# Skripting Age – The Negotiation of Age and Aging in Ambient Assisted Living

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## 1. Describing the Field: The Missing Telephone

What does getting older mean in a postmodern society? Is it possible to stay autonomous, independent, self-determined? These questions underlie the discourse of Ambient Assisted Living (AAL) and ask if technological support – like intelligent wheelchairs or fall detectors, transponders or communication tools – is appropriate to assist older people.

Assistive technologies like AAL should enable persons to lead an independent life at home instead of in nursing institutions, to be mobile instead of confined in bed, open-minded instead of stubborn, socially and physically active instead of secluded. A new image of age and aging appears that is constructed socially, culturally, but also – and maybe foremost – politically. The young olds represent a new category of aging that is intrinsically linked to neoliberal and postmodern figurations of subjectivity, flexibility and autonomy (Dyk/Lessenich 2009) and can therefore be understood as an expansion of the neoliberal entrepreneurial self like it is discussed critically by Bröckling (2007). This perspective on AAL as a discourse of power in which age and aging are configured – following Steve Woolgar (1993) – or prescribed – according to Madelaine Akrich (1992) – is de-scripting: it uncovers a subjectivation of age and aging by promoting independence and autonomy through the use of assistive technologies.

I de-construct this black-boxed power regime in the following text by describing the practices of user integration in the design process of assistive technologies. By explaining the specific practices of user integration empirically, I aim at illustrating how age and aging are pre- and inscribed into the technical devices and thus pre-script age and aging as Akrich would argue

(Akrich 1992). To this aim, I want to give a first insight into the laboratory of an AAL project. But before I open the lab door, I want to situate my research context shortly: Ambient Assisted Living (AAL) refers mainly to smart and intelligent technologies that enable elderly persons to stay independent and self-determined in various areas of their life, such as health, housing, mobility, security and communication. Therefore, AAL technologies should be adaptive, usable, affordable, discreet and intuitive (Lindenberger 2007). Although smart technologies, especially for living and communication applications, are already quite common, the turn towards age and older users challenges the conventional engineering processes. Older users, especially if they are not as familiar with technology as younger generations, may present special physical, cognitive and emotional needs – for example, a reduced retentiveness or deficits in their motoric functions. These age-specific aspects challenge the development process; for example, menu navigation has to be kept simple and non-hierarchical to preserve the memory capacity of the user. Consequently, the development process itself gets more complex, takes more time and requires knowledge from non-technical fields like gerontology, psychology or geriatrics. In 2008 the German Federal Ministry of Education and Research (BMBF) reacted to demands of engineers, computer scientists, companies and future users and set up its funding program "Age-based Assistive Systems for Living Healthy and Independent – AAL"[1] with its first announcement "Living Self-Determined" (BMBF 2008)[2]. Numerous announcements have already been published (MTIDW 2015) that have broadened the scope of AAL-technologies. When I started to become interested in this topic in 2013, the first funding period had ended. A lot of high-tech cutting-edge technologies had been invented, but most of them failed when entering the market (Marschollek/Künemund 2014). Why? Following evaluations, several reasons – time, funding and knowledge – became clearer and it turned out that the nescience about the user and his or her everyday

1 | The initiative of the BMBF was one of the main starting points for the Federal Government's research agenda "The New Future of Old Age", which was announced in 2011 with the "aim to conduct research that will encourage the development of new solutions, products, and services to improve the quality of life and social participation of older people. Discovering the hidden treasures of an ageing society will benefit all generations for demographic change" (BMBF 2011a).

2 | To the specifics of AAL in Germany see also Künemund/Tanschuss (2013).

life was the biggest challenge to tackle. The project executing organization, VDI-VDE-IT, reacted to this deficit and revised its announcement: User-integration – carried out through user-centered design[3] – became an integral part of the funding strategy.

This turn towards the user was also my starting point for undertaking ethnographical research on AAL. Therefore, I accompany different AAL projects by doing participant observation in the projects, interviewing staff and test persons and analyzing the project documents systematically. AAL conferences and workshops complemented my field of studies. Additionally, I analyzed the funding announcements, programs and publications of the BMBF and VDI-VDE-IT. In this article, I will focus on the integration of users in AAL projects by describing in more detail the implementation of user-centered design in one project.[4] The leading questions are therefore: firstly, how does an older person become a test user? And secondly, to what extent can user-centered design be put into practice? To answer these questions I would like to start by giving a short impression about the user-testing situation:

**3** | The integration of users in the design process can be carried out by means of different methodological approaches like, for example, user-centered design, participative design or value-sensitive design. Whereby participative design and value-sensitive design are common approaches in Scandinavia or the Netherlands, German usability studies prefer the user-centered design approach. It is a certified procedure (DIN ISO 9241-210) to ensure the usability and usefulness of a technical system or device by considering needs and requirements of potential users. Therefore, its usability, operationalized by effectiveness, efficiency and satisfaction, is measured in specific periods – the so called formative and summative evaluation – throughout the design process. Here, test persons simulate the behavior of potential real users by solving tasks on a prototype in a laboratory setting and evaluate the above mentioned criteria by answering a questionnaire. In the formative evaluation, the results of the usability tests will be considered in the next steps of the design process. The summative evaluation finalizes the design process and its results are immutable.

**4** | The following description of the project, its laboratory setting, and the involved persons like Mr. Schreiner or Mr. Wolfe, are based on my ongoing field research in AAL mentioned above. The name of the project and the persons quoted in this text were anonymized by the author. The participant observation and the informal talks with the participants and project staff took place between March 2013 and January 2014.

"At home, I would simply call", Mr. Wolfe says, "I would simply pick up the phone and dial the number and then I know if one is there or not." But there is no telephone on the table in the laboratory. Thus, Mr. Wolfe tries again to activate the screen of the flat device lying in front of him on the table. "Push the button and then pull the arrow to the left softly", he whispers, while he is pushing the white button again to pull the arrow to the left. But again, nothing happens. Mr. Wolfe moves nervously on his seat, puts the chair a bit closer to the table, dries his hands on his trousers and tries a third time. It works. "At last!" Mr. Wolfe breathes a sigh of relief. The arrow disappears and a new screen opens. "That's why, the CASEtab is so fantastic. You just take it on and – let's go!" Mr. Schreiner comments on the scenery. Mr. Schreiner is the usability expert who invited Mr. Wolfe some time ago to test a new communication tool that should enable elderly persons without any computer knowledge to communicate via an intuitive and age-based web2.0-platform that is easy to use. I got to know both men during my participant observation in the usability laboratory. In total there were 45 people who tested the platform and evaluated its usability and appropriateness for implementation in the users' everyday lives. Therefore, the users had to visit the laboratory once for approximately two hours. In this time, they solved a set of 16 tasks including writing an e-mail, making an appointment, inviting a friend for a walk, checking out new theatre programs and changing dates on their profile. All the tasks had to be carried out on a tablet PC which was connected to the Internet. An application had been installed on the tablet, which included a reminder for medication, appointments or other events. Besides, it featured a map and a list with local shops like banks, grocery stores, pharmacies or ambulances that was linked to the map. It also included a floor plan of the user´s flat with household devices and furniture like lamps, cooker, windows and the door. All these objects were equipped with sensors that enable the user of the app to control the functions of the objects via the application. For example, if Mr. Wolfe is sitting in his chair and somebody is ringing the doorbell, he doesn't have to get up: he just opens the app, opens the program, pushes the icon with the door and then decides to open it or not while seeing the face of the visitor on his screen.

The CASEtab was designed for older users with less experience in computer usage in an iterative process where users were addressed to take part in the design process (UCD). Therefore, older people were invited to take part in different stages of the design process. First, a group of twenty test users was asked for their needs in terms of technical support in their activities of

daily life; afterwards, another group was asked about their demands. Based on the interview material, the iterative process of prototyping was started without any user participation. The following time, a group of five users participated in the evaluation of the first prototype (formative evaluation) during the design process. The last time users were invited was the end-evaluation, where I took part and met Mr. Wolfe and Mr. Schreiner.

Mr. Schreiner is conducting several AAL projects, "but it is still a challenge to find participants that are motivated to take part in several sessions, answering several questions and doing several tests", he summarizes. Mr. Wolfe retired two years before the project and is living near the laboratory. He already took part in other tests addressing cognitive or motoric competences, but he never used a tablet before. The laboratory is situated on a research campus of a German university where a lot of user tests – not only age-specific ones – are carried out. The majority of the recruited test users is registered in a database of the research center and this data is used for experimental settings, questionnaires and tests. My presence was rarely perceived as unfamiliar, although I introduced myself as a cultural anthropologist doing empirical research for my PhD.

The end-evaluation is typically the last test-situation of the prototype and functions to confirm its usability. This means its efficiency (tasks correctly solved), its effectiveness (time to solve the task) and the satisfaction of the users are quantified to decide whether the design process ended successfully or not. Success in this case means that the prototype is considered to be competitive on the market. Hence, the end-evaluation is a fragile and unstable stage in the design process, where not only the device itself is evaluated but also the work and thus the knowledge, the creativity and the abilities of the project team. If the prototype fails, corrections are no longer possible, since funding is running out. Consequently, the project, or rather, the socio-technical ensemble following Actor-Network Theory (ANT), is extremely careful to avoid any kind of failure. Therefore, the project staff works on stabilizing the prototype technically as well as socially by controlling the evaluation and configuring the role of the test users in the test scenario. How do they carry out this invisible work of controlling? Obviously, they try to minimize technical bugs before or even during the tests: therefore, Mr. Schreiner supervises the test and intervenes if something unexpected happens, such as a breakdown of the application, long loading time or a mistake in the menu-driven operation. In addition, they try to modify the test situation by designing tasks that are solvable for the majority of the users or by giving them enough time

to solve them. These practices are not as obvious as checking for technical or operational bugs. Instead, these are non-transparent for the users, who are and should be unaware of the designed context of the test situation, and invisible in the test manuals or protocols. It is the task of the supervisor to make these practices invisible.

Thus, the test supervisors are powerful actors in the socio-technical ensemble, not only because they design the technical object, but also because they are able to black-box the difficulties and hindrances. Test users at this stage challenge the success of the evaluation because their testing behavior, their critique and their recommendations are not only a re-instabilization of the prototype, but also because their results are a materialization of failure. Hence, user tests are a discrete practice of control, configuration and prescription. The construction of age-specific technologies is thus a social practice in which the final end-product is the result of diverse negotiations by human as well as non-human actors. *Doing age* by negotiating age-specific technologies means in this context *doing age by designing age-specific technologies* that inscribe age and aging into the technology by, first, determining age-specific technologies as age-specific and, second, addressing their users as aged. To describe the various interactions and arrangements that are needed to design AAL and thus to construct a socio-technical ensemble, my approach was to follow Mr. Wolfe and Mr. Schreiner in their negotiations.

## 2. Pre-Scribing Age: The Discourse of Ambient Assisted Living

Over the last two decades, Western societies like Germany seem to have transformed into technological societies. Computer-based technologies in particular have entered the everyday life of people, regardless of social class or cultural habits. At the same time, these societies have had to face tremendous demographic changes. On the one hand, the number of people older than 65 in Germany is statistically rising, while on the other hand the senior population itself is getting older. This growing sector of older people is required to stay active, engaged and informed to gain societal participation and recognition. At this point, technology is introduced as an instrument of empowerment. By using smart assistive devices, older people should engage in society and remain autonomous and mobile while staying in their familiar environment in terms of living and housing. Consequently, AAL technol-

ogies represent a strategy to maintain this activity potential and broaden it towards new fields of application like health, communication and information or security. Thus, AAL is not only empowering but also normative and hegemonial.

Already in the early 2000s, the sociologist Stephen Katz argued from a critical gerontologist perspective that the association of activity with well-being in old age became "so obvious and indisputable that questioning it within gerontological circles would be considered unprofessional, if not heretical" (Katz 2000: 136). Katz points out that the idealization of activity in gerontological discourse helped to establish neoliberal regimes of activity that "manage everyday life in old age" (ibid: 142) in terms of physical and cognitive activity. He states that "[m]ost gerontological and policy discourses pose activity as the 'positive' against which the 'negative' forces of dependency, illness, and loneliness are arrayed" (ibid: 145). The activation of old age subjectifies old age and at the same time allies "their active subjective efforts at maintaining autonomy and health with the wider political assault on the risks of dependency" (ibid: 146; Dyk et al. 2010; Denninger/Lessenich 2012; Schroeter 2000). Following Bruno Latour's argument "that we cannot understand how societies work without understanding of how technologies shape our everyday lives" (Latour 1992: 151), critical aging studies have to ask how assistive technologies are adjusted to the everyday lives of older people, why they are adjusted, and in which ways.[5] De-constructing the co-construction of aging and technology is necessary to de-mask AAL as a neoliberal strategy of subjectifying risk and dependency to old age instead of reminding welfare policies of their duty.

AAL technologies, as technologies of everyday life, are supposed to remind their users to take their pills at the right time, control their household devices, monitor their bio-medical parameters or organize their daily activities. Although it might be useful for everyone to have a control system of his or her daily activities, this seems to be especially useful for older people. AAL is marketed as age-specific, while at the same time age is equated with being in need of technological assistance. Thereby, it is the relatedness to age that distinguishes AAL technologies from convenient smart household de-

5 | Although critical cultural gerontology scholars like Stephen Katz (2000) or foucauldian aging studies scholars like Simon Biggs and Jason L. Powell (2001) do not specifically work on age-based technologies, their critical approach seems to be very productive for a critical view on AAL.

vices, but it is also the development of smart devices suiting the needs of the elderly that produces these needs in the first place. Aside from the notion that this premise is already creating stereotypes, it is also powerful by prescribing age and aging into scripts and programs of AAL devices. This inscriptional work materializes itself again in displays, touch pads or transponders. Different stakeholders – government agencies, scientists, entrepreneurs, care providers – define age and aging as a demographic challenge to claim legitimate involvement in this issue. Here, the discourse of demographic change that is often articulated as a threat or burden (e.g. Butterwegge 2006; Grebe 2012) seems to be quite attractive to promote technological innovation for the elderly, but the real objective actually seems to be promoting economic development. Seen in this light, AAL technologies are less a demographic tool-kit mastering the challenges of demographic aging than basically a federal promotion of national economy.

Therefore, potential users have to be addressed and actively integrated in the design process. This is, however, a challenge, as Mr. Schreiner already claimed, while his colleague Mr. Miller points out: "It's nothing else than prose."

## 3. Inscribing Age: How Users Matter

Although over the last two decades the motto that 'users matter' has become evident in a number of different areas of technology studies (e.g. Oudshoorn/Pinch 2008), aging is a *terra incognita* for most computer scientists and engineers. Consequently, it seems to be useful to become acquainted with it. The question is how. Within informatics and ergonomics, usability tests take over the role of "contact zones", where technical devices, technicians and future users get in contact with each other by testing and evaluating the innovated products. In AAL, this contact zone is produced by user-centered design, whereas the term user-centered is ambivalent. Although it proposes that users play a key role in the innovation process, it is not certain if they fulfill this role actively as participants or passively as part of a preconceived idea of the users' issues, demands and needs. During my fieldwork I started from the premise that user participation can be both: an active participation of users, but also an idea in the users´ minds. The users' agency depends on the situation and the setting of the design process: if the projects are funded by the Federal Ministry of Education and Research (BMBF), they are obliged

to work user-centered (BMBF 2011b). Due to different reasons, which I can enumerate here only briefly, this obligation is carried out in very different ways.

Although "the old view of users as passive consumers of technology has largely been replaced and along with it the linear model of technological innovation and diffusion" (Oudshoorn/Pinch 2008: 543), the idea of making users central to innovation is driven, first of all, by economic reasons, and not because it is reasonable to integrate users in the innovation process. On the contrary, user-centered design can cause additional costs, but it increases the probability that the product will be successful on the market. Therefore, user-centered design was introduced as a promise for a better understanding of users' needs and demands and translating them into technical features, which should raise the commercial attractiveness of the final product.

When taking a look at the production of UCD, the ambivalence remains or even gets more complex, because it is in most cases delegated to actors who do not possess the competence for producing user-centered design. Not all project members are familiar with usability trials or qualitative methods from social sciences like interviews, questionnaires or observation. Although the BMBF has already reacted on this deficit by announcing that project members have to be interdisciplinary and at least one position has to be full filled by a social scientist, this scientist is not automatically the one responsible for UCD. Instead, the UCD test is mostly conducted by computer engineers, psychologists or other project members. Hence, the problem of user integration still remains and gets even more problematic in view of the heterogeneous targeted group.

Thinking of age and technology as together is still somehow paradoxical: older people currently do not have a very wide biographical experience with information and communication technology because technology did not play a big role in their work experience or in their leisure activities (e.g. Czaja et al. 2006; Czaja/Lee 2007; Mollenkopf 2008). Although this imbalance will change within future cohorts, it is a challenge for the current users and that is why their participation is crucial for developing technologies, which should not only fit their needs but also be used by them properly. Therefore, the test-users need to be representative of the actual users, and this raises the question of selection (e.g. Collins/Evans 2002). Who should be included by excluding whom? Who is representing whom? The selection process often is not objective: instead, it follows practical aspects like experience, contact possibilities and time. The test users for the CASEtab were selected by us-

ing a database of people interested in performing the test, who received an invitation to the institute laboratory. Most of the test volunteers were living nearby, had retired and were members of a so-called "Senior Academy", so they were familiar with testing situations and in some cases even with the laboratory. Their motivation for taking part in the test was often not an interest in the age-specific CASEtab, but rather curiosity about getting tested or just time availability. Although this may sound trivial, it manifests that those who took part in the test were mobile, informed and healthy enough, as well as with enough free time and self-esteem to try out an unfamiliar testing situation. All the other members of this age group remain invisible not only in the test itself, but also in the final report, in articles or presentations and in the innovation process – and, therefore, in the finished product. Which users are inscribed when the majority of potential users in need of the product are not visible in the innovation process? Or more specifically, which ideas of users are inscribed?

User integration is a black-boxed process. While the official report includes short descriptions of the sample by naming variables like age, economic status and professional background, it is not reported whether the test persons were already familiar with test situations or whether they had to come to a laboratory even when the technical device they tested is a tablet and, therefore, mobile. Black-boxing the selection of test persons and hence the conditions of the usability evaluation is congruent with the strategy of black-boxing the outcomes of the project. Of course, efficiency, effectiveness and satisfaction of CASEtab are manifested in tables, graphs and numbers and translated in a business model, but the question is still whom they target.

The test users of the CASEtab were on average active, physically and cognitively healthy, and received a satisfying pension, but are they representative of those in need for such a technology? CASEtab should assist users who are unfamiliar with information technologies and communication techniques like chat, email, video-calling or Internet by providing a smart and user-friendly device which foregoes complex menus, difficult commands or detailed displays. Instead, the display components are repetitive, simplistic and clearly structured.

Although user-centered design can be understood as a trial to control users as well as their usage, there is still some potential for resistance and a certain amount of uncertainty that remains: "*Nothing in a given scene* can prevent the inscribed user or reader from behaving differently from what was expected. […] There might be an enormous gap between the prescribed

user and the user-in-the-flesh" (Latour 1992: 161, emphasis in original). Black-boxing this gap, the engineers of CASEtab decided to invite potential users to the laboratory in order to test the platform instead of observing their daily routines of household duties, shopping or communication in their familiar surroundings. Physically confronting real users, researchers were confronted with the gap between their imaginations and their inscriptions of imagined users and the real users – or, as Latour names them, the "users-in-the-flesh" (Latour 1992: 161).

Predictably, the user tests increased that gap. The practical use of the tab revealed a lot of incorrect or overlooked inscriptions of age-specific usage. CASEtab provides a lot of digital features that are designed in comparison to their analog originals, such as an address book. The contacts are listed alphabetically and a frame around each contact separates it from the next: each contact is defined with a photo, name and surname, email address and telephone number. Upon touching a contact, another menu opens where they find more information about the person – for example date of birth or address. At the same time, they can touch the telephone button to call the person directly or the envelope button to write this person an email – this also confused the users, who expected a writing program where they could write down a letter and not a messenger formula. The biggest problem, however, was not the display of information or the retrieval of a contact, but moving through the display. The users in the laboratory needed either several minutes or the help of the test supervisor because they were not familiar with the gesture of scrolling that enabled them to move the display and simultaneously their contacts. Although the gesture of scrolling was explained shortly at the beginning and the test supervisor provided hints that should remind them of it, only a small part of the 45 test users remembered this gesture and applied it correctly and efficiently. In some cases, it happened by chance that the users revealed that the display can be moved by touching it but then forgot to do the same in the next task. Hence, instead of solving the task, users got frustrated and unsure of their competences. Some of them tried to touch all the available buttons, photos or icons, thinking that this might set off an action, but this strategy resulted in a loss of orientation. Mapping them deeper and deeper in the menu without them knowing how to do it and why made them frustrated, anxious and helpless. If they interrupted the task and the test supervisor explained the scrolling function to them, they became even more confused because it was such a simple gesture and they could not master it.

Here the inscription failed, as the aged users could not solve the task: ”It is only when the script set out by the designer is acted out – whether in conformity with the intentions of the designer or not – that an integrated network of technical objects and (human and nonhuman) actors is stabilized” (Akrich 1992: 222). The script of the CASEtab was not carried out by the users. They could not operate the display because, on the one hand, the designers were not informed or did not realize that the simple task of scrolling up and down to move the display and make information visible is unfamiliar to those users. On the other hand, the technical device was not programmed to provide hints. Neither was it attached with a slider bar on the left side, nor did the display switch up and down when it was opened or when the arrow jumped up and down. The interaction failed and the network of human and nonhuman actors remained unstable because the users were not able to read the script and thus use the tab. Although this missing feature can be added easily by designing visual aids in the display, this scenario reveals the complexity of designing human-computer interaction as well as the impossibility to fully inscribe age-specific usage. Consequently, both the human-computer interaction and the sociotechnical ensemble cannot be stabilized in the usability trial. Thus, the idea of smart technical assistance remains unstable as well. What is then questioned is the construction of competence.

In this context, competence is a precondition to use the developed device adequately, but competence is also an “articulation” (Moser/Law 2003: 491) of the aging subject or, as Akrich and Latour describe it, a “pre-scription” (Latour 1992: 178) of the aging actor: “We call *pre-inscription* all the work that has to be done upstream of the scene and all the things assimilated by an actor (human or nonhuman) before coming to the scene as a user or an author” (ibid, emphasis in original). Pre-inscriptions of competence are produced in the discourse of active aging by assuming that it is a natural need of older people to work actively and voluntarily on their abilities and competences, as Paul Baltes and colleagues suggest in their model of selection, optimization and compensation (SOK-model), where the aging subject is doing selection, optimization and compensation work to balance their loss of abilities by focusing on a manageable and necessary repertoire of abilities (Baltes/Baltes 1990). The fact that this repertoire is socially constructed by the activation discourse is as concealed as the conditions of this ‘competence work’. How “’the competent and abled person’ is constructed (or not) under specific circumstances and how it is that he or she is constructed (or not) in relation to new media technologies” (Moser/Law 2003: 491) is the ques-

tion that matters when discussing the "articulation work" (Fujimura 1987: 260) of AAL and its concealed hegemony. It is the invisible work of pre-inscription that enables engineers to "bet on this predetermination when they draw up their prescriptions" (Latour 1992: 178). In her work of *de-scription,* Akrich shows that "the ease with which the actants assumed in the design of the object are related to those that exist in practice is partly a function of decisions by designers" (Akrich 1992: 207). Therefore, de-scribing user-centered design as *taking* decisions through design and thus determine what is an appropriate usage (or not) or what is a competent user (or not) – and ultimately, what is successful aging (or not) – is the necessary scientific task of giving a voice to those who are voiceless (e.g. Moser/Law 2003: 494). This of course means to focus on the technical device as an actor to whom competence is delegated or rather inscribed.

In the case of CASEtab, age is inscribed in terms of information, communication and control. The underlying image is that aged users unfamiliar with smart information systems like tablets or smartphones are ambitious to use them to stay informed and engaged through new media technologies. Therefore, the designers invent an application that reminds them, connects them, informs them, and thus materialize their aging subjectivity in an age-specific device to assist their everyday activities technically. Using CASEtab first of all articulates its users as old and in need for smart technical help. At the same time, it reinforces these imaginations of age and technology by deciding which functions CASEtab should fulfill or not. To conceal this decision-making process is a powerful strategy to produce asymmetries by announcing the opposite (e.g. Garrety/Badham 2004). "Why shouldn't I just call him?", Mr. Wolfe is asking after several misleading trials to activate the video telephony. Mr. Schreiner answers: "Because it's so much easier!" Mr. Wolfe shakes his head. "Why should this be easier", he asks himself in amazement, "it would be so much faster to pick up the phone". After a while, he completes his thought: "It would make me feel nervous, only because if I want to make a telephone call, I would have to shave, brush my hair and put on a shirt. Why should somebody see me like this?" Mr. Wolfe refuses to take over the explanation of Mr. Schreiner and hence refuses the inscriptions made by the designers: he articulates his autonomy in terms of skepticism and refusal (e.g. Moser/Law 2003). In this case, the misleading concept of UCD becomes obvious. Mr. Wolfe's reaction on the idea of video telephony that he expresses clearly towards Mr. Schreiner has to be rejected by Mr. Schreiner because the prototype is already finalized and further modification is not planned or fund-

ed. Hence, Mr. Schreiner has to convince Mr. Wolfe that video telephony is "so much easier" to stabilize the innovation work that is materialized in CASEtab. Hence, he is doing articulation work by concealing refusal or critique and attempting reassurance. He points out that the effort of calling by using the application is faster, less complex and more personal, but by doing this he misses Mr. Wolfe's point that the inscription of communication behavior mismatches his everyday practices of communication.

The *ageskript,* as I call the inscription of age into technical devices like AAL, fails because the evaluation of the prototype is neither participative nor symmetrical. "Only by describing both the production task and the hidden task in articulation, together and recursively, can we come up with good analysis of why some systems work and others do not." (Star 1999: 387) Following the symmetrical paradigm of de-scribing user-centered design brings all relevant actors with their practices into focus. Here, ethnography can play an important role by observing practices, performances and interactions of human and nonhuman actors in the field. Following each actor in his multiple sites – like George Marcus' approach of multi-sited ethnography suggests – means to trace "things in and through contexts" (Marcus 1995: 107). Thus, fieldwork makes "the invisible matters of causes, the regimes, the blank spaces, demarcations and hierarchies visible" (Windmüller/Binder/Hengartner 2009: 16). By moving in and through these different sites, relations and articulations of subjectivity of AAL can be made visible, since "[s]till, no scene is prepared without a preconceived idea of what sort of actors will come to occupy the prescribed positions" (Latour 1992: 161). Doing participant observation is therefore an appropriate method to de-script the hidden knowledge regimes, the translations and delegations of agency in this hybrid constellation of human-computer interaction. Being a visible observer in an invisible field makes the invisible visible by "valorizing previously neglected people and things" (Star 1999: 379).

## 4. Circumscribing Age: Black-Boxing Competence

As I argued in a previous section, the interaction of project members (engineers, computer scientists, designers, etc.), test users and technical devices has to be de-scripted as *doing age by technology.* Therefore, re-constructing the production of an AAL device by describing the inscribed power regimes

and articulations is conducive to understanding how AAL technologies configure age and aging.

But not only the interaction between designers/computer scientists/engineers and test users in the user-centered design process is multi-sited and transitive; it is also marked by uncertainty, nescience and, in some cases, ignorance, so the project work itself becomes asymmetrical. I would like to describe this asymmetry by means of an example.

The psychologist involved in the production of CASEtab claimed that a special colored background is useful for discriminating objects on the screen: she could verify her claim empirically by referring to scientific studies. The designer involved in the production of CASEtab objected that the suggested colors would not be attractive. The software engineer involved in the production of CASEtab was not willing to change the color again. What happened is that the psychologist repeated her arguments in every meeting, made the empirical studies accessible for all project members and suggested design alternatives. She made all her arguments visible by loading them up to the company server, where everyone involved in the production of CASEtab had access, but nobody opened that folder except the psychologist herself.

In the next telephone conference, the psychologist brought up the unsolved question of color. The other team members and project partners expressed their conformity immediately by shouting: "Yes, that's a good point", or "It's good that you think about it", or "We should keep it in mind". Then, they continued with the next topic. The psychologist felt frustrated and powerless. She was only one member representing one partner in a constellation of seven, whereby the other six ones were technical partners. At the end, the software engineer finalized the color by inscribing it into the technical features of the application: he felt legitimated to do so via his competence and his position in the project as an executive actor.

His strategy of keeping the design process manageable by deciding pragmatically is a very common strategy: other strategies are indirect communication, deceleration of decision-making, and refusing designation. These indirect communication strategies foster the exclusiveness of knowledge and expertise. It is not only necessary to question how engineers delegate power to AAL technologies; it is also necessary to de-scribe the power relations in the projects to understand the inscription of age. In relation to the above discussed question "how it is that 'the competent and abled person' is constructed (or not)" (Moser/Law 2003: 491), competence again gains relevance. It is through the interaction of the psychologist, the software engineer and the

device in the working context of the project where competence is used to mark the boundaries of agency and power. Although the psychologist is – due to her scientific background – assumed to be the expert, it is the software engineer who finally decides which color to take. To legitimate his decision, he welcomes the work of the psychologist cursorily and at the same time ignores her arguments and work samples. It is his executive function in the project setting that enables him to do so. No other project partner is able to write the software program: this exclusiveness is a powerful means to prioritize his argument and to black-box the others.

Here it must be questioned to what extent the role of nontechnical project partners can be compared to those of test users. The described interaction indicates a hierarchical imbalance between the project partners that has not occurred by chance, but is rather produced actively to enforce the innovation process in the designated direction. This is an assumption that is neither developed in the design process (by integrating test users) nor communicated in the project meetings (through equal cooperation and transparent decision making), but it is obvious to the software engineer because he translates the concept of CASEtab into the technical device by writing the script and therefore delegating agency to the object. This mediating work is deeply bounded to the technical options available to the engineer (e.g. Akrich 1992), the scripting knowledge he embodies and at least his motivation to be innovative. These circumstances are not communicated in the project: rather, it is the work of the engineer to make them invisible and the work of the ethnographer to de-script them and make it visible that "[t]he obduracy or plasticity of objects, […], is a function of the distribution of competences assumed when an object is conceived and designed" (ibid: 207).

## 5. Skripting Age: Negotiations and Oscillations

What do these observations mean for a scientific approach of understanding AAL as *doing age by technology*? How can the scripting of age be de-scribed from a cultural aging studies perspective? And how can the normative interplay of power, innovation and age become visible in the research? I argued that the multi-sited (Marcus 1995) interactions of the sociotechnical ensemble (Latour 1992) have to be de-scripted (Akrich 1992) in order to re-construct the black-boxed processes that enabled the project partners "to

turn technical objects into black boxes" (Akrich 1992: 221). It is not before they are black-boxed that they can be stabilized and therefore "become instruments of knowledge" (ibid). The translation of complexity into an easy-to-use technical device like CASEtab can only be carried out through the interaction of different human and nonhuman actors. Here, I introduced user integration by user-centered design as a possibility to de-script how "technical objects and people are brought into being in a process of reciprocal definition in which objects are defined by subjects and subjects by objects" (ibid: 222). In the context of AAL, this means to de-scribe how the subjectivity of aged users is inscribed into AAL and, at the same time, how AAL determines the subjectivity of aged users through the inscriptions. I argued that the integration of users to stabilize the translation is a controlled process in which the usability tests produce a contact zone where the different imaginations of AAL are negotiated; however, I also argued that this process of negotiating age and aging is controlled by the project team that is conducting the tests. This control is necessary because the real users are not conforming to the imagined users that underlie the innovation process: these ideas about users are non-empirical, non-theoretical and non-scientifically based. They are assumptions that have materialized in the technical devices: therefore, their authentication in the evaluation process is not possible.

The tests are thus doomed to failure, but failure is not acceptable and hence different strategies – controlling the test, designing solvable tasks, black-boxing critique or refusal – are applied to guarantee success. This is due to the false idea that AAL technologies are easy and quick, innovative and profitable objects that automatically strengthen older people's autonomy and societal engagement when they are used by them. Instead, the innovation of assistive technologies should be understood as an oscillatory process in which the prototype is a materialization not only of ideas and imaginations of age and aging, but also of social practice. AAL is something that is produced interactively by nonhuman actors – like the technical devices themselves, but also the technological infrastructure in which the innovation process is embedded – and by human actors like, for example, Mr. Wolfe or Mr. Schreiner. Their interaction is multi-directional, iterative and complex and takes time, but it is at the same time necessary for developing cutting-edge technologies. Therefore, user integration is inclusive.

Taking it seriously demands making these interactions visible: this approach would bring about coherence, reflexivity and transparency back into the design process. Furthermore, it would bring participation into the labora-

tory and destabilize the normative power hierarchies of AAL. Then designing AAL could become not only a network of innovation or an innovative object for older users and market interests; it could also be an experimental space to think of age and aging differently.

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