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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 (Fritzpatrick & 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 (Abrás, 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 (Muller 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 researchers 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 unobtrusive 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 *Lynne 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 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.

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