Summary

Moral Concerns of Caregivers about Social Robots in Eldercare

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Ageing in Europe comes more rapidly than many people realize: In 2024, one fifth of the population will be 65+ with a further increase in the next 25 years. The so-called gray pressure is defined as the number of people aged 65 and over in relation to the number of people aged 20-64. Gray pressure will rise to 50 percent in 2040. As a result the demand for care increases, while fewer people will be working in healthcare. Healthcare is under extreme pressure because of budget cuts, limited resources and limited personnel together with increased demands. Robots may fulfil important support in this respect. The research reported in this dissertation focused on social robots to support tasks requiring interpersonal communication in a healthcare setting. Many moral concerns and objections were raised, particularly among care professionals. The use of social robots in the caregiver-care recipient relationship requires ethical reflection to ensure that the design and use does not impede the dignity and personal values of the patient, who is often in a vulnerable position. The evaluation of the use of healthcare robots involves that we understand the values and standards of all concerned. To appropriately apply care robotics, the robot should be trusted and accepted by professional caregivers, who, in the near future, may have to work with this kind of care technology.

This dissertation focused on the moral concerns, objections, wishes, opinions and requirements of professional caregivers and trainee caregivers towards the use of social robots in elderly care. We used the following research question that guided the research as presented in this dissertation: *What are the moral and utilitarian concerns of professional and trainee caregivers in applying social care robots in the daily care practices of older adults?*
We chose to classify social care robots according to Sharkey and Sharkey (2010), who proposed that robots in care can be divided into three categories: (1) to assist older adults, and/or their caregivers in daily tasks; (2) to help monitor their behavior and health; and (3) to provide companionship (see Chapter 1 for imaginary of these three types of robots). We wished to investigate the perspectives of (trainee) caregivers towards these three particular types of social healthcare robots. What is and what is not accepted with respect to the notion of 'good care', according to the opinions of professional caregivers. Is there a significant difference in the perception of different types of social

robots? Do caregivers think that, for instance, assistive robot technology might come in handy? Do they feel that monitoring robots will alleviate their workload or that companion robots will reduce feelings of loneliness or depression with their clients? It is important to examine whether or not caregivers think that care quality can be improved by using different types of social healthcare robots. We have used the principles of biomedical ethics of Beauchamp and Childress (2013) to classify moral concerns. Beauchamp and Childress proposing a system of moral principles to reason from values towards judgments in the practice of medicine. They discern four principles:

1) *Beneficence*, acting in the best interests of one's patients

2) *Non-maleficence*, the doctrine of 'first, do no harm', which means that no treatment is better than incorrect treatment'

3) *Autonomy*, the capacity of patients to make an informed, un-coerced decision about their own care

4) *Justice,* pertaining to the fair distribution of scarce health resources (e.g. time, attention, and medication)

These four principles are constructed to help healthcare professionals make a decision regarding ethical dilemmas in a healthcare relationship, such as the use of a social healthcare robot.

Caregivers have to balance between ethical principles and the aim to achieve the 'greatest good for the greatest number,' to best serve the population, thus legitimising their decisions on healthcare interventions. The latter is a utilitarian perspective on new technology. We have included this perspective alongside possible moral concerns of caregivers. The Unified Theory of Acceptance and Use of Technology (UTAUT) is a technology acceptance model formulated by Venkatesh (2003) and others. UTAUT has been widely accepted and used to investigate the acceptance of technology. UTAUT states that if a person believes that using a particular system in daily practice enhances job performance, the perceived usefulness of the machine will increase, and that ethical appraisals will play a less important role. Thus, we expect that when perceived utility is high, moral concerns will be lower. We combined the four principles of biomedical ethics with a more utilitarian approach and

used UTAUT to measure utility and use intention. The following dependent variables were included in our research: moral evaluations through the Four Principles of Bio-medical, i.e. Maleficence, Beneficence, Autonomy and Justice, in combination with Utility, and Use Intentions. The distinction between Utility and Use Intention was important. For example, if care professionals judge care robots as useful, but at the same time state that they will nonetheless hesitate using them, this could mean that moral evaluations dominate their deliberations.

We focused on care professionals working with older adults, because, given the expectations stated in the Introduction (Chapter 1 of this dissertation), this will be the area where we expect that most practical care problems will arise. Related, we decided to collect and examine the opinions of students of care- and welfare programmes of Dutch Applied Universities, because they are the care professionals of the future. Students in healthcare will form a large part of the group of care professionals that will work with social healthcare robots.

Chapter 2 offers witnessed behaviour of older adults in interaction with a social healthcare robot through an observation study recorded in a professional documentary. These observations were followed by three larger original studies that applied a mixed-methods design investigating the moral perspectives, utility, use intentions and opinions of caregivers towards the future use of healthcare robots. In each of the studies described in Chapters 3, 4, and 5, we used the same moral constructs and utility variables: that is, Beneficence, Maleficence, Justice, Autonomy, Utility, and Use intention.

Chapter 3 describes a qualitative exploratory study, using semi-structured focus groups, conducted with 43 healthcare professionals in The Netherlands. Results showed that care professionals primarily focused on maleficence (potential harm done by the robot), deriving from diminished human contact. Worries about potential maleficence were more pronounced in intermediate compared to higher educated professionals. However, both groups saw companion robots as more beneficiary than devices that monitor and assist the elderly, which were deemed potentially harmful physically and psychologically. The perceived utility was not related to the

professionals' moral stance, countering prevailing views. Increasing patients' autonomy by applying robot care was not mentioned in the discussions during the focus groups and justice as a moral evaluation was rarely mentioned by the healthcare professionals.

The study described in Chapter 4 examined the moral considerations, perceptions of utility, and acceptance among trainee healthcare professionals toward different types of care robots in a questionnaire with an experimental design (N = 357). We examined possible differences between participants' intermediate and higher educational levels. Results showed that potential maleficence of care robots raised the largest concerns in both educational levels. Assisting robots were seen as potentially the most maleficent. Both groups judged companion robots as least maleficent and most acceptable, while monitoring robots were perceived as least useful. Results further showed that the acceptance of robots in care was more strongly associated with the participants' moral considerations than with utility.

The aim of the study in Chapter 5 was to elaborate on the results of Chapter 4. Where Chapter 4 studied the differences between intermediate and higher vocationally trained students in care, the study in Chapter 5 focused on differences between levels of intermediate vocational training alone. A total of 2365 students at different intermediate vocational levels completed a questionnaire, rating ethical statements regarding Beneficence, Maleficence, Justice, Autonomy, Utility, and Use Intentions with regard to three different types of robots, along with six control variables: gender, age, school year, technical skills, interest in technology, and enjoying working with computers. The scores were analyzed through MANOVA statistics, showing that all students viewed companion robots as more Beneficent than monitoring and assistive robots. Level of education did not lead to any differences in appraisal. Participants rated Maleficence lowest and the highest scores were given to Autonomy and Utility, meaning a positive evaluation of the use of healthcare robots. Surprisingly, all students showed low Use Intentions, indicating a poor motivation to actually use a robot in the future, although participants stated a firmer intention for using monitoring devices.

Results further showed that morality was more important than utility in accepting a robot in care although utility was not trivial. This is an important addition to prevailing theories on technology acceptance, which primarily focus on utility and ease of use but neglect the possible moral or ethical considerations.

In all, we found that potential maleficence of robots in healthcare dominated the moral evaluations of professionals and trainees in care alike, particularly with assistive robot technology, while companion robots were seen a benevolent new technology. The acceptance of social robots in care was more strongly associated with participants' moral considerations than with utility. This dissertation suggests that it would be wise to enrich the curriculum of vocational care education with practical courses on the use and ethical implications of care robots to ensure that this group of trainee care professionals fully understands the pros and cons of this emerging kind of healthcare technology.

In the three empirical studies we conducted (Chapters 3-5), ethical considerations rather than utilitarian factors accounted for the absence intentions to use social care robots. One possible explanation could be that caregivers fear that care robots violate their notion of 'good care'. As described in Chapters 2 and 3, people fear that social robots may replace human caregivers, thus removing 'warm' and 'human' care out of the process. Witnessed behaviors in Chapters 2, however, showed that these moral concerns were not in line with the benefits that the social robots appeared to have for older adults, particularly to reduce loneliness. This finding also could account for the finding that participants did not view companion robots as maleficent in general; these type of robots appeared to be seen as temporary substitutes that senior citizens, suffering symptoms of dementia, can cuddle or talk with until a caregiver takes over again.

Therefore, the physical presence of and direct experience with a social healthcare robot seemed to outweigh any objections beforehand. One of the more meaningful recommendations emerging from this research seems to be that (future) caregivers need to have direct experiences

with a social healthcare robot. Vocational institutes, for instance, should develop curricula in which direct experiences with social healthcare robots are made possible. So-called future care-labs, or living labs, could provide part of the solution to overcome the problem of not being acquainted with robot technology.

Developers of robot technology would do well to bear in mind that virtue ethics, rather than the utilitarian approach or considerations, are key to a caregiver's intentions to actually use social care robots in their healthcare practices. It is also important to understand that decreases in human contact and/or touch are not compatible with the work ethics of caregivers, and that it is possible for caregivers to deliver good care that includes human contact, while robots perform other or related supportive tasks that alleviate caregivers' workload. Our conclusion is that new social robot technology should not dehumanize care, but rather may bring humanness back into professional healthcare.