Proceedings of the COOP 2016 - Symposium on challenges and experiences in designing for an ageing society. Reflecting on concepts of age(ing) and communication practices.

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1 Introduction

Practice- and user-oriented design approaches, e.g. user centred design (UCD) or participatory design (PD), have built a canon for IT projects in recent years aiming at product development for the ageing society. However, there still seem to be many blind spots, which are simply overlooked or taken-for-granted when reflecting on IT design projects from either a bird’s eye or micro perspective. The symposium “Challenges and experiences in designing for an ageing society” was devoted to create a space for reflections on projects from both perspectives, represented by multiple authors from different fields of research discussing with each other in two tracks.

Track A addressed an important research gap, the reflection on images of age and ageing from a meta-perspective, discussing mainly concepts of ageing. Track B focused more on the micro-perspective, on communication practices in UCD and PD projects with elderly persons in order to identify best practices and recommendations for successful communication throughout the development process. In the following chapters, we will briefly outline the major scope of both tracks, provide an overview on the position papers, and will finally summarize the major points of discussions.

2 Track A: Images of age and ageing from a meta-perspective

In Track A, we tried to step back from everyday-practices of using images of age and ageing in our research projects and reflected on those images from a meta-perspective. The focus was on the social construction of concepts of ageing, and how these are being framed in (taken-for-granted) theories of age and ageing, from deficit- to activity-oriented stances (Östlund 2004).

The goal was to take a deeper look at how images of ageing are present in different stakeholders’/participants’ heads (Sijis et al. 2015, Whitney & Keith 2009). At the same time, we aimed at the deconstruction of their impacts on the design of artefacts as well as on the formulation of IT project objectives themselves: A bandwidth of themes is possible from ethnographically derived self-images of older adults and related attitudes and appropriation processes of and towards IT products (Fitzpatrick & Ellingsen 2013, Müller, Randall & Wulf 2012), to questions of how individual research interests shape the projects themselves (i.e., the formulation of needs, requirements, research targets, and so on) (Müller, Hornung, Hamm & Wulf 2015a, Wulf, Müller, Pipek, Randall, Rohde & Stevens 2015).
2.1 Description of the theme

How people perceive ageing and how they handle issues of health and illness always contain elements of social construction. In a study of wandering behavior of persons with dementia, for example, Wigg (Wigg 2010) has shown how the perspective on wandering an institution assumes – as pathology or as a purposeful and therapeutic activity – shapes how the elderly people are treated and what kind of technology is deemed helpful.

This example suggests that researchers in the field of Assistive Technologies (AT) are confronted with definitions of ageing, health and illness that influence in which ways AT projects, their objectives and outcomes are formulated and how the general landscape of IT-Design for the ageing society is constructed. There is a strong tendency to equate ageing with illness, weakness and neediness. Hence, much of the discourse on ageing is based on deficit-oriented theories. Gerontology, however, offers a broader theoretical basis, which, amongst others, contains activity-oriented theories for the explanation of how individuals experience their lives in higher age.

Opening up to a multiplicity of approaches to the field in AT design means to make space for a number of highly relevant issues. Researchers in CSCW and HCI claim that IT design in the ageing and health domain need to be more sensitive to the mundane problems elderly persons and/or people who receive therapeutic treatment encounter in everyday life. The idea is that understanding everyday practices helps better situate new technologies and ‘sense-making artifacts’ that users can embed in the socio-cultural web of daily practice. Methods adequate to this purpose are ethnography or activity-research, amongst others (Fritzpatrick & Ellingsen 2013, Müller, Walzuch, Alaoui, Lewkowicz, Wan & Wulf 2015b, Östlund 2004).

Another topic for further reflection is the way how researchers and other stakeholders participating in a research project construct the research field. For example Whitney and Keith (Whitney & Keith 2009) talk about the differences in thinking and imagination between elderly participants and younger researchers, which may lead to simplistic, largely unreflected pre-conceptions about elderly people and their needs. This and similar findings suggest a ‘deconstructivist’ perspective on how researchers motivate and formulate requirements and design ideas. When doing so, we might see how research interests (including preferred technical solutions) shape research objectives; how the research agenda and calls of funding agencies structure what is researchable (Wulf, Müller, Pipek, Randall, Rohde & Stevens 2015); and how the formulation of problems or needs is linked to certain constellations of stakeholders (e.g., academia, industry partners) in research consortia (Müller, Hornung, Hamm & Wulf 2015a, Müller, Neufeldt, Randall & Wulf 2012).

How projects are designed also reflects larger societal perspectives on age and ageing. As a result, we often see a ‘wish for optimization’ of the living
circumstances of elderly people, imputing and generalizing a certain fragility or neediness. We suggest to see this as being linked to actual societal trends on how societies deal with their elderly citizens in general and what impact this has on images of ageing that are displayed in the media and in advertising for instance.

When it comes to the participatory elements in IT research projects, especially in the context of sensor technologies, elderly target groups often tend to challenge the objective of autonomy or independent living, which is at the heart of AT. Here, ethical questions are to be discussed more deeply, such as: what is the ‘backside’ of autonomy; which new forms of dependencies are being constructed; how are trade-offs between care and autonomy experienced by elderly persons in different socio-cultural living arrangements? A diversity of research perspectives and approaches are used in the field of IT design for the elderly: value-sensitive design (Friedmann & Kahn 2003), ‘persuasive design’ (Intille 2004) and PD (Participatory Design). Researchers are looking for new concepts, which help to guide design, such as ‘mastery’ (Sijis et al. 2015) or other sensitizing concepts which are derived from the empirical data (Müller, Neufeldt, Randall, & Wulf 2012).

2.2 Aims of track A

Within track A, we pointed at taking a ‘deconstructive’ perspective on ageing and how related problems, needs, and design implications are being articulated by AT researchers. Interested participants were invited to reflect on and present research on the following research perspectives and questions:

- What does it mean to age from a multi-perspective view? What are in particular the perspectives of elderly persons living in a diversity of circumstances?
- How can we achieve a more holistic view on the phenomenon of age and ageing, based on individual accounts as well as from how ageing is mediated, ‘mediatized’, and perceived?
- How can we better institutionalize qualitative research methods as well as participatory ways of designing to guide technology researchers in their projects?
- How can we build a repertoire of qualitative case studies/vignettes and empirically-grounded concepts to sensitize the design of ICT and sensor technologies for an ageing society?
- How can we better deal with trade-offs and ethical issues, such as the tensions between care and autonomy, for example by creating ‘spaces for negotiation’ that allow for individual appropriation and configurability?
3 Track B: Communication practices in UCD and PD projects

Whereas track A represented more the meta-perspectives on aging, Track B focused on the micro-level and the particular aspect of communication practices in UCD and PD projects. The main goal was to discuss and reflect upon notions, best practices, and recommendations for successful communication (within the design team, as well as with end-users and other stakeholders) to better elicit and address user requirements throughout the development process.

3.1 Description of the theme

User-centred design (UCD) is a widely established practice to focus on users’ needs (Norman & Draper 1986) and to address these during the development and evaluation process of computer systems (Mao, Vredenburg, Smith & Carey 2005). It provides a valuable approach that allows potential users of a system or product to shape the design process, based on the identified needs derived from the requirements analysis (Abras, Maloney-Krichmar & Preece 2004). However, when developing products for older adults, one of the major problems is that their specific needs are often not addressed properly. Participatory design (PD) approaches provide a set of theories and practices (Müller 2002) that allow involving older adults more actively in the design and development process and aim at “collaborating with the intended users throughout the design and development process” (Ellis & Kurniawan 2000, p. 264). This approach allows for better addressing user needs and requirements in cooperative systems (Lindsay, Jackson, Schofield & Olivier 2013).

Within participatory and user-centred design trajectories, clear and inspiring communication is key, i.e., communication among the members of the design and development team as well as communication with (potential) end-users and stakeholders. While there has been a variety of research on best practices, pitfalls and challenges on UCD and PD approaches, particularly with regards to older adults (e.g., Ellis & Kurniawan 2000, Lindsay, Jackson, Schofield & Olivier 2013, Newell, Arnott, Carmichael & Morgan 2007, Schorch, Wan, Randall & Wulf 2016), communication issues in this context are barely addressed so far. What does the design/development team actually mean when talking about specific functional requirements? How do we as researchers convey a clear picture of technology without biasing potential end users’ view? How do we get novices to talk about a future they do not know during a PD session? Answers to these questions are scarce, while creating and fostering an open, clear and inspiring mode of communication is crucial for generating innovative, ground-breaking technology by means of participatory and user-centred design.
This track addressed these questions and aimed at identifying best practices, lessons learned and recommendations for successful communication and implementation of older adults’ requirements to support collaborative design activities.

3.2 Aims of track B

The main goal in track B was to discuss and reflect upon best practices and recommendations for successful communication and implementation of user requirements throughout the development process, in particular when working with older adults. Moreover, we aimed at developing principles and guidelines that can support the communication process among engineers and designers. Our discussion was focused on (but not limited to) the following questions:

- How (if at all) do older adults differ from other age groups with respect to joining participatory and user-centred design activities? What understanding of technology is basic in their everyday-life and practices?
- How to create means that facilitate the communication of ideas for design and a vision of future technology that are understandable and not daunting to older adults?
- How can we enable older adults to think about technical solutions that go beyond the things they already know or are already out there?
- How to deduct functional and visual requirements from the products/transcripts of a participatory design session with older adults?
- How can we document functional/visual requirements that are understandable for developers, designers, and older adults?
- How do we validate functional/visual requirements that result from participatory design sessions with older adults (interaction versus interface design)?

4 Perspectives on concepts of age(ing) and communication practices

The introductory session of the symposium was opened by two key notes of two renowned reseachers in the field of ICT for the ageing society: Carla Simone and Hilda Tellioğlu. Carla Simone reflected on “Images of aging: conflicts and opportunities” and Hilda Tellioğlu presented her ideas on “User Interaction Design for Elderly”.

After the key note session, the workshop participants briefly presented their position papers, discussing various aspects in respect to images of ageing and
communication practices. In the following, we provide a brief summary of each research paper:

*Linda Tonolli’s paper* *Researcher's relocations “in her own terms”: repositioning meta-perspectives in the realm of (design for) ageing* provides an anthropological meta-reflection on participatory design in/for an ageing society. She examines ascriptions to design and IT usage from both perspectives of project participants, those of the collaborating older adults as well as of the researchers.

*Angela Locoro* co-authored together with *Tunazzina Sultana* the paper *No More Throw-away ‘Elderly’ People: Building a New Image of Ageing via a Time Accounting System*. They argue to understand Time Accounting Systems not only as support tools for elderly people, but also as means that have the potential to change images of ageing on a broader societal level.

*Michael Stepping* and *Magdalena Walszuch* report in their paper *Supporting Aging in Place by Sensor Technologies and Wearable Devices: A Work in Progress* on their research on sensor technologies to support healthy lifestyles for older adults. Their specific aim is to find unobstrusive solutions which help elderly persons to stay longer independently in their own homes.

*Beatrix Zechmann* and her colleagues reflect in their paper *Challenges in Communicating User Requirements: Lessons Learned from a Multi-national AAL Project* on their methodological approach and experiences of communicating users’ feedback within the research team to ensure its consideration in the development of the prototype. They highlight important steps within this process and outline lessons learned related to the prioritization, categorization, phrasing, and communication of user requirements.

*Hilda Tellioğlu* and her colleagues contributed with their experience from the participatory design of the landing page of an online care platform for informal caregivers. In their paper *Alternatives and Redundancy: Interaction Design of the TOPIC CarePortfolio Landing Page* they argue that clear and constant communication with the users and within the design team can help to better understand users’ mental models and to translate them into interaction mechanisms that provide a best possible user experience.

*Francesco Ceschel* gives in his paper *A common Practice to Rise older Adults’ Awareness of PD* an example about the role users can have in a process of participatory design. Within his work, he illustrates how he involved the participants into an interactive work process and to what extent participants understood their potential to shape the design process.
Martin Stein and his colleagues discuss in the paper *Third Spaces in the Age of IoT: A Study on Participatory Design of Complex Systems*, the challenges of engaging potential end users in complex design processes. They suggest to develop more transparent design of ubiquitous ICT that supports the discoverability and learnability of infrastructures for design.

Andrew McNeill and Lynmne Coventry discuss in their paper “Even in a group I’ll not tell them all”: Understanding Privacy Concerns of Older Adults for Designing Online Social Networks challenges when obtaining privacy requirements for online social network systems (SNS). In order to design SNSs for older adults they suggest to focus on the levels of trust older adults have towards each other, which can be conceptualised in sociograms.

Özge Subasi and colleagues provide in their paper *Challenges of Building and Sustaining Living Labs for Designing Services and Products* an example from a living lab in Austria and discuss challenges of establishing and sustaining living labs in the participatory design process.

Gianluca Schiavo and colleagues discuss in their paper *Wizard of Oz Studies with Older Adults: A Methodological Note* the methodological value of the Wizard of Oz approach when working with older adults. Thereby, they focus on advantages and possible pitfalls in communicating ideas for design.

Mladjan Jovanovic and colleagues discuss the results from a study that aimed at understanding older adults’ motivation to take part in physical and social activities in their paper *Understanding Motivations in Designing for Older Adults*. Based on the Integrated Behaviour Model (IBM), they analyzed the results and derived implications for the intervention design.

The afternoon session of the symposium encompassed a mini-workshop for each track. The results of these working sessions are being summarized in the next chapter.

5 Summary on the working sessions of track A: concepts of age(ing) and track B: communication practices

After the session on presentations in the morning, the two tracks divided up in the afternoon as separate working sessions. The results of these intense two-hour-sessions are being shortly summarized below. We hope that these results may
inspire follow-up research activities and contribute to a better, more reflexive understanding of age respectively ageing.

5.1 Summary of track A: Images of age and ageing from a meta-perspective

Track A gave space to address age and ageing from a multi-perspective view. Some central questions stimulated discussions during the mini-workshop in the afternoon, interrogating means to better understand the phenomenon of age and ageing from a holistic point of view. To meet this aim, a brainwalk opened the session and participants collected their themes of interest in their own work.

The collected themes enfolded a variety of issues in a critical perspective on ICT for the ageing society: ‘user needs’, images of ageing, post-colonial research, and research constraints. The collection of themes should be understood as critical and detailing questions to guide further research in our field.

5.1.1 ‘User needs’

Overall stood the question of what we mean when we talk about ‘user needs’ in the context of requirements elicitation. Under the lense of a ‘situatedness of aging’ we asked who would define such needs – the researcher or the older adults themselves? And further, do we understand ‘needs’ as something abstract/general or rather as something deeply contextualized and personal? For either perspective, what would then follow from a methodological and conceptual point of view? Further, if we accept that needs are deeply contextualized, how may older adults then articulate their needs in respect to potential technology support if they are not aware about technological options?

5.1.2 Images of ageing

A more holistic theme came up with the discussion of ‘bad’ or ‘good’ images of ageing – images which guide our thinking in our work. What do we need to consider in ICT research if we accept that ageing is a construction in manyfold ways, e.g., cultural, social, and economic? This implies that we often deal with many implicit assumptions which would need to be made visible. Linked to this is the question if our research work also should aim at helping to change some of the ‘bad’ images of ageing?

In this respect, the concept of ‘autonomy’ seems to need further explication. It is one of the core values emphasized in both grant calls as well as in scientific
papers. What is autonomy, how is autonomy assessed and worked out in practice? How do attitudes of the older adults and their caring/social networks relate to ideas and aspects of an autonomous every-day life? Autonomy as a research target is in many cases brought up in the same breath with the aim of ‘ageing at home’. Here also, one might ask if the favourisation of this specific living arrangement is more taken-for-granted and linked to economic impacts than a real desire of a large proportion of elderly adults. Autonomy, thus, is a concept which needs to be put in relation to other goals and objectives.

Images of ageing were also discussed in relation to the idea of a ‘situatedness of ageing’. In this context, participants posed the question if there would exist certain ‘languages of ageing’ which were intended as value systems, communication/reflection systems as well as semiotics (sign systems).

5.1.3 Post-colonial research

Some researchers favor a post-colonial approach for the analysis of taken-for-granted and normative narratives we are confronted with in our work. Intercultural research is one suggestion to open design spaces up for the examination of own assumptions. Another vein is critical theory which would imply to interrogate the overall societal framing of research projects for the ageing society, e.g., in terms of asking about the structures of capitalism which encompass academia-industry project partnerships. A following question would then be if our work would also encompass the creation of common goods ‘beyond capital’?

Another perspective onto this theme is the question how far we as technology researchers are able to deliver meaningful ICT-solutions to social (or societal) problems. Do we here have to accept a certain degree of technology-centredness as ICT researchers, in other words: is this the ‘bad luck’ of our profession?

5.1.4 Research constraints

Researchers are often confronted with constraints, such as funding structures which do not match well with user-related/social problems we wish to address, time constraints – especially when deploying extensive user-related research, differing goals and interests in research consortia, and so forth. When reflecting critical perspectives on ICT for ageing or assistive technologies, respectively, the theme of ‘research constraints’ opens up in manifold ways. Further questions to be discussed are: how to deal with these practical constraints and how may we discuss these in the course of our scientific work?
5.2 Summary of track B: Communication practices in UCD and PD projects

The aim of track B was to discuss best practices and create recommendations for successful communication and implementation of user requirements throughout the development process. Three key questions were put up for discussion:

- How can we enable older adults to think about technical solutions beyond things they already know?
- How to deduct, document and validate functional/visual requirements?
- How to create means that facilitate the communication of ideas for design?

These three questions then triggered discussions on older adults as co-designers, methods to elicit older adults input and ways to create a more or less common mindset within design teams.

5.2.1 Older adults as co-designers

Within a first discussion, participants reflected upon the different options on how to involve older users in a design project. A consensus was reached on whether older adults should only be seen as a “source of information”, i.e., addressed only at specific times during the design cycle or whether they should become an “active part of the development team” strongly depends on the context of the intended product or service. The participants also agreed that older people do not constitute a homogeneous user group (which relates to the topic of track A) - more than other user groups they, for example, differ in their previous knowledge with technology. A careful selection of the users that should be involved is crucial for the success of every design activity.

Related to this, it is also important to involve users that identify themselves with the goals of the project and that have the impression that using the intended solution could be beneficial for themselves or their relatives. Example statements like “This system could be helpful for my mother” indicate that many older adults involved in design activities do not see themselves as potential users of assistive technologies, but relate the benefit to others that are perceived as “really old” or “needy”.

Another challenge is to present the aims of a certain design activity as well as the possibilities of the underlying technology in a way that discussions and design decisions within a project can take place based on a similar/shared mindset – regardless the diversity of backgrounds, educational status, age groups etc. of the involved actors. Coping with complexity presents a particular challenge in the the context of IoT-based solutions (Internet of Things).
Moreover, the discussion also revolved around the question whether real innovation can be achieved based on user-centered or participatory design. The concern was raised that while involving older adults certainly helps to understand the needs of the designated user group as well as the designated context of use, completely new approaches and groundbreaking solutions can only be achieved by having experienced designers as part of the design team.

Another potential pitfall within UCD and PD projects is to assume that addressing the needs of older adults necessarily leads to solutions that will also be successful on the market. The participants agreed that results from qualitative research have to be carefully interpreted and reflected within the design team. Empirical evidence on the suitability of certain solutions and services can only be achieved within long-term impact studies.

5.2.2 Methods to elicit older adults input

The second topic that was discussed concerned appropriate methods that can be applied to elicit user input. Participants in the workshop pointed out that as far as their experiences go with older adults, it is important to encourage users to reflect upon the meaning of a certain design idea or artifact in a specific context to ensure users have a tangible and concrete idea about what is going to be developed – easier said than done. Therefore, users should be supported in becoming aware of the context in which a certain technology is used. Hence, particularly living labs or probing studies were considered important as methodological approaches. Moreover, most of our participants agreed that testing prototypes in the field, i.e., at the homes of the older adults, is an important precondition for the success of a certain technical solution or product. Additionally, there is not only the need to elicit input from older users, but also the methodological perspective that a qualitative, mostly ethnographic approach with a longer engagement of the researchers in the native setting of the older users (their home) can provide a real insight and understanding of the everyday life practices and needs of the elderly.

Considering that older adults sometimes have specific needs we aim to address with technological solutions, we discussed the challenge of designing for sensitive contexts or embarrassing issues, for example, incontinence. In this context, active involvement of potential end users might be difficult. This raised the question if at some point active user involvement is actually useful or even ethical. We could not achieve common ground with regard to this topic, however agreed that it needs to be carefully considered to what extent user involvement is useful.

Moreover, we discussed that it becomes increasingly difficult to talk about “the older adults”. Whereas a couple of years we developed for older adults, who have restrictions in mobility or who are facing cognitive limitations, older adults are
getting more and more active. Hence, there is a need to further reflect upon and reconsider the terms age and aging, like realized in track A of the symposium.

Finally, another quite useful approach to gain user feedback we discussed was the involvement of “lead users” who provide valuable feedback and input throughout the project.

5.2.3 Creating a common mindset in the design team

The last topic that was discussed concerned the challenge of creating a more or less common mindset in the design team. Most of the participants are working in a multidisciplinary team of designers, developers, researchers from heterogeneous disciplines as well as end user organizations, who have different backgrounds that often impede communication between the parties. An approach to overcome this kind of “communication barrier” are “design workshop games”. The central idea of this approach is to identify needs and requirements of the different parties, who are involved, by playing. Hence, each person in the team takes over a certain role, and a scenario is provided to support all parties to imagine a certain context or situation in which a technical solution is required. This playful approach aims at supporting all parties to reach a shared language and encourage the design thinking process.

6 Summary

In conclusion to the symposium, a panel discussion lead by Hilda Tellioglu, Carla Simone, Ina Wagner, and Volker Wulf summed up and critically reflected upon the work of the day as well as outlined further research paths to be gone in the future. In terms of communication practices, we further discussed the meanings of design and the importance to have a shared understanding of the term, which is particularly challenging when working in a multidisciplinary team of designers, developers, and researchers. In terms of future work, we need to address the challenge of designing for “resourceful ageing”, i.e., considering older adults as people who are well capable of dealing with the challenges they are facing as they age.

7 References


Researcher's relocations “in her own terms”: repositioning meta-perspectives in the realm of (design for) ageing.

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Abstract. This paper offers a meta-reflection on what can be meant to do participatory design for an ageing society. Ageing is a personal matter, and when ageing meets design, many dynamics unearth, from ageing stereotypes in the actors involved (researchers, seniors themselves, stakeholders, institutional narratives of funding agencies) to critical reactions and reflexive processes. I argue then that repositioning the actors from their own constellations of meanings (perspectives) is beneficial for a critical participatory design. I articulate this reflexive process as part of Design Anthropology. Hence, I provide an account of my experience as a participatory designer with an anthropological background that conducts ethnographic field study among seniors, elaborating design interventions together with them.

1 Introduction

Ageing is a personal matter. Studying ageing is a personal activity.

I admit that I was a bit scared of approaching elderly in an academic way, at the beginning of my PhD – I have blurring memories of my grandparents since they passed away when I was a child. In addition, in the Anthropology literature elders are usually considered guardians of traditional knowledge, expert
politicians, matchmakers, peace-keepers for their community (Sokolovsky 2009). The first image of seniors I got from Computer Science worried me: a frail, mental-impaired, vulnerable person. The Computer Science interpretation of ageing did not match at all with the Anthropology one, thus I started doubting. Nevertheless, what kind of tribes was I going to study? On one side “the elderly” on the other side “the computer scientists”. Thus, I did not know what to expect. I was intimately missing that experience – interacting with someone that has a much broader experience about life than my parents have – but fearing it at the same time. According to the stereotypical image of elderly, what if they were bored, or what if I would have been not patient enough? I was secretly blaming myself for this reaction: what hidden prejudices was I incorporating? As for many PhD students, my research topic was defined in a PhD call. Mine was indeed part of a national project. Since my background is in Social Anthropology and Philosophy and my perspective department was focusing on “hard” sciences with very little space for interdisciplinarity, if I wanted to move to Participatory Design and HCI, I had to commit and adapt to what the research market offers. Therefore, my perspective supervisor suggested me to apply to a project on ageing. It was called: “Ageing in place: a respectful approach”. Whatever it meant, the project was related to AAL technologies, a novel concept for my background, an umbrella term that refers to controlling and monitoring people at their own homes. It did not pass too much time from when I started having strong ethical issues. The project abstract argued a critical position to AAL technologies, explaining that computer scientists and engineers are missing the elderly users’ needs, producing technologies that are not being used. For this reason a “respectful approach” was needed. Ageing is becoming a major problem for EU politics and global society. Therefore, “activating” elderly people is prescribed as an action line to take urgently, maintaining them active in order to postpone the transfer to nursing homes and consequently provoking rapid psycho-physical decline. Therefore, a social scientist might provide, according to the call, methods and sensibility to address this global problem. At the time I did not have a clue that the targeted so-called “older adults” were already active.

2 Reflexive repositions through an anthropological gaze. Approaching Design Anthropology.

**Researcher’s relocations.** Ageing is a personal, inner phenomenon. For this reason, in doing research on and with ageing it is convening taking a reflexive and self-reflexive stance to the phenomenon. Anthropology can offer useful teachings on how methodically pursuing the research with a reflexive approach, usually embedded in its core method, ethnography – considered a method as well as a writing style. An anthropological gaze allows to make what is familiar to the
researcher, unfamiliar, and what is unfamiliar, familiar, reconfiguring the “otherness” through an incremental process of qualitative and quantitative data. So, when I came to “study” ageing – something that is considered understood by everyone as familiar because it is an experience common to everyone – I had to take a step back, approaching ageing as a social phenomenon, which determines certain ageing stereotypes (ageism).

Going from familiar to unfamiliar allows to unfold new horizons of interpretations, experience of ageing and meanings. The added value to an anthropological gaze is that the research is conducted by the anthropologist with the collaboration of the “indigenous tribe” involved: it is a co-research. This implies multiple consequences: reflexivity as a process involves informants too, shaping a co-research style which is analogue to the style of Participatory Design, in which the participants are considered expert in their field, and the encounter with the designer is characterized by the mutual learning of each other competencies. As a provocation, should we aim for publications co-authored by designers and participants?

In my research I aim at developing a Design Anthropology (DA) perspective to Participatory Design. DA improves the design with an anthropological gaze, characterized by a reflexive approach of the participants as well as of the researchers (Gunn et al. 2013, Tonolli et al 2015).

Seniors’ relocations. One of my field studies takes place in a Senior Community Centre, in a city of north-east Italy. This case study consists in a weekly-based workshop on the use of digital technologies (i.e. personal computers, cameras, smartphones) organized every year since 2014 by prof. Vincenzo D’Andrea and 2-3 PhD students (computer and social scientists) from the InterAction and Life Participation research groups of the University of Trento. I supported my colleagues in the 2015 edition, while I organized the 2016 one with two colleagues (a sociologist and a computer scientist). I had the chance to adopt ethnographic methods (e.g.: participatory observation, informal interviews, group discussions) for engaging the participants in interactive activities.

We observed during the workshop that seniors' approach to ICT often produces a stressful and anxious condition rather than a state of well-being. Through a self-reflexive exercise (a collage session) we explored senior’s fascination for ICT and the Internet: their interest is not always supported by personal needs, rather by induced ones. Therefore, we engaged seniors in critically reflecting on the use and usefulness of digital technologies. The result was the making of a multimedia project for sharing their expertise (http://fucinaperta.wordpress.com/, ongoing, a new version can be found here: www.fucinaperta.it). A reflexive process in-the-making has been articulated: making sense of ICT and ageing in seniors' own terms, activating a participatory deconstruction of ageism, in contrast with the normative narratives articulated under the label “active ageing” (narratives that
are present also in the stakeholders, represented by the Senior Community Centre).

We organized a writing collective session with the aim to unearth seniors' self-narratives. The purpose was to generate a collective definition of the group of participants to be displayed in the web-page “About us”. Despite the initial seniors' skepticism that that could have worked, the result let them (and honestly, us too) amazed and delighted. They described themselves as:

“We are a group of people registered at the CSA xxx that has joined to a workshop on technologies performed in collaboration with the University of Trento. The goal is to share knowledge and experience through the contribution of all those are willing to join”. [italics of the participants, original: https://fucinaperta.wordpress.com/chi-siamo-3/].

The word “senior” disappeared, as in the description of themselves as in the description of the association they belong to (the Senior Community Centre). Interestingly, the Community Centre disappeared from their narratives during the collective writing and popped up only lately when Ilenia¹ said: “... But we have to tell that we are from the Community Centre... Fabio [the social worker that represents our stakeholder] is eager for it...”, raising a collective nodding and murmur in the group discussant. This creative writing activity contributed to develop among seniors an unexpected sense of attachment to the online platform, that from a simple project for the group it has started to become something more: a possible artefact to start a dialogue with a public, with “outsiders”. At the same time, the group developed a sense of identity, defining itself as the “original group” that started the project (that in the platform has a specific area). Furthermore, they developed specific issues related to privacy and security of user identities, offering to become the “ambassadors” of the project and asking for moderator permissions to review the contents on the platform (comments and future articles).

In a group discussion it clearly emerged their awareness of their self-perception of ageing and the society's one:

“I don't feel old, I'm more active than many youths I know, I do many things (...). I've started feeling some ailments, but that's physical. But you know, when I turn 65 and I get free bus card, swimming pool discounts, and other discounts, the society is telling me that I'm old. And that's good, having all that discounts!” [Chiara]

“I tried to invite my sister to come to the Senior Community Centre. Do you know what she told me? 'Ah! You go to the wrinklies [dialect word']. But she's always at

¹ All the names have been changed in order to maintain anonymity.
home, doing housekeeping! She never goes out. (...) She's older than me, even if she's younger!” [Paola]

"I'm proud to be old, because this means I've been able to arrive until here. And you know which the alternative is...". [Valeria]

Self-reflexivity about ageing was elicited especially when the potential public of the online platform was discussed. The participants expressed mainly three positions, developed in sequence: 1) “I want to reach other seniors, because there aren't websites for seniors, those I found are very poor, and many of them are isolated” [Chiara]; 2) “I want to reach youths also, for this reason I don't want to display my seniority, otherwise youths wouldn't be attracted [Valeria]; 3) “Displaying my age is important to tell who we are, but it becomes secondary when people search in Internet how to use the online health service or what wild herbs can be found picked [these are two of the sharing projects they realized], they don't look for who wrote that page, but for the content of the page” [Ilenia].

These three positions remain open questions to be evaluated in the future. We are currently focusing on evaluating the restitution to the Senior Community Centre, understanding the evolution (if any) of the online platform and of our community of practice, when it will be presented to our stakeholders and other seniors.

Regarding the relationship built with the group participants, we are often described as “very patient”, compared with their children. Seniors report to behave differently with us than with their children, for instance being more insistent with them or being more “diligent” with us. Reflecting on this, I recognized to be patient in a different way with them compared with my parents, since the circumstances are different: this is my work and there is not that familiar intimacy, although there are often moments of sympathy and empathy.

3 Tentative conclusion towards a critical participatory design anthropology

In conclusion, in order to develop a meta-perspective on ageing and design for ageing, it emerges from the discrepancies between fieldwork and institutional narratives that a reposition of the actors involved in the research is needed, starting from the researcher's reposition. Indeed, the researcher has to navigate between the academic constraints (e.g.: timing of a PhD research, academic hierarchies), the institution expectations (e.g.: what a EU project requires), stakeholders' expectations (e.g. the Senior Community Centre agenda), and finally the participants' expectations and motivations. In order to realize these repositioning, it seems promising looking at other disciplines, such as
Anthropology, that has made reflexivity a core practice of its methodology, developing for instance the method of autoethnography. Transferring the anthropological approach to Participatory Design permits to involve the participants in reflexive practices, establishing a process of mutual discovering and learning with themselves, among the participants and with the researchers. Therefore, the participatory design anthropology process overcomes the centrality of the outcome of the process itself: it is indeed critical. Critics is subversive itself, in respect of any form of power (stakeholders, institutions, funding bodies). For this reason a “critical participatory design anthropology” is hardly institutionalise-able into the ethnocentric normative narratives on ageing, because the critics is often moved also against the (political and economic) interests of these narratives. It is a tricky balance, since we (academics) depend on these narratives, from an economic and a career perspective, being critic to these narratives might look self-destructive. Nevertheless, to institutionalize a critical approach means risking to loose the critical part. An hypothesis for a possible solution might be: on the one hand push for realizing projects with a critical approach, to make these practices a praxis recognized by the (governmental, funding, academic) institutions, on the other hand, reflecting on alternative ways to sustain the research, the researchers and – if this would become a praxis – the academic system as well: thinking about a solution beyond capital (Hakken et al 2015), with the creation of commons that embrace ageing and the research on it.

4 Acknowledgements

I would like to thank all the seniors that welcomed me and opened their constellations of meanings about ageing; my colleagues Francesco Ceschel, Juan Jara Laconich and Angela Di Fiore for learning together how to be a collective of designers. Finally, I would like to thank the reviewers for their insightful feedback.
5 References


Supporting Aging in Place by Sensor Technologies and Wearable Devices: A Work in Progress

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Abstract. Information and Communication Technologies (ICT) have the potential to visualize patterns that might otherwise go unnoticed. Sensor technologies and wearable devices might even do so without the need of manually entering data into a computational system. Our intention lies in changing unhealthy behavioral patterns by visualizing unconscious connections and correlations between certain actions and its consequences. But also the reinforcement of healthy patterns might be achieved when a user becomes aware of the subtle progress he or she already is making. By showing connections between a behavior and the result in an unobtrusive manner we estimate to contribute to a healthier lifestyle and therefore the possibility to live longer independently in one’s home up until old age. This paper presents a work in progress.
1 Introduction

Older adults wish to live independently in their homes as long as possible. There is a growing body of research that focuses on the issues of supporting elderly people living autonomously in their homes. Many of these studies and projects focus on medical issues (de Barros, Cevada, Bayés, Alcaine, & Mestre, 2013; Robben et al., 2014) and on detecting incidents like falling or on prevention of diseases (Aal, et al., 2014). Besides this it is more economic for the society to support older adults in living at home instead of stationary in hospitals or long-term care given in houses.

Authors, researchers and society are therefore interested in encouraging behaviors that lead to a healthier lifestyle (e.g. drinking a certain amount of water per day), and on preventing actions that lead to negative outcomes (e.g. smoking, overeating, undereating) – which might indirectly lead to a healthier life and therefore enable independent living up until old age.

Oftentimes the causal connection between a behavior and its consequence is not directly visible – although in many cases the connection is obvious, it is not really conscious, which often is the reason for breaking healthy patterns or ignoring negative actions. We try to make these connections visible in a non-intrusive manner in order to support lasting behavioral change. We think that the non-intrusiveness of such a system is important for gaining acceptance and when behavioral change is a goal. Since people need to feel autonomous in their actions in order to be intrinsically motivated (Deci & Flaste, 1995), we claim that it is important for the user not to gain the impression as if the system would try to dictate his behavior.

Further steps of the project at hand consist in exploring sensor technologies and wearable devices which on the one hand are able to document aspects of every-day life and on the other hand on devices that might visualize the results in a non-intrusive manner.

User centered design methods like workshops and interviews with elderly people who live independently will help us identify patterns in their every-day lives that have certain consequences but are not immediately obvious or not visible at all. Our aim is to find activities which directly or indirectly correlate with each other. E.g. going for a walk on a regular basis leads to a better mood and a subjective well-being.

Our vision is to create a toolset of applications which provide a real benefit for the users. On the one hand the involvement of future users will lead to a better understanding of their needs, doubts and expectations, which in turn results in a technological solution that is able to fulfill everyday life requirements. On the other hand results of a literature review focusing on the acceptance and non-acceptance of mobile and wearable devices and factors that foster or hinder the
motivation to use technological solutions will be one important factor that will accompany the design process.

Important questions that will be answered during the design and evaluation process are the following:

- How does the everyday life of elderly, independently living people look like? Which challenges do they have to face?
- What are important aspects to keep in mind when designing ubiquitous technologies for elderly? Which aspects foster acceptance for using assistive technologies and which factors result in a decrease in motivation for using new technologies?
- How can sensor data be visualized in order to be beneficial for elderly users and without giving the impression of wanting to control the user’s behavior?

In the following chapter we will provide possible scenarios and a short description of the planned approach.

2 Scenarios and further steps

To illustrate the technological solution we intend to develop, we present in the following section two imaginary scenarios. The areas of interest are: medication adherence and physical activity.

The following scenarios will provide a tool for communicating with elderly users about our ideas. They will serve as a starting point for a discussion and will be refined, improved or maybe even discarded if they do not fit the everyday life circumstances.

Scenario 1: Medication adherence

Some elderly people stop taking their medicine because they do not think they need it when they subjectively feel good. They lose sight of the fact that the medication is the reason for them feeling better.

In this scenario, a daily questionnaire about the user’s health provides a tool that helps the elderly person keep track of her current mood. A mood-analysis-system (introduced in the ongoing research project “Cognitive Village”) might provide a better alternative for gaining information concerning the user’s current emotional disposition, since the data would be collected in an automated manner without the need of an interaction from the participant’s side.

A dialog on the user’s mobile device “proposes” to take the planned medication in the near future. The user gets a message about the upcoming action. He can confirm having read the message. After having taken the medication the
user might confirm his action, too. This approach necessitates a manual feedback from the user about the consumption of the medication.

Another approach is the usage of a medication blister pack with IT support that would be an automated approach to monitoring the medication intake. The blister pack provides input data about the removed pills, but cannot verify that the pill is really taken by the user.

Nevertheless this approach helps to make a prediction between the user’s state or mood and the taken medication. By visualizing a history of medication adherence on the one side and the user’s mood or state on the other side the user gains a tool for making a connection between those two.

**Scenario 2: Physical activity**

When it comes to physical activities, the main goal might consist in increasing fitness. A secondary objective could be to keep or lower body weight. Both targets, staying fit or losing weight, are long term objectives. If the user does short term physical activities he will not recognize immediate results. Therefore some users might become impatient about the expected but still outstanding results and therefore give up trying.

Here the user’s behaviour can be a source of input for IT supported device which leads the user to the long term goal. For example, a personal trainer sets-up a training schedule or the doctor advices to improve the fitness and sets up a certain schedule for training events. A smart watch, a mobile device or a stationary personal computer could give hints to the user. These hints will be designed applying user centred (UX) design methodologies.

Our idea for visualization consists in starting a screen saver with changing colours. Red usually signals very important messages or notifications. So the user gets pointed to the topic to do something for his fitness. When he touches the screen, further information could be displayed.

An activity tracking application on a smart-watch or a smartphone collects information about the user’s sports activities without the need for an interaction with the system. Perhaps at the end of the day a positive message can motivate the user and encourage her to go on being active the next day. For example a light green colour might symbolize a job well done, e.g. when the user made a certain amount of footsteps during the day.

Further areas of interest will be explored in upcoming workshops and interview sessions. Based on those findings, additional use cases will be defined. These will serve as a foundation for a requirements definition and the development of the system which will finally be evaluated with future users.
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No More Throw-away ‘Elderly’ People: Building a New Image of Ageing via a Time Accounting System

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Abstract. This paper investigates the potential of a special kind of local exchange system –a Time Accounting System (TAS)– in changing the traditional image of the elderly people. A TAS is a web-based software system that allows people to arrange transactions of time devoted to work inside a community. We report some findings from a literature survey perspective and from focus groups discussions that provide a comprehensive picture of the role of a TAS. This leads us to claim that a TAS is not only a supporting tool for the elderly people, but also a tool that might change the image of being elderly in the current society. Moreover, the review identifies the absence of a TAS in the developing countries, where “measures” to help people in their old age are considered as a necessity rather than a luxury.

1 Introduction

It is well known that global population is ageing. In most countries, this phenomenon is due to a combination of declining mortality and fertility rates (McKeon 2012). Although the images of ageing are different in developed and developing regions, there is an overall socially imposed constraint that portrays elderly as dependent and care receivers. For this reason, researches have been
carried out to support care and to investigate whether this image could be changed through the design of proper technologies (Cabitza & Simone 2010).

In particular, developed countries are presently passing an era of scarce governmental resources and declining social capital (Collom 2008), which ultimately poses threat to elderly care. Yet, these countries are exploiting the full benefits of technologies to face most of the challenges. Initiatives are oriented to help create and maintain the social network of interaction, trust, and exchange among different units of the society (Carroll 2013). One of these initiatives aims to develop systems like Timebanks, Community Exchanges, and Local Exchange Trading Systems (LETS) (Bellotti et al. 2013), where community members provide to each other small services according to their skills and availability, by relying on the reciprocity within the whole network of system members and by using local currencies. Among these alternative or local currencies Time Bank, which we call Time Accounting System (Cabitza et al. 2016), and TAS in the following, is spreading quickly in many countries (Carroll 2013), drawing the attention of the researchers towards its better understanding and support. TAS are well established to confirm that the things a society really needs are normally unpaid and are never received by the money economy (Cahn & Rowe 1998). Similarly, a TAS is considered as a potential tool for supporting the elderly people, since they are said to be ideal participants as often in need of services, with a lot of free time to give, and with the potential to benefit from intergenerational interactions (Cahn 2000). In this light, we investigated how a TAS can help elderly people in moving their image from that of ‘service receivers’ to that of ‘service providers’ and ‘value creators’. To this aim, we adopted a mixed approach: a literature review on the diffusion of TAS or similar systems in both developed and developing countries, by following the methodology proposed by (Peters et al. 2012, Saunders et al. 2011); focus groups discussions on the adoption of a TAS in a developing country, by following the methodology of (Chiarini et al. 2010). In this paper, we relate our findings to the support of elderly people that a system like a TAS may ideally bring, and to the potential transformation of the elderly life and image due to the introduction of a TAS in a community where this was found particularly suitable and feasible (Sultana et al. 2015, Cabitza et al. 2016).

2 Literature Review

2.1 History and Evolution

The world’s first TAS was found in Japan in 1973, where it was established by Teruko Mizushima. The basic idea of this initiative was to spend the time credit at any time during the life time of the participants, i.e. a person could earn time
credit at his young age and could spend or use it at any time of his life, even at his old age. In the 1990s, a TAS was first introduced in the USA, with the name Time Dollars, as a medium of exchange which could create a way for encouraging and rewarding the work needed to build “strong and resilient communities” (Cahn 2000). This concept was then introduced in the UK by Martin Simon with the name of Time Bank. There is a recent revamp in imagining the potential of TAS in facilitating active ageing through technology, as a means to enhance participation, engagement and local community cohesion and affection. Consequently, the traditional TAS (a paper based one) is being transformed into a web based TAS, usually implemented upon one of a few special purpose TAS or alternative currency exchange software platforms (Bellotti et al. 2014). TAS got popularity over other community exchange systems in a short time due to their simple features (Bellotti et al. 2013). At present, there are around 1715 projects of TAS across 11 countries and 4 continents (Seyfang & Longhurst 2013); notably, all of these are in the developed world.

The studies on TAS reported that male seniors, female seniors, female non-seniors, retirees and people from lower income group are the most common participants to a TAS (Bellotti et al. 2013; Collom 2007; Lasker et al. 2011; Seyfang & Smith 2002; Williams 2000). In the UK, most of the participants to a TAS are from socially excluded and underprivileged members of the society, whereas in the USA the members are mostly well-educated, low income, politically liberal, and ethnic ones (Collom 2007). An exception to the previous studies is the work by (Ozanne 2010), who studied a TAS in New Zealand where the members are from a relatively affluent society and are more educated if compared with the members of other TAS.

2.2 Benefits for the Elderly

A number of researches have emphasized the role of a TAS in promoting both physical and mental health in the participants, particularly those who live alone and who are elderly (Boyle 2014; Gregory 2012; Hayashi 2012; Lasker et al. 2011; Seyfang & Longhurst 2013; Seyfang 2005). Elderly people feel more attached to their community through their participation in the exchange program of a TAS. Active participation in social work through a TAS helps them remain physically sound. Since the elderly people get the opportunity to be connected with the community through a TAS (Ozanne 2010), this helps them feel important for the society, and brings them psychologically uplift. More interestingly, our review found that the elderly people feel better when their medical treatments get associated with the service of the volunteers of a TAS (Dentzer 2002). Involvement with a TAS helps them feel safer as well as more attached to other members of the community, hence avoiding the condition of isolation in which
the people affected by sickness and by the feeling of being useless and frail very often fall in.

3 Focus Group Discussions

We discussed the issues related to the predicted benefits of a TAS in two focus groups sessions. One was made of 8 focus groups, for a total of 64 members (Bangladeshi), and consisting of 8 participants in each group. These focus groups were organized and moderated by one of the authors in summer 2014 in two phases, 4 in Italy and 4 in Bangladesh, on topics related to the adoption of a TAS in Bangladesh: for this reason, it was considered an exploratory focus group. These two groups share the same basic culture and the concerns that are motivated by their common experience to live in an urban area at the time of demographic transition. This fact made it possible to consider them as homogeneous enough to guarantee the soundness of our research outcomes. The second session of focus groups was held in Italy in autumn 2015, with a total of 12 participants split in 2 (uniform) groups of 6 participants each. This second focus group was a confirmatory focus group, as participants were asked to evaluate a web-based TAS prototype for confirming some of the themes emerged during the previous focus groups (the participants to the second round of focus groups were a subset of the participants to the previous one). There were differences and similarities for the two focus groups relative to TAS requirements. All the participants of the focus groups, both in Bangladesh and Italy, agreed with different extents on the fact that a TAS could have some positive impacts on the role of elderly people in the societies. The former let emerge an innovative requirement for a TAS application: the capability to transfer time-credit across communities living in the same urban area. The latter extended this requirement to allow the interaction among TAS systems across continents. A short report on this experience can be found in (Cabitza et al. 2016). For the present work, we focused on the themes related to ageing, as being introduced in point 2.2 of the previous section.

3.1 Intergenerational Linkage and Knowledge Empowerment

All participants agreed on the fact that a TAS could work as a bridge between two different generations. This interaction would bring benefit to both the groups in different ways. On the one hand, the senior usually getting alone and becoming dependent on others for trivial work would find opportunity to get involved with other people. This interaction would help them share their expertise with the people who need them, and sharing skill through a TAS would let them feel useful again to the society. On the other hand, the younger less privileged would get the opportunity to increase personal acquaintances and skills through an informal and inexpensive way. The participants all assume that a TAS would help define
“work” in a different way, and act as a databank for the local skills. The participants pointed that this would also help a person to be an entrepreneur by using, for example, the available local skills at the end of their regular service period.

3.2 Time-transfer capability

Also wealthy people, who are poor in time, may exchange their benefits with the work of elderly through a TAS community. A time-transfer mechanism to and from the “near and dear” has emerged as a mechanism conceivable for a TAS, as it may especially advantage an intergenerational and inter-community linkage. People poor in time may rely on the elderly of their community and of their family to gain time and services from them, and, at the same time, people more active in distant communities may loan time to their old dears. This second option may also help them get rid of guilty feelings for not being beside their old parents, and feel confident that this could really facilitate their distant family to receive back help from other neighbours in case of need.

3.3 Self-actualization

Participants stressed the necessity for such a system, since it would give them the facilities to help others and to show their latent skills. Usually, they would compel to take help from others and, moreover, they were frustrated they could do nothing in return. A TAS would facilitate them to help others and earn time that could be used for their need. It would help them have a feeling of independence and reciprocity. Participants emphasized that a TAS could be a platform for showing the skills of the people, particularly elderly and housewives, who are usually not engaged in the formal job market. This may balance in a more official and satisfactory way their visibility and the usefulness of their roles in the community. Furthermore, the opportunities of doing something for the community members would give them mental satisfaction, which they consider invaluable.

4 Conclusions

Researches on TAS are mostly limited to studying the impact of TAS involvement on participants in general and on policy issues for social capital development. This limitation is especially apparent in studies of elderly-focused TAS. In this regard, this work is a first contribution in exploring the potential new image of the elderly through a literature review and a qualitative research on TAS systems. To conclude, we could safely infer that a TAS can contribute in changing the image of the elderly from the image of someone who just needs care and receives it from keen caregivers, in the image of someone who is able to give
something back, in exchange to their caregivers or indeed to anyone in the TAS community.

5 References


Challenges in communicating user requirements: Lessons learned from a multi-national AAL project

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Abstract. A user-centred-design approach has become essential when developing devices and systems to satisfy users’ needs and to raise acceptance and user experience. Within the eWALL project, which contributes to the prolongation of independent living of older people with and without chronic diseases through technology, iterative evaluations with users in four different countries were conducted to adapt the prototypes with users’ feedback. After each evaluation, the feedback was rephrased in form of specific recommendations and summarized in a spreadsheet. Before communicating those to technical and design partners, all recommendations were prioritized and categorized. This paper describes the methodology for the user involvement and communication within the project team to successfully integrate users’ feedback. Furthermore, it highlights important steps of this process and outlines lessons learned related to the prioritization, categorization, phrasing and communication of recommendations. Derived implications embrace adapted strategies to thoroughly involve users’ feedback in the prototype development.
1 Introduction

Over the past years, it became more and more apparent that the development of technology for supporting older people needs users to be involved in the design process (Wilkinson & de Angeli, 2014). This was mainly caused by the insight that 70 to 80 % of new product developments fail because users’ needs were not addressed accordingly (Von Hippel, 2007). In the past, development was mainly driven by technology and new innovations, whereas nowadays the needs of the real users are the starting point and the reoccurring source of feedback during the development process of support technology for older people (Lindgaard et al., 2006; Wilkinson & de Angeli, 2014).

The benefits of this user-centred design approach, such as increased confidence of the end-users and improved usability, are well-known. However, many support technologies for older people still lack user’s acceptance since proper involvement of user’s feedback in the development cycle is not always ensured (Brett et al., 2014). Older adults tend to have low technology literacy, diverse views about technology support and maybe health problems that affect their user experience and accessibility (Crabb, 2013; Malinowsky et al., 2010). Those circumstances further increase the importance of users’ involvement to understand their needs for specific new technologies and to ensure usability, acceptance and accessibility. A prerequisite for thorough user centred design is good communication within the research and development team. As nowadays mostly required for European research grants, user evaluations are often done in at least two different sites. The more partners involved, the more important is it to use efficient communication strategies for securing the implementation of users’ feedback.

This paper demonstrates the user involvement in the eWALL project. This EC-funded project contributes to the prolongation of independent living of three different user groups: i) older adults who face a risk of loss of function in the physical, cognitive or psychological domain, ii) people with mild cognitive impairment (MCI) iii) people with chronic obstructive pulmonary disease (COPD) (Kyriazakos et al., 2014). The system is composed of a large, wall-mounted touchscreen, which serves as interaction tool for the users. Additionally, environmental sensors (temperature, humidity, gas, movement) in the rooms provide support and safety to the users e.g. to detect that the oven was not turned off. Measurement devices track the activity level and health values which are pulse, blood pressure and oxygen saturation in the blood. The following functionalities are provided by eWALL: individual video exercise training programs based on the user’s preferences and activity levels; cognitive training games with difficulty levels; daily, weekly and monthly overviews of users’ activity level, sleep and health values; overviews of air condition in the living
room, kitchen, bathroom and toilet; smart calendar application. eWALL recognizes the needs of users and detects behavioural changes as well as decline of cognitive functions. According to users’ conditions, eWALL encourages users for a healthier lifestyle. It would, for example, suggest to do some physical or cognitive training, to measure health values, to go outside for a walk if the weather is nice or to have a healthy breakfast etc.

Thorough user involvement for optimizing the final product to the users’ requirements is the main focus of the project, supported by four different evaluation sites in Austria, Denmark, Italy and the Netherlands. Besides the primary user group, also experts for MCI and COPD as well as usability were inquired.

User involvement was mandatory during all phases of the project. Users’ requirements, which were evaluated at the beginning of the project, served to derive personas, user scenarios, concept sketches and finally system requirements for the specific user groups. Personas, which are fictional characters that represent typical persons of the specific user groups, were based on previous user-centred design projects, literature and workshops (Van Velsen et al., 2012). It is a common user-centred design method that is useful in considering the goals, desires, and limitations of users and therefore helped to guide decisions about the product as the services, the interaction or the visual design (LeRouge et al., 2013). By using the personas, requirements engineers created scenarios to describe the way in which care is currently provided. Further, future scenarios created a vision of the future in which eWALL would satisfy the needs and wishes of the personas in their specific context of use. From these scenarios, requirements (describing functionality and technical demands) and use cases (describing the interaction between the user and eWALL) were derived. Concept sketches illustrated the system with all the sensors inside user’s home in order to achieve common understanding between the user and technical partners. Based on that information, system requirements for the eWALL device were defined. The system requirements were an important tool for developing the first prototype, which was iteratively tested with users.

The following section describes the methodology of user involvement for testing and elaborating the prototype. In section 3, we reflect the used methodology and describe lessons learned.

2 Methodology

To allow the proper integration of users’ feedback in the prototype, we evaluated the prototypes of month 19, 22 and 25 through an iterative evaluation cycle. These lab trials, summarized by the term Small Scale Evaluations (SSE), cover the first evaluation stage of the DeChant framework, which was developed
to systematically evaluate telemedicine technology (DeChant, 1996). This stage aims to evaluate the usability of a low fidelity prototype (Jansen-Kosterink, 2014). The main objective of the SSE was to evaluate the usability based on the level of user satisfaction and their intention to use the eWALL prototype, and to adapt the prototype with users’ feedback. The first prototype, developed upon the basic system requirements, was tested in the lab setting in the four different test sites of the project.

In first stages, we tested the interface with mock-ups as the prototype was not operationally working at that point of time. In particular, we used PowerPoint mock-ups on the touchscreen to simulate the user the interface of a fully working system, so users could click on the buttons as if it would work (see Figure 1). In later stages, we already used the operational prototype displaying data from simulated users. Thus, sensors were not used for SSE, the only interaction between users and eWALL was the eWALL touchscreen. The evaluation was divided into 11 tasks e.g. main screen, personal data, daily functioning monitoring, etc. During the tests, a task-based approach was used as well as the thinking aloud technique to know which difficulties users faced during the tasks. For example, we asked them „Please open the video trainer and start a new physical training session.“ The users were asked to comment on the different interfaces of eWALL and related services and functions.

Thereafter, all evaluation partners of the test sites summarized users’ feedback and rephrased it in form of specific recommendations to communicate them effectively to evaluation and design partners of the project (see Table 1).
Table 1: Example of recommendations from first round of SSE for technical partners (0=low priority; 5 = high priority; A/B/C/D = Rating of the four evaluation partners)

<table>
<thead>
<tr>
<th>UI</th>
<th>Recommendation</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rec.1.1</td>
<td>Weather Future weather prediction would be very useful. Add this information.</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Rec. 2.1</td>
<td>Daily Functioning Monitoring The daily information displayed should be reduced to only meaningful events. Not show if person is moving between kitchen and dining room with a high frequency.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Rec. 3.1</td>
<td>Clock Add display of date to clock display</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3,8</td>
</tr>
</tbody>
</table>

If, for example, it was not obvious for users which elements of the main screen were interactive, the specific recommendation was to highlight interactive elements. All those recommendations were summarized in a spreadsheet, separated into more design or technical recommendations and prioritized by the four evaluation partners, based on the users’ feedback of their test site. All problems or emerging needs for changes were addressed in the subsequent prototype optimization, followed by an additional iteration of user tests as described above (see Figure 2).

![Figure 2: User Involvement Cycle](image)

We used weekly teleconference calls to discuss adaptations. The attendance of both technical and evaluation partners in these calls was an important prerequisite to discuss the results on an interdisciplinary level.

A final evaluation of the integrated eWALL system will be given in the field tests, where the final prototypes will be installed in users’ homes for six weeks.
3 Results and Lessons Learned

The approach of using spreadsheets to summarize users’ feedback in form of specific recommendations was a very helpful communication bridge from users to all evaluation partners and finally to technical and design partners. However, some important steps have to be considered when conducting a user involvement cycle in a multi-national project. This section critically reflects the described methodology and shows up the lessons learned. It does not describe the results of the lab tests related to the user’s perception of the system, as this is not within the scope of this article.

After summarizing the recommendations, their prioritization was an important step. On the one hand, this was reasoned by the large number of recommendations that had to be ordered to implement the most important ones first. Also, some recommendations prohibited the implementation of other recommendations. At first, we didn’t prioritize them but soon found out that the evaluation partners of the four countries experienced in their lab trials different priorities with some recommendations which made it difficult for the technical partners to decide which ones to implement. Prioritization helped to find a consensus on all important design decisions within the entire project team.

Additionally to prioritization, categorization of recommendations, e.g. into “new functions”, “data sharing”, helped us to get a structured overview of the users’ feedback, since some recommendations occurred manifold from the four evaluation sites. The categories were an important basis for following discussions.

Moreover, the importance of clear recommendation phrasing became apparent when passing them to technical and design partners. Those recommendations have to be as specific as possible. For example, a recommendation like “change the size of the button” is not specific enough. The desired size of the button must be described. It seems obvious, but it is important to keep in mind to write the recommendations for persons who did not experience users’ interaction with the system. Specification also allowed us to have clear and measurable steps in the development of the next prototype.

This leads to the next point for a good implementation of users’ feedback. Keeping a good communication between partners was an important part throughout the whole SSE. At the beginning, the main collaboration happened between the evaluation partners, who defined the methodology for the four test sites but also summarized their results and rated them. In the second place, the recommendations were communicated from the evaluation partners to technical and design partners. Since we recognised some recommendations not being clear
enough, close communication between technical, design and evaluation partners turned out to be important to discuss the feedback between those who collect the feedback with those who adapt the prototype. This allows clarifying the gap between the questions: *What do users want? What must be adapted to satisfy users’ needs?* versus *What is possible to achieve from a technical point?* In our case, weekly telephone conferences were held to discuss unclear recommendations. The main discussions occurred around the details to cover the identified needs (e.g. What is the minimal duration to log the user in a specific room? – see Rec. 2.1 in Table 1) but also around new insights from evaluations that had not been addressed so far (e.g. including weather forecast – see Rec. 1.1 in Table 1). The attendance of both technical and evaluation partners in these calls allowed us to discuss the results on an interdisciplinary level. The developed personas and use cases helped to guide the discussions by considering the needs of the user group on vivid examples.

4 Conclusion

For thorough involvement of user feedback in the development of the eWALL prototypes, we collected users’ requirements and developed personas, scenarios, concept sketches and use cases as well as system requirements, which served as the basis to develop the first prototype. To test and advance the prototypes, we conducted iterative lab evaluations in four test sites with potential end users as well as MCI, COPD and usability experts. This user involvement cycle consisted of the evaluations and was followed by the reprocessing of the feedback, which was finally communicated from the evaluation to technical and design partners of the project. This article presents challenges and lessons learned of this methodology, concerning clear phrasing of recommendations, prioritization and categorization of recommendations as well as communication between partners. The presented methodology and lessons learned may help other projects to be aware of possible pitfalls that can occur in the user centred design process and outlines the importance of specific measures to avoid them.

5 References


Alternatives and Redundancy: Interaction Design of the TOPIC CarePortfolio Landing Page

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Abstract. This paper introduces the participatory design of the landing page of the CarePortfolio, an online platform developed within TOPIC, a European Project under the Active and Assisted Living (AAL) Programme that aims to design and develop innovative technologies for elderly informal carers. The project employs a user-centred and participatory design (UCD/PD) approach combined with an evolutionary development process (ED), which entails the involvement of end-users during all phases of the project and affords changes in the system as new requirements are elicited. The paper recounts the challenging process that resulted in the design of the landing page of the platform, highlighting the relevance of constant interaction and communication with the users and iteratively with the design and development teams for the generation of useful and usable technological solutions for the elderly.
1 Introduction

The body of literature addressing technological developments for the elderly makes notorious the fact that the members from this target group have peculiar needs, such as those stemming from assorted types of motor or sensory impairments developed with the age, which require extra attention and close work with them (Kobayashi et al. 2011; Lindsay et al. 2012).

This paper reports on findings from the TOPIC project, which sets out to design and develop a set of services and integrated tools to support elderly carers (Breskovic et al. 2013). In particular, we present and discuss findings regarding the design of the interaction mechanisms of our platform. We recount with details the design process of the platform landing page, drawing attention to the relevance of being in constant contact with the users, so to design a solution that makes sense to them and provides a pleasant and satisfactory user experience.

The paper mainly elaborates on our design decision about inserting alternative starting points in the landing page of the platform to accommodate different mental models of our users, despite the fact that they would create redundancy in the system, which has been rejected both by HCI specialists and past HCI studies (Nielsen and Thair 2001; Federici et al. 2005). Findings from our user studies challenge such viewpoint. We show empirical evidence that, for this particular group of users, moderate redundancy is rather useful.

2 Related Work

The concept of redundancy in HCI is multifaceted. Some studies on the design of user interfaces touched upon the concept of redundancy not only in terms of exact duplicates of certain interface elements in the same location (e.g., hyperlinks in an specific page of a website (Nielsen and Thair 2001; Becker 2005; De Cock and Hautekiet 2012)), but also in terms of different modalities (e.g. Vetere and Howard 2000; Terken 2005). Most of these studies argue that redundancy increases the complexity of the interaction: “[...] redundancy can increase cognitive load [...]” (Terken 2005); “[r]edundant links add clutter to a Web page, reducing readability and navigational intuitiveness” (Becker 2005). These concerns seem mostly to arise from discourses from information theory and the predictions of cognitive load theory (see Vetere and Howard 2000).

In this particular paper we elaborate on the concept of redundancy and define the concept of interaction redundancy. Here interaction redundancy is understood as the result of multiple navigation options providing alternative paths leading to the same target, e.g., a particular feature of the system, which has been acknowledged by Nielsen (Nielsen 2002) as ‘good redundancy’. This concept is different from what Reddy et al. (Reddy et al. 2009) and the likes investigated, as
for them redundancy is to do with the simple repetition of content in diverse physical formats (e.g., text, image, sound, etc.) in the same location. From our search in the literature, a thorough discussion on the matter is still missing. This paper contributes towards reducing this gap.

3 Learning from the users: From Corners to Selective Redundant Interaction Paths

The next sections briefly present what has been done so far within the TOPIC project and how our design decisions have been shaped by the information provided by representatives of our target group and how we came to the conclusion that interaction redundancy is a relevant design element for interfaces targeting elderly informal carers.

3.1 Identification users’ needs – Understanding and drawing requirements

In order to understand our users’ context, we carried out an ethnographically informed study. As the study data was analysed, we engaged in elaborating design ideas to support our informal carers in their daily lives, i.e., we started drawing requirements for the platform. We decided for a scenario-based design, which consists in using scenarios as generators of ideas about how the system-to-be should look like and behave in the end-users hands (Carroll 2000).

3.2 Initial design and discussions – Sketching

After the elaboration of the scenarios representing possible situations in which the platform would be used and how its use would be, we discussed our findings and ideas for solutions with our participants in a series of focus groups. Use cases and mock-ups were created to translate insights of the field studies we carried out.

In the first design iteration, we created “corners” with specific functionalities to cluster and focus certain content and related actions in our system. For instance, Learning Corner would be a space where informal carers can ask questions to professionals and follow online landing page training for particular tasks.
Fig. 1. shows our initial proposal for the TOPIC landing page discussed with our participants in a series of the focus groups, whose results showed that the users actually did not resonate with the corners idea. In fact, the data analysis suggests that the users did not understand the idea of corners as online spaces where they could go to and engage in specific types of activities.

As our analysis deepened, it became clearer that one possible reason for rejecting the corners idea is the fact that our informal carers are so consumed with the care work that they cannot actually dissociate it from places. The data showed that, even in their homes, informal carers have no space safe from the care situation they handle: the care work actually dominates everything in their life – their time, their spaces, their activities. Hence, in their minds there are no corners: they would do everything everywhere, although not at certain places. Our data analysis made it noticeable that the care work makes very difficult for them to have certain separated places: everything is connected to the care receiver and the care setting. Therefore the corners felt irrelevant for them.

3.3 High-fidelity prototypes – Refining

Drawing on results of our first focus groups, we revisited our initial design ideas and reworked them to meet the new requirements collected from the users. We drew on the results of the analysis carried out in our data and used the suggestions provided by our users as guidelines for the redesign. Furthermore, we subjected the redesigned artefacts to new user tests, as reported in Section 3.4. This approach ensured that the user requirements collected throughout the design process have been properly addressed.

For instance, the analysis of our data showed that our informal carers mainly react to situations caused by the care receiver or act before something has really happened, again in relation with their care situation. Visiting a place is different from doing things directly. Acting beforehand means in general organising and coordinating care activities with others. No matter who or what triggers an activity, our users continuously do something, like checking the wellbeing of the care receiver, searching for care information, contacting others to get help, arranging professional help or other types of care related activities. So we tried to bring their terminology to our system, i.e., to use terms like checking, connecting, sharing, exchanging, organising, etc. This requirement has been clearly noticed by the members of the design team responsible for the landing page of the platform, who set out to elaborate a list of the main actions the users suggested they would expect to be able to perform in the platform.

Since our attempt to use the metaphor of corners was not really accepted by our users, we continued with our studies to understand their motivation of using technology to support their daily life. We particularly focused on investigating how we could design something that would be more inviting, i.e., that would
make them feel encouraged to use the system. The new version of the landing page used the tree as a metaphor. We used it to represent our reaching out to informal carers, connecting them to each other, and providing a strong link between them. The action items previously mentioned led us into the WHAT side of our tree, illustrated in Fig. 2.

Further analysis of our data made evident that our users also need to (re)act very fast when caring for someone. Sometimes they need to focus exclusively on the care situation and its actors. For instance, we had informants who said that in a shopping situation the only item they would like to see on their device is the “care receiver” and everything connected to him/her. We took up this thought and created an alternative view to already available functions in the system by introducing the actor-related items (WHO). Fig. 2 illustrates the two sides of our new landing page, organised according to the WHAT and WHO approach.

3.4 Early stage usability studies – Assessing

Past HCI research has taught us that, when it comes to system development, engaging in usability evaluation since the very early stages of the project is very important. This enhances the likelihood of achieving a system with a good level of usability at the end of the process. Not investing in a formative approach to usability assessment might result in identification of usability problems when it is too late to solve them (Nielsen 1993). Therefore, we started with our usability tests as soon as the first high fidelity prototypes were ready.

We conducted 14 usability tests for the first iteration of the evaluating phase of our UCD approach. The preliminary results of the data analysis have informed the planning of the next focus group that has been carried out two weeks after the conduction of the last usability test. In the focus group our informants have been
organised in two groups to discuss alternatives for the terms to be used for the TOPIC landing page. A set of clear and straightforward concepts has been identified as the main issue to be solved with the tested interface. In a second moment of the focus group, one of the tasks has been revisited. Difficulties observed during the tests have been collectively discussed in order to better understand the reasons for them and how they could be minimised.

4 Discussion

First of all we have to accept the fact that it is a real challenge to provide a real support for elderly (carers). We have to think on means of easy-to-use, on-demand, useful and informative systems, both with regard to content and interaction. Use simplification in this sense can only be achieved by simple navigation and interaction mechanisms of the system.

A relevant finding from our usability tests and focus groups is that our users form a very special group. When it comes to being part of a community, they mainly want to be passively present, because they want to avoid additional workload to the care work they provide. Our findings show that they prefer to have “on-demand” access to the platform and the community behind it. At the same time, they are aware of the positive impact of such a community to their lives and to their physical and mental beings. Our challenge as designers was to create a system that is useful and informative, which can support our users from different perspectives, but only when and in ways they want to. From our results, if this requirement is not fulfilled by the system, they will simply not use it at all.

In this research work, achievement of the balance between alternatives and redundancy in user interaction turned out to be key. Alternative views to central data enable us to reach out towards a broader group of users. We know that we cannot offer a system that suits all types of requirements and situations of informal carers because the user group is very heterogeneous. Therefore, configurability of the system is crucial to make personalization possible.

In our context, with our multiple alternative access points in our system, we refer to interaction redundancy, against to some guidelines found in the HCI literature. For instance, one of the guidelines for homepage usability is about avoiding redundant content, like categories or links in the page (Nielsen and Thair 2001). In our design we did not repeat content. We only created different paths to reach the same functionality of the system. Coming from different starting points (WHO or WHAT) we provided the same interfaces on the second level of interaction with our system. This way they were not confused, but positively surprised when they could reach the interfaces they needed. They were even happy to have shortcuts to certain functions, especially when the system intelligently selected relevant data for their purposes, like the filter mechanism integrated in case of actor-related (WHO) items in our system. Due to reasons like
faster data access with minimum user interaction, clear entry points considering the user context, easy orientation in the system depending on the concrete situation, and finally the familiar interface to deal with regardless the path of access so far are some reasons what our users like the alternatives we designed.

However, we have been reminded in our usability tests that it is very important which action terms are used on the system’s landing page to correctly communicate the functionality available for this term. They found some of them very useful and refused to use some others, e.g., “Discover” (Entdecken) was not understood as something where users can browse new content provided by someone else, or search for new content, peers, or events. It was more understood as a safe place where they go to search for whatever they could not find the system, suggesting that we must reconsider the term for the next version of the landing page. We can try to explain this phenomenon by referring to the concept of mental model differences of our users. They had another meaning and use of the term “Discover” than we had.

Indeed, we need to rename some of WHAT items available in the landing page. This will solve some of the usability problems identified during the tests. As pointed out in many HCI and IxD books (e.g., (Nielsen 1993; Sharp et al. 2006)), our study confirmed that we, the designers, use a different terminology of actions than our users, something difficult to overcome even when working close to them. One challenge we faced in the redesign process was to communicate our design decisions to other members of our consortium. Since we were proposing an innovative way to give users access to the platform features, some partners were resistant to it. The main argument against it was that users would feel disoriented and have difficulties to find their way around the system. The suggestion was to use the traditional left menu bar approach widespread across the web. However, since we set ourselves to design something that would work across different devices – e.g., laptop, smart phones and tablets – we argued that the left menu bar would have some limitations. After a few discussions and brainstorming sessions, the consortium decided to subject the redesigned landing page to testing in a series of usability evaluation sessions.

The results of the usability tests performed by one of our partners pointed out that users would in fact have no difficulties in using the tree design. Users who were more used to web systems have suggested that, initially, it was slightly more difficult for them to get oriented in the system, however, after a few interactions they have mastered the new navigation concept and could easily find what they needed. On the other hand, users who have no prior experience with web systems would find the tree solution easier from the beginning. This illustrates how communication between users and designers and among designers is very important so to put forward a user-centred solution.

A last challenge we experienced concerns conveying the importance of our methodology to our development partners. Since the beginning they confronted
the qualitative research approach, because of reaching out to a rather small number of users, and the thorough work with the users. It took us an intense negotiation and articulation work throughout the project. Finally, the field study results convinced them of its validity and usefulness.

5 Conclusions

In this paper we presented results of design activities and usability studies conducted in TOPIC. We particularly addressed our design decisions for accommodating multiple user models to make initial navigation in the system more straightforward. Applying user centred and participatory design enabled us to find these different user modes. We could shadow, interview, and gather additional data via cultural probes. Focus groups helped to create rationales for our design decisions. For instance, we thought corners would be very useful as metaphors for the landing page of the system. We were wrong. The tree turned out to be more suitable and understandable by our users. Our experience shows that only clear and constant communication with the users and within the design team can help us to better understand their mental models and translate this into interaction mechanisms that can provide easy of use and a better user experience.
6 References


A Common Practice to Rise Older Adults’ Awareness of PD

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Abstract. The design of Information and Communication Technologies (ICTs) for older adults needs particular attention. Older adults’ potential and unique ideas in shaping a design process are not being completely considered by designers, who cannot rely on a group of users often unaware of its role. In this short paper, we describe our work in creating a common understanding of the role the final users can have in a process of participatory design. Our work, whose primary goal was not the design of a technology, but to introduce a group of older adults to the use of the computer, led our group of users to comprehend the influence they have on a design process.

1 Introduction

The Participatory Design (PD) is a well-established technique; it furnishes the right lenses to collect and interpret the perspective of the target user group, and it involves the users into an innovation process (Müller et al., 2012). PD recognizes the meaningful contributions that users can deliver when it comes to design “something”. For this reason, this methodology is widely used in many areas, and for a large variety of users. PD is increasingly used with older adults to create
diverse kinds of technologies (Rogers et al., 2014; Davidson & Jensen, 2013); the reason lies with the designers’ difficulties to create appropriate technologies for older users (Lindsay et al., 2012).

Differently from other users, older adults do not seem to be completely aware of the role they may have in PD; as they appear to perceive themselves more as “users” than “designers” (Rogers et al., 2014). For this reasons, older adults’ awareness about their power in PD should be incentivized. The goal of PD should be to “empower older adults to participate in developing their own solutions to overcoming the ‘pain points’” (Coleman et al., 2010, p. 176).

In the research presented in this paper, we adopted a PD approach to rise awareness among a group of older adults - who participate in a computer lab - about their role in shaping the design of new technologies. The lab was structured according to requirements and suggestions of the participants, and the results obtained are a direct consequence of the involvement of the user group.

2 The Computer Lab

Since October 2014, our research group of “Social Informatics” at the University of Trento, in collaboration with a Senior Community Center of Trento, carried out an annual computer lab - every year from October to April - for older adults; we concluded two editions so far. This initiative continued the work began by Parra (2014) in collaboration with the same center. The collaboration was based on the mutual interest to find the best methods to introduce elderly people to the computer in order to help them develop new skills and to give them the possibility to socialize (also through the computer).

The lab was held on a weekly base in a computer lab at the University of Trento. The classes of the lab were more informal meetings rather than formal lessons. Indeed, each year, in agreement with the supervisor of the senior center, we involved the participants in a kick-off workshop to grasp which topics would have been more appealing. Participants had to share their preferences on what they wanted to learn. To do so, participants were gathered in small groups and provided with papers, pens, markers and post-its, and through an open discussion they had to create a poster about what they wanted to learn. The workshop also helped us to understand the perspectives of the participants, their experiences with ICT, their expectations, and to give them an active role in the design of the program.

Along the lab, we worked with mostly women, who were 15 in total - men were 4 in the first edition, and 3 in the second edition - and the average age was roughly 72 years; few participants were new in the second edition. Participants were diverse under many aspects: they had different levels of education (from elementary school to university degree) and had different occupations before retirement (worker, clerk, teacher). Nonetheless, there was no correlation with
their computer skills. All of them had basic computer skills, such as Web navigation and emailing. A few participants could be classified as “expert users”: these users mastered social networks, word editor and video editing software. No participant had severe impairments, neither physical nor cognitive. However, participants skipped few classes during the lab – due to other obligations or minor health problems – and therefore, because of this turnover, the average of participants per class was approximately 15 people.

The first edition of the lab was dedicated to a non-formal computer education, decided together with the participants during the kick-off workshop. The lab led all participants to create a personal video (participants were free to choose the subject), with Windows Movie Maker as a “final outcome”.

Differently from the preceding edition, and in accordance with the experience gained, we based the second lab on the concept of “sharing”. Hence, during the kick-off workshop, we encouraged the participants to imagine and describe what they would like to create and share with peers and others through ICT, without considering which tools to use. Participants worked in small groups – provided with markers and papers – that had to be changed every fifteen minutes in order to foster a fruitful exchange of thoughts. Individuals had to discuss with their peers what they wanted to share and also wrote down their ideas on paper.

Once the participants finished the work, we collected all the papers and we had a small discussion about what each one had written. One of the participants, a lady who enrolled for the first time in the computer lab, and who never hid her reluctance to our idea of sharing, stated that “you [we] are asking us [them] the soup we [they] want to eat, before to even know which spoon we [y] are going to use”. This approach belied the expectations of the participants who were expecting to “receive” again a non-formal computer education. F., a participant who enrolled in all the past editions of the computer lab, and who is considered an expert user by her peers, stated: “you caught us by surprise!”. However, older adults actively participated in the workshop, and the preferences that they expressed helped us to gather them in four topic areas (groups): gardening, economy, do-it-yourself and eHealth. Each group had to produce a digital “sharable product”. Therefore, we settled a series of short “technical” classes. We introduced the participants to the use of Google Docs and other simple online tools to allow them to work also remotely and outside the setting we provided. Thereafter, the classes were organized to allow each group to carry out their work in situ, with our assistance when necessary. All groups worked on the creation of a text related to the topic they wanted to “share”, with integrated pictures and short videos on Google Docs; we kept the “ownership” of all the Google Docs in order to track changes and communications among group members.

After the works were all completed, we proposed to the participants to collect all their “products” into a simple website. The older users agreed to have a
platform to share their works and, eventually, we built a simple platform on WordPress.

3 Results of the Participatory Approach

The whole lab has been built on a “participatory approach”. Differently from a rigorous course, we involved the participants into an interactive work process. Apart from a few specific occasions, dedicated to technical lessons, every meeting – two hours long – was structured as following: At the beginning, participants were introduced to the work of the day; afterwards, every group could work on their “topic” assisted by the members of our research group; the last fifteen minutes, we had a gathering moment to collect feedback and suggestions – about the structure and topic of the class, and, at a later stage of the lab, also about the design of the website – from the participants. In addition, we set a mailing list to communicate with participants who often contacted us to give more feedback and suggestions. We used the mailing list also to deliver surveys (in Google Form) to integrate the fieldnotes we took throughout lab. Moreover, in accordance with the participants’ requests, we also delivered lecture notes of the technical classes.

Along the lab, we noticed that many older adults, regardless their skills, approached the computer as a tool that needed to be “domesticated”, and therefore, they were driven by the idea that there is one specific set of actions to follow to obtain one specific result. In other words, they believed that to master computers was sufficient to learn a specific “pattern” for each possible task. This subtended their unawareness about potentials and limitations of computers, and their difficulty to comprehend the logic that lies behind the interaction with ICT (i.e. metaphors), (Gabrielli et al., 2008). In this sense, our new approach belied their expectations because were based on a limited knowledge of the technology. Moreover, we learned that their expectations derived more from a sort of “social pressure”, which made them eager to learn as many things as possible and not to stay behind the time, rather than being driven by concrete needs respectively specific necessities. To overcome these limitations, we constantly engaged the older adults in discussions to convey the meaning of their participation in the decision making process. Of course, we explained that the “final users’ perspective” is fundamental to a design process, but we built our approach on their involvement through workshops, discussions, and short focus groups. Hence, we iterated this methodology throughout the lab and, despite their initial disorientation, participants gradually comprehended their role in the design process (Bratteteig & Wagner, 2014). As a result, older adults autonomously begun to address issues they wanted to solve, either concerning the WordPress site or on new sharing possibilities to explore. Indeed, the WordPress site was built on the participants’ suggestions.
To better understand their necessities, we organized a series of workshops – all integrated by a final discussion, which we recorded, that aimed to understand how to design the site: i) graphic requirements (colors, menu, structure etc.) and ii) contents of the website. For the first workshop, we created three experimental platforms - by using three web services, included WordPress - that participants had to review individually, with the goal to grasp the fundamental design criteria. Therefore, we delivered a form to all participant, who could review each platform by filling in three statements: “something you like”; “something you do not like”; “something you would change”. At the end of the testing, we had an open discussion that we recorded in order to allow participants to express additional comments. The information we collected through the forms and the final discussion regarded: i) design aspects that participants found unaesthetic; ii) visual features that hinder the interaction with the platforms; iii) textual contents of the platforms. This workshop led us to choose WordPress.

Afterwards, we organized a new workshop to arrange the contents of the site; we focused on the “mission” and “about us”. Participants were gathered into four groups to write what they wanted to be published. After the first round, we mixed and regrouped the participants into four new groups, who had to review all texts previously written in order to create a final one. All groups edited similar texts. Surprisingly, no group used the word “older adults”, neither explicated a clear affiliation to a “senior center”, which conveyed their reluctance to be considered “old” and unable to master technologies. Subsequently, we merged the four final texts into one, which we published on the website, together with the “sharable projects” that the participants produced. In addition, we enabled comments on the website.

Once the website was online, we dedicated a first meeting to make the participants explore the new platform. Thereafter, the older adults begun to visit and comment it also outside the setting of the lab. All the suggestions and requests we received during the successive meetings or through the mailing list, were followed by our design work on the website, which was consequently followed buy a new “revision” of the older adults in an iterative process.

4 Challenges and Future Work

Although the computer lab was not conceived as a workshop to design an online platform, we succeeded in carrying out a participatory design process that led to the creation of a simple website. Nonetheless, despite this accomplishment, the platform is not the main outcome. The creation of a common understanding of practices that led the participants to comprehend their potentials to shape the design process is what we primarily achieved. Despite our role as “designers”, the older adults perceived the website as “their own creation”; as has been proved by the increment of self-involvement of the participants. We can affirm that by
continuously conveying the role they had to play, and by being “at the service” of our group of participants, we fostered their willingness to contribute to the design process more as “makers” rather than “counselors”.

However, we need to consolidate this result. The participants implicitly and explicitly expressed their will to maintain the platform active, and to involve new users – not necessarily older adults – to “share”. In addition, there are diverse features they still want to be integrated into the new website; technical requirements (registration, forum), and methods to autonomously upload their “sharable products”, are still to be implemented. These additional features may allow us to verify the users’ satisfaction with the website, and their usage, which could validate the structure of the PD process. In addition, this work gives space to many other analytic frameworks. The data gathered will allow us to explore other dimensions as the deconstruction of stereotypes and the creation of a small community of practice (Wenger, 2011) among the participant of the computer lab.

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6 References


Third Spaces in the Age of IoT: A Study on Participatory Design of Complex Systems

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Abstract. The vision of the Internet of Things (IoT) poses chances and challenges for participatory design. In this paper, we report experiences from a research project that is building a system for supporting the autonomy of elderly users at their homes at well as in their neighborhoods. The complexity and invisibility of the underlying technological infrastructures made it challenging to engage potential users in constructing legitimate third spaces for co-design and led us to adapt our initial approach. Based on a discussion of our experiences we argue that the increasing complexity of both the problem as well as the solution space in the age of the IoT has implications for Participatory Design (PD) approaches and hint towards future research directions.
1 Introduction

The rise of the Internet of Things (IoT) does not only affect work practices, but also lifestyles and sensible areas of human being such as health, personal safety, and social life. Participatory Design (PD) is interested in giving users a voice in technology design, not only with the aim of designing "better" tools, but also to enable and legitimate users to bring in their expectations, fears and concerns. In this article, we want to report experiences from a research project that is focused on designing a system for supporting the autonomy of elderly users at their homes as well as in their neighborhoods. Apart from being based on an invisible, distributed system including various IoT sensors, actors and devices all connected by a shared middleware, this system is additionally complex in the sense that it is meant to adapt to the individual needs and routines of the users based on a machine learning component. The high complexity of this system in combination with our target audience of rather technically-unapt users led to a field of tension that resulted in several challenges in implementing a PD approach in this project and creating a legitimate third space for user participation. In the following, we will report how we attempted to overcome the challenges of engaging users in the design of such as system, and what we learned in the process.

2 Related Work - Involvement of users in design

Creating systems that support a broad range of users and contexts can be challenging. In software design, one way to address this challenge is the involvement of users in order to fit systems to their needs (Bødker, Kensing, & Simonsen, 2004; Finn, Jesper, & Keld, 2004; Kensing & Blomberg, 1998). Participatory Design (PD) in this sense offers a long tradition of involving future users in a design process, giving them a voice and empowering them to influence the design of their own future tools (Greenbaum & Kyng, 1991; Muller & Kuhn, 1993; Schuler & Namioka, 1993). The involvement of the users historically had a political notion (Beck, 1996; Gärtner & Wagner, 1996) and tried to foster a democratization of the workplace. In more recent works, PD is mainly understood as a design approach, used in industry and research (Bødker et al., 2004; Muller, 2003). A challenging task when making use of a PD-oriented approach is overcoming an “asymmetry of knowledge” or “symmetry of ignorance” (Fischer, 2000; Rittel, 1984) and creating a “symmetry of knowledge” (Fowles, 2000) between the designer / developer and the involved users. What it takes to create this symmetry is a process of mutual learning (see Muller (2003) for an exemplary summary of relevant works) in order to create a hybrid space, or “third space” (Muller, 2003). In this hybrid space, developers and users learn from each other and question their own assumptions (Bhabha, 1994; Muller, 2003).
Working with technologically unexperienced users, such as (our) elderly users has led to different understandings of how participation in the design process should be structured. Coleman et al. argue that the limited experience of the elderly can lead to more creative designs since the elderly will not align with current solutions (Coleman, Gibson, Hanson, Bobrowicz, & McKay, 2010). In contrast, Güldenpfennig and Fitzpatrick argue in favor of allowing inexperienced elderly to explore the design space beforehand by introducing market-ready standard solutions before involving them. Their argument is rooted in a “Research through Design” approach (Zimmerman, Forlizzi, & Evenson, 2007). They argue that certain practices, that potentially can provide benefit and should be supported, need to be evoked by introducing technology (Güldenpfennig & Fitzpatrick, 2013).

Both approaches have in common, that they expect a “design space” or a space of opportunity with regard to the design goals that can be either created by the users themselves (Coleman et al. 2010) or that can be understood by exploring technologies (Güldenpfennig and Fitzpatrick 2013). Yet increasing complexity in ICT, invisible technologies (through advancements in ubiquitous computing (Abowd & Mynatt, 2000)) as well as adaptable systems based on machine learning make it harder to envision potential solutions without actually experiencing them. Instead of envisioning a mobile app or a single artefact, users now have to envision whole infrastructures and understand their relations at least so far that they can give informed feedback. Thus, it remains an open question how PD should address situations in which a given design challenge may be feasible on a technological level, yet its implementation requires a complex understanding of how technologies of different kinds (sensors, computers, mobile phones, data sources, etc.) need to be combined in order to meet the given design challenge.

3 Background and Approach

The focus on the tension of highly complex systems and unexperienced users was established within a nationally funded research project that aims at prolonging the time elderly people can live in their own homes autonomously. A challenge of the project is to identify potentials for support and provide technological compensation for physical decline as well as tools to foster wellbeing in older age. The field we are working in comprises of three different neighborhoods (one in a rural area and two semi-urban areas) all administered by the same housing agency. The agency is involved as a project partner in our study. They allowed us to present the project in one of their regular meetings, and helped us to get in touch with several of the elderly tenants in order to invite them as participants to our study. The participants age ranged from 65 to 75 years and they were not experienced with new technologies. Nevertheless, as it was a voluntary
workshop their attendance can be ascribed to their rather active lifestyle (Participants mostly take care of their daily tasks on their own). Our approach combines several empirical methods ranging from ethnographic observations, semi-structured interviews, and various forms of participatory design workshops. For this study, we are focusing on a particular sub-set of these methods in form of a series of “future workshops” (Müllert & Jungk, 1987) that will be described in the following.

The aim of the future workshops was to sensitize researchers (researchers from the fields of HCI, computer science, architecture, social sciences took part in the workshops), landlords and other stakeholders for the issues of elderly people. In total we conducted three of these workshops, one in each neighborhood, each of which consisted of several phases: a preparation phase where we introduced the topic and methodology of the very workshop in detail; a critique phase where users were asked to formulate critical questions and voice their concerns about the idea as well as their current situation; a visionary phase where participants were invited to generate ideas about what an ideal situation would look like, without being concerned about financial or practical limitations; due to reasons outlined below, we skipped the implementation phase which is usually the last part of the method.

Due to the broad scope of the project, this phase openly aimed at identifying the most striking issues affecting their everyday lives the participants could think of. Exemplary issues mentioned were, noise and other disturbances in the neighborhood, complaints about maladjusted or not permitted use of shared trash bins, general lacks of decency, kindness and help in society or inappropriate design of in- and outdoor infrastructures (e.g. showers or bus stops). As expected, issues varied in terms of specificity and were not of focused on a specific technological nature or subject to a particular technological solution. At the same time, it became increasingly clear that the integrated vision we had for our system felt rather disruptive and hard to relate to mundane daily issues, which participants were interested in. The benefits of addressing issues in a more elaborate, integrated way did not become clear. This increasingly visible mismatch led us to stop the workshop at this point and skip the implementation phase.

As follow up to the context study we wanted to bridge the apparent mismatch. The idea was to come up with design ideas that could serve as an entry point for the users and be relevant in their daily lives even though they did not yet need or want the full package of ambient assisted living technology. For doing so, we combined the methods of Brain writing (Arthur B. VanGundy, 1984) and Design Studio as creativity methods. The Design Studio method typically consists of an illumination phase to get a shared understanding of the problem space across participants (we used Brainwriting in this phase), an ideation phase, which consists of rapidly crafting potential design solutions, and a presentation and
critique phase to discuss the solutions. This combination of methods was used in order to transform identified issues of the first phase into possible solutions. In this phase participants belonged to the fields of HCI, computer science, architecture, health, and social science. This set of interdisciplinary participants was chosen in order to include technological expertise but also explore solutions without technological focus. In order to include the future users of our system, we also made use of interviews which we had conducted with almost all participants of the future workshops, so that the participating researchers were able to take the role and perspective of the users as much as possible.

This phase resulted in the creation of different assisting technologies, e.g. little helpers (such as smart buttons that trigger certain predefined tasks, like putting things of a shopping list or shopping assistance to track what needs to be bought), different awareness tools (such as bracelets, that inform users about events or people nearby), safety, health and emergency tools (video surveillance, smart medication boxes or fall detection) and features to enhance wellbeing (such as social gaming in public spaces or evoking memories of happy moments).

To evaluate our ideas, we conducted a shared workshop with participants from all neighborhoods in order to present our ideas to the users and finally to allow them to participate in the implementation of the project. We grouped our ideas into areas that we had identified as being of interest for the users: health, living at home, and social participation. Each of these areas consisted of 4-6 ideas that we had generated in the second activity, each of which was discussed with participants of the workshop, again allowing them to voice concerns and suggestions. In order to engage the users and make participation easy for them, we tried to make the presented ideas as tangible and concrete as possible—a challenge especially with regard to the underlying system as well as the adaptive, learning nature of the project. It was hence no surprise that the discussions about the greater picture required more moderation and input from the present researcher as compared to the more direct, lightweight discussion of singular components. It was surprising to see that especially the safety related ideas were received positively (e.g. triggering emergency calls, surveillance of garages, etc.). Rather concrete concepts, like the smart buttons or shared bulletin boards were also deemed useful. Cross cutting ideas (e.g. a timeline to organize events and control the system or features based on pattern recognition), that were not as focused as the “single purpose” concepts were questioned in terms of usefulness and feasibility, even though they addressed specific practices of the participants.

4 Discussion & Conclusion

While the tension between the design and problem space is not generally new (Muller, 2003), we argue that the gap between available technological opportunities and awareness about and experiences with these opportunities
broadens. As technology represents an integral part in an increasing number of daily situations, the scope of the problems that technology addresses broadens and is harder to grasp for developers and designers. Addressing these more complex problem spaces resulted in adaptable, learning and connected technological infrastructures, which in turn are very hard to grasp for regular users.

First, the degree of technological complexity that we bring into the lives of users requires staging. While PD has initially been concerned with rather focused issues of specific tasks with the workplace, we are now dealing with technical systems that span across different spheres of life. This requires systems to be distributed, emergent, and more and more autonomous in their nature. The vision of the IoT, combined with approaches from ubiquitous and pervasive computing, leads to a situation where we are not so much dealing with systems anymore, but rather need to think about designing of, for and with systems of systems (Liegl et al., 2016). Such increasingly flexible assemblies of components imply very steep learning curves and demand new concept to foster learning of the design space within PD.

Second, for the developers and designers the issue of more interrelated problem-spaces. With ICT increasingly permeating the everyday life of users, and the rapid technological development that affect very different areas of human life, we are dealing with fields that are under constant change and characterized by a high complexity and interdependencies. As all sorts of technologies are already playing a role in the practices of users, it will be necessary to acknowledge them in PD, pushing the issues outlined above even further. As ICT is becoming more and more like an infrastructure for users, it moves more and more into the background; making it visible and addressable in PD thus can be hard despite or in fact because of its ubiquitous and pervasive character. From our perspective, this indicates a need for new approaches and tools to make technology and its effects more visible for the users, again allowing them to reflect what the changes in these systems mean for their life—not only on the level of the interfaces and applications, but also on the underlying infrastructures (Pipek & Wulf, 2009).

For future work, one opportunity might be to develop a more transparent design of ubiquitous ICT, in a way that it is not invisible to the user, but rather includes him/her in order to allow the discoverability and learnability of infrastructures for design in a similar sense as existing tools for appropriation support of users (Boden, Rosswog, Stevens, & Wulf, 2014). With regard to the idea of PD, it remains open how participation can be fostered on the backdrop of the presented issues of infrastructural complexity. For example, it is interesting to explore how to enhance the process of mutual learning. Our case serves as an example on how very complex technologies can be designed together with users. Yet, it is still and open question in how far exploiting user’s problems and critique as a resource rather than a boundary for design still holds up to the concept of PD,
and in how far ethical and social issues can then still be acknowledged and turned from matters of fact into matters of concern (cf. Liegl et al., 2016).

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6 References


“Even in a group I’ll not tell them all”: Understanding privacy concerns of older adults for designing online social networks.

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Abstract. In this paper we explore the challenge of obtaining privacy requirements for online social network systems (SNSs) designed for older adults. Since privacy concerns are purported to be a barrier to SNS uptake among older adults, it is important to design to address these. Unique challenges include the fact that older adults may not be familiar with online SNSs and may not understand existing options to optimise privacy on SNSs. Previously, disclosure grids have been used to understand information disclosure but a more appropriate way to identify privacy requirements may be through participant designed sociograms. Nevertheless, even this approach comes with challenges since privacy is an internal issue regardless of their connection to specific groups of friends. We suggest the possibility of trust-based network arrangements and discuss how these might adapt to information-types and how they might present feedback to older adult users to make privacy settings transparent.
1 Introduction

A key obstacle for use of online SNSs by older adults is said to be privacy concerns (Nef et al., 2013; Xie et al., 2012). Older people are often exposed to media reports of young adults’ online indiscretions and resultant problems. Why would older adults enter a world where privacy appears to be obsolete? If adoption is to be increased within this demographic, design of such networks must place users’ privacy concerns at the forefront of the design process to ensure that consequences of using these products are acceptable to older adults.

There are unique challenges facing researchers when working with older adults to uncover privacy requirements for SNSs. For example, older adults typically use SNSs less than the rest of the population (Perrin, 2015) and when many of them are asked about privacy on SNSs, they may not have a clear understanding of why they would use them, the risks present or the privacy protections available. Those who do use SNSs are not always aware of the privacy settings available or how to control them (Gibson, Moncur, Forbes, Arnott, & Martin, 2010; Madden, 2012). It has also been found that only a small number of users change the initial privacy settings, which often default to maximum visibility, not privacy (Gross & Acquisti, 2005). For these reasons, discussing the potential for privacy features in a new SNS for older adults can be difficult.

2 Research Context

Our context for developing user-led privacy features in an online SNS is the ACANTO project (http://www.ict-acanto.eu/). The aim is to improve the wellbeing of older adults (classified here as people over 65 years) through the combination of an intelligent walker to improve physical mobility, an SNS to develop social contacts, and a recommendation system to generate personalized ideas for activities (combining the physical with the social (e.g. recommendations to go out with a friend). Since the system may collect substantial amounts of data (e.g. physical activity, health indicators, emotional state, activities, social contacts), privacy concerns are significant. Potentially, such a system will feed some information to medical professionals to monitor behaviours that may provide an early warning of decline in an older adult who, for example, has not left the house for several days. Older adults may not want such data to be shared and therefore their privacy preferences related to the dissemination of such data will need to be made clear. The research reported here was conducted as a pilot study with 6 older adults (5 female, 1 male; mean age = 71.3 years) who conducted interviews about privacy among their friends. Some of the users had used online SNSs previously and all were familiar with the concept. The results of
these interviews were reported to developers of the SNS whom we collaborate with to develop the SNS.

3 Disclosure grids

One way in which privacy preferences have been explored previously is through information disclosure grids (Little et al., 2011). This technique asks participants about willingness to disclose different types of information to different groups. In the grid, one axis lists information types (e.g. medical information, financial details, or employment details) and the other axis lists groups (e.g. doctor, partner, or work colleagues). Participants indicate what information they would disclose to each group. This research has shown, for example, that users are more willing to disclose personal identity information (e.g. name and date of birth) than other types. Furthermore, applying the technique to a sample with a large age-range reveals that younger and older members of society are less protective of a range of information compared to middle-aged participants (Little et al., 2011). While younger and older participants were nonchalant about privacy by saying that they had nothing to hide, this may also indicate a lack of awareness of privacy-risks. If so, then this highlights the need to communicate privacy risks to participants when discussing privacy concerns during design-research. Simply asking about privacy concerns may not elicit complete responses if the risks of information disclosure are not fully known.

Nevertheless, the information disclosure grid technique is simple to apply and creates clear paths for information sharing between groups. Developers can design systems to ask older adults what types of information they are happy to share with specific groups of friends and this can serve as a privacy profile. However, because the approach may use a priori categories of groups that information will be shared with, a more inductive approach may be necessary to fully elicit requirements from users.

4 Sociograms

To develop a more inductive approach to privacy requirements-generation for online SNSs, we have used participant generated sociograms to create diagrams of participants’ offline social networks in order to ask them about information-sharing preferences. Participant-aided sociograms (Hogan et al., 2007) are produced by asking participants to write down lists of the names of all their friends, categorise those friends by closeness, arrange the friends in concentric circles around themselves at the centre, and then draw lines around friends to
show groups and lines between friends to show connections. This approach ensures that the identification of groups is inductive (i.e. they identify their own groups of friends) and subsequent questions about privacy can then be tailored to ask about information sharing with each of those groups. In our study, friends were grouped according to activities (e.g. dancing group, bowling club or quiz group) and after participants had produced these diagrams we asked questions about what types of information they would share with each group of friends. We had a list of information types that would potentially be used by the system (e.g. location, emotional state, and health information) and these were described to the user who was then asked what groups or individuals they would allow to see the information.

Because the construction of sociograms represents a social network, it is an ideal way of asking about privacy concerns within an SNS. Participants found it easy to identify people and groups that they would or would not share specific information with. Also, because the groups of friends were inductively generated, it was a more appropriate way of generating requirements for the proposed SNS. Nevertheless, the approach revealed some challenges for SNSs.

Firstly, simply because someone is a member of a group of friends does not mean that everyone in that group is privileged with the same information. Even when a group was seen as close, individuals within the group could be described as “nosy” and were excluded from knowing some things. Secondly, information is shared for specific purposes. With regards to health information, some people wanted to share it widely as a way of gaining support and understanding. For others, health information is hidden from family out of concerns that it might worry them. It is thus too simplistic to say that certain groups will always receive certain types of information. Thirdly, (lack of) trust seems to be a bigger privacy moderator than group membership. One participant, talking about information sharing, said, “It’s like a trust thing isn’t it? You know you build up trust. So everybody is different and even in a group I’ll not tell all of them what’s happening”. Clearly then, the sociogram approach highlights the issue of interpersonal trust which information disclosure grids did not. So how can we explore trust more fully?

5 Networks of trust

If we envisage information disclosure as a social contract in which we expect procedural fairness (including privacy and acceptable use of the information), then trust has a role to play in determining who we will enter this contract with. Just as trust in the SNS itself affects usage among older adults (Braun, 2013), so also trust can be expected be affect the sharing of information within the social network. Furthermore, it may be possible to envisage trust as a grouping category
rather than activities or group membership (Müller, Hornung, Hamm, & Wulf, 2015). We intend to conduct further research in which we ask participants to produce sociograms, not arranged by “closeness”, but by levels of trust. Furthermore, we can produce these sociograms using technologies such as NetCanvas (http://networkcanvas.io/) which allows users to reconfigure their networks based on different criteria (Hogan et al., 2016). In this way, participants can be asked to reconfigure their networks based on their trust of others to be recipients of different types of information. Culnan and Armstrong (1999) identify 4 reasons why people may trust people with information which may help understanding these trust groups: (1) there is an existing relationship (2) they perceive they can control future use of the information, (3) the information is relevant to the relationship and (4) they believe the information will be used to draw reliable and valid inferences about them and will be acted on appropriately. The reasons given for the arrangement of nodes will help explain why some people are more trusted than others with specific information and whether there are simple ways of asking questions that would identify recipients of different information. These criteria of trust can be reported to developers who can design the system to ask users who register to arrange their contacts based on the criteria of trust.

The configurable nature of networks produced in tools such as NetCanvas generates clearer visualisation of privacy settings by older adult users than typically allowed in SNSs insofar as users can see who in their networks see what types of information. Thus, as a design-research tool they are ideal as it is clear to older adults the precise meaning of social network structures and privacy with respect to specific information-types.

Yet even with this arrangement of a network by trust, it still does not deal with the dynamic nature of privacy. While family members might be trusted with health information in general, they may be excluded from specific facts to protect them from worrying. They are trusted, but other considerations affect privacy concerns. In order to probe these issues, participants need to be asked more specific questions, perhaps even given specific examples of information that would be shared with people in their trust networks. Using concrete examples will help to uncover the additional concerns that affect privacy aside from trust. And in the same way as scenarios have proved to be useful in privacy research (Ackerman, Cranor, & Reagle, 1999), concrete scenarios where users are asked to imagine specific information being shared with specific people will enable more precise reflection on when other moderators, aside from trust, are utilised.
6 User-feedback

One important feature of designing an SNS for older adults is feedback on the privacy settings. This has been a problem for many users, and particularly for older adults (Gibson et al., 2010). But even on ethical grounds, informed consent requires that users be fully aware of what information will be shared, with whom and for what purposes. Perhaps the solution is to present privacy settings in the same way as we suggest generating them - through the presentation of a trust sociogram. That way users can see exactly who sees what types of information. Furthermore, being able to easily configure the trust-levels of “friends” would enable users to dynamically change privacy configurations based on changing relationships with those on their SNS. The utility of sociograms in enabling potential users to think about their online SNS structure and relationships would provide insight into whether this is a good way of presenting this data to users.

7 Conclusion

In conclusion, we argue that designing SNSs for older adults requires attention to the levels of trust that older adults have towards others. Such levels of trust can be conceptualised in sociograms that show participants who they share information with so as to enable them to think precisely about whether they have privacy concerns with such sharing. Sociograms are a design-solution for researchers that enable older adults to think clearly about privacy. Furthermore, if sociograms are used as feedback to show SNS users their privacy settings, then this requires developers and designers to conceptualise the privacy settings of users in the same way as users conceptualise them. This shared “mental model” of the network between users, designers and developers ensures a coherent understanding of the system. In this way a user-centered approach to privacy is communicated throughout the entire project team.

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Challenges of building and sustaining living labs for designing services and products
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Abstract. In this paper, we show examples from one of the living labs from the Give & Take project and discuss the observed challenges of establishing and sustaining living labs in a participatory design context. The observations we present are around the mismatch between research language and everyday language, the need for an open-ended conversation for deeper insights and issues around the effort needed for sustaining labs.

1 Introduction

In this position paper, we explore the work involved in establishing and sustaining living labs in participatory design contexts. We introduce the insights from our living lab in Vienna, one out of five living labs from the Give & Take (G&T) project, and reflect upon common issues of building up and sustaining living labs with senior citizens.
In interaction design and information technology contexts, a living lab can be anything from a lab environment with a natural setting to a whole city or urban environment (Folstad 2008) and there are multiple organisational challenges to set up and run a living lab (Kanstrup 2008). In our work we set up our living labs as open innovation environments where co-creators (people from different backgrounds, with or without ICT/design experience) mutually work on future concepts. Our living labs are based on the notions of design labs (Binder, Brandt, Halse, Foverskov, Olander & Yndigegn 2011), that are open and iterative. Our understanding of living labs is that a living lab is a framework for the practice of collaboration, where improvising and learning are mutually practiced (Binder, Brandt, Halse, Foverskov, Olander & Yndigegn 2011), rather than a pre-defined and established environment for collaboration. This type of living labs is in the intersection of participatory design and diverse ICT living lab definitions. In our context, we see participatory design as the practice of participation, where the everyday practices are explored through co-design dialogues together with all stakeholders (Brandt, Binder & Sanders 2012). Therefore, our prototypes are exploratory prototypes (Heyer & Bretton 2010), which are developed through a process of participation and in an open collaboration approach (Binder, Brandt, Halse, Foverskov, Olander & Yndigegn 2011, Björgvinsson, Ehn & Hillgren 2010, Brandt, Binder & Sanders 2012).

The project & methodology: Give&Take is a service design research project with a multi-disciplinary international team. During the lifespan of three years, the team of researchers, SMEs and senior participants co-design a reciprocal sharing-service for local neighborhoods. In the G&T project, we use a participatory exploration approach together with open innovation practices to establish sustainable living labs. In the first year of the project, we organized open collaboration between multiple stakeholders (researchers, companies, municipalities and senior citizens) through design laboratories. From the second year on, based on the gained knowledge, we established five living labs in two countries.

The engagement of senior citizens: From the early days of the project, the team established dialogue meetings, interviews, workshops, co-design and community building activities as design labs and living labs. The main aim of this process is to stimulate co-design sessions together with senior citizens and to mobilize them as co-designers. Participants of the co-design sessions are local members of different neighborhood centers in Austria and Denmark. This project approaches senior citizens not as a specific group defined by age, but rather as active participants of the design and co-creation processes. Therefore, the seniors that are involved in this project are people who like to actively contribute to societal
discussions or neighborhood events. Although we concentrate on retired people only, and this can be achieved by a certain biological age in most cases, our group is heterogeneous in multiple perspectives such as income, education, technology usage, everyday rituals and interests. We further concentrate on neighborhoods or communities of shared interests as the space of collaboration and set our activities in each context differently.

2 A closer look into Vienna living lab

Entailed in living lab methodology is a significant amount of work to build up and sustain such a lab. (Luckner, Fitzpatrick, Werner & Subasi 2015) To give a closer look, we discuss the first six months of one of the Austrian living labs established around a neighborhood center that is part of a large housing complex.

The Viennese neighborhood centers are nonprofit organizations with a full monthly program throughout the year providing a variety of activities for all generations. Figure 1 shows all activities of the G&T project in this living lab between mid-September 2015 and mid-March 2016. During this six-months period, we organized and attended nine planned events, had three meetings with coordinators at the center and documented a continuous usage of exploratory prototypes between November 2015 and March 2016.

![Figure 1. Sample living lab activities in one selected Austrian living lab (Vienna Lab), 6 months period (own figure).](image)

3 Issues and considerations

Based on our experiences from these six months, we made the following observations: First of all, setting up and running living labs in senior citizens’ own environments is a bottom up and very enriching experience for us as researchers and designers. The active involvement of researchers and designers in a setting
with different cultures, interior design and everyday life is a good training for openness, empathy and observational skills. Further, the insights and the engagement from the living labs that are carried to other stakeholders (e.g. via videos) are driving motivations for all the stakeholders of the project. What we learned about the everyday life of the community and its relation to co-creation processes are key insights for our design process.

In the rest of this discussion, we concentrate on the practical issues of setting up and running living labs, as we believe the fine details were the drivers of being able to engage senior citizens (or not) in the living lab during this period. We highlight three key issues that may be important for the future of establishing and sustaining living labs:

**Researcher language vs. everyday language:** During the project, we faced many challenges due to a possible mismatch between research practice and the everyday practices of the neighbourhood centre. Our processes on how to present to an audience, how to record data or how to get consents from people were defined by our research practice. But once we were in the field, it became clear that these practices were creating a language that was not fitting to the everyday language of the neighbourhood centre. As an example, after a slide-based project presentation from a computer, one of our participants said this project is too scientific for her. Another time, another participant said she very much liked the workshops, however she wouldn’t like to be recorded or have photographs taken during this process. We even had a person leaving after the informed consent form was handed out to be signed, as he said it was too scary and serious to sign such an A4 size confirmation letter (as e.g. this reminds him something like a bank contract or a phone contract due to a “signature”). Here it would be important to question how far we can change and adapt these practices for the future practice. Can we make a totally different informed consent? Can we work around the recording process so that it becomes a natural part of the lab activity? How can we better present our work so that it doesn’t sound that scientific?

**Off-track motivators and celebration culture:** In contrast to the language issue, we usually had a good experience of things that were not written in field manuals for participatory design, but which we based on our observations on what fits to
each particular context. At a time where the prototypes were not running very smoothly, we had a participant reassuring us that she was not participating in the project for the sake of the technology, but because she appreciated the kind personality of the field organiser and so continued to attend our sessions. In another session, we brought one of our guest researchers to the neighbourhood centre. During the session, our guest showed participants photos from her garden full of flowers on the other side of the world. The same hobby shared across continents initiated discussions about how the technology could be used for sharing.

And last but not least, we observed multiple instances where many small gestures on our part, such as bringing homemade cakes, or self-made gifts for the participants for Easter, all initiated unexpected communications and generated positive reactions (see Figures 3 and 4):

Figure 3. Our guest researcher showing her backyard flowers, gifts we made for Easter via laser-cut and the home-made cake

Figure 4. Cake recipe put on the Give & Take platform after the meeting

*Sustaining living labs without coordination:* One key aspect of the living labs is the designed process of co-creation. The field organisers apply a pre-planned process in each session. This includes the preparation of materials, invitations, wrapping-up of the sessions and creation of the elements in-between sessions to sustain motivations, such as newsletters, photo stories and videos. On top of this, as mentioned above, a lot of human effort is put to sustain these relationships,
e.g., in the preparation of cakes, gifts, attending to out-of-work events that happen in the community such as summer parties and so on. The quality of the process is very much dependent on the time effort that is invested into every detail. Of course, all these cannot be seen as one-way actions from researchers. The researchers see a big value on the mutual learning process of the participation. In practice, it is important to pay attention to these details and allocate enough time and resources for these gestures.

4 Conclusions

Our insights from the last six months in one of our living labs point to a multitude of fine details that can build a better open innovative approach in living labs. As Lindley et al. (Lindley, Harper & Stellen 2008) summarized, ageing is connected to the broader concepts of social life, such as notions of relationships, and re-interpretation of reciprocity as more of an asymmetrical approach, where older adults have a lot to give, and often more than they need to take. The observations highlighted in the previous section can also be beneficial for practice of participation in living labs. Establishing living labs in a more equally-led way from the beginning, integrating the everyday language of the living lab environment right from the start instead of using a research language, and integrating celebration and surprise (e.g., having guests) into our research structures can be interesting ideas to support the building of relationships. A recent study showed that the ways ageing in the field of HCI is often conceived as restricting the way we design technology for older members of our society (Vines, Pritchard, Wright, Olivier & Brittain 2015). In order to tackle this issue for living labs, we need to question our own research practices and how they fit to the everyday life of the senior citizens we want to work with in our living labs.

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6 References


Wizard of Oz Studies with Older Adults: A Methodological Note

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Abstract. Wizard of Oz (WoZ) is a prototyping technique in which users basically interact with what they believe is a fully functioning technology, while, in reality, the system is operated by a researcher, usually concealed from the participants. WoZ technique allows the exploration of user requirements and design concepts at an early stage in the design process and it can provide information about the interaction of different group of users, including older adults. In this paper, we provide a brief overview of WoZ method in HCI and, based on related literature and our experience, we present the methodological value and the potential drawbacks of WoZ approach in User-Centered Design when involving older people. We discuss indications on organizational and ethical aspects of conducting WoZ studies with older participants and highlight the positive impact and possible pitfalls of this approach in sharing vision of future technology and communicating ideas for design.

1 Wizard-of-Oz Studies in HCI

Wizard of Oz (WoZ) is a prototyping technique commonly used in Human-Computer Interaction (HCI) research (Dahlbäck et al. 1993). Similar to other methods for involving users in the design process, such as scenarios discussion, video prompts and low-fidelity prototypes, WoZ prototypes can be used to support conversations about technologies that are not yet developed. Before
discussing our experience in using WoZ with older adults, we briefly introduce WoZ studies and taxonomy.

As reported by Green and Wei-Haas (1985), WoZ technique was firstly applied in the field of Natural Language Processing and then used in different research domains including HCI, Human-Robot Interaction, Usability and User-Centered Design. The WoZ technique allows the involvement of users who operate an apparently fully functioning system, whose missing functions are supplemented by a human operator called “wizard”. The wizard, usually hidden to the users, can simulate the effect of one or more functions that are not currently implemented in the system. For example, a system based on an automatic speech recognizer can be evaluated before the recogniser is fully functioning, using a wizard who listens to the commands uttered by the user and let the system manually answer in the appropriate way. The goal of WoZ prototypes is to make users actually trying out an external representation of the final system before it is fully developed. Users can contribute at various stages of the design process mainly by being asked for their opinions on the specific prototype or by being involved in discussing features of future technology.

According to the taxonomy described by Höysniemi and Read (2005) and by Eynon, Davies and Holmes (2012), many different factors characterised the design of WoZ studies, such as:

**Technology and experimental set up**

- **Functionality of the technology**: which may vary from non-tech prototypes to more sophisticated devices.
- **Wizard control**: the wizard may provide all the functionalities in the systems or be only operating a part of them.
- **Number of wizards**: the device can be operated by one or several wizards; when multiple wizards are involved, each one controls one functionality.

**Wizard**

- **Discretion of the Wizard**: the wizard may follow pre-defined rules and patterns when operating the system, being constrained to a number of options, or she might be allowed to freely operate the system.
- **Wizard visibility**: the wizard may be seen or unseen / heard or unheard by the participant(s). The operator may be seen but not known to be operating the system, or, his role may have been clearly explained to the participants.
- **Wizard knowledge**: the wizard may be or be not familiar with the technology being studied, with the domain investigated or with the characteristics of the users participating in the study.

**Participants**

- **User knowledge**: related to the visibility of the wizard is the amount that the user knows about the setup. Levels of deception vary across WoZ studies from the user believing that all is done by a functional interface to the user knowing that the wizard is doing all the manipulation. It is common to give the user knowledge that lies between these two extremes.
• **User understanding**: the extent to which participants understand the true nature of the study, the deception and consequences.

A final but not less important aspect is the evaluation and assessment of the information collected in the WoZ sessions. WoZ technique allows indeed (1) to collect information from the observation of the users’ behavior when interacting with the technology and (2) to investigate user reactions and personal opinions with post-session interviews and focus groups.

Generally, the main benefit of using WoZ studies is to give researchers the opportunity to test new user interface concepts before the technology is mature enough, considering different scenarios, even fictional and futuristic ones. Systems used in WoZ studies are usually easy and relatively inexpensive to develop, compared to complete and fully functioning systems. The method also facilitates gathering qualitative and quantitative data on user’s preferences and usage patterns, and depending on the study setup it might enable creative responses.

Issues of ethics and research validity are considered as the main drawbacks of WoZ studies (Eynon et al. 2012). Deception is a crucial component of WoZ approach: (all) participants involved in the study should believe that the system is autonomous rather than operated by a person. Following the framework proposed by Adar and colleagues (2012), WoZ studies represent a case of functional deception: they allow participants to believe that they are using a working implementation, but are in fact playing in a semi-functional sandbox, that is operated by a real person. As stated by the same authors, this type of deception can be considered benevolent if “the end-user would prefer an experience based on the deceptive interface over the experience based on the “honest” one” (p.1865, Adar et al. 2012). Given that WoZ studies work exclusively through deception, a countermeasure that researcher can adopt to mitigate the potential harm of deception is to include a debriefing of the session, revealing the true nature of the study (and of the technology functioning) to the participants (Adar et al. 2012).

# 2 WoZ Studies with Older Adult Participants

This section revolves around the question whether WoZ method is a suitable method for communicating design ideas to older participants and for exploring aspects of future technology. It can be argued that users involved in a WoZ study can actually see how a new technology function and, therefore, they can be more willing to evaluate whether this technology would meet their needs.

## 2.1 Using WoZ Technique with Older Adults

A number of WoZ studies have been conducted to involve older participants in evaluating prototypes of social robots (Riek et al. 2012), home health care systems (Takahashi et al. 2003), online learning services (Eynon et al. 2012) and voice interfaces (Portet et al. 2014). Within the ECOMODE (Event-Driven Compressive Vision for Multimodal Interaction with Mobile Devices) project, we
used the WoZ technique for investigating older adults’ opinions on multimodal interaction. ECOMODE project goal is to develop multimodal human-computer interfaces for mobile devices where the interaction is based on a combination of vocal commands and mid-air gestures, specifically addressing the needs of older adults and visually impaired people. During the first year of the project, we designed a WoZ study, involving 10 older adults (average age 68.9, SD= 3.62) with the aim of (a) exploring how older adults use multimodal interaction when introduced for the first time to a multimodal interface, and of (b) investigating their preferences and opinions on different interaction modalities (vocal, touch and multimodal, meant as combination of mid-air gestures and vocal commands). The WoZ setup comprised a tablet device used by the participant and controlled by a computer operated by the wizard, who was present in the same room together with a facilitator. The task consisted in using the tablet device for taking pictures of the indoor environment by interacting with the tablet using multimodal gestures, i.e., the combination of mid-air one-hand gestures and vocal commands. The task was composed of several sub-tasks (e.g., opening the camera application, shooting a photo, zooming in the scene, etc.) that were suggested by the facilitator to the participants. After completing the task, individual semi-structured interviews were conducted to collect information on the user experience. During the interviews, participants were asked to comment on their experience in using the tablet and to provide feedback on the multimodal interaction. Finally, the participants received full information on the study procedure (the WoZ technique) and on the research goal.

Using the WoZ approach, we were able to engage the participants in discussing their opinions on the technology, even those people less familiar with technology. Although participants used multimodal gestures for the first time, they enjoyed the WoZ experience and reported advantages and limitations of such type of interaction making examples based on their everyday activities. For instance, they spontaneously produced scenarios in which they elaborated on bringing the multimodal tablet on their daily walks or at home, discussing the potential benefits of vocal commands, giving suggestions on how to make the gestures easier to remember and describing situations where multimodal interaction might be inappropriate (e.g., while being in a social situation).

2.2 Benefits and Limitations of WoZ Studies with Older Adults

Informed by related literature and by our experience in conducting the WoZ study, we expanded the taxonomy presented in Section 1 to include indications for the design and organization of WoZ studies with older participants:

**Technology and experimental set up**

- **Functionality of the technology**: depending on the technical expertise of the target group, the technology should look familiar to users in order to reduce technology fear and interaction barriers (Coleman et al. 2010).
- **Wizard control**: the wizard should operate all functionalities that might hinder participants in interacting with the system and limiting accessibility barriers.
• **Number of wizards:** studies with older adults might require a facilitator always present with the participants in order to facilitate the study procedure (Lindsay et al. 2012). The wizard should exclusively operate the technology, remaining preferably in the study location or in a specific room.

**Wizard**

• **Discretion of the Wizard:** independently of the specific user group involved, the wizard should always follow pre-determined rules when operating the system in order to ensure consistency between different study sessions.

• **Wizard visibility:** our experience suggests that the wizard can be present in the same room of the activity without being discovered or distracting the participants. Having the wizard in the same location might help the participant to fully understand the WoZ setup when revealed.

• **Wizard knowledge:** the wizard should be aware of the type of participants involved in the study, such as older participants, and take into account possible age-related impairments.

**Participant**

• **User knowledge:** as previously discussed, deception is a necessary element in WoZ studies. It is important that the participants receive a full explanation of the experimental procedure before concluding the study.

• **User understanding:** when dealing with some user groups, especially with older adults or children, participants might be at more risk of harm. This should be always taken into consideration by the researchers conducting the study.

One of the main advantages of using a WoZ setup with older adults is that non-technology experts can take part in the design process more easily as they can use the prototype without having specific technical skills. Moreover, the fact that participants can actually interact with the system is particularly useful when dealing with older adults that might prefer to discuss on practical experiences instead of elaborating on abstract scenarios. In order to reduce the need to engage in deep explorations of abstract concepts, practical or even playful WoZ activities can be helpful to overcome participants’ discomfort and to encourage participation (Iacono and Marti 2014). Similar to other techniques, such as video prompt and low-fidelity prototypes (Lindsay et al. 2012), WoZ setup can help designers and researchers to engage older participants in conversation more naturally and quickly, establishing a common frame of reference for the discussion. Moreover, the experience with the WoZ session can support the creation of shared references and of a common ground between participants and researchers based on the actual use of the prototype. This is an important element for helping older participants to express their thoughts and comments and for establishing the right and productive atmosphere during the study (Lindsay et al. 2012).

Even though WoZ studies have important benefits, they also bring some drawbacks:
(1) *Expectation issues*, such as creating too unrealistic views on technology development. This might be an issue especially when involving older participants, who may be less likely to accept and may struggle to use forward-thinking technologies, that might be perceived as too unfamiliar and unaffordable (Coleman et al. 2010). Technology should look and feel familiar to them, and more importantly, researchers should provide older adults with clear and detailed information about the benefits that adopting such technology will bring;

(2) *Wizard issues*, particularly, how the capability of the wizard affects the setup. The wizard might experience high cognitive overload when asked to operate many different functions in the system. When involving older adults, the wizard should be assisted by a facilitator (Lindsay et al. 2012), a second researcher, who will guide the user through the study session and support the wizard in focusing on his task. Moreover, researchers and facilitators should use a clear and understandable language and structured activities in a way that they are accessible and not tiring to participants;

(3) *Ethical issues*, especially the deceptive nature of WoZ studies, which in worst case may lead to unethical research. Researchers should always include a debriefing section, assuring that the participants really understand the deception involved in the study. Afterwards, researchers should also remind the participants that they can withdraw their consent and have their data removed.

Concluding, we presented benefits and limitations of using WoZ studies as an approach for engaging older adults in discussions about design ideas through concrete examples and practical issues. Research has now widely shown that older adults do not reject technology more than other age groups. On the contrary, they are willing to use and discuss about novel technology, when it meets their needs and expectations (Conci et al. 2009; Lindsay et al. 2012). An approach like WoZ, that supports older adults to physically explore and interact with technological prototypes, can improve their engagement and participation in the design process; however, organizational and ethical aspects should be carefully considered as well.

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4 References


Understanding Motivations in Designing for Older Adults

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Abstract. A wide spectrum of research has been done in designing technologies for older people that address different aspects of the ageing process, such as physical, mental and emotional health. Recently, technology-based interventions that promote physical activity have gained momentum. Prior to designing the interventions, the key question we need to answer is why older people would use them. This requires consideration of personal, as well as socio-technical context of engagement. In this paper we describe our work in understanding personal and socio-technical factors of user engagement in using technologies for older people that promote physical activity and social interaction. We use the results to identify, articulate and validate user scenarios for our intervention design.
1 Introduction

The general context of our work is to foster physical activity with older adults, in which they do not very often engage at a satisfactory level (Sun 2013). Although physical activity cannot stop the biological ageing process, there is evidence that regular exercise can minimize the physiological effect of ageing, thus increasing life expectancy and limiting the development and progression of chronic diseases (Nelson 2007). By taking advantage of the role of physical abilities and psychological factors in physical activity of older adults, we aim to foster active ageing by designing technology that provides physical and motivational support to older users.

Most of the existing technology-based interventions address ageing around a dominant stereotype, which describes older adults as people in need and technology as the solution to their problems (Gregor et al. 2002, Wilkinson and De Angeli 2014). However, there is strong evidence that this stereotype often leads to inappropriate design of artefacts, which older people may refuse to use or, in the worst case scenario, may be hampered by (Vines 2015). Studies on healthcare technologies move towards a better understanding of ageing as a process rather than old age as a state, where systems should help people move smoothly through later life as circumstances and capacities change (Light 2016). Being part of this paradigm shift, an important issue we need to address is to understand motivations of older people to participate in technology use prior to designing the interventions.

In this paper we instantiate a framework for understanding individual preferences and socio-technical context of engagement in healthcare interventions for ageing that promote physical and social activities. Our goal is to understand individual, social and technological factors to motivate engagement. We argue that addressing the goal above is crucial to design effective intervention strategies for older adults, which build on physical activity and social interaction.

2 Background

We overview some of the relevant and recent research concerned with the motivation of older people to participate in technology-based health interventions and technology-enabled social interaction.

Waycott et al. (2016) argue that much can be gained by looking beyond the technology itself and examine the socio-technical context in which people choose to not participate or discontinue a social isolation intervention. So far, focus on user participation has been in the design process, with limited interrogation of issues surrounding how users participate in the evaluation and use
of new technologies. Researchers have called for more detailed reflections about both positive and negative experiences with technical interventions. Questioning values is another important practice of examining whether the values that technologies embody need to align with the personal values of the people who come to use them.

Vines et al. (2015) propose a general agenda for ageing research. They argue for embracing diversity of individual experiences and reflecting upon how personal histories impact technology use. They also point out that participation can be increased by engaging with older adults prior to the design process where fine-grained measures of “success” in later life can be identified and used to identify useful interventions to design.

Light et al. (2016) reflect on latest practices of using technologies for ageing. They emphasize the matter of engagement when designing technologies as a way to support emotional health during use.

Schorch et al. (2016) give an insider’s perspective on older people as informal caregivers. One of the motivations that emerged from their study is self-recognition of the informal caregivers as care experts over time. An important design implication is the need for social activity support and coordination.

3 User Engagement

We conducted a study to elicit and explore the physical and social activities that older adults like to take part in, the factors that influence their intention to take part in the activity and the barriers to taking part. The study was organized as semi-structured interview with 18 participants. Ten of them were interviewed in Italy (6 females, 4 males; age ranging from 65 to 102 years old, mean 75; 5 from rural areas, 5 from urban areas), and 8 in the UK (4 females, 4 males; age ranging from 60 to 87, mean 70, 8 from urban areas). The aim of the study was to understand factors that can encourage older adults into sustained and varied physical and social activity. In the following we describe the theoretical foundation and summarize results of the study.

3.1 Theoretical Framework

To analyse user intention to perform a specific behaviour we use The Integrated Behaviour Model (IBM) (Montano et al. 2008). The model offers granularity of motivational factors, which we believe is crucial to fully understand the complexity and diversity of motivations to engage with physical and social activities. It describes the intention to engage in a given behaviour as a function of the attitude, the perceived norm and personal agency related to that behaviour.
The three components originally come from the Theory of Planned Behaviour (TPB) (Ajzen 1991). The distinctiveness of IBM is that it elaborates this model and specifies the kind of inputs for attitudes, norms and agency, along with additional factors that influence behaviour (e.g. knowledge and skills to perform the behaviour, salience of the behaviour, environmental constraints and habits). The attitude can be defined as a person’s overall reaction to the behaviour. It is determined by the experiential, emotional responses (affective) and the beliefs about the outcomes (instrumental) associated with a given behaviour. The perceived norm reflects the social pressure one feels to perform (or not to perform) a particular behaviour. This is based on what people think other people think one should do (injunctive norm) and the perception about what others are doing (descriptive norm). The personal agency consists of two constructs: perceived control and self-efficacy. Perceived control is determined by the perception of the degree to which various environmental factors may facilitate (or prevent) carrying out the behaviour. Self-efficacy is the perceived confidence in the ability to perform the behaviour (Montano et al. 2008).

We use the IBM not as a prescriptive model (i.e. what should be done), but rather as a descriptive model that - based on extensive empirical research - identifies the psychological factors that are highly likely to contribute to behaviour intention, implementation and change. The model guided the design of the interview schedule for our study.

3.2 Study Results

We analyse the results against the components of the IBM.

Attitudes - Analysing the attitudes towards the activities people still engage in, the ageing variable could almost go unnoticed. Older participants elaborated on physical and mental well-being, gratification and reward. Physical activities, such as walking or hiking, were described as sources of serenity (mental well-being) and a way to stay fit (physical well-doing). Furthermore, participants elaborated on cognitive capabilities, spatial abilities, attention and concentration (e.g. while describing a path or the ability to recognise a plant), as well as social experiences (e.g. when they walk with others, friends or acquaintances). These varied positive attitudes, relating to senses and cognition, counteracted the risk of physical, social and psychological decline.

Norms - Reflecting on the norms that regulate their activities, participants presented a view of themselves and their actions as strongly situated in the social and material world. In these reflections we noticed an interesting dichotomy. If on the one hand, family members seemed to have a main influence in the selection of an activity (injunctive norm), same-age peers became influential in defining the norms regulating the activities in practice (descriptive norms). Relationships with peers were perceived as being influential in practice because they were framed
into a mutual exchange among people with similar life experiences. On the contrary, relationships with family members reflected an asymmetrical role, with somebody being in charge of helping the other. The majority of interviewees reported to still play this role (i.e. with children and grandchildren), while others declared to need help from family members or caregivers because of physical impairments.

Agency - The effect of ageing came out strongly when considering the perception of personal agency. All participants were well aware of a general decline of their physical abilities, but they appeared to be determined and resilient (self-efficacy). The majority of the participants reported a high internal locus of control, which helped them to face the difficulties related to ageing (perceived control). The narratives about agency reflected a view of ageing as a natural process. Even when talking about health impairments as a barrier to specific activities, ageing was not perceived as negative. On the contrary, resilience, persistency and proactivity were main topics. Participants took pride in emphasising what they actually did and stressed their persistent will to be active. When considering the agency of older adults, it is important to consider their social relationships. Results highlighted that older adults build their agency with respect to their social relationships, all the more by comparing with age peers.

3.3 Design Implications

Reflecting on the results of the study, we identified two main directions in designing health interventions that promote physical activity and social interaction.

Design for resourceful ageing – By grounding design in resourceful ageing (Heil and Marks 1991), the focus shifts from creation of tools in support of older people to construction of devices which improve self-efficacy. So, on the one hand, it is of interest for designers to investigate possibilities for exposing the positive image of the elderly as active and resilient, making visible their skills, knowledge, abilities while respecting their will. On the other hand, designers have the opportunity to work on the creation of a sustainable ecosystem of human and material resources, while amplifying their social value with technological tools. The framework of resourceful ageing suggests design trajectories related to volunteering and family caregiving, which we plan to use in designing scenarios. Engagement of older adults in volunteering has been discussed in literature. It has been reported that volunteers gave account to higher levels of well-being and life satisfaction compared to non-volunteers, suggesting that volunteering can play an important role in maintaining good health in later life (Musick et al. 1999).

Design for pleasure – As indicated by our results, pleasure and enjoyment play a crucial role in motivating older people. By elaborating on this trajectory we will
go beyond the dominant medical model according to which older people need to be monitored, helped and assisted towards independent active persons involved in different kinds of activities for emotional and mental well-being (Cozza and De Angeli 2015).

4 Conclusion and Future Work

In this paper we describe the results of the research we conducted to understand motivations of older adults to engage in interventions that promote physical activity and social interaction. The results indicate that attitudes of older people are strongly positive and embodied. Well-being and well-doing are the main motivators to be active. Reflections on social norms highlight a differential role for family and same-age peers. Finally, considerations about agency suggest that older adults perceive ageing as a natural process, which can be dealt with proactively and resiliently. Although the results cannot be generalized due to the limitation of our sample, most of the results were unexpected providing a portrait of the elderly in contrast with the stereotype as people in need, but as independent active persons involved in different kinds of activities in both social and private contexts.

Based on the results, we set design guidelines according to which our immediate work is concerned with articulating engagement factors in the design of scenarios and validating the scenarios with older adults.

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6 References


