

Paper 1: Righi, V., Sayago S., Blat, J. 2011. Towards understanding e-government with older people and designing an inclusive platform with them: preliminary results of a rapid ethnographical study. *International Journal of Public Information Systems*, 7(3): 131-142.

Paper 2: Righi, V., Sayago S., Blat, J. 2012. Older people's use of Social Network Sites while participating in local online communities from an ethnographical perspective. In *Proceedings of CIRN 2012 Community Informatics Conference: 'Ideals meet Reality'*, Nov. 7-9, 2012, Prato, Italy, ISBN: 978-0-9874652-0-7. Best Refereed Conference Paper Award

Paper 3: Righi, V., Rosales, A., Sayago S., Blat, J. 2013. Older people's strategies for building trust in online communities through an ethnographical lens, In Schulz, T (ed). *Proceedings of the User-Centered Trust in Interactive Systems: a workshop from NordiCHI 2012*, pp. 43-47, ISBN: 978-82-539-0538-9

Chapter 3: Designing engaging technologies for older people: exploring opportunities, challenges and assumptions

This chapter focuses on the design activities conducted during my research. The chapter consists of two papers. Paper 4 was published in the proceedings of ACM Communities and Technologies 2015. Paper 5 is under review in the International Journal of Human-Computer Studies. Paper 4 and 5 present key results that cut across WorthPlay and Life 2.0. Paper 4 and 5 focus on the crucial aspects (e.g. acceptance of designed products targeted at elderly users, new meaning of technology, new established practices) that fostered the change in design and research perspective discussed in Contribution 3 and Contribution 4. The design

scenarios presented in these papers are examples of widened contexts of ICTs use suggested in the dissertation.

Paper 4: Righi, V., Sayago S., Blat, J. 2015. Urban ageing: technology, agency and community in smarter cities for older people. In *Proceedings of the 7th International Conference on Communities and Technologies (C&T 2015)*, June 27-30, Limerick, Ireland. pp. 119-128. ACM Press.

Paper 5: Righi, V., Sayago S., Blat, J. (under review) When we talk about older people in HCI, do we talk about whom? A ‘turn to community’ in the design research for a growing ageing population. *International Journal of Human-Computer Studies*.

Chapter 4: Discussions and Conclusions

This final chapter summarizes the main conclusions and discusses the extent to which the contributions fit in with, and move forward, contemporary *theories* of HCI, changing meanings of HCI *design*, and ways of conceptualizing old age in *Ageing* studies. The chapter also discusses possible limitations of my study and future work perspectives.

Appendix I: Detailed overview of research activities

This appendix details the research activities conducted throughout my PhD research. The details include a description of the type of activity, approximate number of participants and hours of fieldwork.

Appendix II: Others publications and deliverables

This appendix presents papers published at the outset of my PhD and lists other papers and deliverables published as a result of my participation in Life 2.0 and WorthPlay.

Although these works are not the core of my dissertation, I have decided to mention them in an appendix because they helped me to mature as a researcher and paved the way for the five key publications that constitute the body of this dissertation.

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2. OLDER PEOPLE'S USE OF INTERNET TECHNOLOGIES IN ONLINE CIVIC CONTEXTS

This chapter consists of three papers, which have been published in the *International Journal of Public Information System*, CIRN Conference on Community Informatics, and a workshop on user-centred trust in NordiCHI. Each paper presents different aspects of an ethnographical study of the use of mainstream Internet technologies by older people in civic contexts.

Section 2.1 presents a 5-month rapid ethnographical study of e-government. Previous HCI research on e-government with older people has mainly focused on the accessibility barriers that hinder the use of governmental websites or services by older people. In this section, I take a different approach by

- i) exploring the reasons for which older people (do not) want to use public digital services, in an attempt to understand what motivates them to engage in this type of services,
- ii) focusing on the role that ICTs play in reinforcing social interactions and participation in their living areas, which we consider a key element for promoting civic engagement,
- iii) exploring mechanisms for accessing and sharing information, which play a pivotal role when it comes to decision making and citizenship

The findings show a variety of inclusive aspects, such as socialization, face-to-face contact, and mutual support, all of which impact on the use and adoption of e-services by older people. This section discusses potential design scenarios for information sharing and promoting a more active and dynamic participation of older people in their neighbourhood.

Section 2.2 aims to understand whether and how online communities could be used for fostering the involvement of older people in their neighbourhood (online and offline) communities. With the aim of achieving this goal, we considered that a first step was to explore how older people are nowadays using popular Social Network Sites (e.g. Facebook) in civic contexts. This section presents the results of a 17-month ethnographical study, in which approximately 55 older people took part. The results show how important it is for this group of older people to use mainstream technologies in order to *felt included* and not to lag behind. The study discusses their type of online participation (sharing, posting comments and creating contents), as well as trust and privacy concerns, how these aspects evolve over time (i.e. with increasing experience of ICT use). This section outlines key elements that can promote or hinder the participation of older people in online neighbourhoods.

Section 2.3 delves into the role of trust in older people's full participation in online communities. By drawing on an 18-month participant observation study with 55 older people, the results show that privacy issues and concerns about misuse of personal information are important elements of trust for them. Key elements of social networks sites, such as indirect network ties, turned out to increase mistrust because they generate confusion and make this group of older people feel no longer in control of the technology. The section shows how participants adopt strategies to overcome trust concerns, such as relying on their social circles and face-to-face interaction with trusted sources.

Overall, the results presented in this chapter portray older people as active users of technologies within a wide variety of everyday situations, in which multiple actors take part. This picture contrasts with the dominant vision in HCI research, which is focused on older people using technologies in two contexts: the family and healthcare. I argue that the results of this chapter widen the contexts in which HCI research with older people can be conducted.

2.1 Towards understanding e-government with older people and designing an inclusive platform with them: preliminary results of a rapid ethnographical study

Righi, V.; Sayago S., Blat, J. 2011 [Towards understanding e-government with older people and designing an inclusive platform with them: preliminary results of a rapid ethnographical study](#). *International Journal of Public Information Systems*, 7(3): 131-142

Abstract: The ageing population and the growing importance of e-government reinforce the need for further e-government research with older people. We have conducted a rapid ethnographical study aimed at understanding attitudes of older people towards e-government related activities and Information and Communication Technologies. We present initial results derived from our study and discuss a potential scenario for supporting information sharing and promoting a more active and dynamic participation of older people in their neighbourhood, which we consider a relevant aspect of e-government with older people. Our initial findings suggest that a variety of inclusive aspects, such as socialization, face-to face contact, or mutual support impact the use and adoption of e-services by older people.

Keywords: e-government, older people, social inclusion, ethnography

A. Introduction

An increasing ageing population and the relevance of e-government in current society create a need for furthering research into e-

government with older people (60+). In addition to social and ethical issues, having access to information and being able to act on it are two key elements of independence in later life [Gilroy, 2005]. While governments are providing citizens with an ever-growing number of online services, the barriers of Information and Communication Technologies (ICT) for most of older people mean that they might not make the most of them.

Whilst older people are often considered passive users of e-government services, which also tend to be delivered unidirectionally, a 3-year ethnographical study of ICT use by around 400 older people showed that older people are not passive at all in their everyday use of ICT, and social inclusion and independence (i.e. not relying on anyone else) are key aspect of this use [Sayago and Blat, 2011]. In this paper, we extend the discussion to e-government services.

An increasing number of governmental policies are addressing the need for fostering the involvement of older people in local communities in an attempt to avoid isolation and encourage active ageing. Governments are also looking into effective communication strategies for delivering services and useful information to their citizens. We consider that ICT can (and should) help to achieve these goals, and, as understanding people's everyday interactions is crucial in developing better ICTs [Bødker, 2006; Moggridge, 2007], we look into the (lack of) use of e-government services by older people in out-of-laboratory conditions.

We aim to understand the role that ICT could play in creating and sustaining social interactions among older people over time, which we consider crucial elements in enhancing e-government services for senior citizens. We started to address this issue by exploring the solutions older people develop when engaging themselves in social interactions and activities in their local areas, according to their social context and resources. We have been doing it by conducting a "rapid" ethnographical study [Millen, 2000] with circa 45 participants (aged 60-80) over a 5 month-period. The results show

that the sharing of local information of older people is rich, contrary to popular stereotypes, and their use of ICT is thoughtful and inspiring for conceiving useful e-government services for them.

We also aim at envisaging e-services that increase older people participation within their communities, by building upon our interpretation of the ethnographical results and by conducting participatory design workshops. These activities have led to design concepts of an inclusive platform for e-government.

We have been conducting this work within the context of the Life 2.0 EU project [Life 2.0], which aims at making the network of social interactions more visible to older people by implementing a platform which should enable them to track, locate and communicate with relevant members of their social networks (i.e. relatives, friends and caregivers).

The rest of the paper is organized as follows. Section 2 reviews previous work on e-government and Human-Computer Interaction (HCI) with older people related to the objectives of this paper. Section 3 describes the ethnographical study, the methods and the analysis of the data. Section 4 presents our initial findings. Section 5 describes the participatory design activities and design concepts of an ongoing e-government platform conception. Section 6 discusses the main conclusions and outlines future work.

B. Related Work

E-government is receiving growing attention, especially with ‘ordinary’ users of e-services, such as young and adult people, from several perspectives, as illustrated by the different papers presented in the HWID workshop at INTERACT’11 [Katre et al., 2011]. However, we argue that older people have mostly been overlooked, despite the increasing ageing of the populations worldwide. This section reviews previous research on e-government with older people related to this paper.

B.1 More accessible governmental services

HCI research on e-government with older people has been generally focused on improving the accessibility of governmental websites. Often, the approach adopted is to compensate for age-related changes in functional abilities, such as vision, physical impairments and cognitive decline. For example, Becker [2005] conducted a study on 50 state and 50 federal e-government home pages and showed a number of usability barriers (e.g. “banner blindness”, font size, screen length, performance and translation efficiency) that might limit access of those websites by older citizens. Other studies have addressed the design of web forms, which are a key element of e-government services [Lines et. al, 2007; Money et. al., 2011]. Lines et al. provides design guidelines for government online forms, addressing issues related to layout, simplified question structure, data entry assistance, justification for personal/sensitive questions, personalisation.

Pinder [2004] argues that the major barrier to the take-up of e-government services is the difficulty in the information access, given the poor design of most governmental websites. Navigation is often driven by the inner structure of governments, so users are required to know which department provides the service to determine the appropriate section of the website to find the information. This example, amongst others, suggests that web design in the area of e-government has often focused on government needs, rather than on citizens’.

B.2 Older people attitudes towards e-government services

Other studies have looked into the attitudes of older people towards e-government services, which are an important part of ICT and e-services adoption, especially amongst older people, who are usually described as being afraid of the technology.

According to [Sykes 2008], personal contacts, especially contacts within their social circles, is the way older adults use mostly to access information. On the other hand, they barely have direct

contact with local government and agencies, and mainly seek information relevant to them, by looking for data that enhance the factual information and meet their specific needs.

[Curzon et al. 2003] conducted a contextual inquiry with 8 older people to explore the strategies they use to seek web-based government information and compared them with the way they normally perform this task. The results suggest that participants were developing their own strategies by building upon their “crystalized” abilities of information seeking. For example, a woman used her phone book to find how the council called its housing department, and typed it as the search term in the web browser. The results also suggest that older people’s metrics of effective and satisfying government information searching are based on social criteria, such as the possibilities to socialize and to talk with others.

Phang et al. [2006] investigated the effect of perceived usefulness and perceived ease of use to predict the use of an e-service allowing senior citizens to withdraw cash from their social security saving plan. The results showed that older people’s perception of usefulness was driven by both tangible benefits, such as resource saving, and intangible benefits, such as motivation to stay up to date on technological skills. However, human contact did not affect perceived usefulness. The authors associated this result with the low perception of the quality of the service provided by the personnel. Ease of use was found to be affected by computer anxiety and computer support, but not by declining physiological conditions inherent to the ageing process.

Overall, these studies suggest that the design of e-government services for older people should be driven more by social and inclusive goals than by the all-important usability aspects, to cover better all the aspects involved in the overall e-government experience. This paper present a rapid ethnographical study carried out to address this issue.

B.3 Towards citizen-centred design

Criticisms about e-services provision have resulted in placing citizens at the centre of the design processes and research efforts. Studies adopting this approach have addressed several aspects, such as the design of the web-based government services [Hamilton et al. 2011], the evaluation of e-services [Wang et al., 2005], the measure of citizens' satisfaction [Verdegem and Verleye, 2009] and the cost-benefit of the adopted approach [Bertot et al., 2008].

Følstad et al. [2004] focuses on how user involvement is actually conducted in e-government projects development. The results show that involving users' representatives in the project team were the most frequent strategy. Gilroy [2005] suggests a bottom-up approach that looks at creative older people as catalysts to changing governance cultures and modernising local government. His discussion draws upon examples of case studies in which older people have been involved in working groups not just as generators of ideas, but also as equal partners that collaborate together with professionals and researchers throughout the process (i.e. seeking, giving and creating information)

B.4 Ethnography in relationship to citizen-centred design

There is a growing awareness in HCI of how important is to consider the social context of system use and everyday interactions and experiences in order to design *better* technologies [e.g. Bødker, 2006; Moggridge, 2007; McCarthy, 2004]. HCI has looked to ethnography to develop this understanding. As reviewed in [Sayago and Blat, 2010], the main virtues of ethnography in HCI are: (i) to make visible the context of system use, social practices of interactions and communities' sensibilities which might not otherwise be encountered [Macaulay et al., 2000; McCarthy and Wright, 2004]; (ii) to provide explanatory frameworks for whatever is observed that offer us new ways of imaging the relationship between people and technology [Dourish, 2006]. However, ethnography is much less popular in HCI research with older people than laboratory-based studies. An exception is [Sayago and Blat,

2010], who conducted a classical ethnographical study of ICT use by nearly 400 older people over a 3-year period, finding that socialisation, social inclusion, competence and independence (i.e. not relying on anyone else) are key elements of ICT in out-of-laboratory conditions by this user group.

The paper builds upon this previous study and extends it by looking into how older people use ICT to conduct (or not) e-government-related activities.

C. Description of the rapid ethnographical study

C.1 Context

We have conducted our study in Àgora, a 20-year-old adult educational centre in Barcelona. Integrating into the Catalan society people who are, or might be, excluded from it, such as immigrants, non-educated or older people, is a key objective of Àgora. This is done through informal learning in courses (e.g. computing, languages, mathematics or literature) with over 1000 people (using Àgora's terminology, 'participants') taking part in them monthly. Àgora, and its participants, consider that mastering ICT is crucial in achieving social inclusion, so courses in computing, Internet access and workshops are provided. Participants decide what ICT they want to (learn to) use according to their needs and interests: courses and workshops are geared towards supporting their daily life activities. The participants are also encouraged to play an active role in the association, by, for instance, voicing their opinions in monthly public meetings, and making decisions regarding future plans of the centre and research projects.

All these activities are free for the participants, and most of them, supported and encouraged by local authorities. For instance, the *Òmnia* point, a computer room where people take courses in computing and go online, is part of a Catalan network managed by the Catalan Government aimed at increasing the digital literacy in Catalonia. Àgora is also connected with the Education Department

of the Barcelona city council and Catalan government, since teachers working in them run official courses (e.g. access to university for people over 25 years) in Àgora.

C.2 Research methods and participants

The results presented in this paper build upon 90 hours of fieldwork activities in Àgora's computers room. The activities consisted of *in situ* observations and conversations with around 45 older people while using several ICT, ranging from Google Maps, Facebook, weblogs and YouTube. Around 35 participants were familiar with basic and more advanced ICT-related tasks. We have also conducted two, 1-h focus groups (6 women, 2 men) to elicit everyday life stories, and one semi-structured interview with the director of social services of the area to understand key stakeholders in e-services for older people.

We recorded fieldnotes by using inclusive technologies in Àgora: paper and pencil, and photographs. Laptops and video cameras might have been considered intrusive since there are no laptops around and participants are not used to being videoed during their everyday interactions with computers. We took most of our notes at the end of the sessions, since our direct involvement in them hindered taking detailed notes while being there. Although this might challenge their 'veracity', it also indicates the engagement of the participants in our research.

C.3 Data analysis

We have been analysing our fieldnotes by using Grounded Theory [Charmaz, 2007], while gathering the data. This consisted of extracting the main categories and subcategories from the entire body of fieldnotes, and defining the relations between them. The core categories that emerged from this analysis are:

- Relation with e-government services: emotion (fear of being excluded, willingness to learn, independence); training; mutual support; trust.

- Sharing of Information: type of information; channels; actors; channels' problems; peer-to-peer sharing; peer-to-peer advice.

D. Key findings of the ethnographical study

D.1 E-government services

Older people want to use e-government services

The first question is whether older people want to use e-services. Our participants are aware of the growing number of ICT services being offered to citizens, but they consider that society seems not to be concerned about the difficulties older people have in using them.

[Woman B, 66]: 'Now there're many services offered in Internet, for example the other day I found out that my electricity company allows me to pay the bill via Internet! I think it's a great idea! But someone should help us (older people) understand how all this works. The same is happening with the health system. Now you can make doctor's appointments through a web page. What happens in the future this would be the only way we've to make an appointment? We go to the school (Agora) because we want to learn and be up-to-date with technologies and the new services, but we also need support; most of these services are difficult to use for us!'

During a conversation with 9 participants, 4 of them reported feeling frustrated and excluded when not being able to use the most recent services that allow people to, for example, make an appointment with the doctor by Internet or pay the bill online.

[Woman A, 61]: '*I'd like to be able to pay the bill online; this would avoid me going to the bank and stand in a queue. However, I'm afraid of making mistakes. What happens if I do something wrong?*'

[Woman B, 66]: '*I agree it's difficult for us! However with all these new technologies and services growing every day, we need to learn*

as much as possible if we do not want that our grandchildren look at us as persons coming from the prehistory'

In a session with 17 women, with low to medium experience with ICT, they showed interest in learning how to make an appointment with their GP online.

Social support is a key step towards using e-government services

Peer-to-peer support throughout the learning process is a key point for motivation, socialization and new learning. Continuous training is a strategic point for increasing the adoption of ICT (and e-government services) by older people. When approaching ICT for the first time, they tend to be negative and pessimistic, feeling that they will never be able to master the tools. However, once this first step is passed, they are willing to learn new tools and they wish to be independent users. They mostly rely on peer-to-peer support to solve small problems and increase their knowledge. Mutual support is considered a natural part of their relationships and they want to help peers. For instance, to overcome the problems they experience in using e-government and other online services, the group of 17 women who showed a big interest in making an online appointment with their GP, reported relying mostly on friends, relatives and the training they receive in Àgora.

[Women G, 74] *"I know that when I have a problem with my computer and can always ask help to (name)."*

[Women H, 61] *'I am often here at the school and if I can, I am pleasant to help. Sometimes, we chat while we are at ours home and we try to solve problems together.'*



Figure 2.1. Participants working in a group during a class on mobile phones (left) and GoogleMaps (right).

D.2 Rich sharing of information

Type of information shared

The majority of information shared by our participants is about leisure activities, such as events organized by Àgora or by other social services and volunteer organizations. All the information regards activities in their local area. They also often share information about upcoming services addressed to them, such as the deadline to book for the organized pensioners' travels. Less popular are conversations about primary services, such as health.

Sharing with people they know, and through specific channels

We observed that our participants did not read the brochures or leaflets in Àgora with information related to these activities. This was not because they were unaware of this printed material. It was because their sharing is mainly conducted face-to-face with their peers. 45% of the participants reported that they missed out events or activities because they did not go to Àgora, or because none of their friends had informed them about upcoming activities.

Close friends often share information by phone and do not use e-mail for this. E-mail is used to share informal content and information they find on Internet, or to pass on jokes, PowerPoints or public exposure regarding local or national government, to their close friends.

Trustful, thoughtful and appreciated sharing

They do not rely on e-mail to inform friends of an event. Two participants commented that this is because they did not want to be forced to access the e-mail every day to know about something; they prefer to call or wait to meet a friend in class and tell him directly. Moreover, our participants appreciate when their peers give them information, advice and support. Peer-to-peer sharing of information is particularly valid because information received by a friend is perceived as an advice and encourage them to participate. All their social contacts are more familiar with their interests: they know what to suggest or what information a friend needs.

Social networking technologies for sharing information? First, making sense of them

We also observed the use that older people made of social networking sites (SNS) to understand the role that these tools play in supporting the sharing of information. All our participants looked really interested in learning to use Facebook and asked us to give them a special class on this topic. However, SNS are mainly used by the most advanced users. The most used functionalities are the video and photo galleries. They mostly use SNS to share YouTube videos or upload photos of family and friends. Often videos and photos are about an event that took place in a local area (e.g. local dances). One of the main barriers in using SNS is the huge number of possible connections: this increases the sense of losing control and all participants in the SNS class were continuously asking us who can read the messages posted on the wall or written privately to friends, or who can look at the photos in the gallery. Some 70% of them said they were not interested in reading the messages of nephews' friends on their noticeboard and complained that these messages make their noticeboard chaotic. This suggests that although mostly older people are attracted to Facebook because their family talk about it, this tool seems ineffective in supporting intergenerational communication. Our observations suggest that the use of SNS might increase if older people would feel they are using

the tool for a *clear goal*, with known persons and in a restricted and controlled environment.

E. Towards an inclusive e-government platform

As stated in the Introduction, this work has been conducted within the context of Life2.0, which aims at designing and developing an accessible online platform for making the social networks of older people more visible to them. By building upon the ethnographical insights in Section 4, and without aiming to reduce them to a mere list of 'bullet points' [Dourish, 2006], in this section we describe our first attempt to make explicit some of the implications of the ethnographical results for designing an inclusive e-government platform. To do so, we built upon our ethnographical analysis to conduct participatory design workshops promoting discussion around the design of potential services. At the same time the discussion allowed us to deepen and extend our understanding of the findings of our ethnographical research.

E.1 Participatory design workshops

We have conducted two participatory design workshops during the third and fifth month of the fieldwork activities, and took place in Àgora since this is a natural setting for our participants.

The first workshop was carried out by three members of our research team, and one representative of Àgora. Ten participants (5 men, 5 women) attended the workshop to elicit ideas for services that cover participants' needs. During the session, the researchers were taking notes and stimulating the discussion by proposing scenarios of use.

Based on the results of the first workshop and the fieldwork activities carried out in parallel, a second workshop was organized. It was attended by 9 participants (4 men, 5 women), three researchers, one representative of Àgora, and representatives of two ICT industries involved in the Life2.0 project. During the workshop, concrete scenarios of services were presented using storytelling to

facilitate comprehension and start the discussion. Conversation was promoted through questions that tried to cover all the stages and functionalities of the services. Participants were asked to tell their ideas, whether positive, negative, or neutral. While we were discussing the ideas with the participants, some of us were taking notes and written down ideas in "post-its", which encouraged participants to further their contributions to the workshop.

F. Implications for the service

F.1 Supporting the sharing of information

Our results suggest that there is a generalised need to support the sharing of information among older people within the local community. Often, many activities are organized for them but final “customers” are not always informed, when a key aspect of a service is its diffusion, so that they can access and use it. In the neighbourhood we conducted the fieldwork, there are several social service providers that offer different activities for older people each diffusing the information using different channels. Participants in the workshop asked for a centralised distribution of the information so that they would not be forced to access several different sources.

Based on this, we envisage a service which addresses two main goals: 1) help social service providers to organize and disseminate the activities/events; 2) promote an active role of older people within their local community by allowing them to propose and suggest activities and by encouraging their role of promoters of the service.

The service should allow:

- service providers to publish activities, events and all related services addressed to older people;
- older people to both access a list of upcoming events/activities and add/propose a new activity;

- older people to recommend or invite their friends to an activity using a recommendation/invitation system, therefore promoting the service to other potentially interested people.

F.2 Supporting face-to-face contacts and building trust

Our results suggest that leaflets and web sites used to inform about the activities are not very effective. Our participants mostly rely on face-to-face and peer-to-peer contacts for sharing information about local activities; however, this is not merely due to the inefficiency of the other methods, but also because “physical socialization” is important for them. It seems therefore relevant to include these aspects in the service. The service should not replace face-to-face contacts, but instead try to stimulate them and, at the same time, support information sharing in case face-to-face contacts are not possible (e.g. the person is sick and cannot go out). Moreover, our participants wished to be more active in the use of social media, when and if they feel in control of who can read their messages or see their pictures. During the workshop, participants agreed that they would feel more comfortable to use the service if they clearly see a trusted authority (e.g. Àgora) behind it.

Considering these two points, we envisaged the use of the service both in virtual and “private” environments (e.g. access a webpage from home), and in public settings using public screens. The public screens should be located in social centres, and/or other potentially interested organizations of the local area. We hypothesize that the advantages of using public screens are: (1) to promote discussion and face-to-face contacts around the screen; (2) to enable collaborative access to the service; (3) to promote peer-to-peer support and therefore facilitate the access for the ones who are not confident in using ICT, (4) to build trust among users and towards the service since the relation between the provided service and the trusted entity it is made visible. Moreover, we hypothesize that the offline use of the service will increase an active participation in the online platform.

F.3 Facilitating the use of the service

The use of the service can be fostered by allowing the access through different devices, such as TV, PC and mobile phones. TV is a well-known technology with which older people feel comfortable interacting; this device can be especially thought for the users who are less advanced with PCs. PCs are becoming widespread among older people since they often receive unused ones from family members; access through home PCs will be most suitable for the seniors who are more familiar with this device. Finally, mobile phones are widely used among older people. All our participants have a mobile phone that they always bring with them, however only 40% of them feel confident in using it. Accessing the service on-the-move through a GPS mobile phone, would allow receiving and sending updated and geo-localized information, thus facilitating notification of events or publication of activities.

Besides multi-devices access, training and technical support must always be provided if we aim at a wide adoption of the service among older people. Training classes should be organized especially during the initial period of use of the service, while general support should be provided throughout the period. Finally, mutual support between themselves should be encouraged.

G. Discussion, conclusions and future work

We consider that citizen-centred perspectives in e-government should be driven by understanding the social and situated context in which the technologies (and e-services) are used and their everyday use. The results of this paper seem to confirm it, and suggest that socialization, mutual support, face-to-face contact, and trust are important aspects in older people's attitude towards e-services. Although our results are built upon observations and conversations with motivated ICT users, they seem to implicate a number of ways to foster service use and adoption for less digitally engaged users that we have indicated. However, further research addressing this issue is needed.

We did not directly explore existing government webpages since we concentrated on technologies and tools that our participants use and want to use, without forcing them to use others, as we believe that this leads to results that are more relevant.

Time constraints of R&D projects and [Millen, 2000] encouraged us to narrow the focus of the field research when entering it. We did so by building upon our previous extensive ethnographical work on ICT with older people [Sayago and Blat, 2011].

Whereas a key aspect of ethnographical research is to tell a story by giving voice to the participants, the preliminary character of the results moved us to include very few voices, since more research is needed. Yet, these initial findings represent a step forward beyond considering cognitive decline and usability issues as the only usually acknowledged factors affecting the engagement and adoption of e-services by older people.

We have presented preliminary results of an ethnographical study, which fits in the category of ‘rapid’ or ‘quick’ one, due to relatively short period of time spent in the field, as opposed to classical ethnography [Fetterman, 2010]. Our rapid ethnographical study aimed at understanding the role that ICT (can) play in e-government with older people by supporting and reinforcing their social interactions and participation in local areas. We have also presented a first description of a scenario derived from these results, which we consider can help older people’s access to e-services, and increase their participation in activities conducted in their neighbourhood. In this scenario, older people are both creators and consumers of information, which can foster information sharing and support.

Our preliminary findings highlight some of the potential benefits of using ICT for enhancing the participation of older people in the social life of their neighbourhood, reducing social isolation and promoting a more active role of them within their community. At the same time, ICT might be used to build a direct channel of communication between older citizens and their local organizations, facilitating the sharing of information and providing direct support.

Contrary to common stereotypes of older people as e-services users, we have revealed a great interest and willingness to use (and learn) such services and our results outline important factors impacting the overall e-government experience, such as socialization, independence, face-to-face contacts, mutual support, sharing.

We are gathering more data, widening and deepening our analysis, and expect to conduct field intervention studies aimed at evaluating prototypes in out-of-laboratory conditions (i.e. social contexts). The goal is to explore the effect that the service introduced and technologies integrated produce on the sharing of information and events, and we will adapt a mixed-research approach (i.e. quantitative and qualitative data) to understand better the results. We will research into the impact of different elements on the perceived sense of social connectedness with the community, on increasing (or decreasing) engagement in activities, and on the effective broadcasting of information within the network of neighbours, all of which being key elements of e-government. We aim at progressively extending the range of action of the intervention studies, starting from a small and controlled context, such as Àgora, moving to a slightly larger one, such as several social services located in the same building of Àgora, and finally the service will be tested in a large context such as the entire neighbourhood. The latter one will be the target for the Life 2.0 service platform. Throughout the period of the intervention field studies, we will carry on focus groups, training classes, and design workshops with our participants, to transform the design process into a continuous customization process.

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2.2 Older people's use of Social Network Sites while participating in local online communities from an ethnographical perspective

Righi, V.; Sayago S., Blat, J. 2012 [Older people's use of Social Network Sites while participating in local online communities from an ethnographical perspective](#). In *Proceedings of CIRN 2012 Community Informatics Conference: 'Ideals meet Reality'*, Nov. 7-9, Prato, Italy, ISBN: 978-0-9874652-0-7. **Best Refereed Conference Paper Award**

Abstract: Social Networks Sites (SNS) are attracting a lot of public and academic interest. However, despite an increasing uptake of Information and Communication Technologies amongst the older population, very little is known about how older people use popular SNS, such as Facebook. We focus on older people's use of SNS with the aim of gaining an understanding on how they can be used to foster involvement of older people in online and offline local communities. We conducted a 17-months ethnographical study with c.55 older people in a local physical community in Barcelona, Spain. We address the evolution of their interests in SNS and concerns over time, the type of their participation in online communities, and the importance of trust, together with the strategies they adopt to build trust online.

Keywords: older people, online communities, social network sites, community networks, ethnography

A. Introduction

In the last two decades a growing interest has been put on applications of Information and Communication Technologies

(ICT) aimed at the local level, often known as community networks. The main focus of much previous research has been on understanding whether and how community networks reinforce local social ties and foster involvement of their members into the local (offline) communities. Yet, and despite an increasing number of governmental policies, which encourage the involvement of older people in local communities, very few studies have regarded older people as users of community networks.

As Social Network Sites (SNS) have been widely adopted in current society, and have a great potential for enabling online communities among neighbours, we focus on popular SNS to understand how this technology can support the participation of older people (60+) in local online communities. As we argue in the section of Related Work, very little is known about this topic, despite being a timely and important issue to be addressed. In working towards this goal, we considered that exploring older people's use of popular SNS, such as Facebook and YouTube, over an extended period of time, in a concrete and already established local offline community, was a key step. This paper reports the findings of a 17-months ethnographical study of SNS use by c. 55 older people we conducted in the Àgora community (Barcelona, Spain). The study is framed within Life2.0⁹, an EU project aimed at making the local network of social interactions more visible to older people. Life2.0 provides them with a community system, consisting of a web page and an iPad application, through which they can, for instance, see which services are offered in their neighbourhood, who can help them with simple tasks, which the main events in the local area are, as well as offering their help to other peers and proposing activities. The objective of the system is to strengthen, encourage and facilitate informal care and mutual support practices in neighbourhoods, thereby fostering the involvement of older

⁹ Life 2.0: Geographical positioning services to support independent living and social interaction of elderly people (CIP ICT PSP-4-270965), <http://www.life2project.eu/>

people in local communities, which, we consider, is crucial in promoting active and positive ageing. We conducted several project-related activities that allowed us to explore further the participants' attitude towards and use of the Life2.0 community network.

B. Related Work

B.1 Creating and participating in online communities through popular SNS

Much of previous research into online communities with older people, e.g. SeniorNet (Wright, 2000, Pfeil, 2009a), GreyPath (Burmeister, 2012) and OldKids (Xie, 2008), has overlooked how they use popular SNS, such as FaceBook and YouTube, to create and participate in online communities. Since social digital inclusion, i.e. using technologies that others (e.g. their children and grandchildren) use, is an important issue amongst older people (Sayago, 2010), in this paper we focus on popular SNS, and we review and discuss next previous studies that have addressed them with older people and that are related to the objectives of this paper.

(Sayago, 2012) explored the use and sharing practices of YouTube by older British people. (Pfeil et al., 2009b) compared the use of MySpace amongst young and older people. (Brandtzæg, 2010) investigated the content sharing and sociability of Facebook by young and adults (40-62 years old), and (Gibson, 2010) explored concerns of older people towards MyFriendsOnline and Facebook. Common to these studies is the fact that those older people who participated in them were reluctant to create content in online communities. However, we are witnessing a growing tendency towards promoting the active participation of citizens in online communities. Noteworthy examples of this trend are (Macintosh, 2004; Kirk, 2011). Thus, understanding better the (lack of) active participation of older people in online communities is timely and important.

B.2 Type of participation in online communities

(Bloch, 2011) conducted in-depth interviews with 18 older people to understand their engagement in the civic online spheres, and found that none of them created content on the Web. However, they reported being avid information consumers and regarded the use of SNS as trivial. Other studies explored the introduction of online platforms in local communities (e.g. Capece, 2011; Hampton, 2003) suggesting that these might enhance community involvement. However, none of these studies addressed the question of whether (and how) older people (would) participate in, and benefit from, such online communities. An exception is (Karahasanovic, 2009), who explored the use of proxy technologies in a suburb of a Belgian city to gather *social requirements* from older people related to consumption, sharing and co-creation of content in new media. This study found that older people were motivated to create content in an online platform provided that, for instance, the content was relevant for them and for others, such as documenting the history of their neighborhood and sharing their memories in face-to-face get-togethers. Similarly, (Carroll, 2005) shows that senior citizens of a local community enjoyed posting and annotating memories in Blacksburg Nostalgia (a Web-based forum).

Still, very little is known so far about how older people use, or could use, SNS to create and actively participate in neighborhood online communities. We address this question by adopting an ethnographical approach, which is discussed in the following section.

B.3 Methodological approaches to study online communities and SNS

Social Network Analysis (SNA) has largely been used to explore relationships and interaction between people in both offline and online communities. (Pfeil, 2009a) used this method to analyse communication and social network patterns of an online community targeted at older people. (Zaphiri, 2006) conducted it to compare newsgroup use by teenagers and older people. SNA has been

complemented with self-reported questionnaires (Schrammel, 2009) and substituted with qualitative analysis of sample online conversations (Wright, 2000). However, these approaches assume that older people are active content creators (i.e. comment, reply or post message) and, as we described in the previous section, older people are not as active in generating content as they are in seeking information (Bloch, 2011; Sayago, 2012).

Others studies with older people adopted a qualitative approach, mostly based on interviews and intervention study (Lehtinen, 2009), in-depth interviews and usability tests (Brandtzæg, 2010), in-depth semi-structured interviews (Bloch, 2011) and ethnographical interviews (Gibson, 2010; Xie, 2008). Fewer studies adopted an ethnographical approach, an exception being (Sayago, 2012), despite the fact that it has been conducted and encouraged in previous studies with other groups of users (see (Boyd, 2008); (Lange, 2007); (Hampton, 2003)).

We conducted an ethnographical study, adopting a mixed strategy by combining *in-situ* participant observations and conversations with participants while they were taking part in several online communities and using SNS over a prolonged period of time. We also read the online messages they wrote in Facebook and kept track of the evolution of their profiles.

C. Description of the ethnographical study

C.1 The setting

We conducted our study in Àgora, a 26-year-old adult educational centre in Barcelona (Spain). One of Àgora aims is to promote access to ICT among groups of people who are at risk of social and digital exclusion, such as immigrants and older people. This is achieved through informal learning in courses (e.g. computing, languages or literature). Around 1,000 people (using Àgora's terminology, 'participants') take part in them monthly. All these activities are free, and most of them, supported and encouraged by

local authorities. The ICT courses are mostly attended and managed by older people. The participants are encouraged to play an active role in the association. For instance, they are encouraged to give their opinions on aspects of the centre which need to be addressed in monthly public meetings, and to make decisions regarding future plans of the centre and its participation in research projects, such as Life 2.0. Agora is situated in the highly populated suburb of La Verneda (29.389 people in 1.1 Km², 24.2% over 65) within the district of Sant-Martí in Barcelona, wherein most of the social impact of Àgora takes place. The community of La Verneda is characterized by high level of social activities organized by the numerous local associations present in the area.

C.2 The participants' profile

Our study involved around 55 older people, aged 59-80 (15% 59-64, 70% aged 65-75, 15% over 75). All the participants live in flats that are relatively close to Àgora (max. 4 Km) and are familiar with basic ICT-related tasks (e.g. left and right clicks, folders and documents management). 45% of them are familiar with more advanced tasks, including Internet-related tasks, and reported having been using computers for at least the past 4 years. Around 70% of the participants have low educational levels (i.e. primary school). Most of the participants, 70%, know each other as a result of having participated in courses in Agora, and have been maintaining regular contact over the past 2-3 years. All the participants lead an independent life and are active, e.g. they participate in social activities on a weekly basis and around 50% look after their grandchildren.

C.3 Methods

Our ethnographical study, which started in January 2011, adopted a classical approach (Fetterman, 2010), combining *in situ* participatory observations with informal conversations over an extended period of time. Since then, we have participated in 7 ICT courses, wherein the participants used quite a few different

communities technologies: Facebook, Twitter, Picasa, YouTube, Panoramio, Blogger, GoogleMap, Spotify. Each course lasted 3 months and was divided into a total of 12, 2-hour sessions (one session per week). 18 participants were enrolled in each course. Around 15 participants took part in all the courses, while the others were enrolled in 1 or 2 courses.

The participants decided what they wanted to learn during the course, and Facebook attracted a lot of attention. Thus, we set up a Facebook Group among the course participants, in which researchers and participants shared information about the courses and other topics of interest for them. The group was set up by the main author in October 2011 and has 34 members, 4 of which are researchers. The first author has established Facebook friendship with 41 participants – 34 were members of the group, 6 were participants of other courses - with the aim of understanding the interplay between online and offline spaces, in and out of Àgora.

In addition to traditional ethnographical research methods (i.e. observations and conversations), we also conducted the following activities (c.20 participants took part in them) to explore further the participants' attitude towards and use of online neighbourhood communities:

- 2 participatory workshops, which were aimed at eliciting ideas for the concept of the Life2.0 online platform
- 2 co-sketching sessions, which were designed to identify relevant elements for the user interface of the Life 2.0 platform
- 15 semi-structured group discussions in which we addressed expected functionalities and problematic issues of the Life2.0 platform, and its use in wider contexts, i.e. their neighbourhood.

Until now¹⁰ (May 2012), this means over 220 hours of fieldwork. We took most of our field notes at the end of the different activities

¹⁰ The study is ongoing and expected to last until end of 2013.

described above, since our direct involvement in them hindered taking detailed notes while being there.

C.4 Analysis

We analysed our field notes and the content posted by the participants in their Facebook Wall and in the Facebook Group by extracting the main categories and subcategories from the entire body of collected data, and defining the relations between them. We did so by reading the notes and contents, and conducting qualitative data analysis techniques (open, selective and axial coding). The core categories that emerged from this analysis are:

- *Interest and concerns over time*: feeling included, privacy, gossiping, unacceptable behaviours, perception of usefulness
- *Type of participation*: information seekers, trusted interaction, face-to-face reciprocity, sharing (trusted people, friends' interest, cultural tradition)
- *Trust*: recipients control, offline contacts, find strategies, removing friends, restricted social circles, rely on social circle, membership control.

D. Findings

D.1 Online communities and related SNS: interests and concerns over time

Interest in participating in online communities, with some important concerns

Contrary to stereotyped views of older people being uninterested in ICT, all the participants were keen on knowing more about SNS. 85% of the participants reported having heard of Facebook and 20% of Twitter in conversations with their children, "*The other day, my daughters were talking about some photos they had put on...how did they call it? [think] Facebook? What do I have to do in order to see these photos?*" The participants' willingness to feel more

socially included, together with their curiosity to learn ICT, both exemplified in the “*What do I have to do in order to see these photos*”, was a strong motivation for them to explore SNS.

However, their interest in participating in online communities and using SNS was not free from concerns, which were mostly related to a perception of:

- A lot of gossiping, “*This is for knowing what your friends are doing and gossiping. Everyone knows what you have had for lunch today!*”
- A lack of privacy and trust, “*why does this person write on my Facebook? She is my daughter’s friend, but I would swear that she is not in my friends’ list. Can she read my posts?*”
- Unacceptable behaviour, “*I saw my granddaughter’s photos...and I don’t even want to tell you what I saw...*”
- A lack of usefulness, “*Why should I use it? It is a waste of time, I prefer to use Internet for reading newspapers, not for reading these silly things*”
- Being glued to the computer, “*I don’t want to create an account...My husband spends hours on Facebook!! At the beginning he had just few friends but now he is always there...I don’t know what he does!*”

Unacceptable behaviours and privacy concerns have also been highlighted in previous studies involving different SNS, such as YouTube (Sayago, 2012), Netlog (Lehtinen, 2009), MyFriendsReunited and Facebook, (Gibson, 2010). A perception of a lack of usefulness and unwillingness to be glued to the computer screen have not been reported in any of these studies, except (Sayago, 2012), who discuss usefulness within the context of video-content generation.

Evolution of interests and concerns over a prolonged period of time

The long-term aspect of our study allowed us to observe how attitudes towards and adoption of SNS evolved over time. Although their concerns about privacy and gossiping never disappeared, they did not limit the adoption of SNS amongst most of our participants¹¹.

They perceived the usefulness of using SNS over a relatively prolonged period of exploration (7 months) of both what they could do with SNS, *“I was on holidays last week, and the people working at the hotel asked me whether I was in Facebook. They told me that they would upload photos of the hotel to Facebook. When I got home, I logged in my account and could see the photos! This is great! Facebook is very useful for sharing photos!”*, and of how to do it. At initial stages of learning to use Facebook, all of them accessed it by clicking on links embedded in notification e-mails. When they became more confident with this SNS, they started to access it by typing the URL in the address bar of Internet browsers, as they do to check their e-mail, and to adopt it gradually. 7 participants (of 15) reported using Facebook every day, and 5 did so once per week. These findings indicate that Facebook is starting to be part of the everyday ICT activities of c.12 older people, and we show more details of their use in the sections that follows. These results also suggest that concerns and perceptions are much better understood over an extended period of time.

D.2 Types of participation in online communities and in related SNS

Profile pages are empty, but they are there! Active consumers of local information

¹¹ Two participants claimed not to use Facebook because their initial concerns regarding gossiping and unacceptable behaviours did not make them feel comfortable enough to use it

Whereas the profile page of most of them (36 of 41) was almost empty, they used Facebook frequently (at least once per week). Our observations and informal conversations revealed that they read content which was relevant to them. A noteworthy example, with implications for effectively using SNS in communities, is the use a participant made of Facebook to know what was going on in their local area. Namely, she became fan of the Facebook Page of the Neighbours Association, because “*they post a lot of information here...I often look at it to see if they organize something in the weekends*”. This type of use is difficult to gather in Social Network Analyses, as they tend to focus mostly on users’ profiles (e.g. Pfeil, 2009a).

Posting and replying to messages happen in face-to-face conversations

Rarely did our participants post messages or update their profiles. 2 participants posted messages once per week; 3 did so once or twice per month, while the others never posted any message. Information sharing was mostly conducted in face-to-face conversations with people they knew, as showed by this conversation: “[Researcher]: *next time bring your camera because we will use it in class! We will post a message on the Facebook Group to inform people who did not come to class today.* [Participant A]: *don’t worry, I’ll tell [participant’s name]*”, and in this exemplary face-to-face conversation between two participants:

[A]: “*Have you seen the photos of [name of village] I uploaded on Facebook?*”

[B]: “*Of course I’ve seen them! I was thrilled to see my hometown in your photos! Did you like the town? My house is close to the cathedral that appears in one of your picture*”.

Similar strategies have been found in how older British people comment videos on YouTube (Sayago, 2012), but differ considerably from (Zaphiris, 2006), wherein it is claimed that newsgroups for older people are more responsive, i.e. fewer non-

replied messages, than those of younger people. This might be due to the fact that in our study, and in (Sayago, 2012), the community had a strong face-to-face element, i.e. older people met up regularly, and therefore our participants do not show reciprocity, i.e. replying to messages online in SNS, and do not expect their friends to do so, whereas in Zaphiris, the physical component of the community might be much less strong. However, proximity and face-to-face contacts are key elements of neighbourhood communities and, in our opinion, they should be more considered when designing online community networks.

Content creation and sharing with trusted people

Our participants posted links to YouTube videos which had some relationship with their cultural traditions, *“Look the video I’ve posted, it is the Jota aragonesas [Aragon Region’s traditional dance]. We [she refers to herself and another participant] dance the Jota every week in the Aragoneses Center”*, or they thought of as funny, *“Have you watched this video? It’s a parody on how young people deal with love relations in Facebook... it’s so funny!! I’ve put it on the group [Facebook Group]! All you have to watch it!”* We observed that the videos were mainly posted on their friends’ wall. They did so because the videos were targeted at them, *“Look this video that I posted on [name’s] Facebook! He loves these things... it is about the popular dance of his hometown”*. 4 participants, the most active and with more experience with ICT, uploaded photos and videos they create and they think their friends might be interested in, *“Can you help me to upload these photos on Facebook. I went on holiday to the [name of participant’s] village and I want to share these photos with her. I hope she likes the photos!”* or representing moments shared with their friends *“Last Saturday I took a video while we were having lunch with the group of dance classes. I want to share the video on Facebook”*.

These results highlight the importance of trust in the concerns outlined before, and we elaborate further on it in the section that follows.

D.3 Trust is a key issue in online communities and use of related SNS

Trust at different stages: learning and using SNS

When learning to use SNS, one of the main concerns for our participants was whether people they do not know could read their messages or see their photos/videos. For instance, learning to manage the list of friends is key in order use Facebook, and our participants often asked us how to remove so-called friends from their list. We observed, and participants confirmed, that they remove people they do not know very well, e.g. people with whom they had had just few interactions with, indirect friends (i.e. friends of their friends), and users who post frequent and irrelevant contents, *“this guy is ridiculous. He sends a bunch of bullshit...moreover, he sends them in the morning when he is supposed to be at school! Can I remove him?”*

Our participants also showed concerns about trust when they became more confident with SNS, and this confirms the time-persistence of this important concern (see Evolution of interests and concerns over time). We observed that no participant wrote comments on YouTube, or in any other public networks (e.g. online newspapers). Informal conversations with them revealed that this was due to their unwillingness to take part in virtual discussions with people they do not know, *“I don’t know if people who are writing these comments are experts at classical music [the video she was watching was about a classical concert]. Sometimes, I read of people saying that they are music professors. How can I know if this is true? I don’t know this person and if he is not expert he could say a lot of stupid things! I don’t want to waste my time in replying to people I don’t know!”*. Similar concerns were raised in Twitter, *“I am not the person who would answer to public tweets. You know... I don’t know the people who are writing these things. What if they are very expert and I say something stupid?”*

These results disagree with previous works, which show how older people interacted with people they never had face-to-face contacts

before (Wright, 2000, Burmeister, 2012). This might be due to the fact that our participants feel part of a local physical community and do not feel the need to create new social ties (neither strong nor weak) online, as we argue in the Discussion section.

Developing trusting strategies: one-to-one or one-to-few, rather than one-to-many

Trust concerns did not put our participants off participating in online communities. On the contrary, we observed, and participants confirmed, that they developed their own strategies for building trust online. Contrary to what we observed in YouTube, none of our participants uploaded videos to this SNS, our participants did upload and share photos in Picasa, because they felt more in control of the people who would have access to this content, “*You mean that I just have to add his e-mail address in this box and he will receive all the photos? It is like if I was writing an e-mail to him*”. 5 participants uploaded their videos and photos to Facebook but they often asked us what they had to do to send them only to one person. Overall, they prefer selectively sharing of information, “*Why should I post a message on the Wall if I want to show the video only to him?*” Despite the heterogeneity of older people, this strategy is very similar to the one adopted by a different cohort of older people in Scotland to share videos in YouTube: e-mails sent to people they know and that could be interested in the video (Sayago, 2012).

Cross-cultural trust in creating an online community from scratch

Not only is building trust important in popular SNS, but also when creating a community network from scratch. By observing and discussing with the participants during the pilot phase of the Life2.0 project, we found that the participants are unwilling to share contact information (especially their home address) among neighbours they do not know, unless these are shared for a specific and agreed purpose, such as sharing contact data to get in touch with other platform members who are asking for or offering help. The role of members of their social circle appeared to be vital for

recommending trusted users, *“I’ll tell you what I would do...It’s simple! If I don’t know the person, I would ask [participant name] if she knows him. If she does not know him, then I would ask other friends and if none know him, then I would come to Agora and ask at the secretary...because the secretary should know him, isn’t it?”*

The same result was found in the other Life2.0 pilot locations, i.e. Aalborg, Milan, Joensuu (Peterson, 2012). In Aalborg, for example, the participants pointed out that they would like to know the area where a person lives so that they could gather information about her/him in the local area before getting in touch with him or her.

The participants in the four settings suggested strategies for building trust. Common to the four locations was the need to have an external association serving as administrator and coordinator of the online platform. Having a real place where older people can report to in case of need emerged as an important feature in order to support the take-up of the CT among our participants. The participants pointed out that the administrator, who preferably is part of a local association, should control the membership of the online platform, i.e. users who want to have an account should attend an interview with the local administrator to have their accounts approved. The local administrator should also help older people get started, i.e. register them in the platform and verify that all the information is correct, hence functioning as supporter. Periodic face-to-face meetings coordinated by the administrator have also been suggested as a way to increase trust among users.

E. Discussion

We reported key findings of an ongoing ethnographical study which has hitherto looked into the use of SNS amongst older people who belong to a local community with a strong physical component. We addressed i) the evolution of their interests in participating in online communities supported by popular SNS and their concerns about taking this step further, ii) the type of participation in online

communities, focusing of profile pages, content consumption and creation, and iii) the importance of trust, together with strategies they adopt to build trust online.

We considered that looking into older people's use of popular SNS was an important previous step towards addressing the key question of our research: how SNS can facilitate and support the participation of older people (60+) in local (neighborhood) online communities. The results show a number of relevant aspects to consider towards achieving this goal.

Despite initial concerns, and contrary to stereotypes, our participants express a clear interest in knowing more about SNS. Their desire not to lag behind and to being socially included suggests that '*felt included*' is a useful construct to the Technology Acceptance Models, which have been often used to predict older people adoption of social network technology (Karahasanovi, 2009; Ryu, 2009; Chung, 2010), but that have not addressed this construct so far. The results also show the importance of understanding online communities over time, because older people need to i) feel in control of the technology and ii) explore the tool to understand if it addresses their interest and needs, and this takes time. Moreover, the type of participation might be different from that of younger generations, but an overall lack of content creation does not necessarily mean they do not participate in the community. Rather, we have shown that they develop their own strategies, and these strategies could (and should) be better supported by SNS if they are to be effectively used by older people in close-knit communities.

Àgora is a community with a strong face-to-face dimension, which pervades our results. Thus, more research with different types of local communities is needed, and this is part of our next work. However, we consider that it would be a mistake not to consider the introduction and use of SNS by older people in local communities similar to Agora, and our results suggest that in these types of communities, promoting the uptake of online communities among

older people is largely dependent on facilitating trust mechanisms online, as well as enriching the face-to-face strategies in the online.

Finally, and with respect to the methodology, our results also show that examining SNS and online communities use by older people could go beyond data analysis of profiles or uploaded content. There are other important aspects for understanding their use of SNS, such as offline interactions promoted by the online ones, along with considering that older people might be active consumers of information, which we saw thanks to adopting an ethnographical approach, combining traditional ethnographical research methods with others, more related to online netnography, such as reading online comments.

F. Conclusion and future work

In this paper we focused on exploring the use of some SNS amongst older people, who belong to an already established local community with a strong physical aspect, as a previous step towards addressing the key question of how to support and facilitate their participation in community networks with SNS. The results addressed a number of important aspects to be considered towards this end.

We showed that a large number of older people do not necessarily dismiss the potential of online communities. They recognize that social network technologies are largely widespread, both in current society and amongst their family members, and therefore knowing and learning to use them is deemed socially included and useful in order not to lag behind.

Initial negative concerns, i.e. lack of usefulness, fear of being glued to SNS, which are often pointed out by previous studies as key aspects preventing the adoption of SNS (and ICT, in general), amongst older people, are mostly overcome after a period of prolonged use, while others, privacy and gossiping concerns, never disappear. We showed how our participants adopted strategies to

mitigate them, such as learning to control the technology and carefully monitor their friends' list.

We also showed that our participants do not express themselves in online communities with the language/tools offered by Social Networks Sites, i.e. comments, *I like* buttons, status update. Socialization and opinions and information sharing remain mainly face-to-face practices. This can also explain why their Facebook Walls are almost empty, despite the fact that they claim to use Facebook at least once per week. They are avid information consumers in online communities and SNS, especially information regarding their local community or cultural tradition. They prefer private messages (i.e. one-to-one communication, similar to the e-mail), instead of making their status visible to all their friends. They did not actively participate, i.e. commenting, uploading content, in open or public online networks.

Trust is crucial in the uptake of online communities among our participants; especially if people they do not know can participate in the community, and there is no control for trusting their members. We consider that older people' use of place-based online communities can be fostered by adding offline interactions and control (e.g. trusted local association as administrator and membership control), and this is part of our future work.

Our next step is to conduct further ethnographical research to understand the use that our participants make of the Life 2.0 platform, as this should allow us understand our results in a concrete case study, and how technological solutions adopted in the platform support, mitigate their concerns, or create new ones.

G. Acknowledgements

We are indebted to our participants for their collaboration in our research. This work has been partially funded by Life 2.0: *Geographical positioning services to support independent living*

and social interaction of elderly people (CIP ICT PSP-2009-4-270965).

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2.3 Older people's strategies for building trust in online communities through an ethnographical lens

Righi, V.; Rosales, A., Sayago S., Blat, J. (2013) [Older people's strategies for building trust in online communities through an ethnographical lens](#), in (ed). Schulz, T. In *Proceedings of the User-Centered Trust in Interactive Systems: a workshop from NordiCHI 2012*, pp: 43-47, ISBN: 978-82-539-0538-9

Abstract: The paper presents key results of an ethnographical study we conducted with 55 older people (aged 59-80) over 18 months while participating in online communities. The results show that trust is very important for this user group. Privacy and concerns about misuse of personal information are important elements of trust for them, and closed social circles and everyday trusting strategies are key ingredients of their virtual and face-to-face trust building processes.

A. Introduction

Much of previous HCI research on trust has focused on e-commerce and been conducted with ordinary HCI users (i.e. young and adult people). In our research, we are looking into trust building in non-commerce websites with an ever-growing sector of the population, older people (60+). We aim to understand their trust building process in online social networks and how it can be facilitated with improved Social Network Sites (SNS). We present key results of an 18-month ethnographical study of older people's use of popular SNS we conducted to this end. The study is framed in the Life2.0

project¹², partially funded by the EU, aimed at making the local network of older people's social interactions more visible amongst themselves and their social circles through geo-located online services.

B. Related work

B.1 The bulk of research: trust in e-commerce

Trust has largely been studied in e-commerce. Much of this research has focused on determining web-based elements, such as graphical design and information quality [e.g. 1] and important company-based qualities, for instance, reputation and external guarantees [e.g. 5], which influence trust building with clients. We have been addressing web-based elements, as well as motivations, social practices and human actors involved in the trust building process, which are important aspects of the second and current wave of HCI research [3], in online communities.

B.2 Trust in online communities

We consider that Tricia Wang's distinction between social circles and social networks in Chinese online communities can help us understand trust building in our research. According to Wang [7], social circles consist of people we already know (e.g. friends, relatives) and social networks of people we do not know (yet). Thus, "social circles build on existing relations of trust, and social networks build out new relations of trust" [7: minute 15]. This implies that trust in online social networks is created through 'trust-exploring-practices', and in our research we aim to understand the practices conducted by older people.

B.3 Trust, online communities and older people: lots to do

Whilst previous studies of trust with older people have largely focused on exploring the extent to which they trust technologies

¹² <http://www.life2project.eu/>

embedded in caregiving devices (see [6] for a review), there seems to be a lack¹³ of research into trust in online communities with older people, despite the increasing adoption of SNS amongst the older population and the importance of trust in social interactions [2].

C. Our study: setting, participants and methods

We have been conducting our ethnographical study in Àgora, a 26-year-old adult highly participatory educational centre in Barcelona (Spain). Our study adopted a classical ethnographical approach, i.e. we conducted *in-situ* observations and conversations over a prolonged period of time (18 months) with a group of 55 older people (aged 59-80). All the participants were familiar with basic ICT-tasks and 45% with Internet-related tasks. They reported using the computer at least once per week. We conducted the observations and conversations weekly, while the members of our user group were using different community-based technologies, such as Facebook, YouTube, Picasa, Google Maps, Twitter and the Life2.0 community platform¹⁴, and other more common ones, such as e-mail and picture-editing tools, in different ICT courses in the centre. This resulted in over 230 hours of fieldwork. We also set up a Facebook Group in one of the courses, establishing Facebook friendship with 41 older people. Reading their posts and flow of messages, and talking with them allowed us to begin to make sense of the relationship between older people and SNS. We analysed our field notes and the content the participants of the Facebook group posted in their online social network by conducting qualitative data analysis techniques (open, selective and axial coding).

¹³ A keyword search (*trust, online communities, social networks sites, older people, elderly*) we conducted in academic databases (e.g. Science Direct and ACM DL) yielded no studies.

¹⁴ Life2.0 is a community platform through which older people can ask and offer help to people living in their local neighbourhood and keep abreast of what is happening in their local area.

D. Findings

D.1 The nature of trust concerns in online communities

One of the main concerns of our participants is whether the information they post/share in online communities, such as their photos, e-mail addresses or personal videos, can be accessed by people they do not know (or do not want to share with) and that can potentially make a bad use of it, e.g. sending spam e-mails with viruses. At the end of a course session, they also remove any personal documents they put on the computers, which are used by different people, as “*I don’t want people I don’t know to look at my things*”. Privacy, unknown people and the use they can make of the personal information seem to be three key factors in the definition of trust for this group. The complexity and constant evolution of tools to manage privacy settings in online communities (e.g. in Facebook, deciding who can read the posts) makes it difficult for our participants to use them effectively. Instead, they prefer using the private message functionality in SNS, since, in their opinion, it is similar to the e-mail tools they use.

D.2 Trusting the technologies or themselves using them?

Our participants did not show any concerns in trusting the technologies¹⁵ they were using. They often pointed out that these technologies do well its job and that they were the ones who make mistakes. This opinion influences how they participate in online communities, especially when they are learning to use them, e.g. in Facebook, they were often afraid of making mistakes which could result in an unwanted sharing of personal information. Trusting their ability to use the technology is the first step they have to take to start to participate in online communities.

¹⁵ By “trusting the technology” we mean the user’s belief that the system has the functional capability to reliably perform a task [4]

D.3 Relying on their social circles to trust strangers

Our participants are willing to engage in online communities recommended by trusted people, e.g. family members and friends. For instance, a participant reported having joined a Facebook Group because a friend had recommended it to him. Another participant became a fan of the Facebook page of a local association because she knew the association and two of its members. These examples show that trust in online communities is built by this user group through closed social circles, mostly in face-to-face interactions.

D.4 Everyday trust building strategies go online

Gathering information about an unknown person by asking people they know in their neighbourhood or relying on information provided by trusted sources, such as local associations, are everyday trust building strategies adopted by our user group when participating in online communities. For example, our participants considered that a trusted member, e.g. a local association, to whom they could report bad behaviour or ask for further information about others members, would be useful in order for them to trust users of the mutual help service provided by the online Life2.0 platform.

D.5 Indirect network ties increases distrust

Our participants find it difficult to understand the message flow through direct (i.e. friends) and indirect (i.e. friends of friends) network ties. Whereas direct network ties are trusted, indirect ones are not. Our participants did not expect to be able to read in their News Feed comments made by unknown people (i.e. friends of their friends) or be encouraged - by the system - to add people they did not know to their friends' list. These indirect ties raised privacy concerns amongst our participants, i.e. can unknown people read my posts?

E. Discussion and plans for future work

We considered that going beyond identifying trust-cues in websites was worthwhile to start to understand trust in online communities with older people. Our results suggest that privacy control and concerns about misuse of personal information are important elements of trust for this user group, and that closed social circles and everyday trusting strategies are key ingredients of their virtual and physical trust building processes. Our next step is to understand trust further. To this end, we will conduct traditional and online ethnographical research in different communities of older people, to deepen and widen the data collected thus far. We will also conduct co-design with them, which should enable us to discuss implications for designing SNS which support and enrich much better their trust building experiences.

F. Acknowledgements

We are indebted to our participants for their collaboration in our research. This work has been partially funded by Life 2.0: *Geographical positioning services to support independent living and social interaction of elderly people* (CIP ICT PSP-2009-4-270965).

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3. DESIGNING ENGAGING TECHNOLOGIES FOR OLDER PEOPLE: EXPLORING OPPORTUNITIES, CHALLENGES AND ASSUMPTIONS

This chapter consists of one conference paper, which was published in ACM C&T (Communities & Technologies), and one journal paper, which is currently under review in the *International Journal of Human-Computer Studies*. This chapter presents the design and use of new technologies developed within the framework of two R&D projects, Life 2.0 and WorthPlay. This chapter explores the assumptions inherent in the design/development discourses, the opportunities opened up by technologies which have been introduced in older people's everyday lives, and the changes in daily practices brought about by technology appropriation over time. Overall, the results presented in this chapter invite us to re-think how technologies and older people are, and should be, conceptualized in HCI design research.

Section 3.1 discusses the extent to which digital technologies can shape the life of older people in cities. While previous HCI studies have mostly focused on how new technologies can be developed to support older people in their daily mobility and activities, the technologies presented in this section, i.e. a community platform for sharing knowledge and a mobile app for creating and walking through literature routes in the city, reveal the multifaceted aspects that (can) characterize older people's IT-enhanced living in urban cities. The results emphasize social aspects of ageing, the agency of

older people in creating and adapting technologies to their interests, and the role of communities in shaping these interests. The section concludes with a widened vision of smart cities for older people, a vision that builds upon three concepts: community, technology and agency.

Section 3.2 analyses and reflects on the inherent assumptions about practices and discourses related to technology development for older people. This section addresses the breaking points that encouraged reflections and changes in our conceptualization of older people and technologies in Life 2.0 and WorthPlay. In this section, we put forward the concept of *turn to community* as a new way to conduct and think about HCI research within an ever-increasing ageing population. The turn is discussed along two dimensions: i) the conceptualization of the “older people” category as a distinct target user; ii) the intended use of technology and its appropriation. We show how a lens on communities plays a key role in overcoming current and implicit assumptions in both dimensions.

3.1 Urban ageing: technology, agency and community in smarter cities for older people

Righi, V.; Sayago S., Blat, J. (2015) [Urban ageing: technology, agency and community in smarter cities for older people](#). In *Proceedings of the 7th International Conference on Communities and Technologies (C&T 2015)*, June 27-30, Limerick, Ireland, pp: 119-128. ACM Press.

Abstract: Despite the widespread popularity of smart cities in policy and research fields, and the ever-increasing ageing population in urban areas, ageing issues have seldom been addressed in depth in smart city programs. The main focus has hitherto been on making physical environments ‘older people friendly’. We review studies in environmental gerontology, policies and HCI that show the multifaceted relationship between ageing and cities. We discuss two case studies with scenarios of engagement of older people in urban areas we undertook in the past 4 years. By drawing upon the results, we propose a vision of smart city that conceives of older people as embedded in intergenerational urban communities and capable of creating new engagement situations by reconfiguring IT-driven scenarios to their interests and social practices. This paper aims at expanding the current visions of smart cities for older people by building along three main dimensions: technology, agency and community.

Keywords: Ageing; Smart Communities; Smart cities; Older people; Age- friendly cities; Agency

A. Introduction

Despite the fact that urban population is ageing, there is a paucity of studies exploring how ICTs can support older people's living in urban areas. Thus far, visions of smart cities for older people have focused on removing architectural barriers and making physical environments more age-friendly, by considering age-related declines in functional abilities, especially mobility. However, a large number of social studies show how multiple facets of the everyday lives of older people are related to their living environment, such as belongingness, social engagement and community life.

In this paper, we aim to go beyond the current focus on age-related changes in functional abilities in ageing smart cities. The main contribution this paper seeks to make is to present a different portrayal of older people in smart cities research. Thus far, older people have been widely regarded as passive citizens. While we acknowledge that some seniors can take on this role, we argue that others might, and actually are, playing a more active role, which should also be examined if we aim to build better, more inclusive, smart cities. We present two case studies of age-friendly smart communities that explore scenarios of engagement of older people in urban contexts.

Over 100 active and independent people (aged 60-81) were involved in the case studies, which ranged from designing a mutual help service to co-creating routes of geo-located information about different topics. The participants were able to adapt the proposed initial concepts to their interests, which led to sustained outcomes other than being able to use the technology. We present ongoing work that seeks to scale up the two case studies to a neighbourhood context.

By drawing upon the results of the case studies, we propose a set of recommendations for designing urban technologies to support older

people's engagement in cities. These recommendations are based on three main concepts:

- 1 a revision of the central role assigned to technology in the smart city domain,
- 2 an emphasis on older people's agency in creatively adapting ICTs to their real interests,
- 3 a community lens that promotes design scenarios across age boundaries in neighbourhoods.

We discuss how the proposed dimensions can contribute to the governance of cities and whether and how they could be adapted to cater for more dependent older people in future research studies.

B. Current visions of smart cities for older people

“In the vision of smart cities, elderly people are supported by *pervasive and smart environments in their daily mobility and activities*” [22]. Special attention has been given to indoor environments. For instance, the IBM Smarter Cities team partnered with Bolzano (Italy) to equip a group of elderly residents' homes with sensors capable of detecting dangerous situations (e.g. CO₂ levels rise) and sending data back to a central database monitored by city officials, who could eventually dispatch a care worker to visit the elderly person at home [11]. INTEL proposed a community home-based platform that connects the elderly person to the network of people responsible for providing care. This platform allows the older person to receive integrated care while remaining fairly independent at home [12]. These visions are the hallmark of Ambient Assistive Living (AAL).

Studies exploring older people's interaction with urban outdoor environments are scarce, despite the fact that these environments represent another important element in the daily mobility and activities of a large number of active, fairly independent, older adults. A noteworthy exception is [19], where a geospatial service that maps barriers and facilities in urban environments was

developed. It provided personalized paths for people with mobility needs by drawing upon open, sensor-gathered data and crowdsourcing. Another exception is [36], which explored mobile crowdsourcing of older people's opinions on good and bad aspects of their neighbourhoods to support decision-making by local governments in planning urban environments.

Common to studies supporting the mobility of older people in indoor and outdoor environments is that they zero in on removing physical/architectural barriers. Achieving this goal is essential for older people to remain independent individuals. Yet, social studies show that older people's urban life also includes other important aspects, such as social engagement and civic life. To the best of our knowledge, there is a lack of studies addressing these aspects in the literature on smart cities and older people. We review in the section that follows key studies from policy and environmental gerontology that shed light on how concepts of place and community can contribute to expand the design possibilities for older people in smart cities.

C. Urban ageing from a gerontological and policy perspective

The literature on the interplay between ageing and living environments is vast. Environmental gerontology is especially devoted to it. In the early 1980s, environmental gerontology focused on micro-environments (e.g. private and nursing homes) and emphasized the role of personal competences in interacting within these environments [15]. There was a special focus on the physical aspects of the environment, and adaptations to accommodate the physical design of the environments to match the abilities of the older person were proposed. Design standards for housing, nursing homes and furniture are remarkable results of this approach. Over time, researchers progressively began to consider also the social components of these environments. Oswald et al. showed that both good accessibility at home and personal

perceptions of meaning and value of one's own home are indicators of good autonomy in later life and better sense of well-being [21]. Following up on this line of thought, researchers have highlighted the relevance of transforming nursing homes into homelike places [29]. More recently, the focus has shifted towards macro-environments (i.e. neighbourhoods, cities, rural areas) and their impact on older people's mobility, independence, opportunities for social interactions and quality of life. Macro- environments have been analysed by considering two dimensions: the physical and the social. Within the former, accessible buildings, safe walking paths, adequate spatial distribution of benches and facilities, public transportation, among others, are considered key parameters for supporting ageing in cities [18] [40]. The social dimension is concerned with other aspects of public spaces. For example, while exploring what the ideal place to grow old is for older people, Wiles [38] discovered that feeling attached to their neighbourhood as "insiders", because of friendships, social clubs and familiarity with places, underpins the preferences of older people. These findings suggest that community environments are good promoters of well-being for older people, and, in fact, this vision has later been adopted by policy makers.

We have recently witnessed the launching of policy programs that promote the creation of age-friendly cities/communities¹⁶ (e.g. [40]). These policies acknowledge both the physical and social dimensions of the communities, such as opportunities for participating in social events as well as their accessibility (e.g. adequate transportation to reach the location of an event). They also pay considerable attention to the governance processes in place to define and build age-friendly cities. Models of participatory and collaborative governance, which recognize older people's agency in constructing liveable places and creating conditions for their own

¹⁶ Different terminologies have been used to refer to the construction of a favorable environment for older people, such as age-friendly cities, livable community and lifetime neighborhood [16].

active aging, are considered key elements towards building age-friendly communities [16]. In this paper we focus and draw on the social and collaborative dimensions in two case studies of age-friendly smart communities.

D. Two case studies

Over the past 4 years, we have been exploring the design of services and technologies for older people in urban communities. We have conducted this research in Àgora (AG), an adult learning community located in La Verneda neighbourhood in Barcelona, Spain. The centre developed from a grassroots initiative in the late 70s. AG is deeply connected with the network of local associations in the local neighbourhood. AG provides free educational activities on several subjects to meet different interests, expertise, and cultural backgrounds of its members. More than 1,000 people from different countries, Spanish regions, age groups and educational levels participate in these activities each month. AG stands out for its strong participatory orientation, since its members take on an active role in the centre decision-making process and in their own formative processes. They call themselves participants, term which we use in the paper. We adopted a qualitative research approach based on participant observation [7]. To establish a good and close relationship with AG participants, and develop a deep understanding of their everyday practices, the first author participated in several activities conducted in AG on a weekly basis over the course of 4 years. She enrolled in ongoing courses and ran new ones. The courses were about ICTs and during them the participants were learning to use several technologies, ranging from e-mail and smartphones to Social Networks Sites. She also participated in neighbourhood events and hanged around with participants when they met up for coffee in the local bar. She conducted hands-on sessions in which participants were using the technology developed for the research projects, as well as focus groups, debriefing sessions and participatory design workshops to

gather specific information for designing the urban platforms, which are described later. She took notes of her in situ observations and conversations with the participants during or immediately after these field activities.

Fieldnotes were periodically analysed by using inductive thematic analysis [5]. Emerging themes were used to elicit informal conversations with the participants throughout the study. As the research progressed, debriefing sessions were conducted to share, discuss and validate the results with the participants. We identified different themes for each case study. In this paper, we focus on those themes that we consider more related with the topic of ageing in urban cities, and we present them in the two case studies¹⁷. In an additional iteration, we grouped these themes into three clusters, i.e. technology, agency, community, in order to draw more general conclusions. We discuss them in section 6.

D.1 Case study 1: older people as co-producers of community services

This case study was conducted within the context of Life2.0, a European funded project within the Smart City program in 2010. The project aimed at designing innovative services for supporting older people's independent life by enhancing social interaction among their neighbours. We describe the profile of participants involved in the project, the technology developed, and discuss the themes that emerged from our analysis.

Participants

We involved established local communities, the main one being AG, which participated in all the phases of the project, i.e. analysis, co-design, long-term evaluation and definition of the business model.

¹⁷ We have left out methodological details (available in previous papers and project reports of the authors [25, 27, 28, 31]) to discuss further the two case studies in terms of smart cities, which is the main focus of the paper. welfare innovation [20]. Our focus was on understanding the role that technologies play in promoting these scenarios, which seems a topic largely unexplored

We recruited an initial group of 20 people who had been active AG members for several years. Throughout the project, we invited new people to join the group and participate in the different activities organized, resulting in approximately 90 participants involved (aged 60-80). 95% of them were pensioners, the rest were about to retire. All participants were autonomous and independent (i.e. able to conduct daily living activities on their own). They engaged in social AG activities on a weekly basis. Most of them had completed primary education and used ICTs on a regular basis. While our participants cannot be regarded as ‘vulnerable’, there were bereavements and some long absences from people due to health problems during the project.

Meetings with 8 local associations were conducted to gather their feedback on the emerging service proposal and to invite them to join the project and use the community platform developed. Two interviews with district and regional government officials were conducted to understand their views of the intended service towards its eventual sustainability.

A community platform that promotes the co- production of help services

Drawing upon the results of the ethnography and co-design activities conducted in Life2.0 [13, 25], the project partners decided to develop a web-based community platform to offer three types of services related with mutual help, local events and local businesses. We focus on the first one, since it was the most discussed with the participants and technically operational.

The mutual help service aimed to encourage older people to ask and offer help to peers. It supported the idea of older people as co-producers and valid contributors of services, rather than merely consumers - a vision aligned with current paradigms of citizens’ participation in public co-production [24]. The idea has already been explored in previous studies, with a particular focus on welfare innovation [20]. Our focus was on understanding the role that

technologies play in promoting these scenarios, which seems a topic largely unexplored

Through the platform, a user can make announcements by writing which kind of help s/he needs and her/his approximate location. Users can also reply to existing help requests by sending a direct message to the sender. The platform also provides typical elements of social networking sites, such as comments and user ratings for each help offer/request. This is aimed to increase trust among users.



Figure 3.1. The Life2.0 interface with a list of help offers and requests created by the participants. By clicking on one of them, the user can write a comment or send a direct message to the author of the announcement.

From care to social and learning scenarios

Contrary to our initial expectations, which assumed that older people would use the platform to ask and receive help for conducting (instrumental) activities of daily living, our participants regarded the platform as an opportunity for engaging in social interactions, requesting IT help or taking further their knowledge. Examples of the exchanges were help to solve doubts about their Facebook account or their smartphone, or to practice their Catalan with native speakers. The drive for social interactions often prevailed to the actual need in the help request. For instance, a group of women willing to improve their Catalan decided to meet every week in a cafeteria to chat in this language. A woman volunteered to show another one how to delete friends on Facebook in exchange for having some company during her weekly strolls.

The service goal thus shifted from sharing help, a scenario mostly related with care and assistance, to sharing knowledge, in which the social interactions and learning goals played a key role¹⁸.

Self-organization and sustained benefits beyond the platform use

Despite participants recognized the value and usefulness of the services offered by the platform, they did not access it or posted messages very frequently. This low use might be due to a number of technical reasons, such as: an effective notification system was not implemented, the platform was still a prototype or a critical mass of users was not reached. However, this low use did not prevent participants from exhibiting actual mutual help behaviours. In fact, by talking about the possible uses of the platform, and by reading the few announcements posted, participants became aware of needs and interests of other members and started to propose and organize group activities aimed at addressing these needs. The platform was not very important in these activities, though. For instance, new people joined the Catalan chat group without having created an account in the platform. This group, which established itself in 2013 while Life2.0 was running, is still in place at the time of writing this paper and no longer relies on the platform to, for instance, set up meetings or exchange messages. Yet, the co- design of the platform triggered this group. This result might be invisible if the success of a new technological development is only measured through its actual use.

¹⁸ The data analysis showed that the reasons for this shift are related to the kind of community involved which was not taken sufficiently on board in the designers' assumptions and conceptualizations of the older people category. We will discuss this issue in depth in a forthcoming paper.



Figure 3.2. Participants helping each other to use computers and the Internet face-to-face

The platform within the users' communication ecology

When a first prototype of the platform was delivered to users and they started to use it, we realized that participants' current IT-mediated communication practices influenced a lot the way in which they wanted to use our platform. 'Proper' notifications were key aspects of their IT-mediated communication. For example, they often access their Facebook accounts only when getting e-mail notifications of new messages received on Facebook. Thus, our participants asked us to include in the platform a notification system that would be aligned with their everyday IT practices, and made some suggestions. One was receiving a copy of the announcements posted in the platform in their e-mail accounts, given that they expected to be notified by e-mail when a user had replied to their posts. Those participants who were regular Facebook users missed an option that enabled them to share the platform announcements in their Facebook pages. Participants who owned a smartphone claimed that it would be easier for them if they could receive notifications directly on their phones.

Similar comments were received when interviewing local associations about their willingness to use the platform to promote their events. One of their main concerns was the perceived duplicated effort they would have to make to publish an event in

their current communication channels (typically a Facebook page, the association website and/or printed brochures) and the community platform.

These results highlight the relevance of integrating smoothly new community platforms with the users' and communities existing communication tools and strategies.

The role of the community to build trust and foster the service uptake

Over the course of the study, it became clear that it was important to build trust among participants in order to foster their uptake of the platform and share help / knowledge. Indeed, not all the participants knew each other when they joined the project and all reported that it was essential to first know the person with whom they were going to share knowledge and practices.

The weekly face-to-face meetings, organized as part of the project, allowed participants to know each other and build trust. Slowly, they started to identify themselves as a group: “we created a very good group of friends”, a participant stated during the last debriefing session. The group progressively gained a sense of community and commitment to the project, as their active involvement in dissemination activities demonstrated: “to make the platform a success we all have to commit!”

These community-building activities turned out to be beneficial in several aspects: (a) promoting the use of the sharing service by fostering trust-building among potential service users, (b) creating a sense of project ownership by making participants feel part of something they were contributing to build. For example, participants voluntarily took on an active role in disseminating the project among their peers, discussed communication and dissemination strategies, set up interviews with possible stakeholders and wrote articles in a newspaper of a local association to promote the project. Moreover, the social interactions resulting from these community-building activities were considered by the

participants a major outcome of the project. In fact, the core group of participants is still meeting weekly in AG and recently set up a self-organized group aimed at teaching each other how to use and personalize their smartphones.

These positive results suggest that community-building activities should be considered an integral part of the service, which in turn should not be targeted at single (needed) users. Instead, the service relied heavily on a community that acted as the offline reference point of the online platform.



Figure 3.3. Participants in a get-together celebrating the start of the Christmas season.

D.2 Case study 2: Older people co-creating engaging scenarios in urban areas

The second study explored the co-creation of geo-located content for informal learning scenarios. Two main activities were conducted, one in 2012, and the other, in 2013. These activities were not directly focused on smart cities aspects (although learning is an important part of novel concepts of city). Yet, the results reveal interesting ideas related to how ICTs can be used to engage communities in co-creating content related to their urban areas.

Participants

28 people (age 60-81) took part in the case study, 20 in both activities. They were enrolled in a book-reading club in AG, where they read and discuss classical literary books. Most participants had little or almost no experience with ICTs and did not show a big interest in learning how to use them either. Only 5 of them owned smartphones and were regular computer users.

Co-creating literature routes with smartphones

In the first activity the group of participants created routes through geo-located closed-ended questions about the book they were reading, which had a lot of references to a specific neighbourhood in Barcelona (Gràcia), and answered them a few days later in the real locations referenced in the book using a mobile application. The participants were divided into two groups so that each created questions to be answered by the other. There were 4 sessions: 2 for the creation of the questions, 1 in-situ activity in which participants explored the route with smartphones and answered the questions that popped up on their smartphone when they were close to the location, and 1 debriefing session in which the results were discussed by the participants. A detailed description of the activity and some its learning related results was reported in [31]. We highlight here some aspects, which, over time, pointed at new urban scenarios and possibilities.

Good for physical exercise and an ice breaker for getting familiar with technologies

At the beginning, participants were reluctant to participate in an ICT-based activity. Yet, after the activity, 80% of the participants showed a big interest in carrying the smartphone during the in-situ session if the activity were conducted again. Participants' engagement in the activity was also evident by their reactions (e.g. jumps) every time they answered a question correctly. The activity also turned out to be a good physical exercise, as this participant's

comment confirms: “We walked for 2 hours and we did not complain about it!”



Figure 3.4. Participants co-creating a route

Co-creation adds value to the activity

The in-situ activity was important but the overall process of creating the route too, as one participant vigorously pointed out during the debriefing session: “we should not forget about the whole process we followed to create the route! We worked very hard and the results have been wonderful. We all now talk about the activity on the street and the smartphones...but that was just one part of the whole experience, don’t forget it!” Indeed, when defining the contents of the route, the participants engaged in a lot of conversations and debates about the book and the locations of the questions. Our observations and conversations with the participants suggest that their strong engagement in the creation process contributed substantially to the success of the activity.

Exploring and adapting to new scenarios

The second activity took place one year later at the participants’ request. They wanted to create a new route based on a new book they were reading. The book stories were set in a prison, which was a challenge for creating geo-localized content. However, the

participants suggested creating a route on the biography of the author, which contains numerous references to the historic centre of Barcelona. Participants used books, notes and printouts containing information about the author's life to create the route. Each of them had voluntarily collected this material by searching on the Internet, libraries and encyclopaedias. During the in situ activity, participants did not limit themselves to answering questions. Instead, they discussed with each other about what they knew about the places they were visiting. For example, when reaching St. Agatha chapel, a participant commented: “did you know Agatha is the patron saint of breasts? (...) “the stairs leading to the square were built by Juan I...the character of the book we are reading!!”.



Figure 3.5. Participants during the in-situ activity

Incorporating routes as a community practice

Since then, members of the book-reading club have organized three routes. We were invited to one of them, which was about unknown buildings of the historic centre of Barcelona. The activity was quite different than the previous one we organised. The route was created by two members of the club, who picked a topic, the locations, and gathered information about them. They acted as hosts during the in situ activity. There were no questions/answers and no technologies were used. Yet, it is worth noting that the participants incorporated

the activity into their practices and adapted it. They claimed they would like to repeat the routes with smartphones. Yet, to do so, they considered that they would need our help. This shows that handing the technology over to the community and assuming that this technology will effectively be used is an actual challenge, which is a matter of concern being increasingly discussed within the HCI field targeted at communities [34].

E. Towards reaching the city scale: from single to inter-communities

The case studies presented above were both conducted with a specific community. Working towards providing a wider vision of smart cities for older people, it is valuable to expand the context by, for example, moving from scenarios targeted at single communities to other ones that explore interaction within the network of communities that make up a neighbourhood or an entire city. We have recently started to work on a scenario that aims at scaling up to a neighbourhood context. There has been an initial consultation phase with interviews with public actors and local communities to explore the feasibility of the scenario discussed below. We are currently meeting local communities to set up an initial pool of participants.

E.1 Neighborhood cohesion through co-creation of urban leisure

The scenario is situated in the district of Sant Andreu in Barcelona. The area is characterized by high population density, a quarter over 65 years old, low income and a strong associative network. Recently, the city council promoted two new initiatives intended to attract people of the Creative Industries. These initiatives have been bringing into the neighbourhood new “visitors” who do not know much about the local area or people living in there. The city council aims to make the neighbours more visible in these new initiatives. A strategy could be to involve them, particularly the older segment of the population, in creative activities based on ICTs.

Within this context, the pilot develops the concept of local communities creating a geo-localized game about their neighbourhood as a means of promoting the sharing of information between the visitors and the locals. The dynamics of the game would be similar to that followed in the geo-located literature routes presented above. According to initial discussions with local associations, the topic of the gamified activity would be about memories and stories of the neighbourhood, aiming at creating a gamified collective heritage of the local area. The participants will select the most salient memories of, and information about, the local area and transform them into questions localized in specific places. Members of local associations, schools, libraries, and the “visitors” will be invited to play the game and add new content.

Within this scenario, we aim to explore a number of aspects and related challenges, which we discuss next.

Facing challenges in scaling up to a neighborhood context

Conducting the study in a neighbourhood invites us to consider the different groups of people that independently or jointly act in it. Thus, although our focus is primary on older people, we need to see them within a much wider daily life context. In addition to involving associations of older people, we aim to reach cultural centres, associations of parents of school-aged children and libraries, independently of the chronological age of their members. Our approach has been supported by the coordinator of a senior centre, “it is important to foster older people to go out from the senior centres and interact from time to time in other contexts, with people of all ages”.

Working across communities presents a number of challenges too, since the practices of each community can be disjoint and lead to organizational issues. For instance, the group of older people already involved reported that the time slot available in their busy agenda is on Monday morning, which is incompatible with most job and school timetables. The negotiation of a place among the different associations to host the co-creation activities we are

carrying out involves subtleties too. We are addressing these issues in different ways by, for instance, making the collaboration scenario more flexible and involving additional groups.

Exploring civic agency of older people through creative activities

We consider the creation of a neighbourhood game as an example of civic action: the game becomes a neighbourhood common good, which should aid in increasing the social cohesion among visitors and locals. By involving older people as primary creators of the game, we aim at taking forward our understanding of older people as civic agents (presented in case study 1 and 2), which includes exploring their role in collaborative IT-based civic actions. In order to do so, we consider they should take on two main roles: informants (e.g. they provide information to young people who generate the digital outputs) and makers (e.g. they actively select information and produce the digital output). Within this scenario, it is important to understand which technical/social skills, knowledge and motivations foster civic engagement among older people.

F. An enlarged vision of smart cities for older people: technology, agency, community

Through the analysis of our case studies, we have identified a number of factors that are not fully covered in the usual vision of smart cities for older people. We group them into three main clusters: technology, agency and community. Our goal is to outline a set of key aspects to consider when designing scenarios of ICT for older people in urban contexts; there is no aim of completeness, which might be useful to benchmark age-friendliness of cities, for instance.

F.1 Technology

Technologies are key components and drivers of visions of smart cities. Technologies are widely considered enablers and facilitators of predefined scenarios based on fixed goals, which include,

amongst others, monitoring traffic, enabling participatory governance, facilitating communication between older people and public care workers. New platforms and apps are often proposed and developed to achieve these goals, leading to a proliferation of new digital tools. By contrast, in our study, urban technologies were both triggers of new community behaviours and dynamically integrated within the ecosystem of existing technologies and communication practices. These two aspects emphasize the importance of looking at creative use when pursuing innovation in smart cities.

Urban technologies as triggers of new community behaviors

Our results show that the benefits and outcomes of the research activities went beyond the use of the specific technology introduced in the community. The (prototype) technologies did trigger new behaviours, which did not disappear upon project completion. These new behaviours persisted using or not the technologies developed. The members of Catalan mutual help group still meet up and the book-reading club has included routes as a regular activity. The prototype technologies do not play a special role in sustaining these new practices (which could be or not supported by technology), though.

This urges us to reconsider what positive outcomes in IT- and community-based studies are. Rather than measuring impacts on the basis of patterns of technology use (e.g. number of accesses or messages sent), sustained offline behaviours could be considered too. This might also challenge current revenue models of business-driven visions of smart cities, which are based on sales or improved services against payments relying on massive use of the developed technology [1].

Our vision calls for shifting the focus from conceptualizing urban technologies solely as solving tools to widening our view by looking into how local communities creatively use the opportunities offered by ICTs to trigger new social behaviours (and overcome problems, of course).

Urban technologies within the ecosystem of communication tools and practices

Through a technological lens, urban environments are often framed in smart cities discussions as “a source of problems to be resolved” [39]. This vision has driven the development of an increasing number of prototypes which fail to understand the fit of these new developments in current cultural contexts, communication practices and everyday activities of cities dwellers [14]. Furthermore, when these systems are targeted at older people, it is often assumed that they are not regular ICTs users and special and dedicated technologies need to be built for them.

Contrary to these assumptions, our first case study showed that not only were our participants regular users of mainstream technologies, such as e-mail, Facebook and smartphones, but also promoters of integrating them into the platform we were developing. Similarly, local associations were using a number of different technologies and showed concerns about adding a new one without a clear understanding of how it would integrate with the rest of tools. These results show that a new technology should not be considered in a vacuum. Instead, understanding how it evolves within an ecosystem of established (technology mediated) communication practices in a given community is worth the effort.

This has two main implications for designers of smart cities. The first one is that new platforms / apps should easily communicate with other mainstream technologies, especially social media. The second is that designers should consider whether the tasks (needs) allowed (met) by the new technology can actually be performed (addressed) through an effective, perhaps modified use [8] of existing technologies, rather than introducing a new one. Thus, a future challenge for researchers and designers could be to understand how to foster the development of strategies for achieving creative use and appropriation of existing ICTs to accomplish individuals’ and communities’ purposes.

F.2 Agency

Recently, the smart city debate has increasingly moved from a vision based on automation and sensors to one where citizens play a key role in “building” the smartness of their city through collective actions. Concepts such as human smart cities [17], smart citizenships [30], among others, are gaining ground and are challenging the IT-driven approach that builds on technologies the smartness of the city. Contrary to these scenarios of citizens’ engagement and empowerment, the widespread vision on the older population still sees them as passive users of (assistive) technologies, thus overlooking their active role as citizens and IT-users. We consider that it is timely and important to bridge some gaps between the visions of smart cities targeted at older people and the one addressing the “rest” of the population. In this section we claim that in order to bridge this gap, an age-friendly smart city should support a notion of agency by older people.

From “above” to the culture of agency

A thread that cuts across the cases studies is the active role played by older people: they offer their knowledge to other peers, create the contents of the routes or identify key aspects of their neighbourhood. Furthermore, their intervention went beyond playing an active role within the scenarios proposed by researchers. They adopted and adapted those scenarios to their needs and interests. We witnessed this adoption and adaptation in how they turned the mutual help service into a knowledge sharing service, or when they incorporated routes in their class practices. This ability to make decisions and alter pre-defined scenarios is often overlooked. It is also worth noting that the results of their actions did not simply affect the design of the product or service (e.g. choosing one feature rather than another one), but they actually had significant impact on modifying their own practices.

These results have implications for the design of age-friendly smart cities. Designers could reflect on how older people are involved in defining smart city scenarios targeted at them. Researchers are

increasingly acknowledging that the design of technologies for the older population needs to move from discursive constructions of the older people's needs [23, 26]. Similar critiques have also been raised with respect to the specific domain of smart cities, where researchers claim that the vision of smart cities has often been constructed and driven by corporate interests [33]. This approach runs the risk of ignoring the gap between the discursively constructed needs and interests of citizens and the real ones – not to mention the corporate interests. In order to overcome this drawback, empirical research on what constitutes a liveable smart city from the perspective of older people is needed.

Drawing upon our results, this research needs to go beyond a consultation process where insights and feedback from older people about pre-defined scenarios are gathered. Designers and researchers should look into how older people appropriate and adapt the technologies proposed to them to their needs, social interests and practices. In other words, conceptualize an older person as someone who counts in the design process and, more importantly someone with agency in his/her living context – including in the use and design of ICTs. The notion of agency bears some relationship to a notion of power (governance): being able to achieve something for themselves rather than being bestowed “from above” [2]. Thus, we claim that a smart city for older people vision should move away from the current vision in which policies and technological experts define the ageing problem and set the goals, towards developing a culture where the ability of (older) people and local communities to solve problems and create new scenarios of living is considered, fostered and supported.

Agency also means that neither older people nor local communities become an instance of reification within the technological development. This seems particularly challenging since it requires transferring key responsibilities of the project/research to the community and the community willingness to take them. Our experience indicates that research should be driven by community interests rather than by seeing communities as a research setting.

How to balance this community-driven approach with research objectives, or overall policies deserves careful research consideration.

F.3 Communities

Researchers have recently started to explore how local communities of neighbours, craftsmen, artists, or hackers organize themselves to solve issues of daily living (e.g. [9]). Engaging established communities of older people and looking at their everyday practices only recently emerges in design research, with rare examples such as [3,4]. How does a community lens influence the vision on design for ageing in urban contexts? Our results suggest that seeing older people as community members rather than individuals homogenized through an age-based approach can foster interests-based and cross-age design.

Communities, interests and cross-age interactions

When building dedicated systems or services targeted at the ageing population, there is an implicit assumption that older people share similar interests, needs and life experiences, because of their chronological age. This approach is aligned with the concept of “chronologization” of life, for which the age of an individual can determine what type of activities s/he will engage [37], which has been criticized for being too simplistic, overlooking self-identities and creating stereotypes (e.g. [6]).

Our results invite us to think of older people as members of different communities, thus as people who have varying interests and goals according to the specific community with which they identify. For example, in case study 1, participants were interested in learning ICTs, while those involved in the second were more into sharing opinions about literature. Although both case studies were conducted within the same (AG) community, each sub-group had its own practices, interests and goals impacting on potential designs. Community-based thinking led us to consider a wider pool of interests, needs and practices and propose solutions community-

focused, rather than age-focused. It also drove us from a personhood to a citizenship perspective [2] on ageing; i.e. from conceptualizing older people within their immediate micro-environments (e.g. interaction in the home-context with mainly family members) to considering them within wider socio-cultural and political contexts (e.g. interaction in neighbourhoods, which include a varied ecosystem of actors, cultures, forces).

This shift in focus may promote design themes across different age groups, age-integrated¹⁹ scenarios, that benefit an entire neighbourhood (i.e. designing neighbourhoods for all ages [35]). However, reaching age-integration models may be a matter of degree, and requires detailed consideration of different age group communities, as we indicated in our ongoing work.

G. Conclusions

The aim of this paper has been to analyse and expand the current vision of smart cities targeted at older people.

We have discussed that the current (IT-driven) visions of smart cities for older people could and should be widened by considering social aspects of ageing in urban environments and participatory governance processes.

We have presented two case studies that, by drawing on concepts of co-creation and social engagement in community contexts, contribute towards outlining new scenarios of active urban ageing. The results have shown that the urban technologies developed, and most importantly, the process of adaptation and appropriation undergone, empowered older people – at least, our participants - to engage in topics of their interests, such as sharing knowledge and

¹⁹ According to Uhlenberg an “age-integrated structure may be defined as one that does not use chronological age as a criterion for entrance, exit, or participation.”[37]

organizing literary strolls, and resulted in sustained outcomes which were not delimited by continued (prototype) technology use.

We have drawn upon the lessons learned in these case studies in order to propose a different conceptualization of smart cities for older people that leverages on specific approaches along three main dimensions: technologies, agency and community. The first dimension suggests that smart cities researchers and practitioners could harness local communities' creative use of ICTs (existing or proposed) to trigger new social behaviours. By re-positioning the primacy of technology, we can re-think what positive outcomes in smart cities research and innovation are, such as opening up possibilities, beyond designing new problem-solving tools. The second dimension puts forward agency as a key component of smart cities scenarios in order to tap into the capabilities of (older) people and local communities to create new scenarios of living, aligned with concepts of citizen's self-organization [10], effective use [8], civic intelligence [32], among others. Finally, the community dimension invites us to consider the older population within the larger context of their neighbourhoods, communities of interests, and encourages cross-age design scenarios for building cities for all ages.

H. Limitation and future work

The case studies presented, and the implications drawn from them, address only some of the numerous factors that characterize the ageing process and the smart city phenomenon. This may limit the applicability of our findings and, at the same time, opens up future research opportunities.

As far as ageing is concerned, the case studies were carried out with active and independent older people. Other important challenges of the ageing population, such as risk of loneliness and cognitive disabilities have not been addressed in this paper, although they remain an important societal challenge in urban cities. Whether and

how our scenarios and visions can be adapted and benefit frail older people warrants further research.

With respect to smart cities, the case studies have emphasized the role of older people as active citizens. We have barely considered other actors who might also be involved in ageing urban cities, such as social workers and institutions. Further research is needed to understand, for instance, how the proposed scenarios apply to and can contribute to the governance of cities, and which technical and human resources are needed to scale them up (e.g. from a community to a single neighbourhood, and to the entire city). Our ongoing work is geared towards this direction.

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3.2 When we talk about older people in HCI, do we talk about whom? A ‘turn to community’ in the design of technologies for a growing ageing population

Righi, V.; Sayago S., Blat, J. (under review) When we talk about older people in HCI, do we talk about whom? A ‘turn to community’ in the design of technologies for a growing ageing population. *International Journal of Human-Computer Studies*.

Abstract: This paper addresses a number of challenges HCI designers and researchers are faced with when designing technologies for older people. We conducted a 5-year research-through-design study, which combined ethnography and participatory design, to explore the design and use of technologies aimed to enhance the social life of older people. The paper explores widespread assumptions made in HCI with the older population about the social category of older people and the meaning of technologies for this user group. This paper argues that two common assumptions (i) older people can be defined in terms of chronological age, (ii) the meaning of technologies remains unaltered on completion of co-design or participatory design activities, are both problematic, because they do not consider carefully enough the sociocultural contexts in which (older) people interact and engage in their daily lives. The paper argues that the meaning of technologies for older people and their own identities as individuals of a certain age are shaped within situated communities. Thus, technologies designed ‘for older people’ should therefore be designed to meet situated and dynamic needs/interests of the community in which older people are involved. We draw upon our findings and other situated epistemological discourses in HCI to

postulate a *turn to community* in the design of technologies for an ever-increasing ageing population.

Keywords: older people, research-through-design, ethnography, communities, appropriation, practices

A. Introduction

Imagine that you are part of a team of Human-Computer Interaction (HCI) designers and researchers working on an R&D (Research & Development) project designed to build new interactive technologies for older people. During the course of the project, you will need to address some important questions and make decisions so as to design a digital artefact that enriches the lives of your users. In this paper, we deal with two questions: (i) who do you conceptualize older people in the project, and (ii) what interactive technologies do they truly need, and why? We argue that these questions are of paramount importance. Firstly, by answering these two questions, you will be able to define and limit the design space (McLean et al., 1991), within which research and design decisions will be made throughout the project. Secondly, depending on how you define older people (e.g. frail elderly individuals or active retired university professors), some technologies will be designed while others will be disregarded. Thirdly, these two questions are unavoidable. Designers and researchers construct their own meanings of old age and bring them into their activities (Peine et al., 2014), resulting in digital artefacts that exhibit implicit models of their intended users and expected activities (Carroll et al., 2001).

Older people have been conceptualized in two very different ways in previous HCI research and design studies. The most predominant one views older people as individuals with age-related declines in functional abilities (i.e. vision, cognition, hearing and mobility), and with little or a lack of experience with Information and Communication Technologies (ICTs). This way of operationalizing

older people falls into the first wave of HCI research, which focuses on Ergonomics/Human Factors (Bannon, 1991). Compensating for “the downsides of ageing” (Rogers et al., 2014) is therefore the most important design criterion to create technologies, which are primarily aimed to *help* older adults to conduct a wide range of ADL (Activities of Daily Living) and IADLs (Instrumental Activities of Daily Living). Assistive Technologies (ATs) are a noteworthy example of this conceptualization. By contrast, a growing number of studies aim to foster a more positive view of old age and older people, who are portrayed as being able to use ICTs and make important contributions to their families and society (e.g. Carroll et al., 2011; Rogers et al., 2014). Thus, social relationships, personal interests and aspirations, as well as declines in functional capabilities, come into play in the design of technologies, which are intended to foster, for instance, social interaction and inclusion, empowerment and creativity.

Common to these two very different conceptualizations is chronological age. While the number of years a person has lived has traditionally been used to mark life stages and pension schemes, chronological age has been widely criticized by gerontologists. Old age cannot exclusively be defined in terms of being above or below an age limit (e.g. 60/65). Other elements of a person’s life, such as her cultural background, socio-economic factors and personal interests, shape our understanding of old age too (Bengston et al., 2009). Chronological age also tends to imply homogeneity. By classifying people according to their chronological age, we assume people within an age range to exhibit similar characteristics and feel part of the social category they are assigned to. However, older people are a highly heterogeneous segment of the population, especially as far as their experiences, abilities, health condition and skills are concerned (e.g. Gregor et al. 2002). For instance, there are people aged 60+ who are housebound while others are running marathons. Also, gerontological studies have shown that people aged 60+ tend to think of themselves as “not old” (Jones, 2006; Lund & Engelsrud, 2008).

Thus, how should you conceptualize older people in your project, as active or passive individuals, above or below a certain age limit? And which technologies do they truly need / want, those that help them to lead a fairly independent life, or those that enable them to pursue further their interests and hobbies, or both? In this paper, we argue that none of the current conceptualizations are useful enough to design ICTs that older people want to incorporate into their everyday lives. The most predominant ways of thinking about older people in HCI design and research are so focused on individual characteristics that they tend to overlook the sociocultural contexts in which older people interact and shape their own identity.

We draw upon a 5-year research-through design study conducted (2010-2015) within two R&D projects: (a) *Life 2.0*, which was aimed at developing new social and peer-to-peer services for older people, and (b) *WorthPlay*, which was designed to understand and develop meaningful, playable and appealing digital games for older people. We conducted both projects in a lifelong learning community. In both projects, we initially defined older people as individuals aged 65-75. We also wanted to capitalize on positive images of old age. 390 people (hereinafter, participants) aged 55-81 took part in a wide range of research and co-design activities conducted throughout the projects. Yet, participants seldom adopted the technologies that we developed as a result of the co-design process. Participants re-shaped the technologies in order to meet their changing interests. Participants also re-shaped the technologies so that they could fit in with the everyday practices they conducted in the lifelong learning community to which they belonged. These key findings prompted us to reflect on the role that *community* could have played in helping us to re-conceptualize our participants in the design process in both projects. These results also encouraged us to re-frame the current way of thinking about older people in HCI research and design by putting forward the concept of *turn to community*, which invites to:

- change the *object of design*, by shifting the focus from defining the features of a technological artefact to fostering a mutual

shaping relationship between technologies and everyday practices so that older people can be comforted, challenged and stimulated by new interactive technologies,

- re-think the *subjects of design*, by moving from designing “for older people” to designing for “situated communities”, to which older people (might) belong to and where technologies are appropriated.

B. Related works

In this section we aim to provide a more detailed account of the related works cited in the Introduction. In section B.1, we discuss the two strands that have characterized the discourse on developing technologies for older people in HCI thus far. In section B.2, we provide an overview of how older people have been defined and approached in HCI and Ageing studies. We conclude by highlighting some critical aspects that, from our point of view, remain to be fully addressed.

B.1 Two approaches towards designing technologies for/ with older people

The compensation model and related design scenarios

In the 1990s, the *Human Factors Research Needs for an Aging Population* report (Czaja, 1990) and the *Handbook of Human Factors and the Older Adults* (Fisk and Rogers, 1997) pointed out that society had done little to prepare itself for the unprecedented development of the ageing phenomenon, and that new interfaces which compensated for the impact of age-related changes in functional abilities on a wide range of areas beyond ICT (e.g. transportation and home) were needed. According to these two seminal works, these better interfaces would be achieved by getting a deeper insight into the implications of the aging process in the design of systems and including older people in design developments.

Since the publication of these two highly influential works, a large number of studies have considered age, and age-related cognitive and physical declines, as the main influential factors in the design of technologies for older people. In a parallel and interrelated trend, technologies designed to help older people to conduct a wide range of (everyday) activities have been developed. Assistive Technologies, ranging from memory aids (Lawson, Nutter, & Wilson, 2007) to exergames that try to improve balance and reduce risks of falls (Gerling, Schild, & Masuch, 2010), are a noteworthy example.

Dispelling stereotypes; empowering and inclusive design scenarios

The compensation approach has been criticised for focusing on the downside of ageing, which tends to configure older people as passive recipients of technologies (Rogers & Marsden, 2013). Furthermore, (Peine et al., 2014) claim that the design of technologies has mostly been focused on the “*age-related handicaps and problems not because they are necessarily dominant in the lives of older persons, but because they can so neatly be translated into needs and then design requirements*”. Which other aspects characterize older people’s lives? A growing number of recent studies have argued for taking into account different ways of growing older and exploring other aspects than age-related declines as a primary source for design. Through an extensive ethnographical study, (Sayago, 2009) proposed a change of paradigm in HCI research with the older population, moving from factors towards interaction based on older people as social actors, which stresses their highly social use of ICTs. Within this paradigm, compensating for diminishing abilities is not the cornerstone of research. A literature review of research conducted in the fields of Gerontology, Gerontechnology, HCI and Government policy (Durick et al., 2013) dispels a number of myths, e.g. older people are i) homogeneous, ii) socially isolated and lonely, iii) a burden on society, iv) chronically ill, v) unable to use technologies and vi) incapable of learning mainstream technologies. By revisiting

common (and mostly negative) assumptions about ageing, a number of studies have explored new technologies that capitalize on other aspects of older people's (social) life, such as digital games that support engagement between grandchildren and grandparents (Khoo et al. 2009) or mobile applications that support social interaction among friends by facilitating organization of outdoor activities (Malmberg & Yndigegn, 2013). More recently, attention is gradually being paid to older people's creativity and ingenuity as a source for co-creating technologies (e.g. (Rogers et al. 2014), (Lee, 2012)).

B.2 “Older people”, a term with diverse interpretations

Previous HCI studies have been carried out with different types of older people, ranging from dependent residents living in nursing homes to active retired university professors. It is also common to find studies that report on the age and computer skills of the participants in order to describe their profiles. While this information is useful to address technology experience, it is not enough to compare and contrast results, however, given that there might be other aspects accounting for the findings. Furthermore, conclusions are generally related to a general category of older people. However, a clear definition of this category is often missing, and how representative the participants are is not usually discussed. The dominant approach is to define older people by relying on chronological age. Studies tend to recruit people aged above a certain age limit. In the following sections we discuss the main limitations of this approach and alternatives that have been recently developed within HCI.

A gerontological perspective on the concept of older people

Within gerontology, the use of 'older people' as a category has been widely discussed and questioned. Chronological age tends to imply homogeneity within the group (Bytheway, 2005, 1997). Critical Gerontology has also pushed the boundary of the discipline beyond the simple bio-medical models of aging, conceptualizing “what

means to be old” as a social construct rather than a predetermined biological process. The construction of the meaning of old age has therefore been analysed from the perspectives of political economy (e.g. Walker, 1981; Phillipson 1982), gender (Arber & Ginn, 1995; Joyce & Mamo, 2006), technology consumption (Joyce & Mamo, 2006; Peine et al., 2014), and biographical (Gubrium, 1986; Lund & Engelsrud, 2008), amongst others. Additionally, the perception of older people varies in history and amongst different cultures (Bytheway, 1997; Cohen, 1998). Thus, old age should not be considered a universal and natural phenomenon. Instead, it is related to, and constructed within, a cultural system. Another important aspect is the life-course perspective (Dannefer and Settersten, 2010), which helps us understand the heterogeneity of old age in terms of life experiences. These and similar works challenge the idea of older people being a homogeneous group and, at the same time, shed light on other aspects that influence the experience of being ‘old’, such as gender, culture, social class, economy, and politics.

The analysis of the designers’ construction of the older people concept

Designers often construct their own meaning of old age and bring it into the design arena. Informed by social constructionism theories (e.g. Bijker et al., 1989), researchers have analysed the process of how technologies for older people are designed. The results reveal that designers and developers often build a representation of the prospective older users that does not correspond to the self-identity of the participants in their studies (Compagna and Kohlbacher, 2015; Hyysalo, 2006; Neven, 2015; Östlund et al., 2015; Peine et al., 2014). Consequently, these authors argue that this mismatch limits technology acceptance.

Challenging the older people concept in HCI and constructing alternatives to the age-based approach

Only recently has the field of HCI started to discuss and reflect on the categorization of older people (e.g. Lindley et al., 2008). This

re-conceptualization can help us avoid pitfalls and overcome stereotypes in design projects (Durick et al., 2013). (Brandt et al., 2010) proposed the concepts of ‘communities of everyday practice’ and ‘situated elderliness’ as a way to approach older people. Rather than recruiting individuals based on their chronological age, they suggest approaching communities of everyday practices, where “*seniors are skillfully enacting everyday practices as seniors*”. The authors claim that when growing older, people might experience *situated elderliness* (i.e. difficulties in conducting some activities while being able to handle well other situations in their everyday life) and that their need to belong to a community of everyday practices might increase. In this respect, in their study they recruit older people in social clubs and community centres.

Design researchers have drawn on the concept of ‘life stages’. (Laslett, 1991) proposed one of the most influential classifications of life stages. The First Age starts at birth and is characterized by dependence on others, socialization and education. The Second Age refers to the period of maturity, independence, familiar and social responsibilities. People enter the Third Age when approaching full or part-time retirement and when career responsibilities are no longer a central part of life. The Fourth Age is characterized by relying on others for support and help. The Fourth Age is a period of severe illness and disabilities.

In a study of furniture design, designers approached the wide heterogeneity of the older participants by relying on the concepts of third and fourth age. In particular, they selected four different samples of participants based on their housing situations, which were related to a particular life stage, i.e. living in a nursing home, recently moved to senior housing, had lived in senior housing for at least three years, had not moved at all for many years (Jonsson, 2013; cited in Östlund et al., 2015). A more dynamic view of life stages is proposed by (Wildevuur et al., 2013) who distinguish between three life stages (retirement, illness & disabilities and loss of loved ones), and stress their transitions as related to the risk of getting disconnected, e.g. from the professional, social and family

life. Thus, they invite us to look at these transitions to design for connectedness. In a similar vein (Salovaara et al., 2010) focused on the late middle-aged people (age range 55-65) to understand what role technology plays in helping them to cope with life transitions. Their analysis highlights the need to consider late middle-agers as individuals acting in various communities/networks (e.g. relatives belonging to different generations, friends, members of hobby groups, former work colleagues, etc.).

By considering life stages and life transitions, we can go beyond chronological age and focus more on life experiences and everyday needs strongly related to the lessons learned over a person's lifetime, such as connectedness. However, only those experiences and needs related to a particular life stage are considered. For example, if we aim to enhance computer-mediated communication between grandchildren and grandparents, the "aged life stage" might not help us to achieve our objective. Grandparents might be in different life stages (e.g. retired or not). Yet, they share common interests and goals, which are typical of grandparenthood. These common interests could drive the design goals in a more effective way than do their actual life stages. Framing ageing by understanding commonalities between groups of participants can potentially help us to overcome the age-based approach. The life transitions approach, which focuses on experiences and related needs, along with the communities of everyday practice (Brandt et al., 2010) and the networks of individuals (Salovaara et al., 2010) can help us to do so. In this paper, we aim to overcome the age-based approach in HCI design for older people by taking forward these three approaches.

C. Overview of the study and research methods

The results presented in this paper are grounded in a 5-year ethnographical study and the design research conducted in two R&D projects: *Life 2.0* and *WorthPlay*, which lasted 3 and 2 years, respectively. *Life 2.0* was an international project partially funded

by the European Commission, which involved universities, IT companies and older people associations from 4 European countries (Spain, Italy, Finland and Denmark). The project aimed to generate new services that enable independent living of older people by connecting them with people living in their local area and offering new opportunities for social interaction. In Life 2.0, we developed a social networking platform that enables older people to offer their knowledge and skills to neighbours, and to keep abreast of social events, commercial services and assistance available in their local area. *WorthPlay* was an international (non-EU) project aimed to conceptualize, design, and evaluate digital games that are sufficiently appealing, meaningful, and playable in the everyday lives of older people. In *WorthPlay*, we developed an online gaming platform²⁰, which allows older people (and members of their social circles) to both create and play different types of online quiz games. Both projects were targeted at older people (65-75) with mild-to-moderate age-related changes in functional abilities.

Both projects were roughly structured into three phases, i.e. analysis & conceptualization, participatory design, evaluation. In C.1 we describe the setting in which research and design activities were conducted and the profile of the participants. Afterwards, we summarize the main research and design methods and activities carried out. In C.3 we present the ethnographical study conducted throughout Life 2.0 and *WorthPlay*, and in C.4, data gathering and analysis is presented.

C.1 Participants and setting

Our research (summarized in 3.2 and 3.3) was conducted in Àgora²¹, a non-for-profit organization created from a grass root initiative in the late 1980s. Àgora aims at promoting education amongst neighbours at risk of social exclusion, such as immigrants, people

²⁰ <http://worthplay.upf.edu/game/>

²¹ <http://edaverneda.org>

coming from scholastic failure, older and disabled people. Àgora offers a wide range of free courses, ranging from foreign languages, computers and the Internet, literacy, and economics.

Àgora was a partner in both projects and its main role was to identify potentially interested people among its members, contact them and define recruitment and engagement strategies. Given the educational orientation of Àgora, three main strategies were adopted to recruit users: i) join existing courses offered in the centre in which we ran extra-curriculum activities related to specific project phase (e.g. co-design, evaluation activities, etc.), ii) set up new ICT classes on topics somehow related to our research goals, and iii) run activities in open events organized by Àgora in which both members from several different courses and neighbours living in the local area and not formally members of Àgora were attending the event. This approach led us to gain knowledge of and engage with the different sub-groups that constitute the Àgora community, which are mainly identifiable by the several courses offered in the centre.

Overall, 390 participants (120 in Life 2.0, 310 in WorthPlay and about 40 in both projects) were involved in the two projects. Forty percent of the participants were fairly engaged in the research and design activities, as they participated in them on a regular basis for at least 6 months. About 28 participants partook over the entire duration of the study, which allowed us to be in weekly contact and establish a deep relation with them. The age of the participants ranged from 55 to 81 years old (average 68). They had a wide diversity of interests, life experience and ICT expertise, which in part were determined by the type of courses they were enrolled in. All participants were autonomous and independent (i.e. they did not receive help to conduct daily activities). Most of them were socially active, and participated in several cultural and physical activities (e.g. singing, dancing and hiking) in addition to attending Àgora classes on a weekly basis. While our participants cannot be regarded as ‘vulnerable’, there were bereavements and some long

absences from people who experienced health problems during the course of the study.

C.2 Rapid ethnography, participatory design and evaluation

In both projects, we grounded the participatory design process in rapid ethnographical studies (Millen, 2000), in an attempt to understand the daily practices of our participants and explore design opportunities. The ethnographical studies were conducted during the first 6 months of each project. During the course of the rapid ethnographies, we conducted a variety of activities, all of which aimed at understanding, through participative observations and informal conversations, participants' everyday life and use of ICT (in Life 2.0) and their playing practices (in Worthplay). In Life 2.0, we conducted participant observations (DeWalt & DeWalt, 2010) in 6 ICT classes, ran focus groups and conducted informal, face-to-face interviews, and handed diaries to participants to gather information about their daily routines. In WorthPlay, we set up an open *Playing Club* in which people interested in playing weekly met to play a variety of digital and tabletops games chosen by them and / or by the researcher team. We also attended 8 courses in which we proposed to play games related to the subjects studied in the course. Overall, the results of this phase were intended to trigger design concepts, which were further elaborated in the following participatory design phase.

Participatory design

The rapid ethnographical studies helped us to outline the design concept of the service (in Life2.0) and the game (in Worthplay). In Life 2.0, the first service concept, which was proposed by the research team, was further elaborated and validated in 2 participatory design workshops. Given that each use situation can be regarded as a potential design situation (Bjögvinsson et al., 2012), we adopted a design-in-use approach, allowed accommodating for reinterpretation and adaptation of the design concept (Botero et al., 2010) throughout the project. In order to encourage the uptake of

the Mutual Help service, and because the results of the ethnographical study and the co-design workshops highlighted the importance of trust to foster sharing practices, we established a core group of 18 participants which we met weekly in the Àgora computer room. The meetings were structured as regular ICT courses in which participants learned to use a variety of technologies, tried out prototypes of the service and were encouraged to share help among each other. These weekly meetings were aimed at informing both the ongoing design and development of the platform and the evaluation stage.

In WorthPlay, we carried out 9 participatory design sessions with approximately 100 participants over a 2-month period. The sessions were conducted in playful activities, in which participants were invited to create and / or play games. Since the gaming platform was not developed at that stage of the project, we simulated the games by using papers, posts-it and PowerPoint presentations (Rosales et al., 2012).

Evaluation

Evaluation in Life 2.0 lasted approximately 20 months (March 2012 - September 2013). The evaluation was designed to assess participants' attitudes towards and use of the proposed services over time, i.e. whether the participants would (and could) incorporate mutual help practices in their lives, and related benefits. We were also interested in understanding the sustainability of the platform and the actors that could foster a sustained use of it. Evaluation was conducted through immersive data collection methods, which consisted of observing and conversing with a core group of 18 participants during the aforementioned weekly meetings. Other dissemination activities were aimed to recruit more users in order to discuss the Life 2.0 services and receive feedback from other older people who had not previously been involved in the project, as well as a number of stakeholders from public, private and NGOs sectors.

The evaluation in WorthPlay was conducted over a 3-month period in playful sessions carried out in 4 courses and 1 public event in

Àgora. Participants were invited to create and play games by using the gaming platform. We did not aim at testing merely the usability of the platform. Instead, we were interested in evaluating the worthiness of the game concept proposed.

C.3. Beyond the projects-related activities and timeframe

Over the course of five years, we engaged in other activities in Àgora so as to gain a deeper understanding of the context (e.g. the Àgora community and local neighbourhood) and the participants' everyday life and use of ICT. From the start of the study up to the time of writing this manuscript, we have participated on a weekly basis in over 30 ICT courses in Àgora. We have also set up a Facebook group with some of the participants and recently joined a WhatsApp group managed by 25 of them. This has allowed us to keep in touch with them after class hours and beyond the duration of the projects. Some of these parallel activities helped us conduct the design and evaluation activities in both projects. For instance, while conducting activities aimed at evaluating our prototypes in Àgora courses, our observations were guided by our previous knowledge of what “normal” behaviours and dynamics are generally observed in ordinary classes in Àgora. In addition to ICT-focused activities, we have participated in language courses as learners. We have also participated in the organization of dancing events, attended conferences organised in Àgora, and taken part in cultural gatherings too. We argue that our involvement in Àgora allowed us to observe and understand the (lack of) adoption of the technologies developed in the projects, as well as the new activities and social dynamics that the communities have incorporated in their ordinary practices as a result of having participated in the projects and interacted with the technologies developed.

C.4 Data gathering and analysis

The first author took notes of her first-hand observations and conversations with the participants during or immediately after the research and design activities mentioned above and detailed in

Appendix I of this dissertation book. We used paper notebooks to take notes during the activity because doing so was ordinary practice in Àgora courses. For similar reasons, we did not video- or audio-recorded any activity. The notes were then transcribed in a Word document. Sometimes our high involvement in the activity (e.g. conversing with participants, running the activity, answering questions, etc.) hindered note-taking. Thus, the first author had to rely on her memory and a narrative of the activity was added to the Word document immediately after it. While still collecting data, preliminary data analysis was conducted (approximately every 4-5 weeks) with the aim of identifying possible topics to follow them up. This preliminary analysis consisted in reading previous notes, highlighting repetitive patterns and identifying unclear issues by asking questions such as “*what?*”, “*why?*” “*what if?*”

The entire data corpus was analysed, in a recursive and inductive way, by using the six-phases method of thematic analysis (Braun & Clarke, 2006). We started by reading our notes several times to familiarise ourselves with their content. We then generated initial codes²², most of them by working at a latent level of the data (e.g. identifying and examining the underlying ideas beyond, for instance, participants’ quotes). When all the initial data was coded, we started to identify themes by grouping related codes together. Themes were reviewed in an iterative mode, by moving and /or deleting codes and by checking for ‘accurate representation’ (Braun & Clarke, 2006) of the entire data set. Themes were named and preliminary versions of this paper were written, as writing in thematic analysis is considered an essential step of the analysis process.

²² We consider a code as a piece of text that, independent from its length (e.g. could be a sentence, words or paragraphs), captures the richness of a phenomenon (Boyatzis, 1998).

As the writing and analysis progressed, our focus shifted towards the data coming from the evaluation and co-design phases²³. This shift is accounted for (a) the analysis from the conceptualization phase yielded themes which had already emerged from our previous ethnographical study, and (b) we started to develop an interest in aspects of the data concerned with the socio-cultural contexts of the design process, including designers' influences and assumptions, as these aspects helped us to explain the reasons for which the developed technology was (not) successfully being used. In this phase, the analysis started to shift from a realistic to a constructionist paradigm. We also progressively started to engage with relevant literature related to critical theories of technologies design (e.g. postcolonial, feminist), which helped us to sensitize ourselves to more subtle features of the data (Tuckett, 2005 – cited in (Braun & Clarke, 2006)), and to ground the dimensions of the proposed Turn (see Section 5).

The core themes that emerged in our analysis are:

- *Conceptualization of older people*: which help?, for others/not for me, visions of dependence, why just for older people; heterogeneity, group/community interests, more than age
- *Constructing meaning*: community existing practices, adaptation, community-driven

D. Some triggers of the turn to community

Rather than providing a detailed account of the results of each phase of the R&D projects, which have been partly reported in previous publications (Sayago et al., 2016; Righi et al., 2015), in this section we focus on key findings which have not been discussed previously and that we consider particularly relevant for highlighting implicit and widespread assumptions about the ways of conducting HCI

²³ The analysis iterations that followed were thereby conducted mainly on the data set of evaluation and co-design activities, sometimes going back to the entire corpus to check for consistency.

research with older people. These key findings have prompted us to put forward a ‘turn to community’ in HCI design research targeted at older people (Section E).

D.1 Impact of the conceptualization of the user on the design and use: two examples

In section 2.2.2 we presented previous works from Science and Technologies Studies claiming that designers/researchers tend to build their own representation of old age. This seems to be inevitable, since these representations are often constructed at the very beginning of the research journey, when writing up the project/research proposal, which typically addresses the question of *what to build* and *for/with whom to do it* (Prell, 2009). By answering the ‘what to build’ question, the proposal outlines a model of the intended users which conveys researchers’ values and perceptions about the target group. Regardless of whether these values and perceptions are negative or positive, when we narrow down the target user to a specific category, we tend to set this user group aside. However, we argue that the actual differences might not always be so clear-cut when the design concept is being explored. In the next three subsections we provide three examples, two from Life 2.0 one from WorthPlay project, that aim to dispel three common myths in designing technologies for older people:

- i) Older people need help to conduct everyday activities.
- ii) Since our research is on the field of ageing, the target users of the technology that we develop must be older people, their relatives and caregivers.
- iii) ‘Older people’ belong to a well-distinct category to which our design concept could be applied almost universally.

Who needs help?

A Mutual Help service to enable older people to both seek and provide support in their local area was developed in Life 2.0. The design concept was aimed at promoting positive images of older

people as promoters of services, rather than simply receivers. However, the assumptions about the type of help to be shared (e.g. for conducting functional activities of daily life) were influenced by the overall goal of the project, which aimed to foster older people's independent and active living. It is worth noting that this goal is consistent with current efforts aim to tackle the increasing demands of an ageing population.

Participants claimed that this kind of service would be very useful and beneficial for older people during co-design activities. However, in the long-term evaluation, it became apparent that they were not willing to use it. In fact, contrary to our expectations, the scenarios elicited comments such as “*Perhaps we’ll use the service when we grow older, but not now*”, “*This is, for example, for someone who wants to go to the doctor with another person*”, “*Imagine someone who needs to change the light bulb and can’t do it on her own. She can post a message on the platform and eventually get help from some of us*”. The last two comments, which are formulated in the third person, are representative of how participants were envisioning the use of the service for *other* older people. These comments resonates with others, such as “not for me” (Neven, 2010) or “not *that* old” (Lund & Engelsrud, 2008), made by older people in different contexts, and can be taken as an example of the fact that problem Life 2.0 sought to address was built on a simplified conceptualization of the “intended older people” that did not match the participants’ self-identity, which revealed itself in the long-term.

‘Only’ for older people?

Independent people aged 65 - 75, their relatives and caregivers were the target users of the Life 2.0 project and of numerous design projects aimed at older people as well. Yet, the idea of involving family and caregivers was quickly rejected by our participants. To begin with, they associated caregivers with serious impairments. However, they reported being fit for their age, which was part of their identity. With respect to family members, they insisted on the

fact that “*our children are always very busy, better not to bother them with these things*”. Consequently, the partners of project decided to drop the idea of involving these actors. However, participants still showed a sense of unease with the project being articulated “for older people”. They expressed that they understood the Mutual Help as a local community service where the age of the subscribers was not important: “*Why do you keep saying that this project is for older people? This could be for the entire neighbourhood! Everyone could need help! Didn’t you ask our help to organize your trip to Menorca?*” (to a young researcher) or “*Young people now rarely know how to fix something in their house. We can help them because we know how to fix things at home!*”. Thus, chronological age did not fit in with the Mutual Help service envisioned by our participants. Moreover, their conceptualization of the service clashed with the initial vision of the project, i.e. “an online platform for older people, relatives and caregivers” (which, in turn, is widely adopted in ICT & Aging research).

For ‘all’ older people?

The initial goal of WorthPlay was to design *several* games, which should fall in the category of worth playing games (i.e. sufficiently appealing, playable and meaningful) by “older people”. The initial 3 months of ethnographic research on actual game playing revealed a high heterogeneity amongst our participants. Some were really into playing games, while others regarded playing games as a waste of time or a childish activity (Sayago et al., 2016). We took this heterogeneity as an opportunity to change our conceptualization of older people and the gaming technology. A single game, or a set of few games, was very unlikely to cater for this heterogeneity. Thus, we decided to design an online platform, hoping to meet their diverse interests, thereby changing the concept from older people “as players” to “game players and creators”.

Most of the games created by the participants were knowledge games. This might not be surprising, as these games resonate with their shared motivation and the context (a learning community)

where we conducted our research. The knowledge exchanged was very diverse, ranging from memories and art to maths. This diversity can be taken as a sign of the differences in interests and heterogeneity of the life course (e.g. previous jobs, education). The different ways in which the platform was used, e.g. for making literature routes or for brushing up on the contents learned during a course, is another evidence of the diversity we found: different groups of older people ascribe different meanings to the technology. Thus, in the WorthPlay project, we moved from a concept of “a game which is worth playing by older people”, which assumes that all older people would be willing to play a particular game, to a “platform for creating and playing games that older people find worthwhile to play”.

D.2 Beyond the imposed or expected meaning of technologies

In the previous section, we have presented examples of how designers’ assumptions clashed with participants’ identities and expectations. Contrary to previous studies about the development of Assistive Technologies (e.g. Compagna and Kohlbacher, 2015), this clash occurred when designers were committed to leveraging on positive images of older people and the design process proceeded with high participation of users.

In this section, we aim to show how the situation changed when we situated the technologies into the practices of the communities to which our participants belong. Within the context of our study, we define a community as a group of participants enrolled in a given course in Àgora participating in our research activities. The examples show that the technologies neither remain fixed to designers’ initial intentions nor are intrinsically meaningful. Rather, they need to be situated in order to acquire meaning.

Help situated in a learning community means exchanging knowledge

Over the course of the Life 2.0 project, we changed our attempt to design decontextualized technologies to situate the technology

within the specific context of Àgora, where most of the design activities were conducted. In section 4.1.1, we quoted participants' efforts envisaging "help" situations for "other" users of the Mutual Help service in Life 2.0. The comment revealed the unsuitability of the service concept: [Woman, 63] "*I don't know what I can offer. I don't know what I can ask for. I don't need anything. I don't have ideas...*" We could have attempted to recruit more participants in an attempt to look for older people who could be more interested in the service. However, doing so was not either reasonable or ethical. We have already involved approximately 90 people in Life 2.0. They were aged 60-80, interested and not interested in ICTs, regular volunteers in local associations and less interested in volunteering, living alone and living with a dependent partner (i.e., varied profiles that made them potential "suitable users"). After revisiting our fieldnotes, we designed a new scenario in which participants' interest in learning new things could be explored. We witnessed a change: participants started to use the Mutual Help service to ask questions about how they could use their smartphones, set up a Facebook account or for organizing groups for practicing languages, and others similar uses.

Our participants were "old", but in our study they primary acted as active members of Àgora courses, regardless of their chronological age. Within this educational context, what characterized the group of participants was learning – not age. The use of the service only started when help was understood as knowledge exchange. This shows how important it is to situate the technology within a community. At the same time, it shows how important it is to situate "older people" within the contexts in which they act in their daily life in order to better understand their identities and address them in the design process. This understanding was lacking at the beginning of our design activities, because the project started with the assumption that "*older people with mild-to-moderate age-related changes in functional abilities*" was a large, monolithic user group.

Technology is not intrinsically meaningful! Making sense of the technology in dialogue with communities' practices

Designing by taking into consideration the context of the study is very helpful for creating technologies that match people's identities. The WorthPlay case mentioned above is a clear example. The resulting outcome (e.g. knowledge games created in an online platform) was in line with the educational interests of Àgora. However, this does not intrinsically ensure meaningfulness. Technology becomes relevant only once users appropriate it. Appropriation occurs when a dialogue between the opportunities that technology opens up and users' existing practices is established. The result is an enriched technology that might acquire different meaning in different contexts. When this dialogue does not take place, technology is an 'empty bottle', whose shape, ergonomics and functionalities can be tested, but people could not make the most out of it. We explain the process of appropriation and the resulting technologies through presenting some of the results of the WorthPlay evaluation phase.

The gaming platform was evaluated in different contexts during ordinary activities that usually take place in Àgora, such as a public outdoor event that is held every year, a course on general knowledge (GK), a literature course (LC) and two courses on computers and the Internet (CTC). The evaluation activities took the form of playing sessions, wherein the participants were encouraged to use the WorthPlay platform to play an existing game and to create a new one. Approximately 30 games were created. This number of games can be regarded as a success. Yet, participants showed different interests in using the platform. Also, they did not use them in the same way.

The GK and CTC participants valued positively their experience of playing and creating games. However, our observations and conversations revealed different levels of engagement. CTC participants often complained about having to answer another question or writing the answers when they had already done so

verbally. Seldom did participants discuss the answers with other participants in the group, contrary to the typical behaviour exhibited by the same participants in regular class sessions. Despite the fact that 80% of the participants reported that they had enjoyed this new activity and had learned new things, the overall picture was not so positive. Indeed, the activity was unambiguously perceived as extraordinary and not useful, as illustrated by the following comment by a participant “*If there’s no regular class today, then I’ll leave... with your permission. I have other things to do...*”. Unlike this, shouts of joy when answering correctly to a question and different playing groups yelling at each other - expressions of healthy competition - were observed in the GK class. The participants reported that they had enjoyed the activity a lot. They also pointed out that this activity was a funny and useful way to brush up on contents learned over the academic year while familiarizing with technologies they do not normally use. At the end of the activity they enthusiastically discussed the possibility to repeat the activity for the following courses with the teacher. Two of them repeatedly asked us if they could play the game at home. No participant in the CTC class raised this question.

The case of LC is another example that shows how the same technology could be used in different ways. LC participants meet weekly in Àgora to read and discuss books. When we proposed them to use the WorthPlay platform, some of them were reluctant to do it: “*this class is about reading books, not using technologies!*” However, and thanks to some very motivated participants, the group finally decided to use the platform as a way to further discuss and discover aspects of the book they were reading. They did so by creating a route of questions, which were geo-located in specific points of the city centre, and answering them *in situ* through the use of iPads. The answers given by the different players stimulated discussions about the book. The activity was valued highly positively by all the participants, and in fact it triggered a new practice that established itself within the group in the next months:

to create literature routes around the city (see Righi et al. 2015 for further details).

The difference between the great acceptance in GK and LC and the not so great results in CTC seems to lie in the degree to which the groups engaged in the organization of the activity. There was a strong involvement of the teacher²⁴ in the GK class, who prepared the game to be played ensuring the relationship with the course contents. The teacher also introduced the activity to the participants and helped them to answer the game questions. The teachers in the CTC class were less participative. Yet, they allowed us to organize and carry out the activity by our own. LC participants stated very clearly that they would use the platform only if it helped them achieve their goals, and they showed a proactive attitude in finding the proper way to use it within their current practices.

Organizing the activity around the platform use was a way to appropriate it and re-define its meaning. In GK, the platform was conceived of as a playful tool for brushing up on the contents of the course. In LC, the platform was used as a way to enrich their discussion about books. In CTC, by contrast, the platform was perceived as a technology to be tried out. There was no real intention of appropriation.

E. The “Turn to Community” in HCI design for, and with, older people

This section elaborates on the findings presented in section 4 by discussing them along with previous studies and some theoretical frameworks. The aim of the section is to propose a change in the way of conceptualizing and framing HCI design research for older people: a *‘turn to community’*. We discuss this turn in terms of: i) the conceptualization of the “older people” category as a distinct

²⁴ In Àgora, teachers are volunteers who coordinate the class by suggesting content and helping out participants. The contents of the class are mostly decided by the participants based on their interests.

target user; ii) the intended use of technology and its appropriation. We show how a lens on community plays a key role in overcoming current assumptions about older people and their relationship with technologies which are implicit in both dimensions.

E.1 The conceptualization of the target user: from “for older people” to “for situated communities”

Analysing the “for older people” conceptualization as a process of “othering”, from a postcolonial and feminist lens.

Most studies self-framed as “for older people” implicitly carry with them a taxonomic view of older people as a large user group. Thus, the technology developed in a research / design activity should be valid for most of them. This assumption is risky, as older people make up an extraordinary wide and heterogeneous segment of the population. We propose to take a step back and reflect on the “older people” category and how design for “them” is constructed. We draw on similar concerns raised in other HCI-related fields, namely, HCI4D(velopment) and Urban Computing, and two epistemological discourses, postcolonial and feminist, which have recently been making inroads into HCI.

Researchers in HCI & Urban Computing have recently raised concerns about the tendency to create manageable categories of users, such as young, older people, visitors, and treat them almost homogeneously (e.g. Kukka et al. 2014; Dourish and Mainwaring 2012). They claim that by bearing these general categories in mind, designers think that they create technologies for everybody. However, these technologies are actually designed for “an anonymous composite person made up of a number of people falling into a given demographic category” (Kukka et al., 2014), under-representing the diversity of social practices, interests and skills endemic to city (Williams et al., 2009). Similar claims have been made in HCI4D. (Marsden et al., 2008) questioned cultural “averages” as being of limited use for design. (Irani et al., 2010) argued for adopting a generative view of culture in which an individual may participate in many cultures, thereby designing in

conversation with existing cultural practices, rather than designing for static, nationally-bound cultures.

Both fields have drawn from post-colonial theory as a way of exploring how identities are created in social and cultural contexts, how relations of power affect such constructions and how such constructions influence the design of technologies. Previous researchers claimed that those projects that are framed from top-down approaches and outsiders' perspectives do not fit in with the specific cultural context where the technologies are supposed to be appropriated (Dodson et al., 2012; Kapuire et al., 2015; Marsden et al., 2008). In a similar vein, feminist theorists advocate for polyvocality instead of the universality presented and claimed by dominant groups (Haraway, 1988). Feminist thinking has led to both epistemological and methodological reframing of scientific practices, including HCI ones (e.g. Bardzell & Bardzell, 2011)). A key proposal is to question what constitutes "valid information" in technology design, inviting to go beyond taken-for-granted assumptions in the design of technologies.

Let us translate this reflection to HCI with older people. The argument for designing technologies for older people is often built on by adopting a discursive / paternalistic (Rogers & Marsden, 2013)) approach: a need/interest of the (entire) ageing population is assumed to exist and a technology is thought of as an essential component towards addressing that need/interest. By formulating the design goals *for them*, the designer engages in a process of "othering"²⁵ through which older people are positioned in the designer set up as clearly separated and different from the rest of the population, similarly to the "out there" approach in HCI4D (Taylor, 2011). The consequences of the "othering" are not always fixed by actively involving participants in co-designing the technology, as designers often start the co-design process with a clear set of pre-

²⁵ Post-colonial theorists adopted the term "othering" to indicate the process by which individual or groups are set aside as different.

defined goals which are “*informed by values based on a specific worldview, or way of seeing and understanding reality*” (Dunne & Raby, 2001, p.58; see also (Suchman, 2011)). Our results show that participants in co-design activities do not usually subvert the initially defined goals – except when engaged in a long-term process of adaptation and appropriation, which is discussed next. The result is often an useful and easy-to-use solution “for other older people” rather than for themselves (Neven, 2010), as it is also evidenced from our results (see section D.1).

An alternative: situated communities

To overcome the “universalizing schema that typify the research ‘out there’” (Bidwell et al., 2013 p. 31), some researchers propose to adopt a situated lens on technology design (Dourish & Mainwaring, 2012). This lens stimulates us to acknowledge the specificities of the place in which design is carried out, not only in terms of physical aspects, but also in terms of institutional, cultural, commercial and historical circumstances (Suchman, 2011). A situated lens on design also aims to shed light on the mechanisms by which knowledge about the design subject is produced, including the assumptions brought by designers ((Harrison et al., 2011) see also (Haraway, 1988)).

The universalizing schema implicit in the “older people” construct is that ‘they’ share a common experience of the world just because they belong to a pre-defined, decontextualized and separated demographic category, which can be directly applied in the design process. A remarkable example that shows the weakness of the concept “design for/with older people” is the study by (Gaver et al., 2010) in which they designed a prayer companion for a community of nuns. The peculiarity of the community involved in the study – i.e. most of the members were in their 80s and lived a very atypical life due to their religious vows - force the researchers to challenge the view of “*‘older people’ as a category of people who, by implication, share some common set of abilities, orientations and requirements*” (Gaver et al., 2010, p. 2056). Our results of the

inapplicability of a unifying concept of ‘help’ or a single game for *all* older people are aligned with Gaver’s example.

Drawing on these reflections, we consider that in order to situate the design of a technology for older people into a specific context, we need first of all to adopt a *situated perspective on the (expected) users*. Rather than thinking of our users as representative of some predefined categories, such as the category of older people, we suggest thinking of them as being part of the communities in which they engage. The community practices and interests help us to identify the users in a more useful way, especially from the point of view of design. Although we recognize that there is little consensus on what constitutes a community, in this paper we embrace a broad (and non-restricted) definition of community, one that considers shared interests and practices as constituent elements. In our study, the participants acted primarily as members of Àgora, and more explicitly as participants in a given course of Àgora, which we consider a sort of community wherein individuals share and mutually-shape interests and practices on a weekly basis.

In practical terms, our approach for operationalising situated design with older people consists of going where they already are - in the communities in which they dynamically and contingently act – rather than setting up a group of users who are above a certain age threshold. The latter is the approach that predominates in HCI studies with older people. Some exceptions are (Brandt et al., 2010) and (Botero and Hyysalo, 2013), who engaged with local social elderly clubs, and (Müller et al., 2012) who conducted the study in a residential care setting. In order to break the boundaries of age, we consider that it is important to look beyond elderly centres in order to avoid embracing a definition of community based on age, given that different age groups can co-exist on the basis of a shared interest within a community.

E.2 The conceptualization of technology: from “expected future use” to “use shaped within community practices”

Beyond defining the future use of technologies through user participation

Over the years, HCI has increasingly recognized the importance of including older people in the design process in an attempt to design technologies that better meet their real needs and preferences. Indeed, an increasing number of studies have started to explore techniques and methods to best engage them in co-design activities (Vines et al, 2012; Lindsay et al., 2012; Rogers et al., 2014 – to mention but a few).

Nevertheless, very few studies question the real effectiveness of users’ involvement in these participatory processes. (Balka, 2010; Bossen et al., 2014) have called for a reflection on the actual outcomes of participatory design processes beyond the single project. An interesting question to ponder is whether this involvement results in technologies that participants are willing to adopt, or whether the results are technologies easy to use but in practice are not used, on completion of the project. This question is related to an actual willingness to adopt the designed technologies in people’s everyday lives. There are few published works on this issue too, since most design studies stop once the technology is developed and evaluated within the projects timelines. Fortunately, an increasing number of researchers are discussing the need to address appropriation of the technologies beyond the project or research phase in an attempt to bring sustained (positive) impact on the communities involved in the study (Taylor et al. 2013; Balestrini et al. 2014; Malmborg and Yndigejn 2013; Crabtree et al. 2013).

Having people participate in design activities does not automatically ensure appropriation, since “envisioned use is hardly the same as actual use, no matter how much participation there has been in the design process” (Ehn, 2008, p.95). Indeed, a conspicuous number of previous studies have discussed how users adapt and shape the

meaning of technology while using / appropriating it (e.g. Storni, 2010; Salovaara et al., 2011; Bødker and Christiansen, 2012). This *re-shaping* is related to meaning-making, which comes from a long tradition in social construction theories (Bijker et al., 1989). The third paradigm in HCI (Harrison et al., 2011) places a central focus on meaning construction, hinting at its importance towards HCI. It is this *re-shaping* that we consider particularly relevant in order to challenge traditional ways of conducting design studies with older people.

Conceptualizing technology use in dialogue with communities' practices

Our results support the importance of meaning-making by showing that the initial envisioned use of technologies was re-shaped when our participants started to use them in daily living situations. Despite the fact that appropriation has been widely discussed in HCI, as mentioned before, there is a general lack of attention on this research topic in previous studies targeted at older people. Recently, (Rodeschini, 2011) draws on an extensive review of gerontechnological studies to advocate discussing appropriation of technological devices by older people rather than restricting the focus on stabilization of functionality.

We argue that this lack of attention on appropriation and meaning-making in HCI with older people may be due to pervasive stereotyped views as far as their relationship with technologies is concerned: passive users. A second reason may be due to the predominant vision that technologies must meet older people's needs rather than challenge and stimulate them (Peine et al., 2014). Within this context, the main goal of design and development process is to define in detail the functionalities that the technology should have and stabilize them in iterative cycles. This approach contributes towards designing effective and efficient technologies that are easy to use, but it has the drawback that it leaves few space left for imagination and improvisations (Redström, 2006), which seem to be so important in the appropriation phase.

Our results highlight that involving users in the design process does not necessarily ensure that they will appropriate the technology in their daily lives, even if they helped us to define its utility. Our results suggest that participation might unintentionally be directed towards designing technologies *for others* users. This is not to say that involving users in the design process is useless. Rather, we argue for a more thoughtful participation, one that is not limited to the design phase but goes beyond it, looking for appropriation.

Communities play a key role here because appropriation takes place in everyday contexts and practices. The results of WorthPlay (section D.2) show the important role played by communities in shaping the activities that led to technology appropriation. Envisioning, planning, and conducting these activities is a way of appropriating and building the meaning of technologies. It is a way to keep designing the technologies (Carroll, 2004; Binder et al., 2012).

To summarize, understanding needs and current practices is important to situate the technology into a specific context and avoid genericity and assumptions. However, the design process should not be limited to these aspects. Understanding how to foster appropriation should also be considered part of our design goals. It should look at how to facilitate, support communities to interpret the artefact and define its meaning. This expanded meaning of design is aligned with recent studies that postulate design as *infrastructuring* rather than merely building artefacts (Karasti, 2004, Bjögvinsson et al., 2012), as well as designing *staging encounters* rather than simply formulating needs and ways to address them (Irani et al., 2010; Suchman, 2002).

Appropriation for overcoming technology genericity: communities shaping the design agenda

We argue that the focus on meaning-making / appropriation prompts us to overcome technology genericity (i.e. the belief that the technology we are going to develop is suitable for the majority of older people). Instead, thinking in terms of meaning-making

reinforces the need to think of older users as individuals being embedded in specific social contexts. By acknowledging the sociocultural context, the communities in which our participants are acting, and how different meanings are ascribed to digital artefacts by different communities, our design goals shifted from targeting *the generic category of older people* to being shaped by *the specific communities* involved in the study.

Communities became the epistemological agents²⁶ of our design and research processes, because they validated and shaped the topic of our study. This epistemological shift (i.e. from the generic category of older people to situated communities) produces a different approach of doing design research in ageing: from focusing the design on addressing universal problems of the ageing population, towards articulating the design goals from a situated perspective. Consequently, the technology should be conceived of as being designed for and shaped by the specific community involved in the design process, rather than being seen as universally valid “for older people”. This, however, leads to solutions that are locally meaningful, such as the WorthPlay platform or the revamped Mutual Help services, and this might be considered a limitation.

F. Discussions and conclusions

In this paper we have argued for adopting a *turn to community* in HCI research and design with a growing ageing population. The aim of the proposed turn is to introduce an alternative way of thinking about and doing HCI research and design with older people by going beyond widespread assumptions. The proposed turn adopts a situated lens on “older people” by looking at the communities in which they engage on the basis of their interests,

²⁶ The concept of communities as epistemological agents is used by feminist theorists in sociological studies to refer to the fact that knowledge is constructed through interaction among different social groups (Nelson, 1993).

skills, needs, goals, self-identities, and contingencies of daily life and life transitions. By looking at older people through a community lens, the universal design goals attached to an ever-increasing ageing population (e.g. reduce social isolation and foster independent living) are re-considered. The proposed turn encourages HCI designers to be more concerned about technology appropriation, as it is then when the meaning of technology is shaped in a dialogue with everyday practices.

We acknowledge that appropriation has often been explored in previous HCI studies. We also acknowledge that claiming that the meaning of technologies is situated is not new, as it is well-known in other areas related to HCI and amongst HCI scholars (e.g. Dourish, 2001, Suchman, 1987). Yet, we claim that these concepts have seldom been considered in HCI studies with older people. We argue that a focus on appropriation could encourage HCI research to move away from technology genericity and explore instead the different ways in which older people ascribe different and evolving meanings to technologies. We believe that the lens on community can become a point of departure in order to tackle the challenges of working with a heterogeneous population in a pragmatic way.

In discussing the turn to community, we have touched upon concepts that are making inroads into HCI, such as the new meaning of design that goes beyond the physical artefact (e.g. infrastructuring) and the emerging local epistemological discourses (e.g. feminist, post-colonialist). Thus, we consider that the proposed turn can contribute towards moving HCI with older people forward by incorporating, altering and keeping pace with theoretical advances in the field. In this paper, we have showed some studies which can be taken as examples of efforts to keep developing and maturing HCI research and design with older people, such as avoiding technology genericity and embracing a more thoughtful conceptualization of this user group.

Although the term community is central to our approach, it might be worthwhile to reflect on the fact that sometimes it may seem that a

community does not exist. Imagine that we wanted to work with people suffering from social isolation. How could the turn to community be adopted then? Designing when a community does not exist seems to be an open challenge in Participatory Design (Binder et al., 2012). We argue that a community lens should, first of all, be regarded as a way to shed light on how people construct their own identities, in interaction with social cultural contexts. We postulate for leveraging on such identities during the design process. One might have few social interactions. Still, that person has some interests that characterize him / her. Designers could leverage on these interests to drive the design process, and perhaps build a community around such a shared interest / issue. An artful work of *infrastructuring* (DiSalvo et al., 2013) might be needed to align actors around the shared concern.

We consider that further research is needed to validate the turn to community in other contexts and with different profiles of participants. This future research could also make a major contribution to enriching the turn to community with new dimensions and challenges that we may have overlooked in this paper. In our future work we aim to conduct fieldwork activities in other types of communities with people of different age ranges. We are also interested in exploring more deeply how a case study conducted within a community could be scaled up to other communities. We believe this future work will help us improve the turn to community in HCI design for a growing ageing population presented in this paper.

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4. DISCUSSIONS AND CONCLUSIONS

By drawing upon a five-year research-through-design (RtD) study, in this dissertation I have explored older people's everyday use of mainstream Internet technologies. There are numerous technologies that can be regarded as 'mainstream Internet technologies'. In this dissertation, I have explored only those that are intended to enable us to engage in inter- and intra-generational communication and conduct information-seeking tasks, because my participants were interested in or curious about them, and because these technologies also helped them to meet some important needs, such as remaining in touch with their relatives. In this dissertation, I have also explored the design of digital technologies envisioned by researchers in two R&D projects (Life 2.0 and WorthPlay), which were funded in competitive calls. In particular, an online gaming platform (<http://worthplay.upf.edu/game/>), which allows older people (and members of their social circles) to both create and play different types of online quiz games, and a social networking platform, which enables older people to offer their knowledge and skills to neighbours, and to keep abreast of social events, commercial services and assistance available in their local area. These technologies aim to promote active and positive images of old age.

I have conducted my research in civic contexts, which have largely been overlooked in HCI research with older people. However, by conducting my RtD study within civic contexts, I have been able to widen the scope of social interactions explored in HCI studies

concerned about, or carried out with, older people. Thus far, these studies have mostly turned to the social interactions established between older adults and their relatives and / or caregivers. In my dissertation, I have explored the role that other social interactions take on the relationship between older people and ICTs.

Overall, almost 400 people aged between 55 and 81 took part in my study. Most of them were members of Àgora, experienced mild-to-moderate age-related declines in functional abilities, and led a fairly active lifestyle.

In keeping with RtD (Zimmerman, Stolterman, Forlizzi, 2010; Gaver, 2012), the results of my dissertation can be divided into (a) design artefacts, which “provide an appropriate conduit for research findings to easily transfer to the HCI research and practice communities” (Zimmerman, Forlizzi and Evenson, 2007, p. 493), and (b) knowledge, such as concepts and frameworks. The design and evaluation of the online platform developed in Life 2.0 and the online games in WorthPlay are documented elsewhere (Sayago et al., 2015; Righi et al., 2013). It is in the second category of the results (knowledge) where the main contribution that this dissertation makes to HCI research and design with older people lies. This dissertation proposes a re-formulation of the *context of use*, the *object* and *subjects* of design.

The context of use: beyond family and healthcare

This dissertation has shown that older people’s use of contemporary and novel digital technologies is richer and more varied than what one might imagine by reading previous research, wherein the relationship between digital technologies and older people is mostly studied within, or making reference to, family and healthcare contexts. The papers that constitute the body of this dissertation have, in different ways, revealed a rich and varied map of actors and situations that can help us to characterize older people’s everyday use of technologies beyond these contexts. For instance, my participants used Facebook for keeping pace with new ways of communicating amongst their relatives, as well as for keeping

abreast of the news, videos and photos posted by activist groups or cultural associations they belong to. While there are reasons to argue that this way of using Facebook is not new or remarkably different from how, for instance, this SNS is used for by young and adult people, within HCI research with older people, my results are ‘rare’, because they do not zero in on family or health.

This does not mean that I have not witnessed how important it is for older people to keep in touch with their relatives (especially, their children and grandchildren). Indeed, my observations and conversations seem to confirm a fact: family communication (i.e. sharing information between family members with verbal and non-verbal cues) is one of the most important motivational factors for using and learning ICTs amongst the older population. However, **the results presented in this dissertation can be taken as a source of motivation for widening the contexts of ICT use in which HCI research with older people can be conducted.** For instance, this dissertation has shown how HCI research can promote and strengthen social inclusion, which is key in improving the well-being of older people, by envisioning scenarios of ICT use wherein older adults are actively engaged in civic (and highly social) contexts, such as their neighbourhoods and local community groups.

The object of design: mutual shaping technologies and everyday practices

In keeping with the traditional user-centred approach²⁷, much HCI research with older people has focused on designing technologies that ‘meet’ their needs, e.g. a communication-based system that allows older people to keep in touch with their grandchildren and children by exchanging photographs or a robot that helps those older people who are homebound to carry out daily living activities. Older people’s needs tend to be defined according to widespread (and mostly, negative) conceptions of old age. If our user is old, then s/he will probably have: difficulties in conducting tasks on his

²⁷ Technology should adapt to, and cater for the needs of, people.

/ her own, little experience of ICT use, a poor health condition, etc. A digital artefact is therefore often designed – with or without the participation of older people - to address these needs. Finally, the artefact is evaluated in order to ascertain the extent to which it has fulfilled older people's needs. Within this discourse, the role of researchers, designers and older people is limited. As far as researchers and designers are concerned, they look into older people's needs and come up with a technological intervention to fulfil them. With respect to older people, they answer researchers and designers' questions and, in the best case, take part in design and evaluation activities.

How else should (or could) digital technologies for older people be designed? In this dissertation, I have argued that seeing technologies as tools that 'help older adults do something' assumes that the relationship between them and digital artefacts is static, because their needs do not seem to change, and supportive, because technologies usually 'come to their rescue'. This type of relationship is exemplified by numerous HCI studies. While there is nothing wrong in designing technologies that meet basic needs of older people and help them lead a more independent life, attempting to do so by considering that their needs are always the same (e.g. mobility, health) and unlikely to change over time, and that technologies should always 'help' them carry out some type of activity, should be approached with care. This dissertation has argued for conceptualizing the relationship between older people and digital technologies in a dynamic and rather unpredictable way. The 'clash' between existing daily practices and new technologies might eventually lead to new / different everyday practices and ways of using technologies. This dissertation has shown that in order to acknowledge, appreciate and allow for this mutual shaping relationship, we need to widen our perspective and reflect on what the object of design is. Is it a digital artefact that 'comes to the rescue of older people', or is it about **exploring and encouraging situations wherein dialogues between existing practices and new technologies occur and give rise to new technology-mediated**

practices, challenges and needs? This dissertation has provided some practical examples of the latter. Noteworthy examples are how the WorthPlay gaming platform was embedded in different established community groups (e.g. a book reading club, or a literacy course) and my attempts to encourage community-driven processes that fostered technology re-shaping and appropriation.

The subjects of design: a situated community

This dissertation has called for reflecting upon the concept of ‘designing for older people’. I claim that talking about older people as if they belonged to a well-defined category is risky, as doing so can encourage designers to (a) overlook myriads of aspects that characterize the ageing process (e.g. previous and current life experiences, interests, physical and economic possibilities), and (b) create digital artefacts (e.g. systems, tools...) that seemingly ‘work for all older people, because they are all the same: old’. In order to acknowledge and address the wide heterogeneity of older people, and to shift the focus from the older person, who can be conceptualised in terms of Human Factors (e.g. age-related changes in functional abilities) or Social Actors (e.g. older people as competent, social and ordinary ICT users), to the situated communities to which they belong, I have encouraged design researchers to consider the social contexts in which individuals already interact with technologies according to their everyday interests, life experiences, possibilities, etc. It is within these situated contexts where technologies, this dissertation argues, are appropriated by older people, and their meaning is constructed. The design could therefore be targeted at *situated communities* and adapt its goals and activities to the interests of that community and its ‘ways of doing things’. Due to the fact that everyday communities can consist of people of different age ranges, this dissertation invites the reader to see design activities cutting across people with different age ranges. I argue that this perspective should encourage designers / researchers to re-think the way we talk about our design / research ‘for older people’.

4.1 Discussing the contributions in a broader sense

It is my conviction that in order to assess the strengths and limitations of the three main contributions that I have outlined above, I must situate them in their respective contexts. In 4.1.1, I take stock of the main paradigms / waves of HCI research and discuss the extent to which this dissertation is situated in, and pushes forward, them. As a consequence of these changing research paradigms, HCI has approached design in different and evolving ways too. In 4.1.2, I focus on two aspects of this evolution that are particularly relevant to better understand the contributions of this thesis to HCI design. In 4.1.3, and given that I have alluded to ageing throughout the dissertation, I discuss the view of older people presented in this dissertation by taking into account the different ways of seeing and talking about them in the field of Ageing.

4.1.1 Contemporary theories of HCI research

Thus far, HCI research can be divided into three waves or paradigms. The first wave (Human Factors / Ergonomics) focuses on individual users at a desktop working on a computer. Users are modelled through cognitive theories and the resulting models (e.g. GOMS – Goals, Operators, Methods, Selection) are aimed to help designers to define system specifications. The second wave regards users as Human Actors (Bannon, 1991), who coordinate amongst themselves in workplace settings. The goal of HCI researchers was to improve individual and collaborative work in office settings. In this second wave, Distributed Cognition, Activity Theory and Situated Action constituted important theoretical frameworks, and ethnographical observations in work settings and participatory design were important methodological frameworks. About ten years ago, Bødker, Harrison, Tatar and Sengers put forward the concept of the third (or current) HCI wave / paradigm (Bødker, 2006; Harrison et al., 2007). They did so in an attempt to point out that the

goals of HCI have changed and evolved. As stated by Yvonne Rogers (2012): “*The early mantra of HCI ‘know your user’ has in a few years all but been superseded by the socially aware slogan ‘make an impact’. Instead of striving to fix interfaces so they are easy and obvious how to use, the community is looking at how it can transform the world to be a better place*” (p. xii). HCI researchers have increasingly been developing a growing interest in exploring our relationship with digital technologies in almost every facet of our lives, ranging from cooking (Choi et al., 2014) and having sex (Brewer et al., 2006) to how we interact with our pets (Mancini, 2011) and deal with societal concerns (e.g. political activism (Vlachokyriakos et al., 2014), environmental sustainability (DiSalvo et al., 2010), conflicts preventions (Hourcade, 2011)). We have witnessed a proliferation of new terms and approaches – e.g. Positive Computing (Calvo and Peters, 2014), Value-Sensitive Design (Friedman et al., 2013) and Worth-Centred Design (Cockton, 2006). Central to all of them is to design technologies that deal satisfactorily with human values and improve our (perceived) wellbeing or quality of life. To achieve this objective, it is paramount to go beyond usability / ergonomics, as well as efficiency and effectiveness, which are the hallmark of the first and second waves of HCI research. HCI researchers and designers should encompass as many aspects of a person’s life (e.g. motivations, emotions, life experiences, values, culture) as possible in order to ‘make an impact’, which turns out to be the core of new trends in HCI research.

How has HCI research with older people kept pace with these waves?

Although it might be argued that HCI research with older people falls into the third wave, because of its focus on non-work settings and enabling the participation of ‘extraordinary’ people in the information age, I, along with other researchers (Sayago, 2009; Lindsay et al., 2012), consider that the field has yet to embrace fully the third wave. A great deal of HCI research with older people can

be situated into the first and second wave. How do age-related changes in functional abilities influence the way older people interact with technologies (Czaja and Lee, 2007, Wagner et al., 2014)? How should user interfaces be designed to accommodate for such changes (Fisk et al., 2009)? These two questions are noteworthy exemplars of first-wave HCI studies. Another group of studies, which are growing in number²⁸, have focused on building new systems to support independent living by monitoring, diagnosing, supporting or enhancing (Schulz et al., 2014) everyday activities. Due to their focus on purposeful communication and coordination between family members, caregivers and older people, I situate these studies in the second wave. While in the second wave of HCI research the prevailing setting was the office and the actors were work colleagues, in the corresponding wave of HCI research with older people, the setting is the home and the actors are those people who care for older people.

Is this dissertation first, second, or third wave? And why does it matter?

Previous HCI research has made important and significant contributions. Thanks to these works, we understand better the relationship between older people and digital technologies. We are also in a better position to design new technologies that are more accessible and easy-to-use for this user group. However, what is missing in previous HCI research with older people is a perspective on their whole lives, which, as stated above, is the core essence of current trends in HCI research. Adopting this perspective entails setting up more and different goals than those that have predominated thus far (e.g. enabling independent living at home). Adopting this perspective also prompts us to explore other contexts of ICT use that those that abound in HCI with this user group. By looking into older people's interactions with contemporary and

²⁸ Because of the potential impact of an ever-increasing ageing population in the healthcare system of many countries

novel technologies in civic contexts, in which there is plenty of life (e.g. personal and social interests, life experiences, practices), this dissertation aids in orientating HCI research with older people more towards the third wave (i.e. adopting a whole life perspective), without overlooking, or loosing sight of, previous waves.

I am not alone in this mission. Recent HCI studies with older people have started to change the research direction by considering aspects of their lives that go beyond their families and health condition. These studies have explored engaging scenarios (e.g. older people as actors in the makers culture (Farina and Nitsche, 2015; Rogers et al., 2014)), attempted to dispel stereotypes when it comes to ageing and technologies (Durick et al., 2013), and promoted a notion of agency and empowerment (Roger and Marsden, 2013; Bannon, 2011). How does this dissertation contribute to this growing body of knowledge? This dissertation has explored engaging and empowering scenarios in civic contexts, and challenged (widespread) stereotyped views of the relationship between older people and technologies. This dissertation has also argued that in order to embrace the whole lives of older people, it is important to change the way we think of and describe them in our research. We usually look at older people through an individual lens, even when we consider their activities and social network/s. When we aim to design the user interface of a digital artefact, we tend to focus on compensating for age-related changes in functional abilities. When we turn our attention to their activities and social networks, such as keeping in touch with relatives via e-mail or taking their medication, we also concentrate on the older individual. This dissertation has argued that using a community lens can help us become more aware of and look into the broader context wherein (older) people act.

I understand communities as socio-cultural contexts in which people (the potential users) are embedded and the mutual shaping of technologies and practices happens. This is similar to what Dourish (2004) refers to when he talks about the phenomenological view of context, which considers that “*context arises from the activity*. Context isn’t just “there”, (...) [context] is actively produced,

maintained and enacted in the course of the activity at hand”. [Emphasis in original] (p. 22). I consider that looking at existing community groups (in which people of different calendar ages share common interests and conduct similar everyday activities, such as a book reading club) was a practical way to approach this definition of context, since it is where “availability for engagement” (Dourish, 2004) actually already exists. In other words, this dissertation has called for a *turn to community*.

A turn to community

While ‘*a turn to community*’ is not new in areas related to HCI, such as Community Informatics, CSCW, PD and ICTD (Carroll, 2014; DiSalvo et al., 2012; Le Danted and Fox, 2015; Bidwell et al., 2013), to the best of my knowledge, it has seldom been considered in HCI research with older people, as I have pointed out in Paper 5. However, this turn has enormous potential for suggesting new research directions for the field in terms of both what we could design (e.g. new application domains) and the research questions to be addressed. For instance, the situated perspective adopted when conducting research in communities might force / encourage researchers to re-frame our envisaged research questions according to the real practices and goals of that community. Moreover, we might be encouraged to question the extent to which it is worth keeping the division between designing for older people and the ‘not-old’ within that community. This is a timely and relevant reflection, as we are witnessing how HCI research with older people is increasingly looking at areas that go beyond the healthcare domain, and older people who are fit for their age – and therefore are unlikely to consider that the label ‘old’ can be attached to them. Certainly this issue requires much more research, and I believe that by working with communities, wherein different age groups can co-exist, we should (and can) address it fully.

This dissertation has also showed that community should not simply be seen as a new setting for conducting evaluations in out-of-laboratory conditions. Dropping a new technological development

in a community would not necessarily make this digital artefact more engaging and useful. On the contrary, this dissertation has stressed the importance of understanding community (and technologies) in long-term studies in order to explore and understand how digitally-mediated practices unfold over time. Long-term studies of ICT use are rare within HCI research with older people, however.

4.1.2 Evolving meanings of design in HCI

The evolution of HCI research described above called into question the objectives of design. The HCI approach to design has evolved over time and its focus is now wider than it was before (Bannon and Ehn, 2012).

From before to after use, and from tangible artefacts to encounters

Traditionally, design has been regarded as an activity which happens in a particular moment. Design has also been widely regarded as an activity that evolves by going through a set of well-articulated phases, especially those defined in R&D projects (e.g. analysis, conceptualization, implementation). Thus, the project timeframe defines to a large extent the *when* and *where* of design (Dittrich et al., 2002). However, HCI researchers are increasingly recognizing that design does not fit in with this constrained timeframe: design continues when people use technologies and appropriate them (e.g. Storni, 2010; Pipek and Wulf, 2009). Within this perspective, appropriation is conceived of as a specific type of design (Binder et al., 2012), and the concept of design has consequently been re-defined. We move from “design use before use” (Redström, 2008), in which potential users are involved for envisioning the future use/s of a technological development, to design-in-use, design-after-design, and meta-design (Henderson and Kyng, 1991; Dittrich et al., 2002; Fischer, 2003; Redström, 2008). Common to these design approaches is that they regard design as an everlasting, never-finished process.

A second aspect that characterizes the changing focus of HCI design is concerned with what the real object of design is. HCI has traditionally focused on the technological artefact. Participatory Design, Science and Technologies Studies have, however, challenged this focus. Design is no longer about giving form to material/digital objects and defining how to interact with them. Design is becoming more and more about staging encounters between human and non-humans where matters of concern can be dealt with (Ehn, 2008). *Infrastructuring* (e.g. Karasti and Syrjänen, 2004; Ehn, 2008; Bjögvinsson et al., 2012), which is about building fertile ground to sustain participation of *publics* (Le Dantec and DiSalvo, 2013) over long periods of time and allowing new opportunities to emerge and reveal dilemmas and controversies, is the term used by design researchers to refer to this process. Long-term commitment and open-ended design (Marttila and Botero, 2013) are key aspects of infrastructuring. It is therefore clear that the two aspects highlighted here – i.e. widened time frame and beyond the focus on material objects – are highly related to each other: design in infrastructuring is an activity that evolves over time and enables appropriation (thus reshaping) beyond the design-project timeframe. The contributions of this dissertation touch upon these concepts and support new design trends.

Towards designing mutual shaping relationships between technologies and practices

Although my research builds on top of my participation in R&D projects – with deadlines to meet and project plans to follow - the ethnographical research I conducted on completion of the projects turned out to be instrumental in enabling me to understand, analyse and report on *the (lack of) appropriation of the technologies developed*. A mutual shaping relationship between technologies and new everyday practices triggered by them prompted me to reflect on my design journey. In these five years of research-through-design, designing technologies for older people was not only a question of stabilizing the functionalities of the developed platforms to meet

their needs. Designing was about building “relational qualities” (Jégou and Manzini, 2008) in order to encourage trust and peer-to-peer collaborations, and reflecting on controversies that grew out of my efforts of *communicating* the design concept to my participants. Overall, all these activities generated new knowledge and opened up design opportunities which were not considered throughout the projects.

The point I aim to make is not that developing new technological prototypes is pointless in this kind of research. Indeed, the prototypes played a key role in this staging. My point is, however, that technologies should be seen as both *dynamic*, because they acquire (new) meanings in the encounters with real and future practices, and as *triggers*, because (they) can transform everyday practices. Older people should also be seen as active agents in this mutual shaping relationship between practices and technologies. I consider this vision to be consistent with the recent trends in design described above.

I believe this vision is of particular importance when it comes to designing technologies for older people. Think, for example, about the following scenario. We set out to design a new communication tool for improving the communication between older people and their families (e.g. Rodríguez et al., 2009). The design process of this digital artefact proceeds into several phases, all of which aim to stabilize the desirable system features within a specific domain defined at the beginning of the research (e.g. older people’s loneliness and social interaction with family). At the end of the process we have a digital artefact that, in the most optimistic scenario, meets well-specified goals, fits in with existing practices and is evaluated against a set of objectives (e.g. Is the system easy to use? Does it enable end-users to share different types of information?). This dissertation has argued for opening up the design process and exploring several possibilities of use and application domains rather than narrowing them down to a specific

one²⁹. For instance, the WorthPlay platform has been used for organizing playful educational activities in literacy courses, as well as for enhancing the practices of a reading book club. The extent to which these scenarios can be regarded as ‘games’ – the initial objective of the project – is debatable. However, opening up the design space can (as this dissertation has shown) help us to avoid taking universal needs associated to older people for granted.

Feasibility of designing mutual shaping relationships ‘in the wild’

In this dissertation, I have conducted applied research in two international projects whose main goal was to create new digital artefacts for older people. When writing up the project proposals, we are often forced to envision the technological outcome. This constrains considerably the research and design activities to be carried out. It can also bring up potential dilemmas, e.g. what do we do if, during the design journey, designers and participants come up with a solution that addresses the issue being investigated by using off-the-shelf technologies, rejecting new ones, or, even worse, by using no digital technologies at all? When aiming at addressing societal issues (see section 5.1.1) by involving people in design activities, this can happen. So, what can we do?

This dissertation has encouraged me to go beyond the technology-based constraints in HCI and embrace design opportunities that do not limit our possibilities. Perhaps, in the near future, HCI will (or should) increasingly turn its attention to design approaches which are emerging in fields such as *design for social innovation* (Thackara, 2006; Légou and Manzini, 2008; Ehn et al., 2014), wherein the development of consumer products is secondary to supporting sustainable radical changes in practices and behaviour. This dissertation has also pointed out that prototypes, and

²⁹ In the field of design for older people, previous studies aligned with the design vision proposed in this dissertation can be found, for instance, in (Botero and Hyysalo, 2013) and (Malmberg and Yndigeggn, 2013).

discussions around them, can be used for eliciting practices that do not rely on technologies to function. This dissertation has also highlighted the importance of designing our research in a way that allows us to remain in the field on completion of the project, in order to be able to see the evolution and impact of the infrastructuring process staged during the project, and consequently carefully prepare our leaving from the field. All what I have described here is doable. However, within current funding programs (maybe not all of them), it is very difficult to do.

4.1.3 Older people and old age in ageing and HCI

The research activities reported in this dissertation were conducted from 2010 to 2015 with people aged, to simplify, 50-80. This means that (most of) the participants were born approximately between 1930 and 1965. People born in this age range are known, especially in the US, as ‘baby boomers’. We might agree or disagree with the name, but the important thing is that the life experiences of baby boomers are said to be different from those people born in the 1900s and during approximately the first half of the 20th century. Baby boomers tend to be used to technology (TV, radio, and computers), had more free time than their parents, and led very active and social lifestyles (concerts, demonstrations, etc.) in their youth. Cultural gerontologists have argued that these factors shape the meaning of old age. In others words, old age is not only a consequence of calendar ageing³⁰. It is, however, a mix of life experiences, habits and beliefs. In the 60s, for instance, growing older was something to be avoided: “I hope I die before I get old” (Gilleard and Higgs, 2007). What is important from this analysis, and in general from studies of cultural gerontology, is that they are moving the discourse on ageing from a biological-medical process to a cultural one constructed through identities. Not by chance, the influence of

³⁰ Laslett (1991) argued that the fact that people were living longer have resulted in a new phase of life before the frail final stage of life, that is what she called and it came to be widely studies as the Third Age.

self-identities in the acceptance of technologies by older people has been reported in previous studies (Neven, 2010) and in my results (see Paper 5). From this point of view, I argue that while thinking about older people in HCI research (see section 5.1.1) exclusively in terms of calendar age is useful in first-wave studies, it is unlikely to be very useful in HCI 2020 and beyond, since this way of operationalising older people overlooks factors that define their identity (e.g. their leisure time, consumption habits, beliefs...). A *turn to community* helps us realize and understand the identities that people construct for themselves in their everyday interactions in the social contexts in which they participate. Thus, a turn to community can be a practical strategy in the future.

Before discussing the limitations and future works, let me close with a reflection that has struggled me during my research journey a lot. I repeatedly asked myself whether my participants were “good” representatives of the older population. They were (are) very active people. Some of them were (are) very much into technologies. This profile is in stark contrast with other profiles (not always stereotyped ones) of older people - socially isolated individuals, who are uninterested in technologies. Was I doing something wrong? I do not think so. Should I have worked with other profiles of older people? Sure. However, at this point of my dissertation, you may have guessed that these questions are much less important than they were at the beginning of my research journey. After all, are there samples of older people who are really “good representatives” of the whole older population? My participants are representative of what they are. Nevertheless, an aspect related to this question, which I still consider important to reflect on is the tendency to consider older people within a bipolar scale: active versus passive, interested versus uninterested in ICT. I consider that recent HCI studies, and perhaps this same dissertation too, promote an active image of older people at the expense of neglecting the other side of the coin: people not having the (physical / social) possibilities, or the willingness, to participate in those active and

engaging scenarios³¹. On the one hand, this fact encourages me to explore in future works the extent to which the scenarios proposed by this dissertation are suitable for, and adaptable to, other profiles of older people. On the other hand, I believe that the community lens proposed by this dissertation enables HCI researchers to acknowledge both sides of the discourse. Indeed, this perspective prompts us to define older people in our research-through-design study in terms of calendar age and also in terms of the social contexts wherein they *already* interact, which will naturally be suited to their strengths and weaknesses, as these contexts are not artificially set up by researchers. Addressing *contexts of ageing* is a way of overcoming the “bipolar trap” in which much HCI falls into.

4.2 Limitations and future works

I conclude this dissertation by discussing some limitations of my study, which, in turn, may give rise to future works.

A deeper look at older people’s online participatory culture from a community lens

The study presented in this dissertation has been conducted within a specific context (e.g. educational centre) and with a particular profile of older people (e.g. socially active, interested in learning). Thus, some results (Contribution 2, Chapter 1) might not be extrapolated to other contexts and participants. Indeed, while our results show that older people are reluctant to participate in open online spaces (e.g. comments in online newspaper, YouTube), the Spanish case of *iaioflautas*³² and their use of social media for political activism, seem to be at odds with my results. Further research with different profiles of people is thus needed in order to

³¹ Cultural gerontologists have discussed the “bipolar” image of older people in previous studies (e.g. Marshall, 2015). However, to the best of my knowledge, this topic has not been discussed in depth in HCI thus far.

³² <http://www.iaioflautas.org/>

better understand older people's interaction within the participatory culture of Web 2.0. I consider that the community lens could be an effective way of addressing this research issue.

Expanding the design scenarios to other domains of civic engagement

The term 'civic contexts' has been used throughout this dissertation. However, I have yet to provide a clear definition of this term, and this is a limitation of this dissertation. My aim was to use the term 'civic context' in an attempt to shift the research focus from family and healthcare to others wherein different types of civic actors are involved. Thus, I believe that the term has fulfilled its limited scope within the context of this dissertation. However, I also think that a more precise definition of the term, together with 'civic engagement', is needed, and can potentially result in new design scenarios and research lines.

Although there is a general lack of consensus on the definition of civic engagement (Adler, 2005), we can agree that a much wider range of practices and actors, than the one considered in this dissertation, revolves around this concept. For instance, the term civic engagement has been used in reference to citizens' participation in political activism, volunteering activities and local communities. Thus, I believe that future work in HCI research with older people could be framed in wider areas of civic engagement, such as urban planning, political advocacy, activisms and citizen science. These topics are receiving increasing research attention in HCI, as discussed in section 4.1.1. However, older people are mostly overlooked in these areas of civic engagement, despite a growing ageing population.

The contributions presented in this dissertation can inform future research studies addressing, for instance, citizen science in HCI. A community lens could be adopted to build a citizen science project within an existing community whose practices / interests are related to the scientific topic in question. People of different ages might belong to that community, and this aspect allows researchers to

explore generational similarities and differences as far as technology use is concerned in a comprehensive way (that is, looking into age-related changes in functional abilities, motivations, everyday practices, social relationships with relatives, friends, members of the community, etc.)

Exploring the intertwining with ageing policies

The concept of ‘design in civic contexts’ might also be of particular interest for ageing policies. Future works can explore how the design scenarios presented in this dissertation can be exploited by and adapted to governmental agencies wishing to promote *active ageing* (WHO, 2002) through digital social inclusion. By conducting projects in collaboration with governmental agencies, design researchers could explore the challenges, constraints and assumptions that governments bring in the design agenda, and how top-down governmental goals and bottom-up community goals could be integrated in the design process.

Exploring challenges in design across-age

This dissertation has invited design researchers to conduct activities that cut across people of different ages. One might be tempted to relate this proposal with others design approaches, especially those widely known under the umbrella of Universal Design, Inclusive Design, User-Sensitive Inclusive Design and Design for All. Common to these design approaches is to design products by taking into account the needs of an extensive spectrum of the population in order to ensure that mainstream technologies can be used by as many users as possible (Person et al., 2014). These design approaches focus considerably on users’ needs and their functional abilities. However, the cross-age design that this dissertation focuses more on the interests / goals that might be shared by people of different ages that belong to the same community. These shared interests are the core of the designed products, rather than individual needs and abilities. Nevertheless, the validity, feasibility and acceptance of this design approach remain to be validated, since

I did not have the chance to put this ‘design across-age’ approach into practice during my PhD. I aim to do so in the near future, by conducting design projects in which people of different ages and belonging to the same community are involved. This will possibly enable me to explore the opportunities and challenges of carrying out intergenerational projects, including how principles of Universal Design (and related approaches) can be adapted or even challenged by my approach.

The community does not exist!

The term community is central to our approach. Thus, it is worthwhile to reflect on the fact that a community might not always seem to exist. What is the community of people suffering from social isolation? Designing when a community does not exist seems to be an open challenge in Participatory Design (Binder et al., 2012). I argue that the community lens proposed in this dissertation should be first of all regarded as a way of shedding light on how people construct their own identities in social encounters. I postulate for leveraging on such identities during the design process. A person might have few social interactions. Still, s/he has some interests that characterize him / her. Designers could capitalise on these interests to drive the design process, and perhaps build a community around these shared interests. An artful work of *infrastructuring* (DiSalvo et al., 2012) might be needed to align actors around shared interests / concerns.

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APPENDIX I - DETAILED OVERVIEW OF RESEARCH ACTIVITIES

Three tables present a detailed and succinct account of the research activities conducted during the two R&D projects, Life 2.0 and WorthPlay. Each table is related to a specific phase of the projects, i.e. analysis, co-design and evaluation. Each table presents a short description of the activity, the methods conducted and the approximate number of participants and hours of fieldwork.

Table 1. Fieldwork activities carried out in the analysis phase of Life 2.0 and WorthPlay projects.

Life 2.0		
<i>Activity and methods</i>	<i>Total hours</i>	<i>Participants</i>
Participant observations and conversations in 5 Basic-ICT courses which were carried out by Àgora volunteers, and 1 Advanced-ICT course that we set up and ran. In the Basic-ICT course, participants learnt to use Microsoft Word, Power Point and e-mail, and in the Advanced-ICT course they learnt Google Maps, Youtube, Facebook, Blogger, among others.	82h (average of 14h in each course)	75, 10 of them participating in more than one course.
Focus group aimed at eliciting participants' life stories and daily routines.	2h	8, all of them participated in at least 1 ICT course in which I conducted

		observations.
Diaries – participants were asked to fill in a diary structured to elicit a brief description of their everyday activities, conducted outside or inside their home, with or without technologies and with or without the company of friends and relatives.	Participants kept the diary for 1 week	8, 6 of them participated in the focus group. All of them participated in at least 1 ICT course in which we conducted observations.
Interview to the director of social services of the local area. The interview aimed to get an overview of the public services offered to older people and general issues regarding them.	1h	1 representative of the caregiver sector.
WorthPlay		
<i>Activity and methods</i>	<i>Total hours</i>	<i>Participants</i>
Participant observations and informal conversations in <i>Playing Clubs</i> that we set up in Àgora. The group met once per week to play different types of digital and tabletop games.	48h	8
Participant observations and informal conversations in extra-curriculum activities in 8 Àgora courses. The courses varied from Internet, literacy, literature and English.	24h (average of 3h in each course)	152
Participant observations and informal conversations in a workshop (3 sessions) on Smartphone. The goal was to explore participants' use of different applications for gamified activities (e.g. <i>Endomondo</i>).	6h	10, 5 of them were participants of the <i>Playing Clubs</i>

Table 2. Fieldwork activities carried out in the co-design phase of Life 2.0 and WorthPlay projects.

Life 2.0		
<i>Activity and methods</i>	<i>Total hours</i>	<i>Participants</i>
Debriefing session to discuss and validate the results of the rapid ethnographical study, which aimed at informing the co-design phase.	2h	20 participants who already participated in the previous phase.
Co-design workshop in which, through storytelling and personas & scenarios techniques, we aimed to elicit scenarios for future services.	2h	10
Co-design workshop in which 3 scenarios, which were selected by the consortium partners on the basis of the ethnographical studies and the previous co-design activities, were presented to participants in order to elicit positive and negative aspects, variations of the scenarios and collect requirements. The scenarios were presented through storytelling in order to facilitate their comprehension. The discussion was then fostered through questions that tried to cover all the stages and functionalities of the scenarios. Post-its were used to collaboratively write down positive and negative aspects of the scenarios and encourage contributions from participants.	3h	9
Weekly meetings with a core group of project participants were conducted from March 2012 to September 2013. About 35% of these meetings intended to discuss the platform design and service concept. This was done through informal conversations and / or sketching sessions. Fifteen percent of the meetings were aimed at training participants to use the prototype developed. In the rest of the meetings participants were learning to use mainstream technologies, related with	100h, of which c. 35h expressively dedicated to discuss design and use of the platform	24, 18 of them participated continuously; the rest attended the meetings for maximum 3 months.

<p>the project goals (e.g. Social Networks Sites as Facebook, Twitter and social communication tools such as WhatsApp). These activities were aimed at getting a first-hand understanding of participants' attitudes towards and use of the platform and the service concept and identify design improvements.</p>		
WorthPlay		
Activity and methods	Total hours	Participants
<p><i>A game about neighbourhood memories.</i> The game was created by participants of the Playing Club. It was then played in an Advanced-ICT course and during a summer party event organized by Àgora. In these scenarios / contexts of ICT use, participants added new contents to the game. In this activity we looked into how to have older people involved in the creation of digital games, including the rules of the game and its contents. The whole activity developed into 3 sessions.</p>	<p>7h for creating and playing the game</p>	<p>18 participants created the first version of the game c. 80 participants played the game and added new contents to it.</p>
<p><i>A geo-located quiz about a book.</i> The game was created and played by participants of a book-reading club in Àgora. In this activity we aimed to understand the degree to which older people can be interested in participating in a physical and playful activity combining mobile devices and geo-localized technologies. The whole activity developed in 4 sessions.</p>	<p>7.5h for creating and playing the game</p>	<p>20 participants created and played the game</p>
<p><i>A trivia quiz about Spanish folk parties.</i> The game was created by participants of the Playing Club and played in an Advanced-ICT class. In this activity we intended to explore the idea of conducting simple playful activities with non-gamers addressing a well-known topic. The whole</p>	<p>4h for creating and playing the game</p>	<p>5 participants created the game 18 participants played it.</p>

activity developed into 2 sessions.		
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Table 3. Fieldwork activities carried out in the evaluation phase of Life 2.0 and WorthPlay projects.

Life 2.0		
<i>Activity and methods</i>	<i>Total hours</i>	<i>Participants</i>
<i>Weekly meetings with a core group of project participants - See Table 2.</i>	See Table 2.	See Table 2.
<i>Questionnaires</i> aimed at collecting demographic data and overall satisfaction with the developed platform and related services. Participants' opinions about the questionnaire answers were debated in an informal 15 minutes group discussion.	15min of group discussion	18
Through <i>dissemination activities</i> carried out by the research team and / or the same participants, we gathered additional opinions of other older people who were not directly involved in the project and other potential stakeholders.	Approximately 25h	Around 40 older people - not previous participants of the project; 18 older people - participants of the project; representatives of 2 governmental organizations, 2 businesses and 11 associations - including 2 time banking groups.
Two <i>debriefing sessions</i> , at the middle and at the end of the evaluation period. Researchers briefly presented a summary of the results and discussed them with the participants to further elaborate on, and/or validate them.	4h	18
WorthPlay		
<i>Activity and methods</i>	<i>Total hours</i>	<i>Participants</i>
<i>Neighbourhood game in a public event.</i> The game, which was about the memories of the Àgora neighbourhood, was created and played in previous participatory	2.5h	20

design sessions. This time it was played on the gaming platform, by using tablets.		
<i>Games in General Knowledge course.</i> 4 quiz games were created; one game was created by the teacher while the rest by the participants of the course. The participants were free to decide the topics of the games. All the games were about the contents learned during the course. The activity developed in 7 sessions.	8.5h	14
<i>Neighbourhood game in two ICT courses.</i> Two different courses on ICT participated in the activity, which was about playing a game created by some of Àgora participants in previous co-design activities. As the participants were completing the game, the researchers invited them to create and add new questions to the game.	5h (2.5h in each course)	24
<i>Games in literary gathering,</i> a geo-located quiz about the life and works of the Catalan writer Bernat Metge. The activity developed in 5 sessions.	6h	9

APPENDIX II - OTHERS PUBLICATIONS AND PROJECT DELIVERABLES

In addition to the papers presented in the body of this dissertation, I co-authored other papers, which have been published in international and peer-reviewed conferences, workshops and a journal, while conducting my PhD research. Most of these papers present preliminary findings of my research, while others focus on other aspects somewhat related to the core of my research, e.g. learning, game features. I have decided to list them all in this appendix because I believe that these papers show (a) more aspects of my research skills - a PhD candidate should be practiced at conducting independent research and being able to work in a team, and (b) widen and deepen the results presented in the core of this dissertation. The abstracts of these papers are presented in section A of this appendix. Section B presents the executive summary of the Life 2.0 project deliverables that I coordinated - with the support of my supervisors.

A. Other publications

On the Conceptualization, Design, and Evaluation of Appealing, Meaningful, and Playable Digital Games for Older People

Sayago, S., Rosales, A., **Righi**, V., Ferreira, S., Coleman, G., Blat, J. 2016. [On the Conceptualization, Design and Evaluation of Appealing, Meaningful and Playable Digital Games for Older People](#). *Games and Culture*, 11(1-2): 53-80.

Abstract: While older people tend to be regarded as actual, or potential, players of digital games within literature on game studies, human–computer interaction, and gerontechnology, they are also often considered non avid users of digital technologies. This contradiction prompted us to conduct a literature review, which revealed (a) insufficient involvement of older people within the design of games targeted toward this group and (b) insufficient understanding of their everyday digital gameplay. In this article, we present the conceptualization, design, and evaluation of digital games that active older people found to be sufficiently appealing, playable, and meaningful. A 6-month ethnography of the play experiences of 170 older people helped us to conceptualize these games, which were co-designed through playful everyday activities. To facilitate the development of these games, we designed and evaluated an online game creation platform, which enabled 99 older people with different cultural backgrounds to create, play, and contribute to games.

Preliminary Findings of an Ethnographical Research on Designing Accessible Geolocated Services with Older People

Righi, V., Malón, G., Ferreira, S., Sayago, S., & Blat, J. 2011. [Preliminary findings of an ethnographical research on designing accessible geolocated services with older people.](#) In C. Stephanidis (Ed.): *Universal Access in HCI*, Part II, HCII 2011, LNCS 6766, 205–213. Springer-Verlag Berlin Heidelberg

Abstract: Older people run the risk of being socially excluded due to the numerous barriers they need to overcome when interacting with Information and Communication Technologies (ICT) to perform an ever-increasing number of daily activities. This paper presents preliminary findings of a rapid ethnographical study, conducted with around 90 older people during 1 month, which aimed to explore the potential of geo-located ICT services to foster social inclusion and support independent living. This paper discusses potential scenarios of use for technologies that have largely been overlooked in HCI research with older people, such as Google Maps; key aspects of how they (want to) use these technologies and relevant interaction barriers that limit their interactions with them.

Fostering an active participation of older people in local communities: preliminary results of an ethnographical study

Righi, V., Sayago, S., Ferreira, S., Malón, G., Blat, J. 2011. [Fostering an active participation of older people in local communities: preliminary results of an ethnographical study.](#) Presented at *INTERACT 2011, Workshop on Human Work Interaction Design for e-Government and Public Information Systems*, Sept 6th, 2011, Lisbon (Portugal).

Abstract: An ageing population and tendency towards e-government has reinforced the need for further e-government

research with older people. We have conducted a rapid ethnographical study aimed at understanding a relevant aspect of e-government with them: fostering the engagement of older people in their local community through Information and Communication Technologies. We present preliminary results of our study and discuss a potential scenario for supporting information sharing and strengthening a more active and dynamic participation of older people in their neighbourhood.

Not Interested in ICT? A Case Study to Explore How a Meaningful m-Learning Activity Fosters Engagement among Older Users

Santos, P., Balestrini, M., **Righi**, V., Blat, J. and Hernández-Leo, D., 2013. [Not interested in ICT? A case study to explore how a meaningful m-learning activity fosters engagement among older users](#). In Hernández-Leo et al. (eds.). *Scaling up Learning for Sustained Impact*. 8th European Conference, on Technology Enhanced Learning, EC-TEL 2013, 328-342. Springer Berlin Heidelberg.

Abstract: Mobile devices are increasingly being used in lifelong learning. However, while older learners are active members of the lifelong learning system, little research has been aimed at understanding how m-learning can provide them with successful learning experiences. In this paper we address the question if m-learning can foster the acceptance and uptake of mobile technologies among a group of older people unfamiliar with ICT. Following a participatory design approach, 20 participants who were enrolled in a literature course created routes of geolocated questions about a fiction book they were reading and answered them in the real location using the *QuesTInSitu* application. Results indicate that their m-learning acceptance improved as their anxiety around use of technologies diminished. These findings question previous research in which use of mobile technologies tended to

increase older users' anxiety and reduced their acceptance of technology. Participants described the experience as playful, enjoyable and useful.

Ethnographic techniques with older people at intermediate stages of product development

Rosales, A., **Righi**, V., Sayago, S., Blat J. 2012. [Ethnographic techniques with older people at intermediate stages of product development](#). Presented in the *NordiCHI'12 Workshop: How to Design Touch Interfaces for and with Older Adults: Identification of Challenges and Opportunities*, October 14 – 17, 2012, Copenhagen, Denmark

Abstract: In this paper, we argue that ethnographic techniques such as immersion and simulation, using unfinished versions of products or services, either digital or non-digital ones, conducted in activities which are meaningful for older people (60+), help us include their opinions about and attitudes towards products or services at intermediate stages of their development. We present how we used these techniques in the design of a digital game and a mutual help online service with and for older people, and discuss the main lessons learned from these experiences.

B. Project deliverables

The following three deliverables are from the Life 2.0 ICT-PSP Project.

Deliverable 1.1 – Ethnographic Analysis.

Available at: <http://1drv.ms/1QMMr37>

Executive Summary: This deliverable presents the ethnographical work conducted in LIFE 2.0 with older people and key members of

their social circles in Barcelona, Joensuu, Aalborg, and Milano, respectively, in the framework of the LIFE 2.0 project, and its results. The activities were undertaken in the first months of the project, and our approach has been to conduct ethnographically inspired methods, to help the design of LIFE 2.0 services to be more grounded in people's daily needs, as older people are 'extraordinary' users – although one might claim that all users are special – mainly due to age-related changes in functional abilities and having been less active with Information and Communication Technologies (ICT) than other user groups. The ethnographical activity was grounded in, and extended, previous one with older people and their social circles, and the results deepen previous understanding of older people as ICT users and address geo-related services.

The deliverable results are presented in three sections, first summarising the main results in each of the four cities under a common structure, followed by a more detailed account per site, while further information is provided in appendices. The results of the first of these sections are presented through three sets of tables, Methodologies and Fieldwork, Results related to LIFE 2.0 technologies and services, and Life Stories accounts aiming to capture the real context of use and methods per city, summarising the main results from the perspective of developing community and geolocalised services which is the main goal of the project, and giving a lively, first-hand, account to inspire design decisions, respectively.

The four cities environments, whose description starts each of the cities work detailed account, are quite different, in size, in weather conditions, in services provided, and, of course, in people. The different environments are described in detail, picturing the differences from Joensuu older people, living in houses isolated from the urban centre, where harsh winter makes the support for daily life important, to, for instance, Milano, where activities outdoor, and quality of urban, social life is an important motivation. The ethnographical work has involved over 120 older people, with a

majority females, and comprises observations, interviews, diaries, workshops, discussed in the methodological section of each city, which also describes different presentation approaches (diagrams, synthetic pictures, text, and tables); different approaches continue different working traditions, which are important for communication with users, and with communities. All could share a technical label of “quick-and-dirty ethnography” used in the scientific literature related to those issues.

The deliverable discusses the main implications for the design of the LIFE 2.0 platform and its services. The first one is that the services should have socialisation as key motivation, as key issue, and their implementation should support social use too. Our older users feel the need of an active ageing where socialisation is a key part and the services should address it, and despite problems and changes that appear, or even due to them, there is a bigger need to address them. Another aspect is that the individual use of ICT of some other age cohorts is not a valid paradigm, and services implementation might or should support social use. While this aspect is common to the four countries, there are cultural differences in which social uses should be supported, and customisation of the services to different needs is an important requirement. The second implication is that services should support worthwhile use, providing ICT support for the development of activities that are important for older people in their daily lives, as there are plenty of things that they do every day, contrary to stereotypes. The deliverable gives an account of these activities; as they differ locally, LIFE 2.0 services should take this into account, allowing for customisation. A third aspect is related to supporting independence, both in the sense of supporting independent use of ICT, and supporting independent life. In the first sense, independent use includes deployment considering peer-to-peer help – as relatives do not usually provide it, although they are a source of motivation -; living labs, community centers seem to be key elements for the uptake. In the second sense, services supporting independent life need to be customised, as the specific daily life activities differ from

place to place. Finally, another element to be taken into account is made of the barriers to ICT use, where our study has identified an important concern about cost – although new devices are passed from relatives to older people when novelty wears off, creating a path for likely use of smart devices by older people -, and identified some interaction difficulties, where human strategies that might develop should be taken on board.

The deliverable was developed highly in parallel with D2.1, defining personas and scenarios arising from and connected to the ethnographical work, as a way of turning it into more concrete sources for the design of LIFE 2.0 platform and services: personas are sort of archetypal users, while scenarios provide use cases in a sort of abstract way. D1.2 takes into account as well the use of ICT, and the experience of technological partners, to define requirements of the platform and services based on both deliverables results. These services are oriented to support the majority of most important use cases uncovered by the ethnographical work and its analysis.

Deliverable 1.3 – Ethical Protocol

Available at:

<http://cordis.europa.eu/docs/projects/cnect/5/270965/080/deliverables/001-LIFE20D13final.pdf>

Executive Summary: This deliverable describes and discusses the Ethical Protocol of the LIFE 2.0 project. It provides background information on guidelines which we consider are relevant to the research to be conducted in the project³³, and on relevant legislation about privacy and security, which are important aspects of LIFE 2.0. The deliverable then addresses the general terms of the Ethical Protocol for the project that are relevant to the four countries in which research with older people is being and will be conducted in

³³ With older people, but not dealing specifically with health related issues, but with social services provision

the project. Namely, the rules for informing the users, the purpose of the project, the methods related to users, their recruitment, period of the project, privacy in publication and dissemination of results, and contact details, are described. This is followed by templates of information sheets and informed consent forms, which will be adapted according to the requirements of the research conducted in each site (Barcelona, Aalborg, Joensuu, Milano). Examples of this adaptation are also provided. The annexes of this deliverable are samples of information sheets and informed consent forms used in the original language of each site

D4.2: Final data collection report

Available at: <http://bit.ly/1RkgUWk>

Executive Summary: This deliverable discusses the data gathered in the four Life2.0 pilots (Aalborg, Barcelona, Milan and Joensuu) from July 2012 to January 2013. The data includes a) service use and experiences during this period of time, b) the acceptability (i.e. being willing to use) of the service, and c) issues related to its learnability and impact on older people's lives. The deliverable also provides specifications for the business case evaluation. It does so by discussing data the project has collected, from small and medium enterprises (SMEs), hubs and older people, about their willingness to pay to use the service, possible contributions to the platform and expected benefits. It is worth noting that the data gathered refers to the period of Long Term Use of the platform, and that the gathering of evaluation data will go on until the end of the project. The deliverable is structured in 9 sections. We summarise their main contents and findings next.

After a short **Introduction** section, **Section 2** outlines the Evaluation Strategy of the project, and places this deliverable within the different evaluation stages, namely, the period of Long Term Home Use of the Life2.0 platform. The evaluation techniques are presented: mainly structured interviews with older people, complemented with focus groups with SMEs and HUBS, and

objective data collected from the platform use. The data are related to the platform use, and more specifically for this period, its impact on the quality of life of older people, and on the business case of the platform. The specifics of the evaluation activities conducted in each pilot – in terms of, for instance, number of participants - are also provided.

Section 3 details the **Profile of Life2.0 users** during the period considered, starting from the socio-demographics collected. Age, gender, skills and daily activities, amongst other aspects, are elements of the profile of Life 2.0 users discussed. An increase in the users with poor ICT skills (among the total pool of 102 participants), as intended, is registered. The ICT usage has also been collected, and in this period, especially with respect to SNS. Mobile phone related data were also collected, as it seemed important to understand the (potential) use of the platform. Finally, older people's expectations and plan for use (where increase of ICT skills is one of their stated objectives) are also provided.

Section 4 presents and discusses the **Service Use** and suggestions for improving the platform. Both objective data collected from the Life2.0 platform back-office, and more qualitative and detailed results coming from the interviews, are part of the Section. The platform was effectively used for different types of help exchange, and subjective appreciation of the platform is positive. However, the objective data indicates that the extended use would need more critical mass, and further improvements, as boredom emerged from participants' interactions with the platform at some stages, and the positive appreciation might have been due to their politeness and high expectations about the platform. Some improvements to existing functionalities and suggestions for new ones are also addressed in this section.

Section 5 deals with the data collected from **other potential users** than older people – as they were part of the intended target users of the platform in the project definition. While the project has realized that other members of the elderly social circles (relatives, for

instance) were not interested in getting involved at this stage of the platform, the consortium has contacted a significant number of 3rd sector and public organizations, and SMEs (around 45). A small number of them have used the platform, while the majority of them pointed out that they plan to use it in the future. Some 3rd sector and public organizations used the platform *Events*, not as extensively as we would have liked, as there were some technical issues in this period. Businesses could not join as the *Market Place* functionality was not ready.

Section 6 is the first attempt to discuss the **impact of the platform on the life of older people** – with data coming from long-term use. Two parameters have been discussed: perceived quality and improved ICT use – especially, confidence with respect to the use of the technology and devices, and SNS. With respect to the first point, the social aspects involved in the platform training and use, namely the social activity that takes place in face-to-face situations, rather than those which happen in virtual environments, seems to be a key factor for the uptake of the platform. With respect to the second point, Life2.0 has been beneficial for attracting new users with little or no ICT skills, and for improving the confident use of these technologies.

Section 7 is extensive and substantive in dealing with **business case data**. It reflects the results of the interviews with over 40 different actors – besides specific discussions with older people users on the business case -, deriving specifications to improve the business case, and to adapt it to the different local contexts. It starts with collecting relevant statistical data to estimate the size of the market, it reflects the view of the users on their (un) willingness to pay – except for very high quality specific services, in some cases -, while users, 3rd sector and public organizations are willing to commit resources (estimates are provided, including moving some budgets from printing paper to virtual communication) and see the platform as a likely way forward to a future with less public resources and more older people, that they would encourage. The SMEs provide a different input, namely on the expectations on the number of users

that would make their subscribing in a paying platform an interesting option. The requirements of the different actors are also discussed, and details of the organizations and businesses interviewed are provided. The adaptations of the business case, which were made to the local contexts (including identification of funding actors, community providers, service brokers, etc.) after the data gathered, are discussed in a final subsection.

The deliverable closes with a **Discussion**, followed by **Conclusions and future work**. The discussion makes explicit some specific implications of the data gathered with respect to the design and deployment of the platform, and with respect to the business case. The conclusions provide a global view of the results of the deliverable in terms of the evaluation; the extent to which it covered the outcomes that were planned, at the onset of the project, to achieve; the different segments that have been targeted at, and the new objectives related to the business case identified during this evaluation period. A section with **References** and an **Appendix** with details of the data collection questions and instruments complete the deliverable.