

Robots in elderly care

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August 1, 2006

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Abstract

The number of elderly people is increasing rapidly, people naturally get older and the 'children of the babyboom' are getting older and are now becoming elderly people themselves. A problem caused by this increase is that there will be more people needing care and less people that can provide this care. A possible solution to this problem would be the use of robots. There has been a lot of research towards the wishes of the elderly. There however has not been any research towards the ideas and wishes of the nursing staff. Through the use of interviews we tried to find out whether nursing staff would like to have robots and smart appliances. We also asked them about ideas on how robots could be used to support nurses and help prolong the elder's independence. From our interviews we found that most nurses would not have objections to robots and that they have some ideas about possible uses of robots, examples are the improvement of the mechanical hoist, a system that can help people to get up independently and a robotic pet.

1 Introduction

The number of elderly people is increasing rapidly, modern health care is better than it was years ago and as a result of this people get older and older. At the same time the children that were born during the baby boom after the Second World War, are getting older and they will need elderly care in several years. There will be far more elderly people than younger adults, which means that there will not be enough people to provide elderly care. A possible solution to this problem is the use of robots and smart appliances. There has been research towards social care robots, but most of this research is based on what elderly people want or what researchers have thought of. Our aim was to investigate the wants and needs of the nursing staff, since they know best what is needed in elderly care and since they will be working with the robots. Our research consisted of interviews with nurses. These interviews were very open to collect as many ideas as possible and to be sure that these ideas were not limited by the examples we provided.

To provide some background to our research, we first look into some projects that either involve the wishes of the elderly or robots that have been built or could be built for elderly care. After discussing these projects and robots we turn to our own research. We conducted interviews with five nurses. First of all we give a description of how we set up our interviews, followed by the results that were found. In the conclusion and discussion a short summary of the interview results is given and a discussion of the problems we came across during our research. The guidelines found in the literature combined with the wishes and desires of nursing staff provide a guide to building a robot for elderly care.

2 Guidelines for building social care robots

When building social care robots, it is important to consider the desires of the future user, in this case the elderly. In this section we will describe several guidelines regarding appearance, communication and behaviour. Most guidelines are abstract, but they can be used to develop better robots.

2.1 Personal values and desires

Forlizzi et al. (2004) investigated the wishes of the elderly concerning the use of assistive robotics. They interviewed seventeen elders aged 60 to 90. Dorfman (1994), as cited in (Forlizzi et al., 2004),

found that the values of remaining autonomous, sustaining personal growth, helping others, maintaining social ties and experiencing pleasure are the most important values for the elderly. Forlizzi et al. (2004) concluded that it is important that products should support the elders' values of identity, dignity and independence. Independence is "the state of being competent and self-supporting", dignity is "the state of being worthy of respect"; the elders have the desire to maintain their personal standard within their home or community. Scherer and Galvin (1994) (as cited in (Forlizzi et al., 2004)) found that 54% of the elderly currently do not use their mobility aids, because they want to stay independent and self-supporting or because they think that using the aids might harm their social status. These feelings could also arise with the use of a robotic assistant. Therefore we should consider the wishes of the elderly when constructing aid robots. Forlizzi et al. (2004) translated the desires of the elderly into three guidelines, which were kept quite broad since technology development is rapid and they wanted to set up "rules of thumb" rather than strict guidelines that might not be applicable in five years. The first guideline states that robotic products "have to fit the ecology as part of the system" (Forlizzi et al., 2004). This means that the products should suit the target environment; they should be able to be part of environments in which other aids are already present. The second guideline states that robotic products have to support the changing values of those within the ecology, in this case the values of the elderly. According to Forlizzi's research, these values are independence and dignity. However, these values might change over time and every individual may have different values. Robotic products should be easy to adjust to support changing values. The third guideline states that robotic products have to be functionally adaptive. This means that the products should be adjustable to the needs of the target group. These needs could change as the elderly might change their daily behaviour when they will be assisted by robotic products. An example is that an elderly person might become more socially active because of a robotic product. If a user moves around more because they can now independently get out of their chair, the robot should be able to move around with them so it can continue to assist the user. Changes in behaviour should not lead to an inability to use the robotic product.

These three guidelines are not very concrete, but can serve as a basis when designing robots. They do make clear that it is important to know and use people's values and wishes when building a robot, so that the product will be used by the target group.

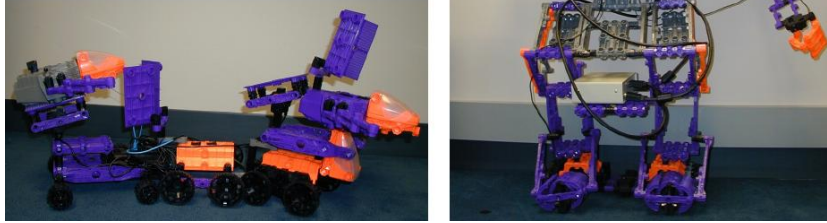


Figure 1: Robot-vehicle and robot-man made of Robotix Vox CenturionTM (Kiesler and Goetz, 2002)

To anticipate these guidelines, we asked the nurses about their wishes and we also asked them what they thought the elderly would like.

2.2 Desires regarding the robots

Kiesler and Goetz (2002) were interested in the mental models that people form of robots when interacting with them, because they believe the better the mental model people have of a robot the better they can interact with it. They used two different robots made of Robotix Vox CenturionTM; a robot-man and a robot-vehicle (see figure 1). They tested which robot would be approached faster. It was assumed that this depended on the different expectancies people had based on the exterior of the robot; their mental model. To test this they placed the toy robots, one by one, in the open hallway of a science museum on two weekend afternoons. Every two hours they switched the robots. When a robot was approached it turned towards that person and said "hi" to start a conversation. If a person replied the robot asked them to complete a questionnaire. The measure of success was the willingness of visitors to complete the questionnaire. They found that the robot-man had a higher success rate than the robot-vehicle, 24% and 4% respectively. This shows that people are more likely to interact with a human-like robot than with a vehicle-like robot. Therefore we feel it is important to consider the exterior of a robot when designing one that can be used in elderly care.

Kiesler and Goetz (2002) also experimented with different personalities on the robot Pearl (see figure 2). They experimented with giving Pearl a playful and a serious personality. These personalities were tested on a group of forty users (with an average age of 22) by exposing them to Pearl with either a serious or playful personality. The per-

sonality of the robot was manipulated by changing the dialogue. The serious robot talked about the participants health and welfare while the playful robot talked about having fun and told jokes. In a twenty minute trial participants performed a series of breathing and stretching exercises. The users then had to rate the robots' traits, they also measured how cooperative participants were by measuring how long they exercised when asked to do so by the robot. The playful robot was graded more positively across all personality traits, but the participants were more inclined to listen to the advice and instructions of the serious robot. Possible reasons Kiesler and Goetz (2002) mentioned for listening better to the serious robot are that the serious robot may be perceived as caring more, the serious robot may be more credible and the serious robot may be seen as more likely to disapprove when people do not comply.

This research shows that the kind of personality a robot should have depends on the purpose of the robot. When building a robot that has to remind people to take their medication, a serious personality will be better since people will be more inclined to listen to it. If the robot is supposed to entertain the user, a more playful personality can be used.

2.3 Communication

Roy et al. (2000) evaluated Flo's user interface (Flo is the predecessor of Pearl). To do this they performed a systematic study using 10 robotics graduate students, students that had minimal exposure to the nursebot project, were chosen. The participants were asked to communicate with Flo's dialogue manager without any instruction. They were only told which subjects could be discussed with Flo. The participants were able to communicate with Flo, but a number of them, the article does



Figure 2: Nursebot (www.activrobots.com)

not state how many, reported that they were uncertain whether the robot was “thinking” (processing information) or waiting to be addressed. This indicates that it would be good to have more feedback from the robot besides the synthetic speech, so users are aware of the robot’s internal processes. We think that robotics graduate students are probably not the right participants to test how easy it is to communicate with a robot since they have a lot of prior knowledge of robots. A usability test should not be performed on people that already have experience with the product to be tested, it should be tested on target users or similar groups. The conclusions that were made by Roy et al. (2000) are useful though; if even robotics graduate students find it hard to interpret what the robot is doing, it will be even harder for people without any prior exposure to robots. Therefore it is important that a robot gives feedback to its user.

Communication is not only influenced by speech but is also influenced by non-verbal communication, such as facial expressions and gestures (Fong et al., 2003). According to Fong et al. (2003) emotion helps facilitate better human-robot interaction. There are robots which have speech influenced by emotion. An example of such a robot is a robot whose voice level and pitch rise when it is frustrated (Nourbakhsh (1999); cited in Fong et al. (2003)).

PeopleBot

Dautenhahn et al. (2005) investigated people’s perceptions and their attitudes concerning a robot companion for the home. They did this as part

of the Cogniron project, which intends to develop a robot companion whose task it is to serve humans. This project studies “perceptual, representational, reasoning and learning capabilities of embodied robots in human centred environments” (www.cogniron.org).

There were two research questions:

1. Are people accepting the idea of a robot companion in the home?
2. What are people’s perceptions of a future robot companion?

To get an answer to these questions, they had 28 participants fill out questionnaires and interact with the PeopleBotTM robot. Each participant first had to fill out a questionnaire that asked personal details (e.g. age, job) and a questionnaire that asked the participants what they thought a robot companion was, whether they would like one and how they would like the robot to be and behave (e.g. considerate, polite). Secondly the participant had an interaction session with the PeopleBot robot, Dautenhahn et al. (2005) do not say how long this session lasted or what the participants had to do. After this interaction session the participants had to fill out another questionnaire about how they felt while interacting with the robot, what they found interesting and annoying during the trials, and what they would like to see changed regarding the robot.

Even though only 40% of the 28 participants would like a robot companion for their home, Dautenhahn et al. (2005) made quite some conclusions about the design of the robot. A summary of their results:



Figure 3: PeopleBot (www.cs.cmu.edu)

- 40% of the participants would like a robot companion in the home.
- The participants would like the robot to fulfil the role of assistant, machine or servant.
- 90% thought it useful if the robot's task was vacuuming
- The participants thought the robot should be predictable, controllable, considerate and polite.
- Human-like communication was preferred for a robot companion above human-like behaviour and appearance.

These conclusions seem convincing, but are rather questionable. First of all, only 40% of the participants want a robot companion. Since all the percentages mentioned above also include the 60% of the participants that do not want a robot companion, the conclusions cannot be seen as valid. It would have been better if the results had been divided into two groups, one group of people that wanted a robot companion and another that did not want one, since combining the data ignores the possible lurking variable of wanting a robot or not. Another factor that might have influenced the answers was that the participants only met the PeopleBot robot (see figure 3), which is not at all a human-like robot and rather big compared to for example Kismet (see figure 4). This might cause a prejudice for not wanting a human-like robot. It would have been better if, apart from interaction with the PeopleBot, the participants of this investigation would have been shown alternatives.

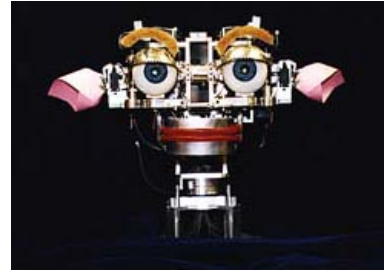


Figure 4: Kismet (www.ai.mit.edu)

2.4 Design issues

As Dautenhahn et al. (2005) showed, the users' view and ideas about the robot are of great importance, especially with social robots. This is why it is important to look at the intended user group when designing a robot.

According to Fong et al. (2003) there are several design considerations which should be kept in mind. The appearance of the robot has to match its intended function and the exterior of the robot should make apparent what the robot is capable of. This is important to prevent people from expecting too much from the robot. When a robot does not live up to the users' expectations, people will be disappointed. This disappointment could lead to disuse of the robot, which might not have been the case had it been clear what the robots capabilities were beforehand. Since current mobility aids are often not used by the elderly (see Forlizzi et al. (2004)), we want to prevent the disuse of robotic products. Therefore this design consideration is important to keep in mind.

Another important design consideration is that the robots appearance has to be balanced between looking like a robot and a human. This refers to Mori's 'uncanny valley' (Mori, 1970). The 'uncanny valley' describes that when a robot is very human-like, but not quite perfect, people will find it hard to identify with it. When a robot is almost perfect people will be greatly bothered by small details that are not realistic, an example would be a robot that does not blink fast enough. It is easier to relate to a less realistic robot than to one that falls in the 'uncanny valley' (Mori, 1970).

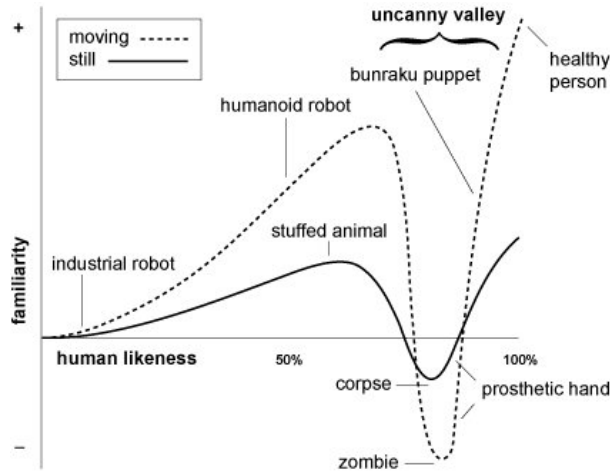


Figure 5: Mori's 'uncanny valley' (Mori, 1970)

Figure 5 shows a graphical representation of the uncanny valley. As a robot becomes more human-like the familiarity increases, but after a certain point people have a very negative response to the robot; they are repelled by the robot's appearance. This negative response disappears as the robot becomes more realistic. It is important to design a robot in such a way that it does not fall into this 'uncanny valley'. The figure also shows that there is a different uncanny valley for moving and still objects. When working with moving objects the effect of the uncanny valley is bigger than when working with still objects. We should keep in mind that the uncanny valley is a theoretical model rather than a researched phenomenon, Mori (1970) did not do any research that provides a basis for his theorem. Mori (1970) possibly describes an interesting phenomenon, but without scientific basis it is not very powerful and therefore we think it should not be a main consideration in designing robots.

Caricatured representations of human or animal faces are also used for robots (Fong et al., 2003). An example of a caricature is the iCat, a robotic cat with human features. By making a caricature of a human, it is easier to avoid the risk of creating an uncanny humanoid. Another way to avoid the uncanny valley problem is to create a zoomorphic (animal-like) robot. Examples of zoomorphic robots are the Sony Aibo, RoboScience RoboDog, Omron cat and Paro (Fong et al., 2003, Taggart et al., 2005).

3 Robotic Applications

After describing these research projects we will now discuss several robots. Some of these robots are in use, while others are developed for research

purposes. First we will discuss three zoomorphic robots; iCat, Aibo and Paro. Then we will describe Handy 1, an assistive mobile robot system (AMOS) and a multi-agent monitoring system. We noticed that most robots are designed without taking into account the wishes of the users, but they do give us ideas about people's responses to different kinds of robots.

3.1 iCat

The iCat robot developed by Philips is a robotic cat with human features (see figure 6), which can act as an interface. The iCat is capable of showing many different facial expressions by manipulating the lips, eyes, eyelids and eyebrows. Heerink et al. (2006) performed an experiment to "investigate the influence of perceived social skills on acceptance of a robot interface by elders". Their experiment consisted of a Wizard of Oz set-up, so the interaction would be similar in each trial. In a Wizard of Oz trial the experimenters control the robots movements and speech, while participants believe they are interacting with an autonomous robot. Groups of eight elders were exposed to the iCat. The iCat told them beforehand what its possibilities were: "an interface to domestic appliances, monitoring, companionship, information providing, agenda-keeping and memorising medication data". After this introduction the participants interacted with the iCat one at a time, during this interaction the other group members were present in the room. The interaction consisted of several simple tasks such as setting an alarm or asking the weather forecast. In total a participant spent ten minutes with the iCat, five minutes during the group session and five minutes during the individual interaction

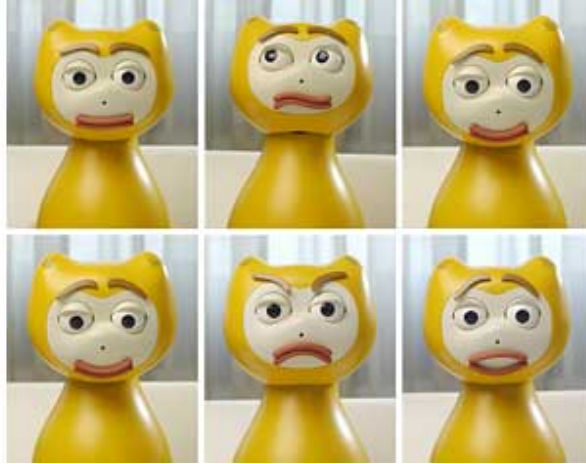


Figure 6: Philips' iCat (www.research.philips.com)

session. After the individual conversations participants were interviewed to find out whether they felt comfortable when talking to the iCat.

In the experiment forty participants took part. Half of the participants were exposed to a more sociable version of the iCat than the other half. During the experiment many participants did not only do the simple tasks that were asked of them (e.g. setting an alarm) but tried to have a 'normal' conversation that the iCat is not yet capable of. Either because they did not understand the iCat's limitations or because they liked to 'confuse' the robot. This shows that people are not always willing to interact with a robot.

From the interviews after the interaction session, Heerink et al. (2006) found that there was "a significant difference between the two conditions on the question of feeling uncomfortable talking to a robot". None of the participants that interacted with the more sociable version reported feeling uncomfortable talking to it while "many" of the participants that met the less social robot were "more or less uncomfortable" (the article does not say how many participants). They also found that participants that interacted with the more sociable iCat were more conversationally expressive (nodding, waving, smiling and laughing) than those that interacted with the less sociable iCat. Participants also remarked that they would not want to use the robot because they did not want to have technology to help remind them of things. They would rather try and remember as much as possible without help until absolutely necessary. This resistance to technological aid is something to consider when developing for the elderly or nursing staff.

3.2 Aibo

The university of Washington and Purdue university performed a study to evaluate "the impact of robotic dogs on seniors' depression, physical activity, life satisfaction and morale." (www.purdue.edu). They used Sony's Aibo, a small robotic dog. In the study they would first observe a group of elderly people aged sixty-five and above, and they would keep a journal of their feelings and daily activities. Then an Aibo would be placed with them as a pet to observe the effects, journals were still kept during this period. The researchers did not expect the people to bond with the Aibo because "it was believed that no one would relate to the robotic dog because it was metal and not furry". But after only a short period of time they found that people formed strong bonds with their Aibo. This was determined by looking at the journals. They also found that people became more socially active, as they could talk about the Aibo to other elderly people and these people also started conversations asking how the Aibo was doing. There have not been any publications regarding this research, the information above is based on a small summary of the project found on the Purdue website (www.purdue.edu). We feel that this research project is important as it shows that people are capable of bonding with robots, it would be useful to see published results of this research to have more information about this 'bonding'.

3.3 Paro, the seal-like robot

An example of a social robot used in elderly care is Paro (see figure 7). Paro is a baby seal-like robot that can react to people, show facial expressions to show its emotions, and produce baby



Figure 7: Paro (www.androidworld.com)

seal sounds. It does however not speak or move around autonomously. Shibata (2004) (as cited in Taggart et al. (2005)) did a research project with Paro and the elderly. He concluded that “Paro had a positive influence on depression in the elderly”. Taggart et al. (2005) also conducted an experiment with Paro. This experiment primarily produced qualitative results, they had plans to gather quantitative results. In the experiment groups of three seniors were seated at a table, these seniors were all residents of the same nursing home. A caregiver and an experimenter were also present at the table. There were three conditions: *Paro on*, *Paro off* and *no Paro*. Each interaction session lasted for approximately twenty minutes. After this the participants were asked to complete a questionnaire and take part in an interview that lasted ten minutes. Participants took part in several of these experiments with the varying Paro conditions. Taggart et al. (2005) visited the nursing home over a period of several months. The results are mainly based on the observations during the interactions. The elderly showed heightened social activity when a Paro that was turned on was present. When the robot was turned off social activity reduced compared to the *Paro on* condition. It was also noticed that there was heightened social activity when the elderly were alone with the observer, without Paro present. This makes it difficult to assess the trials with the *Paro on* condition since an observer was present as well. It is important to note that out of eighteen participants six refused to interact with Paro at all. This shows that people’s reaction to robots, can differ greatly.

It is hard to determine whether Paro made the elderly more socially active or whether the researchers presence did this. This project seems

to show however that a robotic pet can help to improve people’s social life and we think that this could be a good product, considering that a robotic pet was also mentioned by the nurses in our interviews (see “Experiences and Observations”).

Besides robots which interact socially with people, there are also robots that do not interact with the user on a social level. Although these robots are not social they can still be of great use in improving quality of life and prolonging independent living. We will describe the Handy 1 robot, AMOS; the assistive mobile robot system, and a multi-agent monitoring system.

3.4 Handy 1

The robot Handy 1 (see figure 8) was constructed to aid people who have diminished arm function with eating (Topping, 2000). A special tray can be filled with food and through the use of a pressure sensitive button and a selection system the user can select the food they want to eat (Topping, 2000). Lights go on above the different partitions, and when the desired food is lit, it can be selected using the pressure sensitive button. The system with linear scanning of items in combination with the single switch to select an item, has proven to be very successful for people with all kinds of disabilities (Topping, 2000). Handy 1 was originally developed for a young boy with cerebral palsy, but is now being used by many kinds of users. Among users of Handy 1 are people with motor neuron disease, multiple sclerosis, stroke victims and elderly people. After the eating set-up turned out to be very effective, several other trays were developed. This included a washing/shaving/teeth



Figure 8: Handy 1 (Topping, 2000)

cleaning tray and a cosmetic application tray. The washing/shaving/teeth cleaning set-up allows users to wash their own face, as well as rinse and dry it. The tray also includes an electric toothbrush and shaver. The cosmetic application tray allows users to choose from several different cosmetics including blusher, foundation, eye shadow and lipstick. In both the washing and make-up tray, selection is done by using the led light system and the switch. A final addition to Handy 1 is the artbox, with this module the user is able to draw. The Handy 1 has been sold commercially and is in use in several European countries.

Handy 1 is not an intelligent or social robot but is able to assist people with basic tasks and in doing so, it can improve the quality of life and promote independence of its users. As one user remarked: *“I feel that no one can put a price on the ability to feed yourself or on how nice it feels to be able to put a toothbrush to your mouth or wash yourself”* (O’Connel and Topping, 1999). This confirms the conclusions made by Forlizzi et al. (2004); people want to remain independent.

3.5 Assistive Mobile Robot System

Takahashi et al. (2004) developed an assistive mobile system called AMOS (Assistive MOBILE robot System). This robot was developed to aid the physically handicapped and it should “improve the quality of life while providing suitable ADL (activities of daily living) care”. The main objective of the AMOS system is to “identify objects used daily and place them indoors semi-autonomously”. The user

has to point out the target object in the video image. AMOS will then autonomously go to and pick up the target object. The user then has to point out a location where the object that AMOS is holding, will be placed. Takahashi et al. (2004) concluded from their experiments that AMOS can successfully pick up a target object and bring it to the user. It has to be noted however that AMOS is only able to pick up objects that are placed on a tray that has a cylindrical grip (see figure 9). Furthermore a stable background colour is needed for good performance. Concerning elderly care, this research is interesting, but the system would have to be improved to deal with objects that do not have a cylindrical grip and it should be able to act in any environment. Ideally a robot should be able to perform in any environment, without any additions such as cylindrical grips. An environment should not have to be adjusted to the robot, but the robot should be adjustable to the environment.

3.6 Multi-Agent monitoring system

The RoboCare project developed a multi-agent system to aid independent living. This project, funded by the Italian Ministry for Education, University and Research, was set up to contribute to raising the quality of life of elderly people by developing technical support (Bahadori et al., 2004). The system developed is a monitoring system, consisting of 2 kinds of agents; a *people and robot localisation and tracking agent* and an *execution monitoring agent*. The idea is that by using multiple agents, each equipped with a camera, it is possible to de-



Figure 9: AMOS' tray with cylindrical grip (Bahadori et al., 2004)

termine the 3D position of a person or object. This cannot be done using a single camera. Bahadori et al. (2004) claim that 3D capabilities make it easier to recognise objects and track them.

At the moment the system is only capable of recognising the current state of the user, by analysing the images provided by the agents, and comparing this state to the predefined schedule. The state of the user is compared to the schedule and the schedule will be adjusted accordingly. For example; if a person starts lunch fifteen minutes late, the schedule will adjust by moving all other activities fifteen minutes forward. There is no indication of what the system does when the schedule is violated in such a way that important tasks cannot be completed, this shows that Bahadori et al. (2004) have merely built a framework. We think that this project sounds promising, but more than a framework will be needed if it is ever going to be used in elderly care.

3.7 Literature Overview

This literature study has provided us with several guidelines and important factors that can be used when designing a social care robot. We will now give an overview of what we feel are the most important considerations. When constructing aid robots it is important to consider the values and wishes of the elderly so that the aid robots will actually be used by the target group. The exterior of a robot is also of great importance; people prefer to interact with human-like robots, the robot's appearance should match its function, and it should also make clear what the robot is capable of. Another important factor of robot design is interaction; emotion makes interaction easier. When communicating with a robot people also like feedback and a personality can increase the effectiveness of communication.

Research has shown us that people can form a bond with a robot and a robot can also improve people's

social life. We therefore feel that the pursuit of social care robots is not in vain. No matter how useful robots can be, it is also important to consider that some people will always be resistant to technology, which can be seen in the iCat and Paro experiments. The best way to prevent this is to consider the wishes of the prospective users. This can also be seen with Handy, the users are very happy with the product because it fulfills their wish of being independent.

4 Experiences and observations

In our project, we intended to find out in what way the nursing staff of the elderly can be supported by the use of robots or other technical aids. We also wanted to find out in what ways robots or technical aids can help the elderly to remain in their own homes for an extended period of time. Our emphasis was on the views/ideas of the nurses, as we noticed that most of earlier research projects (such as Forlizzi et al. (2004)) concentrated on the opinion of the elderly. As there will be a shortage of nurses in the future, we wanted to know what their thoughts are about the application of robots in elderly care. Nurses know exactly what processes take place in elderly care and are most likely to know which processes could be performed by robots. Therefore we only interviewed nurses and tried to get as many ideas as possible from them about the use of robots in elderly care.

4.1 Research method

Our method included open interviews with nurses (of Dutch HBO education level). The interviews were held using an interview scheme so that it would be easier to compare the responses. One person took notes (a tape recording was also made) and the other conducted the interview. Only when

needed would the writer assist the interviewer. The tape was used when summarising the interviews. The interviews were held at different locations. The first interview was held at the participant's house, the second interview was held in a conference room at the university of Groningen, the last three interviews were held at the home of one of the interviewers. The interviews took about thirty minutes.

Interview set-up

The interview started with a general introduction of our project. We explained that with an increasing percentage of elderly people needing care, it is clear that there will not be enough caregivers to cope with this increase. A solution to this problem might be the use of robots and intelligent systems/appliances (domotics) to support the caregiver and to allow people to remain living at home for an extended period of time. After this introduction, we asked people whether they felt robots and smart appliances could be used in elderly care, and whether they had any ideas. We decided to keep our questions very open to allow the nurses to come up with ideas; we wanted to collect as many ideas as possible.

We then asked them about their daily schedule and asked additional questions based on their responses. This was done to gain insight in the daily routine of a nurse. Then the structured part of the interview followed. This started by giving a very short overview of what robots are. In this overview we steered away from the robot as a science fiction figure and introduced simple robots people can come across in daily life. Examples are: rain sensors in cars, motion detection controlled lights and robot arms that build cars. This overview was accompanied by several images of different robots (such as Handy 1, iCat, PeopleBot and the Aibo). The robots in these pictures were mainly social robots. The idea behind showing these robots and the short introduction was to lay out some possibilities for the use of robots to the participants. After introducing these possibilities we would again ask about their ideas regarding the possibilities of using robots to assist nurses and to help the elderly to maintain their independence.

In the next part of the interview we introduced the participant to domotics. Domotics comes from the Latin word *domus* meaning home, combined with *informatics*. Domotics is a way of incorporating technology into a home, it is also known as home automation. These improvements enable elderly people to remain living at home for an extended period of time. Examples we gave the par-

ticipants included the Smart Home project, the Virtual Care project and an experiment carried out with Aibo at Purdue university (www.smart-homes.nl, www.thfl.nl, www.purdue.edu). In the Smart Home project several apartments were fitted with domotics. Functions that were included are turning off rooms with one switch, safety precautions in the kitchens (e.g. stoves that would turn off automatically after a predetermined period of time) and electrically operated curtains. The Virtual Care project gave people the opportunity to communicate with a nurse twenty-four hours a day using a television set. Users were also able to contact their family with this set-up. The Aibo experiment at Purdue University involved giving elderly people an Aibo robot as a pet. Following this overview of several domotics projects the participants were asked if they had any ideas regarding domotics applications.

We concluded the interview by inquiring after the wishes of the nurses and clients, regarding robots and domotics. This was broken down into three questions: (a) Is there a need to use robots and domotics to increase independence? (b) Is there a need to use robots and domotics to support nursing staff? and (c) Which processes should never be replaced by any type of system? We asked all these questions in two ways, first we asked them about their viewpoints and then we asked them what they thought the clients would think.

4.2 Results

We interviewed one male and four females, of which three females were still students. They were all between 20 and 30 years of age. The male participant works in a health care institution for people who suffer from acquired brain damage. The working female participant is currently employed at an elderly care institution. One of the female students works part-time in elderly home care.

The interviews were transcribed and these transcriptions were used to extract the ideas mentioned by the participants. We collected all the ideas and then divided them into two categories. In "Ideas for prolonging independence" we summarise the ideas that were mentioned to help the elderly to stay at home for an extended period of time. "Ideas for supporting nurses" sums up the ideas that lead to robots/devices that support nurses; these robots may either support the work the nurse does or replace a second nurse.

Idea	Number of re- sponses
a robot/hoist mechanism that can help people to get up independently	4/5
a robotic pet / a social robot	3/5
a robot that can grasp objects	2/5
a robot that can help people with going to the toilet	2/5
a robot that can help to remember to take medication	2/5
a device that can lay out the medication for a week/give the right amount of medication	2/5
a system that helps people with walking/enhancing the rollator	2/5
robots like Handy 1	2/5
a device that can help people to put on a support pantyhose independently	2/5
a robot that can make coffee	2/5
a robot that can prepare meals or help to prepare meals	2/5
a system that helps people go somewhere in standing/leaning position without walking	1/5
a robotic cuddle toy for demented / bedridden people	1/5
a combination between domotics and a social robot	1/5
a robot that helps in housekeeping and cleaning the house	1/5
a robot that can do grocery shopping (online)	1/5
a robot that helps people to put on their coats	1/5
a robot that can keep an eye on people	1/5
a robot that can get the mail	1/5
a robot that can remind people daily tasks / agenda points	1/5
a device/robot that can make (visual) contact to friends and family	1/5
a detection system for when people put metal objects in the microwave	1/5
enhancing security for elderly homes	1/5
enhancing security in bathrooms; a detection system for when elderly people fall down or slip	1/5
using bright colours on the robots/appliances so that people with diminished eyesight can easily distinguish them	1/5
a robot that can help a person to dress oneself	1/5

Table 1: Ideas for prolonging independence for the elderly

Ideas for prolonging independence

Table 1 shows all suggestions made by participants as well as the number of times they were mentioned. Four out of the five participants suggested a robot or hoist mechanism that can help people to get out of bed or out of a chair independently. Three participants thought that a robotic pet or a social robot would be nice for elderly persons who feel lonely or who would like to have a pet. Two participants mentioned a robot that can grasp objects, so that the elderly people don't have to bend to pick something up from the floor and so that they can also grasp objects that are lying out of reach. A robot that can help people with going to the toilet was also mentioned twice, suggested was a robot that can lift people and place them on the toilet so that a mechanical hoist and help of a nurse will no longer be necessary.

More ideas that were also mentioned twice are a robot that can help people to remember to take

their medication, a robot that can lay out medication for a week and/or give the right amount of medication to the elderly person, a system that helps people with walking (like a rollator but improved) so that it is also adjustable in height, a system that helps people who can't walk to go somewhere, letting them stand or lean and bringing them to their destination, robots like Handy 1 that help people with eating, a device that can help people to put on their support pantyhose independently (now nurses have to help people to put on the support pantyhose), a robot that can make coffee and a robot that can prepare meals or help to prepare meals. Ideas that were mentioned once can be seen in table 1.

Ideas for supporting nurses

Table 2 shows the ideas that the nurses suggested for supporting them in their work. All partici-

Idea	Number of responses
improving the mechanical hoist	5/5
a robot that operates the mechanical hoist	1/5
a robot that can clean the bedpan	1/5
motion sensors for the lighting	1/5
a robot that serves as a second nurse	1/5
a device that can help position a person in bed	1/5
a device that helps interaction with people suffering from hearing difficulties	1/5

Table 2: Ideas for supporting nurses

pants suggested to improve the mechanical hoist, either by making it easier for nurses to work with it (a mechanical hoist requires quite some physical strength) or by changing the hoist so that the clients can use it independently. Other ideas that were given for robots/devices that can support the nurses in doing their jobs are a robot that operates the mechanical hoist (checks if a person sits stable in it), a robot that can clean the bedpan, motion sensors for the lights (so the nurse does not have to look for light switches in every room), a robot that serves as a second nurse (for holding objects such as a shower head), a robot that can help the nurse to position a person in bed and a device that helps interaction between nurses and people with hearing difficulties. The participant who suggested this idea mentioned that often hearing aids only work for 35% and therefore nurses still have to yell or write down messages.

Processes that should not be replaced by robots

All of the participants agreed that human/social contact should never be replaced. Four of the five participants said that they would not want a robot to take over the washing of the elderly. They thought that this was too intimate and normally nurses inspect the skin and body of the person while washing to see if nothing is wrong. This would be hard to do for a robot. Two of the participants mentioned that the injecting of medication should not be done by a robot, they both thought that this probably could never be done by a robot anyway. The checking of people's condition and whether medication is working was also mentioned twice as a process that should not be replaced by robots. Other processes that were mentioned included catheterization, handing out medication (this participant did not trust robots with this task), helping with eating (as people might choke), and one participant said that robots should never take over complete jobs (this participant said

that robots should only assist on jobs).

Acceptation of robots in elderly care

All of the participants were conservative in their answer to the question whether they would like robots or domotica for prolonging independence or supporting the nurses. One of the participants said that it is not what the nurses want, but it is what is best for the elderly. Two participants said that nurses wouldn't object, but that you have to be careful when introducing robots, the social contact should not disappear and certain tasks such as washing and examination of the elderly person should not be done by robots. There was one participant who did not object to robots at all and thought that it would be good to keep people at home as long as possible. The last participant did not really understand our question and therefore did not give a clear answer. He did remark that it is important to preserve the clients' privacy. Concerning the acceptance of robots by the elderly, two of the participants thought that clients will not mind. Two other participants thought that clients probably have to get used to the robots/appliances but won't mind them once they know how to use them. One of these participants said that it depends on the robot, but that elderly people want to stay at their own house for an extended period of time which implies that they probably would like a robot if that means that they can stay in their house. The other participant said that the elderly people will probably appreciate robots when they find out that by using them, the nurses will have more time for regular conversations. The last participant said that it depends on the state the client is in (this was the nurse that works in a health care institution for people who suffer from acquired brain damage).

Idea	Number of responses
improving the mechanical hoist	5/5
a robot/hoist mechanism that can help people to get up independently	4/5
a robotic pet / a social robot	3/5

Table 3: Ideas for robots

Process	Number of responses
Human/social contact	5/5
Washing	4/5
Injecting of medication	2/5
Examination/checking of the elderly	2/5

Table 4: Processes that should not be replaced by robots:

5 Conclusion & Discussion

Tables 3 and 4 show the most important results found in the interviews. Table 3 shows the ideas for robots that were mentioned more than two times (these are for prolonging independence as well as supporting the nurses). Table 4 shows which processes should not be replaced according to more than one nurse.

We were disappointed to find that the most mentioned idea is the improvement of the mechanical hoist. We hoped to get more ideas for new robots/appliances. We feel that we might have gotten more novel ideas had we presented the participants with more examples and had we conducted a directed interview. In a directed interview the interviewer directs the participants to answers instead of asking open questions. A possible improvement could also be a combination of an initial open interview combined with a second more structured and guided interview. This would give the participant the opportunity to think of more examples/ideas. We did send an email one week after the interview to the participants, to enquire if they had thought of other ideas. This however did not prove to be very successful/effective.

Another problem we encountered was getting in contact with elderly care institutions. Our initial plan involved spending a day with a nurse to experience the daily processes and tasks a nurse performs in elderly care. We were however not able to successfully establish contact with any institutions. The institutions we contacted, mentioned that they did not have time to participate in such an experiment. We would recommend anyone planning on conducting a similar experiment to establish good connections with elderly care institutions before starting with the rest of the project, as this makes it easier to find more participants. As we did

not have such contacts it was hard to find participants, in the end we managed to find five nurses, one of which does not work in elderly care.

Despite these problems, we were still able to produce interesting results. In our research we mainly focused on the wishes of the nurses regarding the capabilities of social service robots that could assist them as well as help prolong independence for elderly people. Our literature study mainly focused on robots for elderly people, wishes of elderly people and on guidelines regarding the design of social robots. When combining the results from the literature study and the interviews, ideas and guidelines for developing a robot for elderly care can be constructed. It was interesting to see that some of the ideas mentioned in literature were also mentioned during the interviews, for example robotic pets.

From our interviews we gathered that it would certainly be useful to introduce social care robots for both prolonging independence and aiding nurses. Although people were not always enthusiastic, they all acknowledged the need for such technology. We often heard that if technology could improve the quality of life of the elderly there would be no question whether it would be accepted. The nurses also thought that acceptance depends on getting acquainted with robots and smart appliances, some of the current elderly people might still have problems with robots, but the next generation will probably have less problems as technology becomes more usual in everyday life.

We feel that it is very important to consider the wishes of both nurses and the elderly. An effective method of assessing the needs and wants in elderly care is the use of interviews with both nurses and the elderly and also going along on shifts to see the processes, appliances in use and daily tasks firsthand. Seeing the appliances and processes firsthand is useful for a better understanding of what

the nurses talk about, and it could be that nurses overlook tasks that could easily be replaced, these tasks could then be noticed by the experimenters. This however would have taken too much time for our project, therefore we limited ourselves to interviewing nurses. We think that this research area is definitely interesting, nurses are quite positive about robots and smart appliances, they realise that it will be needed in the future. They however do not know a lot about it yet, therefore they suggested improving current aids, such as the mechanical hoist. We think that there are more possibilities for robots in elderly care and we hope that this project can lead to a guide to building an elderly care robot.

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A Interviewschema:

- Introductie & introductievragen
 - Met de aankomende vergrijzing is er steeds meer behoefte aan verplegend en verzorgend personeel. Een mogelijke oplossing voor deze groeiende vraag is het gebruik van robots en technische hulpmiddelen. Deze zouden mensen de mogelijkheid geven om langer zelfstandig te leven en zouden daarnaast de verplegenden en verzorgenden kunnen ondersteunen bij hun taken. (*in spreektaal*)
 - Denk jij dat robots toegepast kunnen worden in de zorg?
 - * langer zelfstandig
 - * ondersteuning personeel
 - Zo ja, waar en hoe?
- Gestructureerd deel
 - **Robots**
 - Kan je ons een overzicht geven van de taken die je op een dag uitvoert? *Aan de hand van overzicht, vragen stellen.*
 - Een robot is niet perse een sciencefiction figuur. Robots en intelligente systemen zijn overal om ons heen. Je hebt bijvoorbeeld in sommige auto's regensensoren die de ruitenwissers aanzetten als het regent, bewegingssensoren die het licht aandoen als iemand een kamer binnenkomt en robotarmen die helpen bij het bouwen van auto's.
In deze map hebben we een aantal voorbeelden van robots die er uitzien als sciencefiction robots, dit zijn hoofdzakelijk gezelschapsrobots, daarnaast zijn er ook een aantal voorbeelden van andere robots.
Een robot of intelligent systeem kan dus van alles zijn, de mogelijkheden zijn eindeloos.
 - Vragen
 - * Wat kan je nog meer met robots voor langere zelfst.?
 - * Wat kan je nog meer met robots voor ondersteuning verpleegkundige?
 - **Domotica**
 - We geven wat voorbeelden van lopende projecten.
 - * Smart Homes
 - Huis aan-en uitdoen in de hal en de slaapkamer
 - Actieve sociaal-medische alarmering (bv. 4 uur geen beweging: stuur verpleegkundige)
 - Camera bij toegangsdeur en videofoonsysteem
 - Automatisch licht in hal, badkamer en/of toilet
 - En knop of schakelaar voor meerdere stopcontacten
 - Electriche bediening zonwering of gordijnen
 - Veiligheidsvoorzieningen in keuken (kookduurbegrenzing voor fornuis)
 - * Virtuele Zorg
 - Via TV 24h/dag contact met verpleegkundige
 - Via TV ook contact met familieleden en vrienden.
 - * AIBO
 - Oudere mensen konden zich opgeven voor een huisdier en kregen een AIBO.
 - Het doel was om de mensen gezelschap te bieden en een middel om meer contact met andere mensen te krijgen (door vragen over aibo, en samen te spelen).
 - Vragen
 - * Wat kan je nog meer met domotica / slimme dingen voor langere zelfst.?
 - * Wat kan je nog meer met domotica / slimme dingen voor ondersteuning verpleegkundige?

- **Wensen**
- Is er behoefte aan ondersteuning robots/domotica ter verlenging bij de zelfstandigheid?
 - * Willen zorgverleners dit?
 - * Willen cliënten dit?
- Is er behoefte aan ondersteuning robots/domotica bij de ondersteuning van verpleegkundigen?
 - * Willen zorgverleners dit?
 - * Willen cliënten dit?
- Welke processen zouden nooit/niet vervangen moeten worden door systemen?
- Extra ideeën
 - Heb je nu meer ideeën over mogelijkheden?
 - Zijn je eerdere ideeën veranderd?

B Interview scheme:

This is a translation from the original dutch scheme.

- Introduction & introduction questions
 - With a growing percentage of elderly people there is an increased need of caregivers. A possible solution to this growing demand is the use of robots and technical aids. These could allow people to stay independent longer, and could also support caregivers. *in natural language*
 - Do you think robots can be used in elderly care?
 - * for prolonged independence
 - * to support nursing staff
 - If yes, where and how?
- Structured section
 - **Robots**
 - Could you give us an overview of your daily schedule / tasks? *Ask questions using the answers.*
 - A robot does not have to be a science fiction figure. Robots and intelligent systems are present all around us. Nowadays there are cars with rain sensors that automatically turn on the windscreen wipers when it rains, motion detector sensors turn on lights when people enter a room, and robot arms that can build cars.
In this folder we have a few examples of robots that look like science fiction robots, they are mainly social robots, there are a few other examples of robots in the folder as well.
A robot or intelligent system can be anything; the possibilities are endless.
 - Questions
 - * How could robots be used to prolong independence?
 - * How could robots be used to support nursing staff?
 - **Domotics**
 - We will give some examples of current projects.
 - * Smart Homes
 - Turning the house on and off in the hallway and bedroom.
 - Active monitoring (e.g. no movement for 4 hours: send a nurse)
 - Placing cameras at the main entrance.
 - Automatic lights in hallway and bathroom.
 - One switch for several sockets.
 - Motorised curtain and sun screen control.
 - Safety precautions in the kitchen (automatic timer on the stove)
 - * Virtual Care
 - 24h/day ability to contact nurses using TV.
 - Using TV to contact relatives and friends.
 - * AIBO
 - Elderly people could apply for a pet and would receive an Aibo.
 - The goal was to offer the participants companion as well as a tool to get in contact with others (because of questions about Aibo, people wanting to interact with Aibo)
 - Questions
 - * How else can domotics / smart appliances be used to prolong independence?
 - * How else can domotics / smart appliances be used to assist/support nursing staff?
 - **Desires**
 - Is there a need for robots and domotics to prolong independence?

- * Would nurses want this?
- * Would clients want this?
- Is there a need for robots and domotics to assist the staff?
 - * Would nurses want this?
 - * Would clients want this?
- Which processes should never be replaced by technological aids?
- More ideas
 - Do you have any more ideas?
 - Have your previous ideas changed?

C Interview 1, 21 april 2006

De geïnterviewde was een vrouw in de leeftijdscategorie 20-30 jaar. Zij was werkzaam in een verpleegte-huis.

Introductie en introductievragen

Denk jij dat robots gebruikt kunnen worden in de zorg?

M.b.t. langere zelfstandigheid:

Ik weet het niet, wel over nagedacht, maar weet niet zo goed wat robots allemaal kunnen, geen duidelijke ideeën.

M.b.t. ondersteuning verpleegkundigen:

Bij tillen.

Gestructureerd deel

Overzicht taken

7.30-7.45: overdracht van nachtdienst naar dagdienst, rapporten doornemen, de nachtdienst vertelt de belangrijkste dingen. Dan naar eigen afdeling. Wasgebeuren tot 10/11 uur. Dan doktersvisite of multidisciplinaire bespreking of opruimen. De ochtendmedicatie wordt gegeven voor 9.00 u. Nieuwe medicatie wordt uitgezet voor het middageten, daarna eten, sommige mensen helpen.

Vraag van geïnterviewde: Gaat het ons om ouderen? *ja* Dan zitten we wel goed, zit zelf op somatische afdeling; niet dementerende ouderen.

Hoe gaat het wassen?

2 waskommen naar een persoon met washandjes/handdoeken. Zelf hebben ze meestal eigen flesje shampoo. Dan worden ze gewassen. Mensen die niet kunnen lopen worden van onderen gewassen, bovenaan doen ze zelf.

Hoe gaat het tillen?

Tillen gaat d.m.v. passieve of actieve tillift. De passieve tillift is voor mensen die niet kunnen staan, de cliënt wordt op een mat gerold, met 4 bevestigingsplekken, gekanteld tot de zithouding en met de lift naar de stoel gebracht, daar in laten zakken. De actieve tillift is om mensen te helpen opstaan, een band om het middel, voor mensen die wel kunnen zitten.

15.30-16.00: zelf pauze, overdracht naar late dienst.

Medicijnen klaarleggen: iedereen heeft een eigen la van de apotheek, hieruit worden de medicijnen gehaald en per dosering gesorteerd, voorheen deed de nachtdienst dit, nu is er iemand voor ingehuurd, omdat de nachtdienst het zwaarder heeft gekregen.

Contact? Sociaal?

Heel veel, tot nu toe klinkt het misschien veel alsof het alleen om wassen e.d. gaat, maar tussendoor vindt er erg veel sociaal gebeuren plaats. Dit is wel afhankelijk van de fitheid van de cliënt.

Vertellen over robots

Robots bekijken

Handy: ok, daar ondersteunen wij ook vrij veel in; bij eten.

Pearl, tv/internet: dat is de nieuwe tendens, om in contact te komen met de familie.

Als iemand niet kan bukken wordt nu een grijpstok gebruikt, vanuit ergonomisch oogpunt.

Mogelijkheden robots voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Robots voor langere zelfstandigheid?

- Oppakken, dat gebeurt nu met een grijpstok.

- Ondersteunen van vergeetachtigheid voor bijv innemen van medicatie.

- Op sociaal gebied inzetten, groter maken van de wereld van de cliënt, internet, contact met familieleden.

- Toilet, grote robot, liften, is nu enorm grote taak voor verpleegkundigen, nu soms is er ook een wachtrij en krijgt dus de cliënt het gevoel dat hij niet zelf kan bepalen wanneer je zelf naar de wc kunt.
 - Lift. In en uit bed tillen. Nu zijn er al wel liften, maar vaak worden deze bediend door de thuiszorg/mantelzorg.
 - Mensen die huisdieren willen maar er niet voor kunnen zorgen (bijv wandelen) zouden een robot kunnen nemen.
 - Koken, assisteren of doen van boodschappen (bijvoorbeeld online)
- Robot voor ondersteuning verpleging?*
- niet meer gevraagd

Vertellen over projecten

Smart Homes: huis aan/uit zetten klinkt ideaal.

Virtuele Zorg: erg prettig, huidige internet is voor sommigen te ingewikkeld.

Mogelijkheden domotica voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Domotica voor langere zelfstandigheid?

- Veiligheid verbeteren
- Uitglijden in douche; alarmeringssystemen. Nu is dit er ook al d.m.v. een ketting om de nek.
- Post ophalen
- Koffie zetten
- verder even geen ideeën.

Domotica voor ondersteuning verpleging?

Zorg:

Grijper: niet echt een robot, kan wel en robot voor ingezet worden als het verder weg ligt.

Ziet dat veel robots voor sociaal zijn, niet veel praktisch. Praktische zijn gewenst.

Bij langer thuishouden van mensen kan hierin ondersteund worden; kleding, wassen, medicatie en met name toiletgang en ondersteunen met lopen. Het is moeilijk uit te leggen de beperkingen, omdat het voor de verpleging zo duidelijk is.

Wensen van verpleegkundigen / wensen cliënten

Wensen verpleegkundigen:

Zelf & collega's: robots etc. is niet wat zij willen, maar wel wat goed is voor de mensen, proberen mensen zo lang mogelijk zelf thuis te laten wonen, want er komt toch niet meer zorg voor verpleging.

Wensen cliënten?

Wel.

Wasrobot?

Dan mis je het gesprek, sociaal, eigen emoties. Zal tekort aan ontstaan.

Welke processen moeten niet vervangen worden?

Welke processen wel vervangen?

- Naar wc gaan; dan kan de cliënt op het moment gaan dat hij/zij wil.
- Liften; ook voor in bad gaan etc → dit kan mogelijk vereenvoudigd worden, maar dat er wel een mens aan gekoppeld is.

Welke processen niet vervangen?

- Wassen; te intiem gebeuren, robot kan niet goed observeren mbt rode huid, koude huid, blauwe plekken. Dus daarin tekortkomingen. En verder is het niet alleen het wassen zelf, anders mis je ook het één-op-één moment, sociaal contact.
- Eten: in verband met verslikken, eenzijdig verlamden kunnen zich makkelijk verslikken, dus kun je dit niet vervangen door robot.

Meer ideeën?

In de thuiszorg is veelal: aantrekken van kousen, wassen etc. Deze mensen wassen zichzelf vaak nog wel. M.b.t. kousen: dit kunnen mensen nog wel, maar ze hebben er geen kracht voor. De kousen zijn een grote beperking, als dit wordt overgenomen zou erg schelen. Nu is er wel plastic kous als hulpmiddel (geleider), maar dit is een hulpmiddel voor de verpleging.

Misschien nog meer ideeën via de mail.

Wat veel voorkomt in thuiszorg: kousen, verder veel ondersteunen met wonden en diabetes: spuiten, eerst waarden daarna spuiten, maar dit is wel risicovol om over te laten nemen.

Medicijnen standaard uitzetten kun je wel overnemen. Uiteindelijk uitzetten, geven aan mensen en controle niet.

Verder nu niets, later wel. Vraagt collega's om gesprek. Wil je niet met revalidanten praten? *Is ook wel goed* → vraagt revalidanten binnen het verpleegtehuis; kun je bij mensen op bezoek.

Vaak ook iemand die thuis nog is, partner ondersteunend maar door leeftijd ook niet veel mogelijkheden; qua kracht en soms gaat het wat te snel, niet bij te benen. Vaak helpen de ouderen elkaar: lichamelijk gehandicapt (bijv moeilijk lopen) helpt geestelijk zwakkere etc.

Verpleging: (1) long-stay: zware zorg nodig, gaan niet meer weg. Verzorgingshuis beperkt aantal zorg aan mensen. (2) revalidanten (3) terminale mensen, binnen korte periode komen te overlijden.

Zorgzwaarte bij een verpleeghuis is het zwaarst, lichamelijk etc., behalve bij revalidanten. Veel multidisciplinair gesproken; artsen, fysiotherapie etc.

Grote mogelijkheden bij wc-gebeuren. Verbeteren van de kwaliteit van het leven, niet wachten = niet afhankelijk.

Kousen.

Verpleging kan nooit compleet worden overgenomen.

Iemand in opleiding: beter spreken met mensen van lager niveau: werken meer met handen, hbo is theoretisch, veel meer theorie, praktisch weten ze minder.

Mensen willen ook wel graag naar buiten, niet gekluisterd aan huis, vaak wel rolstoel, maar misschien hulp bij aantrekken jas nodig.

Einde

D Interview 2, 9 mei 2006

De geïnterviewde was een man in de leeftijdscategorie 20-30 jaar. Hij was werkzaam in een verpleeghuis voor mensen met niet aangeboren hersenletsel.

Introductie en introductievragen

Denk jij dat robots gebruikt kunnen worden in de zorg?

Verlichting zeker mogelijk bij ADL (Algemene Dagelijkse Levensbehoefte) kan voor een groot gedeelte overgenomen / verlicht worden door robots. Bijvoorbeeld een patient zelf het apparaat laten besturen, helpen bij het opstaan, tillen (tillift)

Hij doet ook verschillende niet lichamelijke taken. Maar mogelijk met meer uitleg dat hij meer ideeën denk te krijgen.

Gestructureerd deel

Overzicht taken

3 verschillende diensten, nacht/slaap niet zo interessant, zal dus vooral vertellen over dag diensten. //

- helpen opstaan
- helpen naar bed
- hulp / herinnering medicatie innemen

Wat er precies gebeurd is nog wel verschillend per dag .. mensen gaan bijvoorbeeld naar dagbesteding zoals werk of activiteiten op de locatie.

- huishoudelijk taken (kleding wassen / schoonmaken / koken)
- sommige mensen helpen wassen –i halfzijdig verlamde mensen bv
- aankleden
- sociaal contact met mensen ... ook erg belangrijk

Vertellen over robots

Robots bekijken

Doen jullie nu onderzoek naar sociale robots, of vooral robots die wat kunnen?

Handy lijkt op robotarm die zijn broertjes die spierziekte (Duchenne) hebben gebruiken. Die gebruiken ze bv om hun glas op te tillen, bestek te gebruiken.

Mogelijkheden robots voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

- Papero: maar dan bv een volwassener uiterlijk. Mensen in de gaten houden die niet meer zo zelfstandig zijn, zodat ze dan zelf makkelijk dingen kunnen doen. Omgeving in de gaten houden erg nuttig.
- Het sociale is ook wel erg belangrijk, dat is misch nog een probleem bij het gebruik van dit soort robots.
- Maar robot dan misch toch ook juist weer een hulp bij de eenzaamheid van mensen.
- Qua uiterlijk moet er een hoop gebeuren willen de robots geaccepteerd worden, maar dat onderzoek van die aibo was dan ook wel weer verassend hoe die mensen zich daar zo aan hechten. Misch onderschat ik het wel ...

- Privacy issues kan je natuurlijk wel hebben bij zo een Papero, omdat onze cliënten ook zelfstandig zijn. Zitten behoorlijk wat haken en ogen aan.

Vertellen over projecten

Mogelijkheden domotica voor langere zelfstandigheid / mogelijkheden domotica ondersteuning zorgverlener

Voordeel van die aibo is dan natuurlijk wel dat hij ook niet verwaarloosd kan worden.

- tilliften
- lift die mensen helemaal kan laten staan
- domotica combineren met sociale robots
- pil uitgeef apparaat (dit lijkt me niet zo een probleem qua fouten maken, mensen maken ook fouten, maar dit blijven natuurlijk altijd lastig dingen om uit de hand te geven, altijd vertrouwen hebben op robots.)

,

Wensen van verpleegkundigen / wensen cliënten

Behoeft zorgverleners: privacy erg van belang, dus robot die monitort misch minder geschikt. (antwoord gaat niet over verpleegkundigen maar over bedrijven / instellingen)

- dingen zoals Handy wel handig om taken over te nemen.
- nadeel: je maakt de mensen afhankelijk van de robot, dus als hij stuk is / geen stroom kunnen ze dingen zelf niet.
- Wel goed over nadenken, sommige dingen fijn voor mensen zoals bijvoorbeeld naar de wc gaan / aankleden.
- *Bestuur*: overhalen is misschien lastig i.v.m. privacy enzo
- *Verpleegkundigen*: opzich niet zo een probleem aanpassing is altijd mogelijk (zal wel tijd kosten om te wennen), en is natuurlijk ook afhankelijk van de kennis van apparatuur hoe gemakkelijk de overstap is. Maar als het echt nuttig is moet dit geen probleem zijn.
- *Cliënten*: lastiger. Bij mensen met hersenletsel kan het verschillen per dag hoe ze zich zouden voelen bij een robot. Het is belangrijk dat een robot zou herkennen hoe een persoon zich die dag voelt en niet alleen een programma afdraait. Wisselend per client.

Welke processen moeten niet vervangen worden?

- mens-mens interactie blijft belangrijk: niet vervagen op korte termijn
- niet echt dingen die het niet ooit zou kunnen
- op het moment zou ik medicatie niet toevertrouwen
- niet zo snel de robot alleen taken laten ondernemen, meer als assistentie, ondersteuning

Meer ideeën:

- alles kan wel gedaan worden door een robot
- dingen met tijd (herinnering) / wekker achtige functie
- concrete dingen moeilijk
- problemen met rug: tillen / tegen bedlegerigheid
- robot zou de tillift kunnen aansturen / corrigeren
 - controleren of iemand goed zit met sensoren
 - niet afgekneeld
 - makkelijker maken van het gebruik
- Handy achtige dingen wel handig.

Einde

E Interview 3, 12 mei 2006

De geïnterviewde was een vrouw in de leeftijdscategorie 20-30 jaar. Zij was studente HBO verpleegkunde en werkte tevens als bijbaan in de thuiszorg.

Introductie en introductievragen

Denk jij dat robots gebruikt kunnen worden in de zorg?

Handig voor kleine dingen, zoals opstaan; huishouden/schoonmaken.

Tilliften: handige systemen om iemand op te tillen.

M.b.t. langer zelfstandigheid:

Mensen die moeilijk lopen: een systeem om te staan en leunen, dat je naar keuken/toilet wordt gebracht, dat je niet meer echt hoeft te lopen.

M.b.t. ondersteuning verpleegkundigen:

Tilliften: tiltechnieken zijn er i.v.m. de rug van de verplegenden. Misschien daarin nog meer verdiepen. Soms zijn er 2 mensen nodig om iemand op te tillen. Tillift handig, maar soms bepaalde technieken nog moeilijk zoals optillen en draaien in bed, dan is 1 persoon niet genoeg, vooral als iemand zwaar is. Dus hoe pak je dat dan aan? -> uitbreiding tillift. Vooral bij bed. Iemand wil goed in bed liggen. Nu: easy slide; iemand kan dan naar links/rechts. Gladde mat die onder iemand wordt geplaatst, trekken om naar rechts/links te gaan. Zie je niet zo vaak.

Gestructureerd deel

Overzicht taken

's Avonds langs bij mensen;

- medicatie geven en controleren.

- Steunkousen uitdoen; m.b.v. easy slide

- mensen naar bed brengen, eten klaarmaken en brengen (eten wel zelfstandig). Wil mensen zo veel mogelijk zelfstandig laten blijven, bijv. ook wassen

- wassen: 's ochtends, wassen en helpen, ouderen moeten zelf aangeven wat ze kunnen; zo zelfstandig mogelijk houden. Kost veel tijd.

Vertellen over robots

Robots bekijken

Handy: n.a.v. de meerdere mogelijkheden: geweldig

Nursebot: is het een robot die dan praat? ja, maar is vooral voor zuster.

Mogelijkheden robots voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Robots voor langere zelfstandigheid?

Praktische dingen: eten klaarmaken, koffie zetten, po-stoel verschoneren; dit alles kost veel tijd voor de verpleegkundige. Sociaal gezien moet je het nooit doen, mensen hebben wel nodig contact om te praten. Rollator mooier maken/praktischer. Rijke mensen hebben bijzondere rollators, beter. Een rollator die omhoog kan gaan, zodat mensen niet zo hoeven te reiken.

Robot voor ondersteuning verpleging?

Dat soort dingen (hierboven genoemd).

Tillen.

Medicijnen; aangeven dat tijd is voor de medicatie - dit is een optie. Scheelt de thuiszorg; komen soms alleen bij iemand om medicijnen te checken.

Vertellen over projecten

knop/schakelaar meerdere stopcontacten: heel handig

Virtuele Zorg: Hoe ging dat? Ging dat goed? - *ja, tevreden.*

Aibo - Amerika: ouderen in Nederland die thuis wonen, zijn echt eenzaam, dus het is serieus een optie om dat ook te gebruiken.

Mogelijkheden domotica voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Domotica voor langere zelfstandigheid?

De camera bij voordeur: dat is er al. In flat. Dat is er al. Heleboel erg handig, vooral huisdieren. Misschien met kleuren: oudere mensen die blinder worden; bepaalde felle kleuren gebruiken. Bijvoorbeeld voor bekers/vorken/pakken melk. Deze ouderen mensen, willen zelfstandig, gaat heel moeilijk, dus meer ondersteunen - hierin verdiepen.

Domotica voor ondersteuning verpleging?

- niet meer gevraagd.

Wensen van verpleegkundigen / wensen cliënten

Wensen verpleegkundigen?

Ik zou het heel fijn vinden bij de praktische dingen. Maar contact; wassen en naar bed brengen. Contact met cliënt is heel belangrijk, maar moet niet weggaan. Maar praktische dingen; super, daardoor minder tijd om dit te doen dus meer tijd om te praten met de ouderen. Dat willen zij ook graag; meer praten, meer begrip tonen.

Wensen cliënten?

Even wennen, maar ik denk dat als ze weten dat wij (verpleegkundigen) dan meer tijd voor ze hebben, dan uiteindelijk wel een goed idee.

Welke processen moeten niet vervangen worden?

Welke processen wel vervangen?

Niet meer ideeën.

Welke processen niet vervangen?

Sociaal, aibo-hondje is wel leuk, maar sociaal contact leggen... tv-tje is goed idee, maar er moet nog wel iemand langskomen; oogcontact, lekker praten, plat Gronings praten. Dus dat moet nooit weg.

Wassen: hoe doe je dat? Vooral als mensen helemaal niets kunnen.

Meer ideeën:

Mensen die slechthoort zijn: kleuren, vond ik wel een heel goed idee.

Mensen die slecht horen: vaak mee te maken: zo hard praten, zo vermoeiend. I.p.v. pen en papier iets anders bedenken, om de interactie handiger te maken. Ze hebben wel gehoorapparaatje in, maar dat helpt maar voor 35%.

Wijkverpleegkundige: meer bezig met medicatie.

Automatiseren uitgifte medicatie? Kan. Wijkverpleegkundige vult bij mensen de doosjes voor de week, verzorgenden/verplegenden geven de medicijnen aan de mensen.

Verzorgingstehuis: eten geven en wassen, laag niveau. HBO-V leer je juist; "wat willen de ouderen?", verzorgingstehuis houdt geen rekening met de ouderen, voeren routinetaken uit.

In Rotterdam is een verzorgingstehuis dat wel rekening houdt met de wensen van ouderen. Het kost meer tijd, maar het werkt wel!

In een verzorgingstehuis valt over het algemeen de werkdruk wel mee, er is wel tijd voor ouderen, maar de werknemers gaan liever zelf pauze houden.

Andere mensen die wel interview willen? Zal morgen vragen.

Verzorgings/verpleegtehuis: vooral techniek nodig, zodat meer contact kan met mensen.

Einde

F Interview 4, 22 mei 2006

De geïnterviewde was een vrouw tussen de 20-30 jaar en was bezig met de opleiding HBO verpleegkunde.

Introductie en introductievragen

Denk jij dat robots gebruikt kunnen worden in de zorg?

M.b.t. langer zelfstandigheid:

Tilliften voor ondersteuning, dingen waardoor mensen minder hulp nodig hebben, steunkous-aantrekapparaat.

Gestructureerd deel

Overzicht taken

Thuiszorg:

Minder complexe zorg, insuline spuiten, spuiten, stomazorg, steunkousen aandoen, wassen (afhankelijk van wat de mensen zelf kunnen)

Ziekenhuis:

Afhankelijk van de afdeling: aankleden, wassen, voorbereiden onderzoek, naar onderzoek brengen, medicatie geven.

Vertellen over robots

Robots bekijken

Mogelijkheden robots voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Wel iets anders: Handy1 → wel goed dat het er is, voor jonge mensen wel geschikt (die graag zelfst. willen zijn). Contact met mensen is heel erg belangrijk, dus misch minder handig. Veel mensen zien alleen de thuiszorg en zien al heel weinig mensen op een dag.

Belangrijk om menselijk contact te behouden.

Voor veel problemen zijn al wel oplossingen .. op het moment geen ideeën - komen straks terug (uiteindelijk niet). In Thuiszorg zijn de middelen die in ziekenhuizen zijn vaak niet beschikbaar.

Vertellen over projecten

Voor mensen in een rolstoel is die aan en uit knop zeker handig.

Keuken inschakeling/ uitschakeling ook handig.

Mogelijkheden domotica voor langere zelfstandigheid / mogelijkheden domotica ondersteuning zorgverlener

Nog niet tegen heel veel dingen aangelopen .. werk nog niet zo lang.

Je hebt dus een steunkousen-aantrekapparaat, die is er al. Ze gebruikt zelf de easy-slide.

Weinig ervaring .. dus niet zo heel veel ideeën nog.

Wensen van verpleegkundigen / wensen cliënten

Behoeft bij zorgverlener voor zelfstandigheid:

Bij sommige mensen kan het wel goed werken, maar niet te ver gaan, menselijk contact is erg belangrijk. Ook opletten dat mensen niet door blijven klooiën nadat ze dingen niet meer aankunnen. Dat ze dan denken dat ze zich zelf maar moeten redden.

Ouderen:

Zijn vast wel mensen die er wat in zien. Zeker in de toekomst voor de jongere generaties die zijn opgegroeid met computers etc. Nu misch moeilijker, maar waarschijnlijk over een jaar of 20 geen probleem.

Ondersteuning verpleegkundigen:

Ja zeker, dingen minder zwaar maken is natuurlijk prettig. Ligt er natuurlijk aan welke afdeling je bezig bent, kinderen is heel makkelijk, gehandicapten / zwaarzieken is alles natuurlijk veel zwaarder. Is dus erg afhankelijk bij wat voor een zorg dat is.

In het ziekenhuis heb je een po-spoeler; een soort van po-afwasmachine.

Welke processen moeten niet vervangen worden?

- Voor veel menselijk contact
- zelfstandigheid is goed, maar contact / controle blijft belangrijk
- Spuiten is erg moeilijk te vervangen. je controleert dan ook gelijk dingen. (harde plekken enzo)
- Wassen is een belangrijk onderdeel van de dag. Vaak ook mogelijk een goed gesprek te houden, omdat het een meer informele situatie is.

Meer ideeën:

Op het moment geen ideeën. Wel een voorstander van al deze dingen. Mensen niet aan hun lot overlaten en altijd een goede controle houden op hoe het met mensen is.

Einde

G Interview 5, 31 mei 2006

De geïnterviewde was een vrouw in de leeftijdscategorie 20-30 jaar. Zij was studente HBO verpleegkunde en had net 6 maanden stage gelopen in een verpleeghuis.

Introductie en introductievragen

Denk jij dat robots gebruikt kunnen worden in de zorg?

M.b.t. langere zelfstandigheid:

In de thuiszorg: bijvoorbeeld voor tilliften in robotvorm, maar dan moet de persoon zelf nog wel veel kunnen, zichzelf in band hijsen en dan de rest automatisch.

M.b.t. ondersteuning verpleegkundigen:

Verpleeghuis: zwaar lichamelijke werk overnemen

Misschien medicijnen toedienen? Injecteren... nee, lijkt me eigenlijk niet dat dat kan.

Gestructureerd deel

Overzicht taken

Thuiszorg (vakantiewerk): rond 7.30 collega overleg, dan naar mensen: mensen uit bed halen, wassen, op bed, douche, steunkousen aanhijsen, klaarmaken maaltijden. Eind van middag/avond: helpen met steunkousen uitdoen, naar bed gaan.

Verpleeghuis: s ochtends ook mensen uit bed halen, helpen met eten, medicijnen, koffie drinken. Mensen die niet meer zelf mobiel zijn, help je met een tillift: bijv. in rolstoel zetten.

's Avonds breng je ze weer naar bed.

Vertellen over robots

Robots bekijken

Pearl: Zijn die beweegbaar? - *Ja, kan rijden* - ok

iCat: kan deze dan ook de gevoelens van cliënten weergeven? Hoe gebruik je die emoties? *Nee, kan alleen eigen emotie uitdrukken*

Mogelijkheden robots voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Robots voor langere zelfstandigheid? Ik kan me wel beter voorstellen voor mensen bij hulp bij eten, geen verpleegkundige nodig, behalve dan misschien voor het klaarmaken. Schijnt dat mensen prettig vinden dat ze zelf kunnen kiezen welke hap ze nemen. Ja, kan ik me voorstellen.

Robot voor ondersteuning verpleging?

Sommige mensen in een verpleeghuis moeten door twee mensen geholpen worden, bijvoorbeeld bij het douchen, omdat het voor één iemand te zwaar is, dan zou een robot wel handig zijn om de douchekop vast te houden. Dus ofwel dingen aangeven ofwel vasthouden.

Vertellen over projecten

Mogelijkheden domotica voor langere zelfstandigheid / mogelijkheden robots ondersteuning zorgverlener

Domotica voor langere zelfstandigheid? Terugkomend op de knuffel: in verpleeghuis, wel leuk voor mensen die al heel dement zijn en bedlegerig zijn en wel behoefte hebben aan snoezelen, beetje knuffelen. M.b.t. smart homes: sommige mensen zetten metalen spullen in de magnetron, zou wel handig zijn als dat gedetecteerd kan worden.

Domotica voor ondersteuning verpleging?

In de thuiszorg moet je als verpleegkundige soms zoeken naar knoppen van lichten etc. Het zou wel

handig zijn als licht van badkamer bijvoorbeeld automatisch aangaat. Dit is dus vooral handig. Maar scheelt ook wel wat tijd ja.

Wensen van verpleegkundigen / wensen cliënten

Wensen verpleegkundigen - langere zelfstandigheid?

Verpleegkundigen: goede zaak, clinten thuis hebben vaak nog eigen leven, in verpleeghuis zijn ze snel gehospitaliseerd, passen zich snel aan aan het leven in verpleeghuis, beter lijkt me als ze eigen leven hebben.

Wensen cliënten - langere zelfstandigheid?

Mensen willen graag langer thuis blijven, zo laat mogelijk naar het verplegings-/verzorgingstehuis willen gaan.

Wensen verpleegkundigen - ondersteuning verpleegkundigen? Zullen het wel prettig vinden, hangt wel af van samenwerking met de robot.

Wensen cliënten - ondersteuning verpleegkundigen?

Afhankelijk van wat voor een robot het is. Misschien moeten de clinten er even aan wennen. Dit vind ik moeilijk in te schatten.

Zijn er nog meer dingen waarvan je denkt dat cliënt het niet prettig vindt aan robots?

Gebrek aan menselijk contact.

Welke processen moeten niet vervangen worden?

Welke processen niet vervangen?

Wassen; is persoonlijk contact. Verpleegtechnische vaardigheden kun je denk ik ook niet vervangen, zoals injecteren en katheteriseren. Een mens kan fouten maken, maar ik denk niet dat je een robot kunt laten injecteren. En je moet ervoor waken dat menselijk contact behouden blijft.

Meer ideeën?

Toiletrobot?

Ja - zou kunnen, persoonlijk zou ik het zelf onprettig vinden om naar het toilet geholpen te worden door een robot.

Meer gemak - zelf kiezen wanneer je naar wc gaat?

Ja dat is wel zo. Lastige afweging.

Meer privacy?

Ja zou ook nog kunnen.

Sommige mensen gewend aan verpleegkundigen (privacy)?

Nou sommige mensen wennen daar niet aan, dus dan zou een robot wel weer nuttig zijn. Niemand om je heen die ziet wat je mankeert.

Robot die dingen kan oppakken?

Ja is ook wel handig, vaak wel of je iets wil oppakken, want de cliënt kan er dan niet bij. Zo hou je dan wel wat meer je eigen leven (met robot) in het verpleeghuis.

Rolstoel die je in hoogte kunt verstellen?

Ja - volgens mij is dat er al wel.

Einde