

Studying Social Robots in Practiced Places

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Abstract: What is the strength of anthropological fieldwork when we want to understand human technologies? In this article we argue that anthropological fieldwork can be understood as a process of gaining insight into different contextualisations in practiced places that will open up new understandings of technologies in use, e.g., technologies as multistable ontologies. The argument builds on an empirical study of robots at a Danish rehabilitation centre. Ethnographic methods combined with anthropological learning processes open up new way for exploring how robots enter into professional practices and change values, social relations and materialities. Though substantial funding has been invested in developing health service robots, few studies have been undertaken that explore human-robot interactions as they play out in everyday practice. We argue that the complex learning processes involve not only so-called end-users but also staff, management, doings and discourse in a complex amalgamation of materials and values.

Key words: social robots, anthropology, participant observation, cultural learning processes, technology-in-use, multistability

Introduction

The field of health service robots can be said to be a burgeoning technological enterprise involving laboratories and enterprises all over the world. From a global perspective, technologies like health service robots move in and out of the world-system (Marcus 1995) transgressing boundaries of nation states, implementation sites, politicians' offices, municipal or other public institutions and private homes.

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The robot designers often live in countries far away from so-called end-users and have only little or no knowledge about the complex environments connected to the end-users' everyday lives. End-users and service providers do, however, always have to handle new technologies in local material and social settings (Hasse 2013). In this article we show how anthropological fieldwork opens a multifaceted understanding of these particular localities which we conceptualize as practiced places. The article deals with robot technology, a technology which apparently can substitute for human relations, but which in practice, like any other technology, is strongly dependent on social relations, human forms of organization, and the whole courses of action that figure in any human-technological relations (e.g., Alac, Movellan, and Tanaka 2011). Technology is simultaneously material, social, and meaningful, and therefore we need Techno-Anthropological methods to fully understand technology and human-machine relations (Suchman 2007).

Robots are hard to define—now more than ever, since robot designers keep developing new techniques, functions and types of robots. The International Federation of Robotics keeps coming up with new types of sociable and health service robots as specific subsets of robotic systems (Ondas et al. 2013). The robots are often defined in relation to their use in different sectors (e.g., service, education, health, industry). Service robots are designed to be able to engage with and assist human beings with a range of services, either as mobile robots or sociable robots (Baltus et al. 2000). Sometimes service robots are only defined as autonomous machines like vacuum cleaner robots (Lin 2012), but sometimes they also include social or sociable robots that are meant to communicate and interact with people (Breazeal 2003). Health service robots are engaged in services ranging from 'brain-training' to acting as helpers for blind people (Lacey and Dawson-Howe 1998); they can assist with janitorial services (Schraft and Schmierer 1998), and also monitor and help with data collection and telemedicine (Baltus et al. 2000).

It would be understandable if research on the implementation of health service robots and sociable robots in health care started with the assumption that such robots are designed and selected with a specific problem-solving capacity in mind. The strength of anthropological fieldwork is, however, that it can transgress such self-evident and often misleading assumptions and point to the complex reality of social and material life. In our study it is the very presence of a robot with certain affordances that creates new areas for its use. At the same time, this robot was chosen for the test by a municipal agency on a thick carpet of imaginaries, hopes, and public representations that cannot be isolated from its practical use in the rehabilitation centre. To capture these meanings and uses we draw on anthropological

approaches to materiality stressing that material artifacts also exist by virtue of their potentiality and their affordances (e.g., Ingold 2001). This seems especially true of robots.

The specific robot we are dealing with in this article was explicitly developed as a new system of telecommunication and human-robot interaction by its Japanese designers. It has been tested on children in schools (Yamazaki, Nishio, Ogawa, Matsumura, Koda, and Fujinami 2012; Ogawa, Nishio, Koda, Taura, Minato, Ishii, and Ishiguro 2011) and on elderly people in a shopping mall (Ogawa, Nishio, Koda, Balistreri, Watanabe, and Ishiguro 2011) and in care facilities (Yamazaki, Nishio, Ogawa, and Ishiguro 2012; Yamazaki, Nishio, Ishiguro, Nørskov, Ishiguro, and Balistreri 2012). When it entered a specific social and institutional setting as part of a test project in a Danish rehabilitation centre, however, in effect it was both being tested for its capacities in human-robot interactions and communication by an international team of roboticists and university-based researchers, and put to use as a health service robot in a negotiation between the researchers and the local managers and staff.¹

As will become clear in this article, the robot exists in multiple states at the same time. Though technologies like robots may appear stable, their status changes when they become technology-in-use (Hasse 2013). It is a “designer’s fallacy” (Ihde 2006, 121) not to acknowledge that technology is classified and re-classified differently at different points in the social lives of technologies, acknowledging that the meaning of things derive from human transaction and human motivations. Drawing on insights from postphenomenology (Verbeek 2005; Ihde 2002), we understand the robot as a multistable technology, meaning that “the ‘same’ technology takes quite different shapes in different contexts” (Ihde 2007, 13). Multistability means that when the ‘same’ technology becomes part of different life worlds and activities it produces different realities with the potential to transform people from within (Hasse 2013).

In some ways similar premises can be seen in actor-network theory (ANT), e.g., in the work of Bruno Latour (2005), John Law (2004) and Annemarie Mol (2002), whose work has stimulated a renewed interest in non-human as well as human actors in social and cultural anthropology. Anthropologists studying ‘exotic cultures’ have always paid attention to the agency of non-humans, e.g., in animism and magic, but Latour and ANT paved the way for a whole new awareness of materiality and multiple ontologies in quotidian Western lives. Our concern with all these approaches is their lack of clarity about how, *methodologically*, we can grasp the social processes through which multistabilities or multiple ontologies

(Mol 2002) are achieved. Our main aim with this article is epistemological, as we regard processes of recognition as crucial for the multiple ontologies identified by ethnographers. An argument for multiple ontologies must include a clarification of the ethnographers' learning processes in the field. We discuss the example of a particular robot technology and some of the emerging ways in which ethnographers come to learn about how the robot is stabilized in a specific institutional setting.

The complex roles of robots in practiced places are hard to capture, a fact that is also reflected as a gap in the burgeoning research literature on robotics. Although service robots are increasingly tested and put to use in institutions such as nursing homes, rehabilitation centers and schools, most robots are initially tested in laboratory settings (e.g., Alac, Movellan, and Tanaka 2011). Even when robots are tested in real-life settings, reviews of their development and functionality rarely focus on the staff in e.g., the rehabilitation centers, kindergartens, schools and nursing homes where the robots are put to use, and staff problems are rarely mentioned in the reviews (e.g., Fong, Nourbakhsh, and Dautenhahn 2003; Goodrich and Schultz 2007). Though the staff members are key actors in the practiced places where the robots are implemented, the staff perspective on the robots seems to be a marginal perspective, at least for roboticists. In this article we show how anthropological fieldwork can capture the complexities of technology-in-use, including the angles that are often overlooked once robots leave the protected and manageable environment of the laboratory and become part of people's life worlds.

If we want to study robots and the life worlds of which they become a part, we need to start out with an appropriate analytics for understanding localities as social worlds that people at once act *in* and act *on*. In *The Practice of Everyday Life* the philosopher Michel De Certeau (1984) offers a helpful distinction between space (*espace*) and place (*lieu*) to conceptualize our fields of ethnographic study:

A place (*lieu*) is the order (of whatever kind) in accord with which elements are distributed in relationships of coexistence. It thus excludes the possibility of two things being in the same location (*place*). . . . It implies an indication of stability.

A space exists when one takes into consideration vectors of direction, velocities and time variables. Thus space is composed of intersections of mobile elements. It is in a sense actuated by the ensemble of movements deployed within it. . . . In short, *space is a practiced place*. (De Certeau 1984, 117)

De Certeau thus makes a distinction between ‘space,’ which for him represents a phenomenological understanding of the complex social world that is always in motion and involves countless actors and points of view and ‘place,’ which implies some kind of order and stability. Describing a ‘place’ in anthropological analysis is necessarily a reduction of human experience. A ‘practiced place’ involves power relations that stabilize space into place.² De Certeau gives the example of a street that is geometrically defined as a place by urban planning but transformed into space by actual walkers. The relationship between place and space is replayed in the relationship between a ‘map’ and a ‘tour.’ While maps reduce or freeze geometrical places in images of the world, ‘tours’ express actions and directions in the social world. Stories,³ de Certeau writes, constantly transform spaces into places and vice versa, and they organize the changing relationship between places and spaces. Any kind of discourse, story or other reflection, such as ethnography itself, is a way to ‘map’ lived space. To be clear, both spaces and places are part of human life and people constantly engage in mapping and living their worlds.

Doing anthropological fieldwork and participating in people’s lives gives us access to their tours and practiced places, where people and things move. At the same time we are attentive to the ways in which space is transformed into place as we study practiced places *with* people. Put differently, we are attentive to the ways that people, who inhabit the life worlds we are studying, map their own life worlds. Fieldwork allows us to follow other peoples’ tours and ‘read’ their mappings. Values are an important part of social spaces understood not only as “conceptions of the desirable” according to Clyde Kluckhohn (cited in Graeber 2001, 3) but also as valued activities or “patterns of action that in practice are called into being by the very fact that people value them” (Graeber 2001, 259). When we spend time with people, talk with them and listen to their stories we gradually learn about how they define each other and their work, e.g., through everyday activities, small talk and interviews. Over time we get a fuller picture of what they mean with their words and what they value because we have ourselves to some extent followed the same tours.

Through fieldwork we learn that the knowledge with which we as human beings live is not the same as the knowledge whereby we intellectually make sense of life (Jackson 1996, 4). Anthropologists often talk about this as the distinction between what people *do* and what they *say they do*, not to suggest that people lie or consciously conceal what they do, but because we act in the world with practical knowledge that is not verbalized. Thus our values may not be clearly expressed just as stated values may not cover everybody’s desires. Adding to the complexity,

when we enter practiced places as fieldworkers to study social phenomena like technology-in-use we discover that people are situated differently in social worlds, so the way some people explain the values of a robot (e.g., roboticists or managers) may be countered by the way others (e.g., service providers) explain robots in the same practiced place. Some maps are imposed on social worlds, and to stick to de Certeau's metaphor, during fieldwork we learn to grasp which actors draw which maps and which maps are the most powerful in different social situations, so that they come to determine the routes of other people.

Human life with robots, as with any other technology, is simultaneously about places and spaces, maps and tours, discourse and practice. In the following we present our study of robots in a Danish rehabilitation centre that we have chosen to call Lakeview Rehabilitation Center in order to preserve its anonymity. Our discussion of the study as it developed in the practiced place of Lakeview will lead up to our final conclusions about the methods and theoretical advantages of Techno-Anthropological approaches to robot technology.

Making Fieldwork Visible

In 2013, the three authors of this article, two anthropologists and an engineering intern, ventured a study of two different robots introduced to the rehabilitation center Lakeview: a reprogrammed brain training robot and the sociable telecommunication robot described in this article. Lakeview functions both as a municipal rehabilitation center specializing in physical rehabilitation for people who have experienced disabling physical illnesses, strokes or accidents, and as a test center for new welfare technology. As in all fieldwork the initial period was characterized by confusion and disorientation. When entering a rehabilitation center, workplace and municipal facility such as Lakeview one encounters 'an already practiced place' where movements and things are meaningful for the local inhabitants. Yet, it seems rather incomprehensible to the incoming ethnographer. At first sight it is a material and geometrical world, full of human and non-human actors moving hither and thither. Fieldwork then becomes a question of observing closely and, if possible, getting a more complex understanding of, for example, how service robots and different kinds of human actors engage with each other by learning from tentative participation in the practiced place.⁴

The two fieldworkers (the engineering intern and one of the anthropologists) took turns in following activities at Lakeview and mapping the place, at first geometrically and then more and more according to people's stories, values and actions. The composition of actors in the field was in itself complex, ranging from

the end-users at Lakeview, the management and various groups of professionals, such as nurses, healthcare assistants, doctors, physiotherapists and occupational therapists working at Lakeview through the managers at the municipal agencies allocating resources and tasks at Lakeview to the international team of researchers and roboticists who test and implement robots and other welfare technology at Lakeview, not to speak of all the non-human actors such as the robots, computers, wires, work schedules, work ethics and all the other devices and concepts working in a practiced place like Lakeview. At some point the place began falling into space, so to say, and the fieldworkers began to be able to understand peoples' actions and reactions and to discover the diversity in how different people map out their shared workplace. The definitions belong to the definers, as expressed by Susan Leigh Star and Anselm Strauss (1999, 14), and we soon learned that end-users were neither defined as 'residents' nor 'patients,' although the research team from the university kept referring to these categories. The staff at Lakeview referred to end-users as either 'citizens' or 'guests,' and there was an interesting internal value conflict and continuous negotiations hidden in the use of these two concepts, which were tied to particular values and practices. These negotiations got new life with the introduction of the robots, but it took time for the ethnographers to learn to recognize that and to put their own process of learning about these meanings and values into words.

Fieldwork, or the fieldwork process, often appears as a black box of social processes that are hard to grasp and are rarely described in detail. Diana Forsythe, who worked for many years as an anthropologist among knowledge engineers and physicians in the area of medical informatics, observes that anthropological methods easily become 'invisible work,' referring to a concept developed by Star (Star and Strauss 1999), because ethnography looks and sounds straightforward (Forsythe 1999). Ethnographic data-gathering methods, as opposed to laboratory research methods, are flexible and meant to be unobtrusive; they are designed to be used in uncontrolled—and uncontrollable—real-life settings (Forsythe 1999, 128). It is precisely this flexibility and adaption to complex and unique real-life settings that makes ethnographic work invisible and makes it difficult to provide hard-and-fast descriptions of its methodology. Working in the field of technology design, Forsythe has not only experienced an interest in ethnography and its utility but also the misconception that anyone can do it. Forsythe, however, maintains that what makes ethnography look so easy is *expertise*.

In order to unpack ethnographic expertise Diana Forsythe emphasizes that ethnographic methods are grounded in anthropological theory and based in a

distinct philosophical stance. Though ethnographic fieldwork methods (including participant observation and interviewing) may be employed by many disciplines, the special approach in anthropological fieldwork is the theoretical grounding of ethnography in anthropology. One of the important theoretical frameworks for anthropological fieldwork is the distinction between different sorts of knowledge at play in social life (e.g., what we have called knowledge whereby we live and knowledge whereby we make sense of life) and the attention paid to the relationship between beliefs and action in social situations (what we called the difference between what people *do* and what they *say they do* above, with reference to Michael Jackson (1996, 4)). Most importantly, the philosophical stance of anthropological fieldwork involves conceptual distance—i.e., to “take as little as possible for granted”—or essentially to “maintain careful epistemological discipline” (Forsythe 1999, 129). ‘Epistemological discipline’ involves always treating concepts in relation to the context in which they appear and identifying the status of different concepts in a social setting. This philosophical stance or epistemology is sometimes called methodological relativism or contextualism emphasizing anthropology’s focus on the use and deployment of concepts in social practice (Dilley 1999, 6). Tracing concepts, their use and meanings in social worlds can, however, also be seen as a learning process of gradually shifting the anthropologist’s perspectives, thus avoiding both perspectivism and relativism (Hasse 2015).

The philosophical stance of social and cultural anthropology is very different from the positivism that underlies the natural sciences, engineering, cognitive psychology and many other disciplines involved in technology design, but whose scholars may not emphasize consciousness of their own disciplines and their philosophical premises. ‘Careful epistemological discipline’ thus does not follow automatically whenever somebody sets out to do ethnography and ‘describe what they see’ in geometrical space. During fieldwork our perceptions of the world we study change with the learning experience.

This position is also taken up by Tim Ingold in the epilogue of *Being Alive: Essays on Movement, Knowledge and Description* (2011) in which he describes anthropology as a craft. Anthropology is not the study *of* human beings, but the study *with* human beings (Ingold 2011, 239), and anthropologists explore the world from a phenomenological perspective of human dwelling, or place-making, in the world. Ingold makes a distinction between ‘doing ethnography,’ that is describing the lives of people with whom we have studied, and ‘creating anthropology,’ that is contributing to our knowledge of humankind:

An education in anthropology, therefore, does more than furnish us with knowledge about the world—about people and their societies. It rather educates our perception of the world, and opens our eyes and minds to other possibilities of being. The questions we address are philosophical ones: of what it means to be a human being or a person. (Ingold 2011, 238)

Ingold maintains that even though ethnography has its methods (e.g., note taking), it *is not* a method in itself. It makes no sense to distinguish ethnography as description and anthropology as theory and separate the two in time and space, because the anthropological engagement is a process where there is no distinction between the anthropologist's work and life. Our ethnographic data become anthropological analyses as "studying with people" changes our perceptions (Ingold 2011, 240). In this sense, the collaborative work between robotics designers and researchers, staff, management, and anthropologists can add to the anthropological analysis of Lakeview which focuses on the variety of values tied to the robots entering an already practiced place.

Entering a Practiced Place

In Denmark, service robots, and especially health service robots, are part of a profound political interest in welfare technological innovation and the opportunities that spring from new welfare technology to improve, rationalize, and make more efficient public health and care institutions and care for an aging population in their own homes (Hasse 2013, 83). Not only this overall interest but several other interests in robot technology form important contexts for our present study. When it comes to research in robotics, there is both a strategic interest in state-of-the-art technology for business development and a basic research interest in fundamental philosophical and ethical questions concerning welfare technology, human-robot interaction (HRI), and artificial intelligence (AI). Municipal agencies are interested in keeping up-to-date with technological innovations, because they assume robots can be of value politically and economically in future health and eldercare. Hospitals, health care, rehabilitation centers and home care services work with welfare technology in interaction with citizens and end-users of the technologies.

In our present case study, all of the above interests in robotics and welfare technology do in a sense come together in the rehabilitation centre Lakeview. Lakeview functions both as a training and rehabilitation center for ill or injured patients and as a 'living laboratory' exploring new welfare technology in the municipality of Aarhus, the second largest city in Denmark. Being an exploratory

site at the spearhead of the latest welfare technological developments is both part of the rehabilitation center's mission statement, as presented in brochure material for the public, and integrated into the staff's self-understanding of their work, as explicated in the interviews we made with the staff. The management at Lakeview works closely together with the welfare technology unit of the municipality of Aarhus, one of the frontrunners in implementing health service robots in Denmark. The leader of the welfare technology unit is a key person in setting up new test projects at Lakeview. He explained to us in an interview⁵ conducted in his office just prior to the start of the test project on the telecommunication robot:

I have been involved in several projects with Japanese and Koreans where I think they are extremely driven by the technology. They produce a device because it is possible, and then they have a theoretical idea about what you can do with it. They have rarely been out [of the laboratory] and have considered the practical needs and looked into how we can do it more cleverly. How do we increase the value for the people who live here?

The welfare technology unit promotes projects that give immediate returns, e.g., in the form of 'citizen satisfaction' or new technical appliances, as well as projects that the leader later during our conversation called more 'avant-garde.' Such projects typically start with the leader of the welfare technology unit learning about new technology, e.g., robots at international trade fairs in technology. In this case, the test project was developed when the team of university-based researchers offered to co-design a research project with this particular robot operated with the so-called 'Wizard of Oz' technique (cf. Goodrich and Schultz 2007, 252). 'Wizard of Oz' means that the robot is tele-operated and speaks with the operator's voice.

The robot tested at Lakeview has a human-like round head, is totally white, bald and the size of a small child, but has no hands or legs. It acts as an interface where a human voice is connected to the robot's mouth movements. Furthermore, it can turn its head and move two forelimbs. The robot was not developed with any specific health service in mind, and this soon became an issue in the negotiations between staff and researchers.

The design of the collaborative project between the university-based group of researchers, the municipal welfare technology unit, and management at Lakeview changed a couple of times in the start-up phase of the project, due to both technical circumstances and negotiations. The main problem seemed to be finding a meaningful set-up for the test based in a potentially useful application of the robot in the Lakeview context. The municipality and the management at Lakeview wanted

a research design where the rehabilitation center could benefit from the project by developing new treatment methods, for instance, whereas the university researchers were mainly interested in testing human-robot interaction as such. After some negotiations, the test design was focused on testing the robot's capacity to help people who eat very little, so-called 'small eaters,' to eat more.

The initial test design was to place the tele-operated robot at a table with four to six persons from the rehabilitation center and to let the robot entertain people, to explore whether the presence of the robot would encourage people to eat more. This assumption did not build on any previous studies of human-robot interaction but, as we found out during our fieldwork, it imitated so-called everyday 'dining situations' at the rehabilitation center. Thus the test served two purposes: one purpose highly prioritized by the university unit to see how people reacted to the robot 'as-if-it-were-human,' and the other to test whether a robot could encourage people who eat too little to eat more. To prove this effect of the robot, the participants in the test had to be 'small eaters.' It turned out, however, that the social category of 'small eaters' mapped the end-users in negative ways in the local context with unexpected results for the robot test project, and the test design was changed.

This time it was decided that there were to be three parallel sessions each week where the robot was placed opposite a single resident in his/her own room while he/she was eating at a small table: two sessions with a participant from Lakeview and a robot operated from a hidden place by an occupational therapist or a health care assistant from Lakeview, and a control group session with a participant from Lakeview and a staff person, also either an occupational therapist or a health care assistant. These three parallel sessions had to follow the exact same rules. They were filmed and the test went on for eight weeks. In the beginning the idea had been to weigh the plates of the 'small eaters' after a session with the robot in order to see if the residents in the robot-situations ate more than those in the control group with the human-human interaction, but this idea was eventually abandoned as well.

We followed the development of the robot test project from the sideline and interviewed the project partners, managers from the municipal welfare technology unit, the management at Lakeview, and the staff that operated the robot during the robot test. We participated in the project meetings among these parties when the project was introduced and evaluated and observed the tests while they went on at Lakeview. In order to understand Lakeview as a practiced place it was important to spend time there before the robot project started. Because the initial project design imitated everyday 'dining situations' at Lakeview and targeted 'small eaters,' we

had asked for permission to participate in a number of ordinary dining situations at Lakeview before the first test even started.

Contextualizing Dining Situations

A typical day at Lakeview starts with breakfast and the residents' individual morning routines, followed by morning sessions with exercises with the physiotherapists and occupational therapists. The residents are typically people—older or younger—whose lives have been disrupted by serious diseases, strokes, or accidents and they typically stay at Lakeview for a rehabilitation period of five to six weeks with intensive treatment and exercises. After that they are supposed to return to their normal lives at home or in care homes. At noon, a warm meal is served in the dining hall in each of the three sections at Lakeview that house approximately twenty residents. Before we entered the dining hall on our first visit, we had a short introductory meeting with the manager of Lakeview. She told us about Lakeview's approach to 'dining situations': The meal is supposed to be a social event without disturbances from other activities, such as phone calls, and before each dining situation one staff member is appointed as that day's hostess of the meal. The hostess is supposed to have an overview of the dining hall and all residents and create a quiet and peaceful atmosphere. Before the manager left us in the dining hall, she pointed out to us who was going to be that day's hostess, the health care assistant Susan.

In the dining hall and the adjacent kitchen the staff seemed to follow their routines: The kitchen assistants arranged the plates and cutlery on a trolley and the health care assistants started calling on the residents for dinner. Some could walk down the corridor to the dining hall with walkers; others had to be pushed in wheelchairs. Susan explained to us that many 'guests' at Lakeview preferred to sit in their own rooms and eat their meals alone, but that the staff, as part of rehabilitation, was making an effort to motivate people to come down to the dining hall and participate in the 'social community' with the others. Even though the residents have a right to decide for themselves if they want to eat alone or together with the others, Susan explained to us that socializing and sharing experiences with others would promote people's rehabilitation at Lakeview. Then she went off to one of the rooms to encourage an elderly man to eat together with the others in the dining hall.

Later we asked Susan about her role as a hostess, but, much to our surprise, we got only a sarcastic laugh and an unexpected answer back: "Did she really call it being a hostess? Well, we are also supposed to be a 'health and care hotel'!"

Puzzled by this answer, we made a mental note concerning ‘hostess’ and ‘health and care hotel’ and asked Susan what she would call her role instead then. She answered that she simply called it “being in the dining situation” and explained that the persons who “are in the dining situation” have to make sure that the residents do as much as they can by themselves, e.g., set the table and collect their plates and food from the trolley:

Many of the oldest people at Lakeview like to be catered for and waited on at the tables, especially the old women who have taken care of others their whole life and think that they are now in for a treat here at Lakeview. The dining situation is in itself too service-minded, considering that we are a rehabilitation centre and have to teach people how to take care of themselves. It sounds rude to say that they have to put back their tableware on the trolley, but it helps them. Our task is to help them find satisfaction in doing things themselves.

After spending more time at Lakeview, talking with the staff and residents and observing more dining situations, we found out that the concept of ‘hostess’ was more than an aphorism of the manager and Susan’s skepticism more than ordinary irritation, but was linked to fundamental values and discussions among the staff about rehabilitation. The ‘dining situation’ formed an important pedagogical tool in rehabilitation at Lakeview.

In the official information material about the rehabilitation center, Lakeview is called a “health and care hotel” and the residents are called “guests,” underlining that Lakeview offers a health service and that the goal of a temporary stay at Lakeview is “to support citizens in becoming as self-reliant as possible and thereby forming the basis for an independent and meaningful life.” To speak of the users of Lakeview as ‘guests’ emphasizes their personal freedom and independence and their status as temporary residents. In everyday interaction, however, the staff usually spoke about people as ‘citizens,’ emphasizing their independence and also their status and rights as citizens in a welfare society. It became more and more clear for us that for the staff ‘guest’ and ‘citizen’ were different subject positions for the people staying at Lakeview, and that it did not only make a symbolic but also a practical difference which status was evoked in everyday interactions. Those staff members who had previously worked in care homes for the elderly, for instance, pointed out to us that there was an important difference between care homes and the rehabilitation center: In care homes people are called and treated as permanent

and dependent residents, and this makes the contact with people very different from Lakeview where the goal is for people to stay for as short a time as possible.

Extended fieldwork at Lakeview provided insights into the connections among concrete social practices, mappings, and practical knowledge during dining situations and the staff's and management's considerations about rehabilitation and the residents' different subject positions that were actualized in the dining situations. Dining situations, as practiced places, are difficult and ambiguous social situations where the concepts of 'hostess' and 'hotel' gain a particular meaning; they are important contexts to understand the complexity of the dining situation.

One of the most important aspects of doing anthropological fieldwork is being attentive to such contexts, to physical places, language, behavioral environment, and bodily interactions that are drawn into specific social situations during fieldwork. In this example, the context of the hostess and hotel is an extra-situational context that is drawn into the situation and made relevant in the social situation by the actors themselves. According to Ben-Ami Scharfstein (1989), context is "that which environs the object of interest and helps by its relevance to explain it" (cited in Dilley 1999, 3). Contexts are frames of relevance that can be both immaterial and very material and physical (Hasse 2015). To recognize relevant contexts in social situations the fieldworker has to be open for new perceptions of the field as it emerges while studying *with* people over longer periods of time, being well aware, of course, that knowledge of e.g., eating and robotics is not distributed evenly in the field but is "situated knowledge" (Haraway 1988).⁶ Deciding what counts as a relevant context in a social situation is an important form of power, and the fieldworker must be attentive to which contexts are forced onto social situations and which contexts are chosen, and furthermore be attentive to the re-contextualization that continuously taking place in social interaction (Hastrup 2003).

For Susan and many of the other health care assistants and occupational therapists, the job of a hostess in a dining situation is not supposed to be the servicing role that the terminology of a 'health and care hotel' easily signals. For her, the terminology touches upon some of the important dilemmas tied to dining situations and rehabilitation in general. One is the dilemma between being friendly and polite and providing a health service to people on the one hand, and the promotion of independence and self-reliance on the other. Another dilemma exists between letting people decide for themselves whether they want to eat in their own rooms and encouraging them to participate in the common meal in the dining hall, because eating with others is connected to an idea of faster rehabilitation. There is a broader cultural context in Danish society where meals are important social

integrative situations, closely linked to the idea of a home as a model for sociality in public institutional settings (Højlund 2011). Meals provide important social situations for civilized and close interaction among members of a family or other groups, on the one hand, and on the other, being able to prepare a meal for oneself or for others can be seen as a marker of individual personhood, independence and self-reliability.

We argue that all these contexts, and doubtless many more, are relevant for understanding the complexity of dining situations and also that such contexts are made relevant when a robot enters into the dining situation as part of a test project. Introducing a robot was not simply a question of introducing ‘new technology,’ but it entered into an already established framework of expectations, social roles, values, means and ends, maps, and tours. So when occupational therapists and health care assistants were asked to participate in a test project with a robot mimicking dining situations, these contextualized values and expectations still played a role.

This became particularly clear to us during a meeting between the test project’s team of university researchers and the staff and management at Lakeview, during which the second test design was introduced to the staff. After the researchers had explained the set-up of the test and the staff’s task during the eight weeks of tests, the floor was opened up for questions. One of the occupational therapists wanted to know what exactly the researchers were testing for and whether it still had something to do with food intake. One of the researchers explained that focus had shifted from food intake to whether ‘eating together with a robot’ would influence people’s attitudes towards technology, but that participants were still chosen after the same criteria of low BMI to collect baseline data. This shift in focus had been discussed with the manager of the team of occupational therapists, but now they had to think and talk through the shift’s practical effects with the whole team of occupational therapists. While the team of researchers were mainly concerned with the overall guidelines for the project and creating comparable data sets in the tests, the coming operators and their manager were practically oriented and went into great detail with the actual activities and dialogues with the robot. Therefore, the manager asked whether the role of the robot still was the role of a hostess at the table:

Can I ask about some practical things? As you know the robot cannot get up and move. It cannot pick up something from the floor or fill people’s plates, as a hostess would do. How are we supposed to do that? What if they want more food?

To this the research team replied that it did not matter as long as all occupational therapists participating in the test did the same. Then one of the occupational therapists asked:

What about the control group? Does it have to do exactly the same? If somebody drops a fork, is someone in the control group then not allowed to pick it up? I consider it very rude to sit next to a person and not to pick up a fork that has fallen down from the table.

This excerpt from a longer dialogue shows a negotiation about how to practically organize the new test situation. The robot and the tests carried different meanings for the researchers and the staff. The contexts of the dining situations and the practical knowledge and dilemmas of 'being in the dining situation,' related e.g., to picking up forks or filling plates, were invisible to the researchers whose main goal was to create a generalizable and replicable test site. They had, of course, consulted the management, considered the ethical aspects of the test project, and made certain that it would not endanger anybody's life or well-being, but they had not learned about the everyday practices and values connected to the rehabilitation process at Lakeview.

For the staff at Lakeview, it was important to understand how the project and test setting related to their everyday work with rehabilitation and what subject positions of their users the robot activated. In the same vein, the staff reacted strongly when participants in the test were spoken about as 'patients' or 'test persons,' which are subject positions that are at odds with those promoted by the rehabilitation program at Lakeview. What also becomes clear from the discussions above is the importance of bodily presence for the rehabilitation process, and that the bodily presence of the robot was different from that of a human being. The robot's design made it possible for the operator to speak with the test participants and strike up a personal conversation suitable for a dining situation, but the robot sitting on its tripod had no hands and could not reach down for a fork if it fell down. In this way, the interaction and values of a dining situation were altered.

At a final meeting when the robot project was evaluated, the staff and local leadership at Lakeview found that the main outcome of the test project was the conversations with the participants that the robot had provided. It had been surprising for the operators of the robot how quickly the project participants gained confidence in the robot and had told him or her details from their personal lives that they would not normally disclose to strangers. They found that the guests at Lakeview had categorized the robot as a professional caretaker whom they

could trust. Since the robot could not move and each test session lasted for thirty minutes, the test had provided opportunities for uninterrupted and open conversations and intense interpersonal interaction for which there was rarely time in their everyday work life. In this sense, the staff participated in a stabilization of the robot as a surprisingly good tool for interpersonal communication. Yet these findings did not seem to be connected to the dining situation in particular. The robot thus went from being a robotic communication device without any connection to health services to a health service robot aimed at ‘small eaters’ and back to being a communication device. The control group sessions experienced similar positive effects from taking thirty minutes to just talk with people while they were eating, so perhaps, it was not the robot itself that provided good communication but the whole test setting.⁷

When a robot is put to use in a practiced place, there will always be several agendas at play at the same time, and anthropological fieldwork can bring these complex contexts to the fore.

Conclusion: Making Complexity Visible

Doing fieldwork at Lakeview was a learning process of getting to know Lakeview as a practiced place. One of the strengths of this anthropological fieldwork was that we could move around and get access to many perspectives and opinions informing the practiced place: the university researcher groups’ meetings, the municipal management office, the staff rooms at Lakeview, the dining hall, etc. This made it possible to disclose a complexity that was not present from the perspectives of individual participants. Though the participants were well aware that negotiations take place all the time, in an anthropological analysis these negotiations were situated in a wider context, e.g., tied to conflicts of value and status. The robot turned out to be a ‘multistable’ technology: even though it was the ‘same’ robot it produced different realities and had different effects for the different people involved in the robot test at Lakeview. In this article we have focused on the group of researchers and the occupational therapists and health care assistants engaged in dining situations as pedagogic tools for rehabilitation. Even though this context was not clear for all parties involved, the robot became a certain kind of agent and intervention in the rehabilitation at Lakeview. At the same time, the robot was tested for its capacities in human-robot interaction by the researcher team, and it also provided a promise of future welfare technologies for the municipal welfare technology unit. Our fieldwork showed that an artifact that is introduced in one

context as a health service robot may be a tele-communicator or a therapist robot in another. Thus robots are ‘multistable’ artifacts (Ihde 2007).

With Marilyn Strathern (1991) we could say that the robot was one and many robots at the same time—“more than one, less than many” (cited in Mol 2002, 82). The different actors at Lakeview were all talking about the robot as if they were interacting with the same robot but actually the robot existed simultaneously in different social life worlds with different kinds of being. Having conducted anthropological fieldwork, we can, however, extend Mol’s philosophy of multiplicity, because we have reached a new understanding of people’s life worlds. We are not merely describing the robot in multiple actor-networks, but we are exploring the multiple ontologies of the robot from within the practiced place of Lakeview. We directed attention toward the changes of context, values, and negotiations of what kind of robot the robot was or could be at Lakeview. From within the practiced place of the staff the robot is not just one thing, but a figure that is continuously negotiated.

From the outset, the anthropologist arrives to the field as an outsider. Being an outsider and a newcomer provides opportunities for moving around in the local space, asking ‘stupid questions’ and engaging in movements that, for instance, professionals in the field cannot engage in themselves. In this process we learn to change our perceptions of material artifacts. They become multistable—or at least we can follow processes of stabilization, processes that are largely unexplored by the professionals in the field who are generally occupied with negotiations from their particular perspective. The analysis we have presented here is not just a question of making ‘the missing masses’ visible (Latour 1992), but an uncovering (Forsythe 1999) of both the work of the ethnographers and the groups of people engaging with technologies in their everyday work life: health workers and service providers in rehabilitation centers and robotics researchers.

The multiple ontologies found in, e.g., Mol 2002 depend on stabilizing processes such as the ones described in this article, and these processes of stabilization can be studied ethnographically. This implies following the mappings and tours in practiced places through the fieldwork process where participation means moving around with the practitioners and at the same time being sensitive to what we see (Ingold 2011). Through anthropological fieldwork as a learning process, including ‘epistemological discipline,’ multistability and negotiations of stabilizations may be followed and described ethnographically.

The advantage of including anthropologists in testing and implementing new technologies are twofold: 1) The testing team of researchers and robot design-

ers gain a better understanding of the wider social and material context in which they engage. When “studying with people” (cf. Ingold 2011), anthropologists and other researchers, new technology and other things unsettle everyday practices, and values and practices may be renegotiated. 2) The process of understanding what e.g., robots do and how they may be helpful could be a much more iterative design process where the multiple and changing perspectives of end-users as well as staff and other actors and the negotiations among these actors can be taken into account.

In this article we have followed many different and primarily human actors circling around the non-human actor: the robot. We have focused on the perspective of staff members who often act as invisible workers and go-betweeners between robot designers and end-users. This also reflects our position as fieldworkers in the field—we participated and thus saw the world from their perspective and shared their experiences and learning processes with the robot project. A longer period of fieldwork and more time spent with the people staying at Lakeview, the end-users of the welfare technology, would have opened other life worlds.

Notes

We wish to thank the management and staff at Lakeview and the researchers from Philosophical and Transdisciplinary Enquiries in Social Robotics (PENSOR) at Aarhus University with whom we have collaborated in this project and who have generously shared their ideas and network with us and commented on a draft of this article.

1. We refer to the interdisciplinary research group Philosophical and Transdisciplinary Enquiries into Social Robotics (PENSOR), based at Aarhus University and testing the sociable robot at Lakeview, as ‘university-based researchers’ in order to set them apart from roboticists and other researchers involved in strategic research. Even though the team behind this article is also university-based—engineering intern Signe Hanghøj from the Engineering College at Aarhus University and anthropologist Maja Hojer Bruun from Aalborg University, who participated as fieldworkers at the rehabilitation center for five months from August to December 2013, and anthropologist Cathrine Hasse, Aarhus University, who participated as project coordinator—we were not part of PENSOR. Our research at Lakeview was part of a project in 2011–2015 funded by the Danish Strategic Research Council called Technucation. Technucation studies how a better understanding of technology-in-use in professional practice can be used in developing learning instruments, which improve the education of pre-service professionals in the health care sector and schools. There was collaboration between the PENSOR and the Technucation group, but while PENSOR worked on and developed

the test with the robot at Lakeview the Technucation group followed this and other robot projects at Lakeview as well as daily life at the rehabilitation centre.

2. De Certeau refers to Merleau-Ponty's distinction between "geometrical space" which is analogous to de Certeau's *place* and "anthropological space" which corresponds to de Certeau's *space*.

3. By 'stories,' de Certeau and other phenomenologists do not mean a certain genre of speech or writing, as in fairy tales or folk tales, but the transformation of social or lived worlds into discourse which always involves a reduction.

4. The 'fields' that anthropologists enter to do fieldwork, of course, do not simply exist in the world as independently bounded places or sets of relationships to be 'discovered' by the ethnographer. They are constructed by the fieldworker, and the process of the fieldwork itself is part of this construction of the field (Amit 2000). It is part of anthropological expertise to account for how precisely our fields came about and to prize them apart from other possible constructions, contextualizations and connections in the social worlds of which we have become parts.

5. The interviews for this article were conducted by Maja Hojer Bruun and Signe Hanghøj. In all, nine interviews were conducted with the management and staff at Lakeview and the leader of the welfare technology unit.

6. The limited space of this article does not allow us to discuss this at length, but of course there were different opinions among the staff about the dining situation and how it should be handled.

7. For technical and human resource reasons, the control group sessions were often left out, and it is difficult to draw any definite conclusions. At the time this article was written, the analysis of the test filmings was not yet finished.

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