ICT-Development in Residential Care Settings: Sensitizing Design to the Life Circumstances of the Residents of a Care Home

Claudia Müller, Cornelius Neufeldt, David Randall, Volker Wulf
Information Science and New Media
University of Siegen
Hölderlinstr. 3, 57068 Siegen, Germany
{claudia.mueller, cornelius.neufeldt, volker.wulf}@uni-siegen.de; daverandall2008@gmail.com

ABSTRACT
In this paper we wish to contribute to the recent ICT-design for and reflection of the application field of residential care homes. In doing so, the contribution of the paper is twofold: we wish to highlight some aspects of the every-day life of institutionalized elderly people – trust, sociality, and memory – which not only provoke reflection on design ideas but also on the socio-technical nexus in which design for the elderly has to take place. This domain, we suggest, is one where the 'parachuting in' of technology is unlikely to prove successful, for reasons we examine below. Further, we suggest that design for and with the elderly carries with it some specific problems. We illustrate our methodological reflections by means of an ongoing empirical research project which aims at the development of a large-screen display for a residential care home.

Author Keywords
Elderly people; residential care; design, methodology; action research; large-screen display

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H.5.2 [Information Interfaces And Presentation]: User Interfaces – Theory and methods;

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Human Factors; Design.

INTRODUCTION
Ethnographic and related qualitative research in the context of HCI has progressively extended its remit. One such area is that of assistive technology and, more specifically for our purposes, support for elderly people. Such research confronts unique problems insofar as traditional ethnographic methods, reflecting notions of the 'native', the 'stranger' and processes of enculturation, may not be entirely appropriate. This, we suggest, is particularly the case where the elderly population in question is living in a residential nursing home. If so, then a more creative and opportunistic approach to ethnographic work may prove necessary. In this paper we further elaborate on a broadly ethnographic approach which attempts to deal with three interlinked issues.

Firstly, we argue, the idea of a generic concept of the 'elderly' itself needs to be challenged, since there are specific cultural, institutional, professional policy and age- and health- related issues [1,32] that are implicated here (we have no space to go into theoretical debates concerning the best way to understand 'aging' in society but of relevance here would be so-called 'structured dependency theory' and its critics. The former aims to isolate the specific factors which cause varied experiences of aging whilst critics tend to see such arguments as 'disempowering'(See e.g. [13] for a discussion).In detail, therefore, our research focuses on a very elderly population and one, moreover, which has had to contend with a transition from family to care home. This issue of 'transition', we argue, is a major issue when reflecting on ICT usage for the improvement of quality of life.

Secondly, there are issues relating to the appropriate level of 'granularity' associated with the analysis of 'situated practice' [33], and thirdly in this specific case there are issues which have to do with the relationship between ethnographer and 'user' and which implicate some form of action-based or interventionist approach (see [7]). Specifically, we were confronted with the problem of getting a very elderly user population (aged on average between 80 and 90) in a residential home interested in, and motivated about, potential ICT applications. In the residential home in question, known features of the 'digital divide', notably the poor take-up of ICTs by the elderly and by those of low socio-economic status (most of the residents were from relatively poor backgrounds), compounded by experience of very disruptive life processes during and after the war had a significant impact. In much the same way, the care home instantiates known issues of the 'digital divide' [23,37]. It provided nothing in the way of Internet access, few (if any) residents had computers, and only a very small number had any experience at all of using computer technology. We were not, then, able to conduct

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studies of their routine ongoing, ordinary experience and use of IT in quite the way we might have wanted. On the other hand previous research has consistently shown that there are significant benefits to IT adoption for the elderly and even for the very old living in residential settings [24] and so we had good grounds for pursuing, by whatever means we could find, methods for engaging this potential user population. In detailing our own work here, we draw on certain perspectives on 'action research', notably those which stress the 'process of systematic reflection, enquiry and action carried out by individuals about their own professional practice' [11]. In other words, there was a process of learning for us as well. Here, we draw on approaches to the 'cultural probe' and on the notion of 'co-construction' as adjuncts to the existing methodological tool box in an effort to address this challenging application field [6,9,17,20].

In what follows, we describe the methods we adopted, the analytic results and some reflections on the development of a large screen display in the care home. Some design implications are then introduced stemming from our empirical investigation.

ICT-DESIGN FOR RESIDENTIAL CARE RESIDENTS: DEALING WITH 'CONTEXT'

The topic "ICT development for old people" and especially in the context of residential homes has not been extensively studied. Indeed, it is sometimes argued that the topic is often neglected, trivialized or treated as merely usability challenges [5,21]. Other researchers report on experiences we also have had, namely being confronted with rather cynical questions about whether it is worthwhile engaging in ICT-design for these old people [2,6]. They are, in other words, classic exemplars of the 'digital divide'.

But there are several reasons for going on with research in this domain. Besides the fact that digital – and social – exclusion remains a vibrant research topic, demographic changes mean that it will become more, not less, important. The fact of an increasing number of single households and increased geographical mobility means that residential care will become an alternative for more elderly citizens in the future. If so, then solutions to the social problems the elderly face will become urgently sought. Such solutions will need to address sociality and 'quality of life' issues as much as those of health and security (for examples of the latter, see [38]). Moreover, 'parachuting' ICT into a care home is unlikely to have the desired effects since issues of the institutional framework, professional practice, family rights and responsibilities and so on will all be relevant. [10,31]. On the face of it, then, engagement on the part of both researchers and participants will be critical.

How this is to be achieved, however, is non-trivial. To some extent, our difficulties are similar to those encountered by Crabtree et al. in their study of a halfway house for psychiatric patients [7]. We learned over time that simple observation of the behavior of the 'older old' revealed relatively little. Sadly, and perhaps because of the institutional setting in which they found themselves, there were relatively few examples of spontaneous 'social' behavior on display and fewer examples of 'activity' than we might have wished for. Being institutionally confined can be an isolating and relatively inactive experience. Where activities were available, they tended to be of the organized kind, provided by staff for groups. Equally, the 'older old' do not necessarily make good respondents. In this case, they knew very little about the possibilities inherent in ICTs and we perhaps were naïve in our initial assumptions about the kinds of question we wanted to ask them. This implicates both problems of method and of analysis. User-centered design approaches are without doubt a 'consummation devoutly to be wished' but are not easily managed when users do not wish, or do not know how, to be at the centre of the design process.

We already know that the move to 'non-work' settings has brought with it some controversy about method, perspective and paradigm [8], largely predicated on the irrelevance of an 'efficiency' or 'task' oriented paradigm. This has led to suggestions such as, from the inclusive technologies research arena, the need for "user sensitive inclusive design" [22]. Similarly, it has been argued that more playful and experiential user involvement endeavors in user-centered design projects would better serve the challenge of engaging elder people [2,16,21,34].

Analytically, it is evident, as Räsänen and Nyce [25] stress, that there is more than one way to conceptualise the socio-cultural context in ethnography-based design processes in HCI. A detailed focus on task, sequential organization, naturally occurring talk, and so on – the kinds of things that have proved enormously revealing in other contexts, proved – as it turns out – less helpful here for the reasons we give above. Below, we reflect on these methodological and analytic difficulties, on the factors which led to our evolving choices, and on their relationship to design decisions. We identify three major themes which, we argue, closely relate to the transitional experiences of the very elderly. They provide an analytic framework for understanding the way in which changing life circumstances intersect with the possibilities that new technology can afford for this population. The themes in question are: *Memory*, *sociality* and *trust*.

EMPIRICAL STUDY: DEVELOPMENT OF A LARGE-SCREEN DISPLAY FOR A RESIDENTIAL CARE HOME

Setting and Project Focus

The original impetus for the project came from an inquiry from the manager of a residential care home. His initial idea was to position a large-screen display for mainly promotional purposes in the entrance hall. Elderly people and their relatives often come to visit the home in order to assess its suitability. Besides that, he was looking for workable ways of providing internet access to the residents, and supporting their every-day activities in terms of social

activities, games, and multimedia offers by means of the large-screen display. In meetings with him, we learned that he and his team were very open-minded towards new ICT-based solutions and also flexible and open towards an exploratory, ethnography-based research approach which we perceived as a necessary and fruitful prerequisite for the design process that would follow.

The residential care home houses about 90 elderly residents who mostly have physical or mental problems and who are mainly of advanced age (80+). The home is located in the center of a small city, which is representative of this region (which has very few large cities). Most of the residents have lived their whole life or at least for a long time in the city or one of its neighboring villages.

The support staff offers many regular daily and weekly group activities to their residents. In terms of media usage few seniors had used the internet before and neither did the social workers and other support staff for the activities they offered; the main media the residents consumed were, variously, television, radio and newspapers.

Methodological Challenges when Designing for a Residential Care Setting

As our usual set of methods and research designs in the area of user- and practice-based computing had proved to be successful in our other projects in several application fields we initially planned the research as in a fairly standard way: an extensive pre-phase based on semi-standardized interviews and participant observation, followed by a diary-study in order to gather an extensive understanding of the living context and of daily routines, of patterns of communication and interactions, and the media use of the residents. We were interested in their every-day activities, their information needs and wishes, as well as their interests in communal activities, such as games, music listening, and watching TV.

We started with interviews with staff and residents who had been proposed by the manager and who had signaled their willingness to talk to us. The interviews with residents took place in their rooms, which are partly furnished with their private furniture and decorative elements, such as family pictures. We deliberately choose the rooms as interview settings in order to be able to integrate talking about personal artifacts during the interview, especially photographs of loved ones displayed on the walls or on cabinets.

We initially undertook 13 semi-standardized interviews and 30 hours of participant observation. After the "internet days" (see below) (altogether 15 hours), we accomplished another 15 semi-structured interviews to reflect on these activities together with the participants. The interviews were recorded and transcribed, and field notes were taken both during the participant observation and the "internet day" activities. Data analysis broadly followed the precepts of grounded theory methodology. Analysis was conducted in several steps. We started with open coding, describing loose categories which came up in the interview transcripts. Subsequently, the codes were clustered to higher level categories. Some of the results of this process are the themes we describe in this paper. Our interviews allowed us to identify some recurring themes in relation to perceptions by the elderly of their lives. These were *coping with the current situation* and the *positioning of elderly people*. That is, we were provided in the main with fairly general observations concerning what it is like to be elderly and to live in a care home. These turned out to be very useful insofar as they gave us a picture of a level of acceptance, even fatalism, which prompted us towards a more interventionist stance.

Coping with the Current Situation

Coping with the actual situation in terms of accepting one's fate is a core theme we identified in the analysis of the interviews. We noticed this attitude permeated reflections about their actual every-day life in the home and specifically in relation to themes such as their poor health status and their relative lack of autonomy. Thus and for instance, one respondent told us that, although in the summer he likes to take walks through the village and enjoys being mobile and meeting his former neighbors, in winter he does not leave the home because he is too afraid of falling down. Another example involved a woman who possesses a radio but cannot listen to it: *"I have a radio, but with these buttons, it is too complicated. That's why I do not use it. […] I would like to listen to it if it were simpler."*

A further example demonstrating this attitude involved a woman talking about games she likes: *„I like to play Rommé very much. But most of the time I do not have partners. There are also many other board games available in the house, but only few like to play. But that's ok."*

What is common to all is their acceptance of the current situation and their unwillingness to complain. Even when possible solutions were suggested, our respondents were unlikely in the first instance to respond with any enthusiasm.

Positioning of Elderly People

The same attitude was apparent when the elderly reflect on their own position: *„My grand-children do not visit me very often. It's because the young do not like old peoples' homes. But that's all right, I can understand this."* Although this woman would like to see her relatives more often, she accepts their choices as 'natural' and more or less inevitable features of the interaction between younger and older generations.

Relating to this general attitude, and of specific relevance to our themes, was the relative absence of self-organized activities. As we have said, the home regularly provides organized activities for its residents but it is in the nature of such activities that they are fairly undifferentiated – they are organized for the group, not for the individual. Some

residents admit that they regret this low level of activity and would like to have more individual exchanges and encounters with other residents. On the other hand, there seems to be a tension between being seen as a "social petitioner" or as a "lone wolf".

One man told us in this respect: *„One talks to the others. One should not think that I am a lone wolf. In the summer I am always outside. I also have contacts. I often participate at organized activities in the house. I do not exclude myself."*

Altogether, the interviewees manifested considerable caution in expressing wishes and desires, were unwilling to sound critical and had a more or less fatalistic attitude to the conformities associated with living in a residential home. In a very real sense, they seemed to have given up some part of their individuality. Comments of the following kind were common: *"one must think of the commonality"*, or: *"Of course I adapted myself – that's what you must do here."*

This in no way reflects on the home. Residents commended practices in the home, stressed the quality of activities on offer, the personnel, especially the manager, and the food: *"It must be forcefully stated that they do so much for elderly and disabled persons. They are really very caring!"*

In much the same way, our research in the house is seen very positive by the elderly, with statements like *"it`s nice to see that the young people don`t forget us"* often heard. At the same time, these utterances rather reflect the sense that these elderly people have of something 'abnormal' taking place when potential interventions take place. Being very old, it seems, meant a forcible disengagement from the world. Again, it was not uncommon to hear contrasting stories about past and present. Respondents would, for instance, report on their previously very fulfilling lives and implicitly contrast them with their current situation. One person reported on her prior life in a big family and made the contrast by pointing to how, *"Today, only one sister is left"* and going on to talk about how mobility problems meant that they were seldom able to meet in person. It is all the more surprising, then, that when we reflected together with her on possible options for supporting them by e.g. video chat and other community tools, there was an unenthusiastic response. The 'fact' of her inability to use new communication technology was too big a barrier. The massive reality of their current situation, the lack of expertise amongst both residents and support staff, and a contrastive orientation to the past seemed to mitigate against engagement with technological change. However, indirectly, we learnt an important lesson on identity construction, on self-perception and perception of the other by the elderly residents which have a huge impact on the design, acceptance, appropriation, and use of new media by elderly people who live in residential care homes. We see these themes also belonging to the research on socio-cultural context of the prospective users. This group were, in a sense, and quite understandably, 'unreliable witnesses' to their own lives. As such, they form something of a marginal case in terms of a conventional ethnographic project and, on reflection, we decided that some kind of stimulus was necessary, a stimulus that has much in common with the notion of 'cultural probes' [12]. In the absence of a clear means to identify interests and desires through observation and interview, we needed to find additional strategies for the engagement that was otherwise lacking. We will elaborate on that further on below.

'Internet Days' as Action Research-Based Approach

Confronted with a lack of any clear direction concerning relevant possibilities, we decided to establish 'internet days' for the residents. Part of the reason for this was the recognition that the residents were familiar with and willing participants in, organized activity.

'Internet Days' – The Setting

The events were planned to take place on two Saturday mornings at a time when no other organized activity were planned. They were promoted as special events in the residential care home and in the village where the home is located, by giving flyers to the elderly and by putting up posters in the building. The project group consisted of a student group of 8 persons and of three lecturers. The event was planned to start at 10am, but in fact, when we started to prepare the desks and switch on the computers at 9am, there were already many elderly people arriving to see what was happening here. During the event the elderly were mostly brought to the stations by the people from the social services and the manager of the old people's home. Other elderly people, who had not previously taken notice of the posters, noticed that there was something going on by other signs which caused their curiosity, e.g. more cars in the parking lot and more younger people in the home, so they got interested in the event, too. The net result was a high degree of participation throughout the course of the day.

During the 'internet days' we presented different online services at five stations, four with computers with large monitors (24") and one with a Wii console connected to a large screen television.

To begin with, and in the absence of any strong sense of 'need' from our initial studies, we structured our provision through discussion with our student volunteers, using readily available resources that they (the students) would regularly use. Students, in other words, were showing the services that they habitually used to residents. We were demonstrating well-known, real world applications to them. These included Facebook, media libraries (TV and broadcast), YouTube, and Google Earth (see figure 1 below). The event was recorded on video and audio, photos and notes were taken during the event.

Figure 1: An 'internet day' in the care home

Acceptance of and Interest in the Different Internet Stations

At each station, we saw very different patterns and degrees of engagement. The students consistently tried to involve as many of the elderly sitting at their stations as possible, which was not always easy. In part this was a function of the large numbers, prompted by curiosity about the event itself, the presence of young people interacting with the elderly, the technology we were presenting and the contents shown on the computers. Examples of this varied reaction are as follows:

At the first station we presented the *online media library* of a German television channel. Our intention was to show news and content from the neighborhood of the old people's home as we prior interviews indicated that the elderly were mostly interested in those news stories. We also had evidence from other studies that some content in the library was of special interest for people above 50 years of age. At the internet day we noticed that the content was not as widely accepted as planned. We found two possible explanations for this fact: First was that the group of 50+ is a large group of individuals with different and varied interests. It became apparent that a much more nuanced and differentiated view of the 'elderly' and their interests was necessary. The other fact was that the elderly have quite a bit of time on their hands to consume TV content and consequently have no need for getting content they might have missed. This can be seen at the example of clips from the Olympic Games which were running during the study. The elderly explained to us that they have enough time to keep awake to see the Olympic games coming at night in the TV, so they don`t need the recorded clips from the digital library.

In contrast, *YouTube* was a perfect tool to *collaboratively explore* media content to be of interest for the residents. Together with a student the elderly successively browsed through old films and series they liked to watch in the 60s, to former musicians and pieces of music they liked but had forgotten about and also to actual media content, such as cooking shows (see figure 2).

Figure 2: An elderly resident and a student are commonly exploring YouTube

At the *Facebook* station we could see many interested elderly people searching for relatives – mainly their grand-children – and writing comments to them. They also had fun looking at the account of the manager of the home and leaving messages on his wall. We presented Facebook as the "yearbook of today" and the seniors had no problems of understanding what it offered. They knew yearbooks very well and were interested in the content. This result was not entirely unexpected, since it is known that social bonds between grandparents and grandchildren can be very strong (see e.g. [19]).

The most intensive use, besides *YouTube*, could be observed at the stations where we switched to use *Google Earth* and webpages from different cities to give the elderly the possibilities to see pictures from their cities of birth again, their favorite former holiday regions or other stations of their individual biographies. The initial start of such a session started usually by a question of a student asking what they would like to see. Some of the elderly directly mentioned some regions, but some did not know what to say. Students explored various websites in response to comments, which prompted further remembrances and reflections. This mutual engagement was what we can call a 'trustful' encounter.

An example of this was a 98-year-old person who was on the internet for the first time in his life on this particular day and expressed delight at being able to see his place of birth and the company where he had worked for almost 50 years. As he was so enthusiastic we offered him an extra space on a laptop on which he browsed for over three hours. At the end of the day the manager printed his favorite pages for him. This gentleman was still showing and explaining them to other people several weeks later (see figure 3).

Again, this linked very closely to biographical memory. Three women in particular, with a biography as displaced persons, expressed great happiness at seeing the places where they were born and had spent their early lives. Another feature of this was that their experiences generated narratives. This was not a passive experience for our group

– they showed a great eagerness to tell stories associated with the text and images they were discovering.

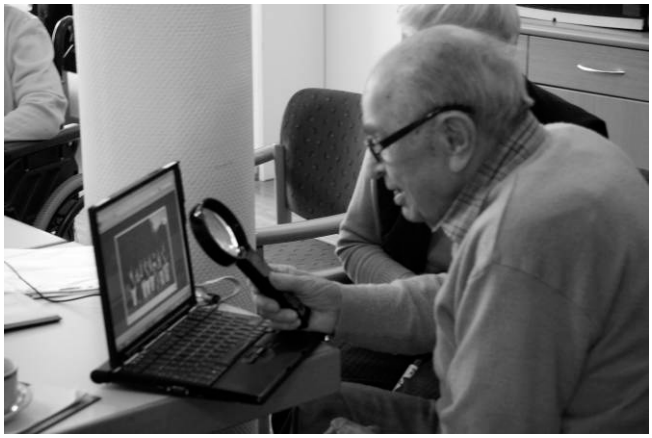

Figure 3: A 98-year old browsing through his past

The action-research based approach in bringing the technology and content to the residents, and trying them out with them helped us in finding anchor points to their interests in media use in a deeper way. All participants – the residents, the students and researchers, and the staff were engaged in a mutual learning process regarding their own attitudes and their perceptions of self and others. For the residents, besides the evident fact that the 'internet days' were fun, the activities also generated a certain trust in their own bodily and cognitive capabilities: One lady told us "*playing the game was so much fun because I noticed that I could do it. I first thought I was not able to do it, but then I was really surprised and happy that I made it."* This utterance of the feeling of success is an indicator of a problem which is experienced by many elderly people with physical handicaps: they often feel uncomfortable exposing their frailty in public and even to an intimate circle of other inhabitants assembled in front of the game. 'Front', in Goffman's sense [14], remains important even to the very old. This game was not only fun for her but also gave her back a little trust in her physical capabilities.

Another elderly lady admitted that she had *"exercised theoretically"* the arm movement for the *Wii* bowling game. She had participated at a *Wii* bowling session which had been organized by the social workers before the 'internet days'. At that time she had felt embarrassed when she could not manage to press the buttons as required. After that session she did not participate in that event again, even when the social workers invited her to. After having exercised the movement she had 'the feeling she could dare' to try it again with us. These physical and confidence issues also produced the phenomenon whereby residents sometimes preferred to instruct the students rather than handle the input devices (*Wii* controller, mouse and keyboard) themselves, despite regular opportunities to try it for themselves. All in all, it was clear that mouse and keyboard are very hard to handle for elderly people who often have fine-motor problems.

Also for the staff the 'internet days' were helpful in adjusting their attitude towards their quite fixed perceptions of the residents. The 'internet days' aroused so much attention that social workers and support staff expressed considerable surprise: *"We see here that we often have too little confidence in capabilities and interests of our inhabitants"*. The social workers also had many insights and ideas themselves towards a possible integration of the media contents into the activities they offer regularly or for setting up new activities. Some of them, mainly women not familiar with new media themselves and as a result rather skeptical about our endeavor, took the chance to learn themselves in the sessions. To different extent, they – due to their own familiarity with new media – considered the use of internet applications as interesting in their work with the residents in the area of "biography work". Biography work is seen as an important task in the house. Especially when new residents enter the house, the personnel tries to get to know the person and aims at documenting as much as possible about the resident's former life in order to be able to offer person-centered care. This is especially important for both building up relationships and a good care atmosphere with persons who have symptoms of dementia. Also in the regular activities offered by the social workers links to historical topics and to remembering the past take up a lot of space. They offer, for example, discussion groups guided by topics such as "how children played 60 years ago" and then they introduce pictures to the group which they found in the literature or somewhere else, such as their own family picture archive or the residents' archives. However, personal chats with the residents in spontaneous face-to-face situations take up most of the time in biography work, e.g. when a social worker and a resident go for a walk and then the resident talks about his life, being happy that someone has time to listen to his personal story. To different extents, the staff started to use the internet to augment the chats with the people after the 'internet days'. Before our activities in the house, they were provided with a laptop, but had no internet access beyond the manager's office. One of them, a young, internet-affine social worker, downloaded pictures from the internet and then took the laptop to bedridden people. As we needed to install WLAN for the 'internet days', we left a new infrastructure in the house, which was later used by this person to be more spontaneous when it comes to searching for pictures and other illustrative material linked to topics that had arisen in chats with residents.

DISCUSSION

The 'Internet Days': Collaborative Exploration and the Setting-up of a Common Space of Thinking

The action-research based approach, which led us from fairly orthodox ethnographic observation to more interventionist strategies has similarities to other design approaches which are based on playful and experiential endeavors, such as Gaver et al.'s "cultural probes" [12], Svenssons and Sokolers "tickets-to-talk", Blythe et al.'s

ludic engagements in residential care settings or Harper et al.'s SenseCam [2,16,34]. Blythe et al. coined the term 'interpassivity' to describe some of the features we had also observed. In our view, however, the 'internet days' supported, to a significant degree, more active interactions on the part of the residents and at the same time produced valuable data for informing our further design of the display. The different internet stations, guided by the students, offered a variety of "tickets-to-explore" and "tickets-to-reflect" on further design alternatives but also our general design work in the field of residential care. Similar to the SenseCam research [2,15,33], the 'internet days' drew attention to interests and (past) moments in the residents' lives which otherwise would have been neglected – as the limits of our first interview series have shown. However, what is different to the SenseCam approach is the collaborative moment of the 'internet days'. It seems that, in a context where interview and observational data confronts the problem of the 'unreliable' or 'unwilling' witness, then additional triggers need to be found. Our collaborative engagement was one such. The ongoing exchange between residents, staff and students/ researchers generated mutual knowledge in an ongoing dialogue of offering, asking, exploring and listening – "what can the students and the technology offer for me" and "what could be of interest for her/him" . These evolving methodological and analytic choices led us to three important empirical categories which were helpful to understand the very specific life circumstances of residents in a German care home, residents who have experienced a number of transitions in their lives. These categories are "sociality", "trust", and "memory". The categories have significance for a comprehensive understanding of the very specific social setting and its relation to questions of ICT development and appropriation.

Trust, Sociality and Memory

Trust

It is easy for the young and able-bodied to ignore physical and mental decline. At the same time, and as disability rights campaigners (see e.g. [4]) have constantly reminded us, we should not view 'them' as the problem. The issue of trust here refers not only to the level of faith the very old have in their own capacities but also to the assumptions made by us and by professionals about the appropriateness of what we do. There are some fairly evident design issues relating to physical and mental capacity: Thus, whilst some people were eager to experiment with the controllers, mouse and keyboard themselves, others were not. It was evident to us, for instance, that we needed to experiment with input devices which must be very easy to handle for the elderly, and which connect directly to basic functionalities and information like weather information, news from the city and recent photos from organized activities. On top of that, we learned that the display was quickly recognized and adopted by the social workers and caregivers, as well as the elderly, as a new tool for their activities. Thus, there are two quite distinct user role concepts for the development of the devices and the media accesses – 'the elderly resident user' and 'the social worker user'.

Importantly, our subsequent interviews revealed that trust and confidence were not an issue just for elderly people. Caregiver confidence, as Li and McLaughlin have also pointed out [18] is an important issue which has direct consequences on the residents' self-perception and their practices. As they suggest, caregiver confidence has direct impacts on evaluation by the elderly of their health status and their ability to accomplish activities in daily life. Our observations indicate that this also holds true for the residents' evaluation of new media as a sensible tool for their leisure activities. When caregivers think that new media are not especially useful for the residents, then this is a huge barrier for the residents as the caregivers in the house dominantly affect their possibility of taking part in such events as the 'internet days'. This is especially true for those people who need help due to their restricted mobility so that they need to be accompanied to the place where the activity takes place. During the events, the caregivers came to experience many surprising moments and saw that *"we often have not enough confidence in our residents"*. They, in other words, needed to be 'enlisted'. Whether or not, their prior assumptions can be thought of as "ageism" [29], we have no doubt that our interventions prompted some serious reflections on their part about their own assumptions. Their 'enlistment' in the 'internet days', and afterwards, had a powerful effect on their decisions over which services and treatments are to be offered to elderly people and which are not.

In addition, caregivers' confidence towards media interest and capability of the residents is often affected by their own personal access to new media. Perhaps surprisingly, many of the caregivers themselves had limited access to the new media in their private lives and had limited knowledge of how to integrate new media into their activities with the residents.

With ongoing ICT diffusion into the private arena, there will be a demand for new professional roles. Since relatives and interested elderly persons who come to inspect the care home increasingly ask for internet access and about the role of ICT in activities in the house, new tasks and role requirements for the caregivers working in the house become salient. From this stance, our project can be seen in terms of a coupling of professional, organizational and technological development approaches [28]. This means, that we need to have a more sensitive view of the media learning needs and requirements of all stakeholders, and not only the elderly residents. This requires us to give stakeholders training options, and to co-develop new practices around media usage in their daily work.

Sociality

For the elderly, sociality is something of a problem. Interaction with family, whilst often regular, is no longer under their control. There is, as we have seen, a moral imperative not to be a 'lone wolf' but at the same time there is a certain contempt for those who show an unacceptable 'neediness'– the 'social petitioners'. There is, in other words, something of a tension in place. Elderly people wish to preserve their privacies (and other rights) but at the same time have a clear collective orientation to the activities in the home predicated on the need for a level of organization.

Our respondents, then, whilst reacting with considerable enthusiasm to the displays we put in place and the collectively organized events associated with them would also like, in principle, to engage in some more individual or spontaneous activities. They nevertheless have little idea about how to go about this. Our own view is that this has to do with certain cultural-historical facts – that this generation has tended to come from small and homogeneous communities with strong family and community ties, and hence that relocation has had major consequences in relation to self-marginalization and self-identification. This in turn has consequences for the 'quality of life' agenda associated with, for instance, the gerontological literature and the constraints that institutional settings place on it [27,36]. This problem can be conceptualized in terms of an incommensurability between life-historical narratives on the part of the elderly – their identities are, unsurprisingly, constructed out of their life experiences – and the adjustments that are required in institutional frameworks. The so-called "culture change" movement in the US [30,35], one which we are entirely sympathetic to, aims to promote a more humane institutionalized care as important approaches for an individualized, patient-centered and autonomy-oriented care philosophy. However, in the light of our own findings, it is apparent that balancing the demands of individual 'narrative' and institutional life is non-trivial (see e.g. [30]).

Taking this view, we have learned that relocation into a care home involves a renegotiation of sociality, one which is often troublesome for residents. Individual attitudes and ways of moderating sociality, i.e. personal distance and closeness, which stem from individual and collective biographical experiences which are often hard to express verbally have to be measured against institutional expectation. Appropriation of technology will reflect this. Additionally, design criteria need to reflect the constantly changing nature of the group in question, a group that has developing needs and wishes. As people age and their health status deteriorates. Hence, in our design work, we must think of "the elderly" as a continuum [26] and related needs and wishes as being in a constant state of change. Our reflections on sociality, that is, need to reflect this as well.

Memory

Perhaps the clearest and most unambiguous finding from our work is the importance of acts of remembering. Reminiscence, we find, is important in many different ways – in the use of Google maps to identify previous location in a life history; in 'madeleine' moments prompted by music and other media; in photographic records, and in searches on Facebook. Gerontopychology suggests that older adults actively use reminiscence in social interactions for emotion regulation and promotion of psychological wellbeing. Self-identity and self-continuity, the meaning and coherence of life, promoting acceptance and reconciliation, and especially for institutionalized elderly, dealing with boredom (for an extensive theoretical overview see [3]) all prompt these acts.

Our studies powerfully confirm this. Anecdotes, reminiscences, and other narratives drove many of our interviews with elderly people, often to contrast previous and current existence. Harper [15] has described how photographic elicitation (and other visual representation) can be used as an aid to narrative work and one of the unequivocal results of our 'internet days' was the fact that they provided a strong and clear opportunity for residents to do narrative work of this kind. They provided a fruitful space for the stimulation of remembrance and narrations, framed by social interaction and common activity.

In sum, we learned that internet content and applications which support and stimulate reminiscence activities can contribute to meaningful and joyful activities in the home. Our design work aims precisely at supporting both individual memory activities through the prompts entailed in music and photographs, and through the co-construction with care givers and elderly people of collective content which can be used in group activities on the large screen.

First Prototypes

A reflection of the study results let to the introduction of a first set of prototypes which subsequently were the basis of our ongoing research and development process up to the present.

The first set of prototypes consists of a large-screen display (55'), input devices and a small collection of 'programs'. The display system is a common windows-based PC. We will briefly elaborate on the elements.

Although at first we were skeptical about the designated location of the display in a corner in the entrance hall which initially seemed to us a fairly hectic and uncomfortable space we learned that the hall had some certain meaning for sociality. On one hand, the manager's office, which is located at the end of the hall, serves as a focal point for many residents, who will typically walk over for a quick chat or to hear what is happening in the house and around. In addition, some people like to sit on a sofa next to the entrance and to see what is going on there. The dining hall is also next to the entrance hall, another reason for action

around that place three times a day. That is, what we considered to be an unsuitable site was viewed quite differently by the people on-site. This was supported by the manager's plans to restructure the display area, with the introduction of a nicely fitted cafeteria, which he implemented immediately. From a sociality perspective, the place offers two options, to start individual interaction with the system and to use it as the basis for group activities. As discussed above, there is a tension between the desire to socialize and to be informed about things happening, but at the same time to be restrained in one's orientation to 'group' activities. Elderly people (and perhaps like the rest of us) do not want to be thought of as 'bothersome' or 'needy'. The display in its very location somehow provides new options to deal with this tension. People now can stop by the display on their stroll through the house, and use it to just briefly get some information or to take up a more intensive interaction, on their own or with others. Meanwhile, the display area has led to some new forms of interaction among residents distinct from organized group activities which are linked to obligations. In this way, the technology mediates social activity. It "legitimizes" cooperative endeavor, but does not bind people to it. This is true for both social constellations, between residents and also between residents and staff, who can, when they choose, explore mutual likes and interests.

In terms of content we chose four programs: (1) a photo album which is constantly actualized by the manager with photos from activities in the home, such as festivities. We chose the photo album because a culture of picture taking and displaying in the house already existed. (2) a program of "short films" with *YouTube* videos which are selected collaboratively by the research team and the staff on the basis of our experience from the 'internet days', and which reflected biographical interests,(3) a news channel which is frequently watched by many residents at the classic daily 'prime time'. With this application they now are able to stop by and get the actual news from the broadcast's media library, and (4) a "local news" programme. The news, we find, functions as a "ticket-to-talk", i.e. a kind of legitimation for communication with others.

General internet access is also provided via a browser, at the moment mainly to be accessed by the social workers. This is most likely not the final set of programs, but is based on the first empirical findings and in our ongoing evaluation and development cycles we learned that people very much liked to stop by or sit for a longer time to interact with the display. Besides this, it offers a first approach for remembrance work led by the social workers.

Besides keyboard and mouse we looked for a simple input device for the residents. As a first approach, we modified the *PlayStation* buzzer. The buzzer consists of five differently colored buttons which were connected to fixed functionalities on the screen (e.g. "would you like to see the photo album then press the red button"). This is sufficient and works well for access to this small program. However, for the future we need to find another solution as complexity of the program increases. Other prototypes are on the way, such as an easy-to-use music device, an input device which provides access to *google maps* and annotated content, and a device which enables residents to annotate places with personal narrations. With the ongoing prototype design and implementation also additional questions will need to be dealt with, such as how to organize the growing material, searchability, and, most importantly, privacy issues.

CONCLUSION

Our study contributes to research on ICT for the elderly and serves as a window to better understand the life circumstances of institutionalized elderly people and the methodological challenges involved in the set-up of a user-centered design process. By applying a set of methods containing interviews and collaborative and explorative action-based research we could identify some core socio-technical themes – sociality, trust, and memory – which constitute the contours of every-day life in a residential home and impact on interactions between not only the elderly themselves but also the other stakeholders involved in their care. These analytic categories help to understand respective specificities of life in an institutional setting and certain social issues which come to the fore as elderly people experience a major transition in their lives, a transition which has material, spatial and social elements, as we have shown. Participatory design adherents often speak of 'mutual learning'. As we have seen, work with the very elderly is something of a limiting case in respect of participation. Mutual learning, nevertheless, very well describes our experience.

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