Working with Robotic Animals in Dementia Care: The Significance of Caregivers' Competences[1]

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ABSTRACT

Robotic animals are increasingly discussed as a solution to challenges connected to the aging population and limited resources in care. While previous research focuses on the robots' effect on the patients' well-being, there is a general lack of knowledge regarding the hands-on experience of caregivers' use of robots. Therefore, the aim of the study is to explore the competences that caregivers draw upon when facilitating interaction between residents and robots. The study was conducted through ethnographic observations and interviews with caregivers at dementia care homes in Sweden. The notion of 'competence' is understood as knowledge about the ways of working and social norms that are valued within a community of practice, which members develop through engagement in the community. The findings show that caregivers' use of robotic animals as caregiving tools rests on embodied, social, and ethical competences.

KEYWORDS

Caregiver / dementia care / embodied competence / ethical competence / social competence / robotic animal / working life

Introduction

Robotic animals are increasingly discussed as a solution to challenges connected to the aging population and limited resources in care. Robotic animals that play social, assistive, or therapeutic roles can have a positive impact on care both in terms of replacing expensive workforces in healthcare and social care (e.g., Dautenhahn et al. 2005; Roger et al. 2012) and in patients' well-being, by facilitating communication and helping persons with dementia remember their life story (Kangasniemi et al. 2019; Moyle et al. 2018). Robotic animals have also been criticized for increasing older

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people's social isolation (Sharkey 2014) and have a negative impact on their dignity (Parks 2010; Vandemeulerbrock et al. 2018). The effects of robotic animals are mixed and can vary based on one's personal experiences of pets, and which features the robot is designed to have (Bradwell et al. 2021). Therefore, the use of robotic animals should be tailored to specific users (Abbott et al. 2019; Mol et al. 2010), and caregiving staff need to be given adequate resources to make sure robotic animals are being used in appropriates ways (SBU 2022). Studies indicate that the benefit of robotic animals is rooted in the caregivers' practical usage of the robot in interaction with the patients (la Cour & Højlund 2019; Pfadenhauer & Dukat 2015). Accordingly, this kind of 'win-win scenario' with better care and lower costs, which is a widespread idea related to new welfare technologies (Ajslev et al. 2019, p. 33f; Kamp et al. 2019, p. 1), needs to be understood relative to the competences required to productively use social robots in care.

There is a general lack of knowledge in the body of research regarding caregivers' hands-on experience when facilitating interaction between residents and robots (Persson et al. 2021). The current study begins to fill this research gap by pursuing the following research question: which competences do caregivers draw upon when they use robotic animals with residents? Through ethnographic observations and interviews with caregivers at care homes for persons with dementia, the caregivers' experience is explored through an existential perspective of competence, which 'conceptualizes competence not primarily as a thing or entity we possess, but rather something we embody and enact in the sense of what we do and at the same time are' (Sandberg & Pinnington 2009, p. 1145). We understand 'competence' as knowledge about the specific activities, material tools, and social norms that are valued within a community of practice, such as dementia care, which members develop by actively engaging in the community of practice while simultaneously reflecting on ones' place within it (Wenger 2010).

To situate our study and account for its contribution, we review previous studies of the use of robots in care settings. We then present the theoretical framework, which consists of a situated perspective on learning (Lave & Wenger 1991) that is integrated with Sandberg and Pinningtons' (2009) perspective on competence. After accounting for our qualitative approach to collecting and analyzing data, we report the empirical findings in three parts, showcasing the competences caregivers draw on when they use robotic animals with residents, namely, embodied, social, and ethical competences. In a concluding discussion, we argue that the robotic animals are not caregiving tools because of any specific technological properties; instead, they emerge as caregiving tools when the three forms of competences intersect in a community of practice.

Previous research: Caregivers' use of robots

While not focusing specifically on caregivers' competences when using robots in care settings, prior studies have identified conditions that facilitate the use of robotics in care settings, including technological competence, person orientation, and active engagement in matching robots with persons and in various care tasks.

Frennet and Östlund (2018) find that technological experience among caregivers is a key factor for the likelihood of acceptance and success of implementation. To start using robots, the caregivers must first make sense of them. There are also findings that

caregivers must understand the functionality, usability, and purpose of the robots and feel that the robot contributes something valuable to their practical work (Hasse 2018; Hudson et al. 2016). In general, the more technologically advanced a device is, the more technological competence is required (cf. Read et al. 2020).

Other studies emphasize caregivers' ability to match technology with individuals who will use them to 'provide dignified support to the lives of elderly [persons] through affirmative, person-oriented and relational care' (la Cour & Højlund 2019, p. 70). This demand for caregivers' local and practical knowledge has been observed in relation to feeding assistive robotics (Dag et al. 2017; Nickelsen 2019), robotic bathtubs (Beedholm et al. 2015), and wash-and-dry toilets (Hansen & Grosen 2019). In these examples, the technological devices would be useless without staff members' active engagement and competence as caregivers.

In addition to caregivers' competence, studies show that technological artifacts demand continuous tinkering by care workers who understand how the technology can be used in the complex and specific setting of everyday care work; for instance, by (dis) assembling the robotic device and doing minor repair work (Dag et al. 2017). The tinkering can often take more time than the time saved by the technology (Ajslev 2019). Regarding robotic animals, tinkering can involve loading and changing batteries, washing the fur, and adapting the sound.

Technological tinkering is part of a wider 'attentive experimentation' that characterizes care work (Mol et al. 2010, p. 13), that is, the same technological tool can be used in different ways, for different purposes. Several studies find that robotic animals, such as the robotic seal PARO and robotic cats, are used as tools for calming purposes and as companionship to reduce the need for patient supervision (Jung et al. 2017; Persson 2020). Other studies show that PARO can be used to stimulate playful interaction and conversation between patients and caregivers (Gustafsson et al. 2015; Moyle et al. 2018). Similarly, Pfadenhauer and Dukat (2015) observe that when using PARO, caregivers can assume the role of either a participant in the interaction with the user, or as an observer of the user's interaction with the robot. The two strategies demand different competences, and the first requires more social competence than the second.

Thus, there are findings about caregiver requirements needed to understand and use technology in ways that are fitted to patients as well as to different care tasks. Less is known about ethical aspects of using robots in care work. However, findings about the ways in which new technology affects professional values indicate that this is an important aspect of professional competence. For instance, Beedholm et al. (2015) study the introduction of a robotic bathtub and note that the caregivers started to reflect upon their own work ethics and what kind of values were at stake regarding the patients' wellbeing. Residents' safety and integrity (e.g., Hebesberger et al. 2017; Greenhalg et al. 2019) are other ethical issues raised relation to the robots. In a study about the lifting robot 'Hug', Wright (2018, p. 33) demonstrated that caregivers thought that the robot got in the way of person-centered care, as the relationship to the individual patient became partly automated, and it became difficult to stay attentive to the residents' integrity, as well as to the unique body of each resident, which did not always correspond to textbook models of elderly bodies. Other studies highlight that a robot companion can be used as a justification for leaving nursing home residents alone for longer periods of time, at the risk of increasing their isolation (Sharkey 2014, p. 35; Vandemeulebroucke et al. 2018). Regarding the robotic animals in dementia care, ethical questions regarding

patients' awareness of the robots' ontological status also arise (SBU 2022). While not addressing what kind of ethical competences caregivers need to draw upon when using robots in care, this research demonstrates the need to study this ethical competence in relation to other forms of competences in more depth.

Theory: Professional competence

We approach caregiving as a community of practice dependent on learning situated in care settings (Lave & Wenger 1991). Through an increasing degree of participation, community members of a practice gain knowledge about the ways of working, material tools, and social norms that are valued within it. Actively engaging in the community of practice while simultaneously reflecting on ones' place in it, is central part to identifying with it (Wenger 2010). Individuals position themselves reflexively as members of a community of practice—for example as a competent caregiver—with mutual engagement and a shared repertoire of routines, and ways of talking and feeling (Edlund et al. 2021).

As we saw in previous research, caring professions face an increasing demand for technological competence, which may collide with other competences and values within the caregiving community of practice (see Kirpal 2004). Values connected to relationships with patients—such as empathy, altruism, and the ability to see the individual behind the diagnosis—may clash with perceived risks of being replaced by robots and alienating patients (Fejes & Nicoll 2010; Parks 2010; Talbot & Brewer 2016). Caregivers' ideals of providing individual and patient-centered care do not always resonate well with increased requirements of technological competences (Kirpal 2004).

Current theories on competence suggest that competence consists of professional knowledge (Alvesson 2004; Mulder 2014) and tacit knowledge (Castillo 2002; Kontos & Naglie 2009), as well as knowledge in action and understanding of work or practice (Sandberg & Pinnington 2009). In line with Sandberg and Pinnington's (2009) existential conceptualization, the current paper rests on the understanding of competence as embodied and enacted knowledge about specific activities and tools that is accomplished and developed through human actions in the encounter with other members of the community of practice and in relation to the institutional framework that characterizes the context in which the work is performed and given meaning (Engeström 1993). Hence, professional competence is developed in interaction with other people but is also individual in the sense that persons develop and embody a certain competence in their own unique way (Sandberg 2000).

A central aspect of Sandberg and Pinnington's (2009) understanding of competence is the professional use of tools. The importance of tools (such as robotic animals) not only relies on practical purposes related to each individual interaction but also on the broader context of individuals' experiences and normative regulations within institutions (cf. Mol et al. 2010). In the context of dementia care, this means that the purpose and meanings of robotic animals are interpreted within the framework of core values within the caring ideal and profession, such as altruism, autonomy, human dignity, integrity, honesty, and social justice (AACN 2008; Poorchangizi et al. 2019). Tools must therefore be treated not only as engineering constructions but also as social constructions that emerge from a dynamic process of social action and interpretation when tools are used (Dewey & Bentley 1949; Pickering 1993).

Tools are a part of the materiality of learning (Sorensen 2009), as they often change the corporeal aspect of work, as they elicit new bodily postures and embodied subjectivities (Ihde 2002). Through this use, they also attain a situated meaning and become symbols of how people understand themselves and their work (Hasse 2013). When they change our goal-directed actions and professional agency, they subsequently also change our professional identities. Tools can thus function as 'evocative objects' in so far, as they cause people to see themselves and their world differently (Turkle 2011). In this sense, robotic animals may affect caregivers by enabling or limiting their thinking and actions. They may also affect the way people relate to other people, such as colleagues and patients (Hasse 2018). Robots are not necessarily only tools *for* care work—their material presence might also reconfigure care work. Based on this understanding, we explore how caregivers express and reflect on their ways of working when using robotic animals in relation to residents. As we will show, these experiences also connect to broader questions about the core of their professional identity and ideals, that is, about their place in a wider community of practice of caregivers.

Method

The paper draws on qualitative interviews and ethnographic observations (cf. Hammersley & Atkinson 2007) with caregivers in dementia care settings in Sweden. The study has been approved by the Ethical Board in Sweden (Dnr 2020-04661) and was supported by the AFA Insurance in Sweden (Grant 190170).

Before beginning fieldwork, informed consent was obtained from the participating caregivers. The study involves caregivers with experience of working with robots in interactions with people with dementia. The participating caregivers are all female (except one male), which is consistent with the national gender distribution (90% women) among caregivers in Swedish elderly care (Statistics Sweden, 2020). Most of the participants not only work as assistant nurses, providing bedside care, which involves a variety of daily care routines, such as helping residents to dress, eat, and bathe, but also to engage in social activities.

Although there are different types of robotic animals, all the robots in this study are cats and dogs, or 'pups' developed by the toy manufacturer Hasbro (see Figure 1). The cat has pressure sensors under the fur, which makes it react to touch, which initiates data protocols triggering both movement and sound. The cat can, for example, rotate its upper body backwards, lift one paw to its face, meow, and purr. The dogs also move and respond to touch, and sound sensors allow them to bark if users talk to them. The dogs are also equipped with machinery that makes a 'heartbeat' that can be felt through the fur. The robots are of a relatively simple design—they have limited set of movements and sounds that repeat independently of who is using the robots.

Documentation was performed through audio-recorded interviews with caregivers, and video-recordings and field notes focusing on interactions with robots in care homes. The field notes consist of rich descriptions of the environment, the people, and the events that we encountered (cf. Polunin 1970). The field notes contain words, quotes, and sketches that the researchers jotted down while observing the environment, as well as detailed accounts written after each day of fieldwork (cf. Emerson et al. 2011,

Figure 1 Joy for all companion pet selections. (Available via license: CC BY 4.0).

p. 123). Also, video-recordings of the localities and participating caregivers were taken as a supplement to the field notes. Audio-recorded, semi-structured interviews (Merton et al. 1990) were conducted with 44 caregivers during visits at the care homes. The interviews were sometimes conducted individually and sometimes in groups, depending on the situation and caregivers' preferences. The recorded interviews were transcribed verbatim.

When analyzing the data, we viewed videos and read the field notes and the transcriptions several times within an extended timeframe. An important aspect of the analysis has been to read the transcripts with fieldnotes and videos in mind. The purpose of collecting different types of data sources was to provide a comprehensive understanding of how caregivers carry out their work in situ, and of how distinct ways of being arrange and integrate central aspects of practice into specific forms of professional competence (Sandberg & Pinnington 2009, p. 1164). The interview transcripts, videos, and field notes were coded according to central aspects of the caregivers' ways of working with the robotic animals, for example, how they positioned themselves in relation to the residents in different situations, and how they managed any problems that occurred. Videos were also used to make line drawings of illustrative examples. We coded a wide range of practices, which we compared and clustered into categories of similar meaning content. Analytical categories were discussed and revised accordingly, making sure they were mutually exclusive and not overlapping in meaning (Aspers 2007). The definition of each category was further elaborated and clarified in dialogue with our theoretical framework (cf. Braun & Clarke 2006). This process resulted in the construction of three forms of competence, which we account for in the next section. Finally, we confirmed the validity of the categories by applying them to empirical extracts and by comparing them to our holistic understanding of the dataset.

Findings: Embodied, social, and ethical competence

In the following, we present three categories of professional competence that were constructed in the analytical process. These categories are either spoken about or expressed through caregiver's hands-on use of the robotic animals in relation to the residents.

Embodied competence: Handling robotic animals as caregiving tools

Caregivers are required to perform a wide range of instrumental tasks that are physically demanding, such as heavy lifting, pushing, pulling, and working in stressful body postures to handle patients and equipment. Caregiving also requires physical demands of an expressive and intimate character, such as when touching patients in communicative and comforting manners (Pedrazza et al. 2018; Werner et al. 2022). We will draw on both these corporeal aspects—the instrumental and expressive—as part of the embodied nature of professional competence (Castillo 2002; Kontos & Naglie 2009) of handling of robotic animals in relation to residents' needs and personal traits.

We start with the act of initiating an interaction between the robotic animal and a resident. The robotic animal is materially designed to spur human interest and evoke interaction through its appearance, movements, and sounds. However, because most residents do not request them, it is usually caregivers who actively introduce the robotic animals to the residents, as one caregiver informs us:

> We take it and bring it to them and put it on our lap and talk about cats, or we put it on the table, so that they can feel it. Then they get to pet it and we talk about the old cats that they had. (Home 2, Caregiver 5)

The lack of initiative from the residents can be understood as an aspect of dementia, which can make it difficult for persons to spontaneously figure out the right course of action or solve a problem in different situations (Hydén & Samuelsson 2019). To initiate interactions between a resident and a robotic animal in a perceptive way that suits the residents requires a new kind of embodied competence within caregivers' community of practice. The caregivers must make the robot relevant for the residents to act upon. Pfadenhauer and Dukat (2015) call this 'proffering', which is a corporeal form of giving someone an offer of acceptance. In this case, the caregivers usually hold out the offer—that is, the robot—and invite the resident to accept the offer, as illustrated in Figure 2.

The act of proffering can be performed in different ways, but it often involves certain expressive corporeal aspects. For instance, we observe how caregivers carry the robotic animal demonstratively in their arms, slowing their pace, and switching on the device before the encounter. This gives residents time to observe and recognize the caregiver, as well as the robot, and understand what is about to happen. By adopting a slow approach, the caregiver has time to start the robot, and by petting it while walking it will also start making sounds. The importance of a slow proffering process is emphasized by caregivers to avoid taking the residents by surprise. As one caregiver (Home 2, Caregiver 4) says:

Figure 2 Caregiver offers a robotic cat to a resident.[1]

> … it's not possible to just throw forth the cat from nowhere, like "here…here is a cat!" You must be a bit more strategic and laying out the cat—"Oh! Here is a cat!"—and then you pick it up, because then you create a caring situation.

In this example, the caregiver explains how she has placed the robot in a strategic place beforehand where she knows that the resident will see it. Then, when she and the resident walk pass the robot, the caregiver can act upon it, and thus create a joint activity in which they together find a cat.

Going back to the illustrated example above (Figure 2) in which the caregiver presents a robotic cat to the resident. As seen in this example, the caregiver looks at the resident in the eyes while holding out the robot to read the resident's reaction (this will be further discussed in the next section as a 'social competence'). Interpreting the resident as interested, the caregiver gently places the robotic cat on the table in front of the resident and starts to pet it herself, as illustrated in Figure 3. She makes sure to pet it in places (behind its ears and on the back) where she knows the pressure sensors are placed under the fur, so that the robot will activate its sound protocol (purring and meowing), hence making it more 'evocative' (Turkle 2011) and relevant for the resident to act upon through her own bodily disposition and actions (Kontos & Naglie 2009).

A few of the residents in the care homes have 'adopted' a robotic cat or a dog owned by the care home and have come to regard it as their own pet (Home 2, 4, 5, 6). These residents interact with the animal spontaneously; petting, talking to, and sometimes feeding it. One resident takes her dog with her in the basket of her walker when walking around the premises. Another resident has a water bowl and cat food for the cat in her room that her daughter has bought. In a third case, the resident said that 'her' dog

Figure 3 Resident accepts the caregivers' offer and starts petting the robotic cat.

is always waiting outside her room. In these cases, the caregivers do not have to proffer the robotic animal to the residents but will still engage with residents and robots to nurture the idea that the robots are real pets. For example, staff members refill the water in a water bowl and clean the robots or change their batteries at strategically chosen moments when the residents are not occupied with them. When and how to go about these instrumental tasks of robotic maintenance can be understood as a part of embodied competence—commonplace yet crucial for the users experience of the robots.

Finally, in caregivers' accounts of how they handle the robots, there is a palpable absence of references to technological competence. This may be because the robots are simple in their design—they are basically operated with a simple power button. A caregiver says:

> The basis of our work consists of interpersonal work and technology comes in secondarily as a complement in situations, and for individuals, where it seems natural. (…) If the technology does not come in in a natural way, then you ignore it. (Home 3, Caregiver 11)

This is a commonly held view among the interviewees. Another caregiver (Home 5, Caregiver 34) elaborates on this point and suggests that technological competence will never play a central role in the professional identity of caregivers. Rather than being simply technologically competent, she says that caregivers need to be 'the spider in the web' at their ward and use the technology depending on each resident's unique needs.

Embodied competence, as expressed by the caregivers, consists of corporeal aspects of work related to handling the robotic animals in relation to the residents, that is, the caregivers must develop new bodily postures and learn how to physically act upon the robot to make the robot relevant for the resident (Ihde 2002). Engaging in joint activities is an important part of everyday practices in dementia care, due to the progressive nature of the illness, which diminishes cognitive and communicative abilities in the

patient (Hydén et al. 2022). Doing things together becomes a way of being together, and has both functional and existential purposes, as emphasized in Wright's (2018) study regarding the loss of inter-corporeal and personal closeness between caregivers and residents when introducing a lifting robot. Thus, we understand embodied competence as a fundamental way of being in the caregivers' endeavor to integrate the robotic animal in care work and to construct the robotic animal as a caregiving tool.

Social competence: Sensitivity to person and situation when using robotic animals

As stated in the Introduction, robotic animals must be used in individualized ways (Abbott et al. 2019). To do that, the caregivers need to know the residents' personalities. This is a type of knowledge that is often emphasized by the participating caregivers. We understand this as a social competence, which includes the caregiver's ability to establish and enrich verbal communication and social relationships on the terms of the person with whom they are interacting (Gadecka et al. 2015), for example, understanding individual expressions of the residents' mood and needs, reading their body language, and learning to interpret the residents' reactions in different situations. Social competence refers to the role-taking (Mead 1932–2002) ability to interpret the behavior of other people and to adapt one's own behavior in a professional manner according to the demands of the social situation (Chrzan-Rodak et al. 2019). Such social competence is a vital resource in everyday practice, which caregivers draw upon to establish professional relationships with residents who are physically and cognitive vulnerable so that they can provide continuous, supportive care (Oh, 2019). Communicating and interacting with residents in a professional manner is an integral part of care work, and are, as one interviewee points out, 'highly qualified tasks' (Home 3, Caregiver 11).

The need for social competence is actualized when caregivers use robotic animals. For instance, the caregivers need to assess who among the residents are susceptible to robotic animals and who are not, and in which situation they are susceptible: 'It is important to read the situation because it is not always appropriate to use the cat. You must know when it fits, when it is appropriate' (Home 3, Caregiver 14). This view is shared by other caregivers, who are keen to emphasize the importance of social sensitivity in caring work: 'One should never underestimate human contact, and the feeling of having one's antennae out so that one can read (a person)' (Home 3, Caregiver 16). 'Having one's antennae out' includes being attentive to the fact that residents can change their views as time goes by, as one assistant pointed out. She remembers one resident whose first reaction to a robotic cat was 'Yuck! I don't want to touch that!' but later came to appreciate it when the resident saw others using it (Home 5, Caregiver 35). Adjusting to such different needs requires a great deal of social sensitivity from caregivers.

During a visit at a care home (3), we observed firsthand how a caregiver practices her social competence when being on the lookout for residents that might be interested in interacting with a robotic cat, as illustrated in Figure 4. The caregiver is 'reading the room' (Fritz 2020) and paces from one resident to another, while holding the robotic cat in her arm in the competent manner described in the previous section. First, the caregiver turns to the resident in the wheelchair to the right. She does not get any signs

of interest from the resident, so she turns to the residents to the left instead. The man in the wheelchair watches television and does not show any signs of interest. But when the caregiver turns to the man in the armchair (furthest to the left), he meets her eyes and raises his right hand. The researcher (Persson) that is present interprets this as a sign of interest; however, the caregiver does not approach him. She continues to read the room, and finally, she walks over to the resident who sits in the sofa in the back, and together, they start to interact with the robotic cat. When later asked, by the researcher, about the man who raised his hand, she states that 'he did not want the cat'. Knowing the man, she did a completely different interpretation of his raised hand than the researcher did, which apparently meant 'no' instead of 'yes'.

Figure 4 Caregiver on the lookout for receptive residents.

When the caregivers are identifying which of the residents are interested in the robotic animal, they must know the residents' individual preferences for using the robot—how they like to use it, and whether they prefer sitting with it alone or together with others. For instance, one woman resident who often acts out violently when the staff tries to help her with her personal hygiene has become much calmer and comfortable with the situation when she can bring her robotic dog with her to the bathroom (Home 4, Caregiver 23). Thus, before helping the resident with her personal hygiene, the caregivers have learned to first include the robotic animal in the situation and thereby create a less stressful situation for the resident.

One caregiver (Home 6, Caregiver 43) tells us about a woman with a robotic cat who has become even more attached to it after they turned off the sound (so as not to disturb others) and will often say that 'it's the kindest cat there is, and he lies here, and he sleeps, and he is so nice'. Sometimes, it is the other way around and the sounds provide comfort. One caregiver tells us of a man who 'think it (the robotic cat) is kind of sweet. He does not see very well but he hears when its meows' (Home 2, Caregiver 3). Such individual preferences are examples of information that the caregivers must be familiar with, and sensitive to, in order to use the robotic animals as a caregiving tool, that is, which resident reacts in what way to the robot in different situations. These examples

are a part of the caregivers' social competence and will guide how staff members enact caregiving with the help of the robotic animals in relation to the residents.

In the case of residents who have adopted a cat or dog as their own, the staff are usually well informed about the robots, for example, if they have a nickname for it. Attaching a personalized nickname to the robotic animal is another way to further enhance individualized ways of using the robot and attributing canine or feline identities to it (see Hebesberger et al. 2017; Moyle et al. 2018). Finding a name for the robot ('What shall we call it?' Caregiver 43, Home 6) or reminding residents about its name is often involved in caregivers' initiations of interactions. In some cases, it is the residents who came up with the nicknames, and in other cases, it is the caregivers. These names stick with the robotic animals and are spread by word of mouth among the caregivers.

A final point related to social competence is that while it is important for caregivers to know the residents individually to appropriately employ the robots, the robots can also be used as tools to get to know the residents better. One caregiver (Home 3, Caregiver 11) says: 'You want a lot of life stories, which we can then use to encourage certain things, or avoid them if there is something that is a little difficult'. These life stories are usually documented in a personal book. Not only can the robotic animals sometimes inspire residents to talk about past experiences (Home 6)—sometimes the residents build life stories around their robots. One caregiver mentions a woman who will always cheer up when she gets the chance to tell people about her robotic cat (Home 5, Caregiver 36). During our fieldwork, we also met a woman with a robotic dog who tells us stories about when she adopted the dog, and about the dog's life before the adoption (Home 5).

The need for social competence is thus fundamental to many aspects of caring work when using robotic animals. The caregivers need not only to be able to have local, situated knowledge about each resident, and to read the person and situation, but also to be able to consider whether and when it is appropriate to use robotic animals with a particular resident. If successfully employed, the robots can then be used as material tools for learning (Sorensen 2009)—expanding local knowledge about each resident and how to approach them (Hasse 2018). This represents a new kind of competence in the community of practice of caregivers that is actualized with the introduction of robots.

Ethical competence: Managing ethical challenges when using robotic animals

We now turn to the last form of competence, which is characterized by the possession of ethical knowledge next to the ability to 'see' what a situation presents; to reflect critically about what caregivers know, are, and do; to encourage ethical practice; and to 'be' ethical (Gallagher 2006). Thus, ethical competence allows for decision-making in a caregiving context that includes an interpersonal relationship, with the patient's well-being as the focus of concern (Lechasseur et al. 2018, p. 696). A fundamental challenge when using robotic animals in dementia care is for the caregivers to be attentive and protective of the dignity of the residents. This means that you should not put residents in a situation in which they may experience a loss of personal respectability and worthiness as persons (AACN 2008). The interviewees often emphasize that they never force robotic animals on anyone who expresses discomfort or shows signs of disapproval.

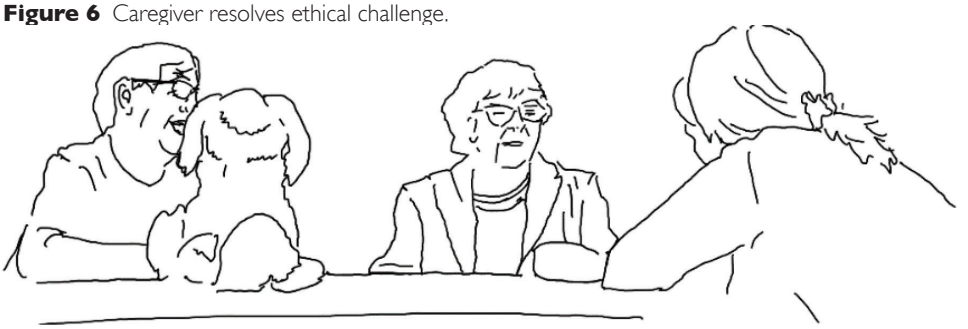
They acknowledge that some residents think that the robots are 'ridiculous' (Home 3, Caregiver 12), 'silly' (Home 1, Caregiver 3), or 'childish' (Home 3, Caregiver 14). One caregiver says that if a resident thinks that a robot is childish, it is crucial to respect that: 'You know, it's offensive, it's as if you would get treated like a child, like "do you want a little doll in your lap?"' (Home 5, Caregiver 34). Maintaining the dignity of the residents in this way is understood as an ethically approved way of being involved in the daily care of the residents.

An ethical challenge for caregivers is when residents have incongruent views on the robots. Such situations require ethical competence—a compass to navigate between different views on robots while maintaining residents' dignity. Such ethical competence is highlighted in the following example, from observations in care Home 6. The researcher (Iversen), caregiver (Maja), and resident (Sigrid) have been sitting chatting with a robotic dog for about 20 minutes. Sigrid is at times treating it as a real dog, asking Iversen and Maja about where it lives, who takes care of it, and what it eats. Carina, another resident, has been sitting nearby. Maja has invited Carina to join, but she has declined, saying 'You don't want me there'. After some time, Maja gives it another go and pulls up a chair for Carina to sit in. Carina joins and sits down. Sigrid turns to Carina and asks, 'Is it your dog?'. Carina replies 'I don't answer such stupid questions'. As we can see in Figure 5, both Sigrid and Carina turn to Maja, Sigrid with a puzzled look on her face.

Figure 5 Caregiver faces ethical challenge.

Carina's remark has challenged the 'working consensus' where Sigrid's question was valid, and thus threatens Sigrid's dignity. However, Carina's dignity is also under threat: she has come into a situation and displayed hostility, which means that it is either the definition of the situation or Carina herself that faces exclusion. Her earlier remark ('You don't want me there') shows that she may already feel excluded. However, Maja quickly moves closer to Carina, saying 'You, know, we're sitting here talking about different…did you know that I've had a dog too Carina?'. By forming her utterance as 'giving information', Maja treats Carina's remark as born out of lack of knowledge, not hostility. At the same time, she treats Sigrid's question as valid and aligns with Sigrid's project of talking about dog ownership. In addition, finishing with a yes/no-question, the caregiver makes it easy for Carina to respond without having to offer any personal information. As we can see in Figure 6, Sigrid is now smiling, and so the threat to the residents' dignity can, to some extent, be seen as averted:

Figure 6 Caregiver resolves ethical challenge.



After this, Carina says, 'I haven't had any dog' and Sigrid treats this as an answer to her initial question by answering 'Oh, you haven't had a dog'. In this sense, the threatening situation was treated as a misunderstanding, and the participants go on to talk about their ownership of different animals. As they finish, about 15 minutes later, Maja jokingly asks Carina if she does not think the dog is a little bit cute, and Carina responds that she does. Accordingly, Maja has adeptly managed a situation with the robot where Sigrid could possibly have ended up feeling stupid and Carina excluded.

According to some of the caregivers, it can be difficult to use the robotic animal if the residents are 'too alert', that is, they have not progressed far enough in their illness and are able to understand that the robotic animal is a machine.

> This man, who uses the cat a lot, he has it at bedtime but for a while he sat up late a lot and then he had it too. It works best on him, because to him it's a real cat. The others are a little too alert so they can see that 'that is not a real cat'. (Home 2, Caregiver 6)

This touches upon another ethical issue related to dignity, namely that of deception (Matthias 2015). According to the Swedish Medical Ethics Council (2014, p. 60), it is important that caregivers and residents should not be led to 'believe that the robot has capabilities other than what it possesses', which may cause problems regarding informed consent and the risk that the user is not given necessary care. One way to minimize the risk of this type of misunderstanding is to ensure that everyone involved has complete information about the robot's capabilities (SMER 2014, p. 60), that is, always making sure that residents are informed that it is a robot they are using and not a living animal. One caregiver (Home 5, Caregiver 35) who is responsible for coordinating the implementation of new technology in care homes in her region says that when she introduces the robots for the first time, she always explains to residents that the cat and dog robots are not real animals. But as she points out, many will soon forget what she has said and approach the robots as real animals. In those cases, she does not persist in telling them the truth (cf. Home 6).

There is a dilemma between deception and transparency: if residents believe that a robot is alive, ruining that illusion can itself cause confusion and anxiety. This is illustrated in the next quote: 'They also think it's their cat, their current ones. She has been to [a nearby city] today and bought it. Yes, that's how it is. Then you must go along' (Home 2, Caregiver 9). It seems that the caregivers rarely tell outright lies about the robots to the residents. Instead, they 'go along'—an expression used by many of the

interviewees—which means that you follow the resident's experienced reality while trying to avoid revealing the illusion, as in this quote:

> You must do that (go along) otherwise it will also be a worry if you start talking about the fact that it is not a real cat. I do not think that is good, because those who believe that it is a real cat, they see that it is a real cat. (Home 2, Caregiver 8)

Flipping the robotic cat or dog over to press the on-off button on the stomach of the animal could also risk revealing the illusion. Therefore, the caregivers often 'sneak a little', as one caregiver (Home 2, Caregiver 7) puts it to conceal the movement of the hand, to preserve the illusion. They may also say that they were going to 'look at the dog's tummy' to see why it is not barking (Home 6, Caregiver 43). Here, ethical competence intersects with the embodied competence of handling the robotic animal.

Sometimes the illusion is ruined, which may lead to an ethically challenging situation. One caregiver (40, technology coordinator for Homes 4 and 5) tells us of a colleague who introduced a robotic cat to a resident. The resident noticed that the cat's ears seemed oddly plastic and suggested that the cat should be taken to a veterinarian. However, upon closer inspection, she saw that it was not a real cat. She then seemed disappointed and said: 'But why are you tricking me?' In this situation, the caregiver says, the only thing to do is to be fully transparent about the robot and explain why they are using it.

Last, the line between transparency and deception is sometimes blurry. Some users seem to oscillate between treating the robotic animals as real animals, and talking about them as electronic gadgets, even in one and the same interaction (Home 6). We observe an example of such a pragmatic stance to the robots when having coffee with a caregiver and two residents in the company of a robotic cat. One of the residents says that the robot is not real and explains that it will lie down if you scratch its stomach. However, the resident still addresses the cat when it lies down on its back, purring: 'Yes. There there…Hi there!' Some of the caregivers confirm that some residents use the robots while knowing on some level that they are not real. While ethical competence is a core trait in caregiving (Lechasseur et al. 2018), the use of robotic animals as evocative tools (Turkle 2011) for caregiving gives rise to new situations and issues, which must be reflected upon and resolved in the everyday practice of care.

Concluding discussion

We have shown the different ways in which caregivers' use of robotic animals requires embodied, social, and ethical competence. We understand embodied competence as knowledge about corporeal actions towards the material object. The caregivers must ask themselves: How do I handle the robot to encourage the residents to use it? Social competence is understood as knowledge about the subject and the social situation in which the robot enters. Here the question is: How do different residents react to the robotic animal, and in which situations can I approach them? Last, ethical competence is understood as knowledge about the core values that permeate the caring profession. The caregivers face the question: How do I protect the dignity of the residents when

using the robot? The competences should be understood as intertwined; they depend upon and feed into each other.

Also, the competences are the result of collegial learning. None of the caregivers have received formal instructions or guidance about how to use the robotic animals. Instead, it is the caregivers who informally teach each other in relation to the needs of the residents. The competences are developed through engagement in the community of practice at each dementia care home.

The accounts concerning embodied competence in the study point towards the inter-corporeal challenges of implementing new technology—a complexity that is sometimes smoothed over by technological optimism and 'win-win' scenarios (Ajslec et al. 2019; Kamp et al. 2019). Like the embodied competence of using touch as a caregiving tool (Pedrazza et al. 2018; Werner et al. 2022), the handling of robotic animals requires the competence to turn, though bodily action, a machine into a caregiving tool. The interviewees' discussions related to social competence show the importance of caregivers' unique and localized knowledge. This discussion also challenges concerns that social robots isolate users (Parks 2010; Sharkey 2014; Vandemeulebroucke et al. 2018); rather, if employed with social competence, robots can engage users in social interactions (Gustafsson et al. 2015; Persson et al. 2021). Finally, the ethical competence accounted for by the caregivers in the study gives a more complex picture of situated professional decisions concerning transparency and deception, in contrast to the stricter official ethical guidelines for the use of robotics in dementia care (such as in the Swedish guidelines, SMER 2014; SBU 2022).

Robotic animals also highlight the more general question of the role of deception in the community of practice of care workers (Matthias 2015). A core human trait is the ability to play (Huizinga 1970), and it is through play and game that humans develop as social beings (Mead 2002/1932). If it were only a matter of play, then there would not be an ethical issue for the caregiver. However, since confabulation is considered a symptom of dementia, which might be difficult for healthy friends and family to deal with (Hydén & Samuelsson 2019), the challenge for caregivers is to know when and to what extent they should follow the residents in their belief that the robots are living animals, and ethical competence is necessary to be able to make such judgments in the practice of everyday care.

Interestingly, technological competence did not emerge as an important theme from the analysis. This may partly be due to the robots' simple design—they are operated with just a power switch (see Read et al. 2020). The caregivers downplayed the importance of technological expertise in favor of other professional competences. At the same time, we found no examples of 'tech-resistance' (Timmons 2003) in relation to the robots. Many caregivers instead found the robots to be helpful tools when used in a manner attentive to the residents' needs. The result is therefore in line with several other studies that show the benefit of welfare technologies when caregivers make use of their understanding of the residents (Talbott & Brewer 2016), along with their authentic interest in helping others (Fejes & Nicoll 2010), and their continuous tinkering with the machines (see, e.g., Beedholm et al. 2015; Dag et al. 2017; Hansen & Grosen 2019).

As Sandberg and Pinnington (2009) emphasize, a tool must be understood in relation to other tools used in a vocation. The robotic objects do not become tools for caregiving unless caregivers manage to mediate, bodily, the relationship between the object and the subject of care, by using their social knowledge about the subject, and relying

on the ethical values of their community of practice. Technological tools are in this case integrated with other tools, such as embodied and social competence, and a professional sense of what is right and wrong in the care situation. This may explain why there is little fear among the staff members that social robots will replace them (cf. Parks 2010). The need for informal and situated knowledge when using the robots also shows the close connection between technological tinkering and a relational 'tinkering with care' that ensures that care is given in the best way possible with respect to those cared for (Mol et al. 2010; see also la Cour & Højlund 2019). The results thus contribute to an understanding of the socially constructed nature of tools (Dewey & Bentley 1949); technological devices emerge as caregiving tools from a community of practice when different existing competences intersect.

When robotic animals are used in individualized ways, to suit the personal needs and wishes of the users, the robots seem to actualize competences in ways that rely on and reinforce core community values in the practice of caregivers. Our results suggest that training in using the robots (cf. Abbott et al. 2019) should not emphasize technological knowledge; instead, if formal training is arranged, it should be rooted in collegial learning and caregivers' embodied, social, and ethical competences. It is after all, these competences that make these rather simply designed technological devices into caregiving tools.

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Note

[1] All line-illustrations have been made by the first (Persson) and fourth (Iversen) authors.