# Research

Experiences with the digital planning boards in a small-scale group accommodation for people with dementia

DAY STRUCTURE
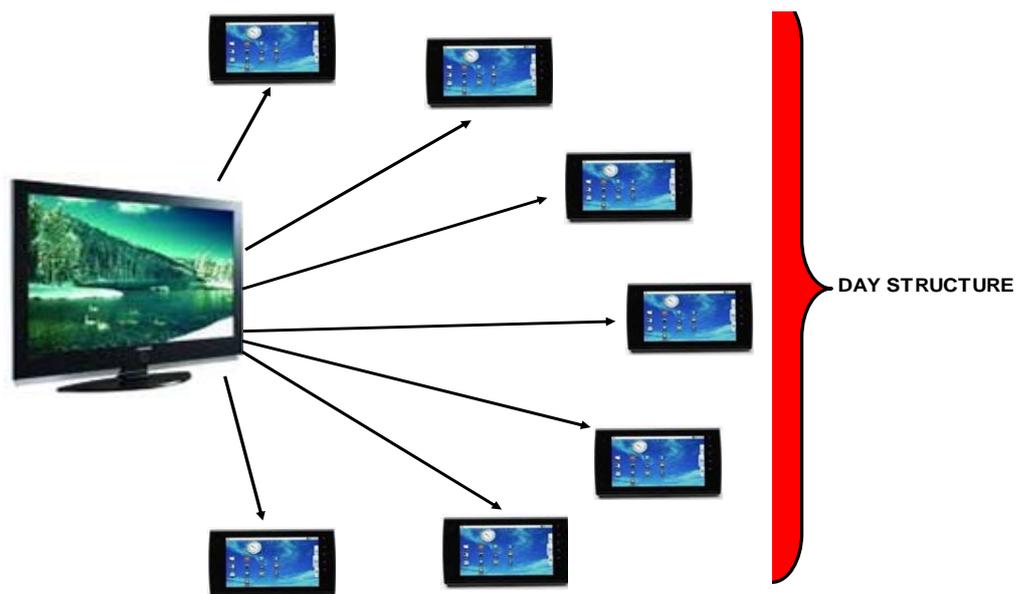
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Preface

Due to personal interest and professional involvement, I carried out a small-scale study regarding the experiences of people with dementia using digital planning boards. As a nursing teacher, I am connected to the department of health of University X. Since September 2009, I am also a member of the Expertise Circle of the lectureship for Technology in Care & Welfare (Dutch abbreviation: TiZ&W), where I am responsible for the set-up and execution of the research line regarding dementia & technology. The lectureship TiZ&W forms part of the expertise circle of Health Care, Welfare & Technology of University X. The goal of Expertise Circle is to increase expertise and to disseminate and share knowledge. This is achieved by looking at activities that improve the quality of work in practice. The challenge and ambition of the TiZ&W lectureship is to develop new technologies and implement these in practice based on applied research. For this purpose, research projects are initiated, which are carried out by bachelor and master students under the supervision of teachers and in close cooperation with the professional field. The digital planning boards for a small-scale group accommodation for people with dementia were developed by various (research) projects. Students from different departments participated in this. The development started during January 2008 and in September 2009, the digital planning boards were placed in the small-scale group accommodation for people with dementia. I have been officially responsible for the second phase development of this project since September 2009, on the basis of the research line on dementia and technology.

In designing and executing this study, I received help from a variety of people. My special thanks go to:
- The residents, the informal carers and staff of the SSGA for people with dementia where the digital planning boards were placed.
- Prof Fatemeh Rabiee, my study supervisor from BCU.
- Engeline van Lokven MA, for the inspiring hours of 'peer debriefing'.
- Dr Charles Willems, lecturer of the TiZ&W lectureship.
- Frans Verschueren, my predecessor in this research line.

Abstract

Introduction: Dementia is increasing worldwide due to changes in the population profile and aging. In 2001, the estimated number of people with dementia in EU countries was 5 million and this number is expected to double by 2040 (Ferri et al, 2005). Use of technology, particularly digital planning boards to support the memory by structuring the daily activities of the residents in old people homes, is a new innovation in The Netherlands. This paper presents the process of development of the digital planning boards and the result of a pilot study looking at the experiences of using this device in people with dementia living in a small-scale group accommodation as well as experiences of informal carers and members of staff.

Aim: To evaluate the implementation of the digital planning boards in practice and to improve the use of this device from the user's perspective; the residents, informal carers and members of staff.

Method: A qualitative method was chosen and data were collected in Dutch using semi structured interview schedule through individual interviews with the residents (n=7) and focus groups interviews with informal carers (n=5) and members of staff (n=6). Data were tape recorded, transcribed, translated into English and then analysed using Ritchie & Spencer's (1994) framework analysis.

Results/Findings: Analysis of data generated three main themes: the meaning of the digital planning boards, their use and the needs for further development.

Discussion/Conclusion: The occurence of installation errors, inefficient use, limited ease of use and a lack of knowledge regarding the function and use of the digital planning board are the most important findings that prevent a successful implementation. However, the majority of the residents were happy with the use and function of the digital planning boards when it worked. The informal carers, however, were not very positive, indicated opportunities for improvement. This was echoed by the staff, although they saw an added value for the current use of this electronic device. The findings although highlighted the diverse needs of different users, pointed to shared views about ways of improving through adaptation of the software programme and additional technological applications such as Internet connectivity, improving its accessibility by using a remote control, adding videos and photos. A number of lessons are learned about the use and transferability of this innovation in general health care setting as well as in people with dementia.

Recommendations: Long-term and intensive cooperation is necessary between the care organisation, a software company and the university. Users need to be optimally involved in the further development by means of applied research, which will not only stimulate the quality of user-centred designs, but also an effective deployment of the digital planning board.

1.   Context of the study

Lucy van de Berg has lived in a small-scale group accommodation for people with dementia for a few years. Because the group is small, she knows her fellow-residents and care providers well and feels at home there. Due to her health condition, Lucy has some difficulty remembering appointments and the fixed activities that take place every day, such as eating, drinking coffee, cooking, etc.. She is very annoyed when she forgets an appointment or is late for an appointment. In order to prevent this from happening, she often appeals to the care providers or fellow-residents, but this also makes her uncomfortable. A digital planning board was recently installed in the group accommodation, which states all of the fixed activities of the day and other appointments, including times. She also has her own digital planning board in her bedroom, which displays her personal appointments. This is the ideal solution for her to not forget appointments or to be late. She still occasionally asks a care provider what time she has an appointment, but her care provider points out that she should check her digital planning board. This is a good thing, because eventually, she will manage it herself....

The above case outlines the use of the digital planning board in a fictional situation. Hopefully, this use will be reality in the future in small-scale group accommodations for people with dementia.

1.1.   Dementia and small-scale group accommodations (SSGA)

The WHO uses the following definition of dementia: 'Dementia is a syndrome due to disease of the brain, usually of a chronic or progressive nature, in which there is a disturbance of multiple higher cortical functions, including memory, thinking, orientation, comprehension, calculation, learning capacity, language and judgement. Impairments of cognitive function are commonly accompanied and occasionally preceded by deterioration in emotional control, social behaviour or motivation' (WHO, 1990). Different types of dementia are distinguished, whereby dementia of the Alzheimer type is the most common and most well-known, but the dementia syndrome also covers: vascular dementia, dementia due to other somatic disorders (lewi body and frontotemporal dementia), persisting dementia due to the use of drugs (Korsakov), dementia due to multiple causes and dementia left undefined (DSM-IV-TR, 2000). People with dementia are increasingly dependent on the care of others. To begin with, this care is often offered by informal carers, but as the disease progresses, admission to a nursing home or old-people's home is inevitable. The number of people suffering from dementia is increasing enormously, both nationally and internationally, due to ageing. In 2001, the number of people with dementia was estimated to be 5 million in the European

Union member states and this number is expected to double by 2040 (Ferri, Prince, Brayne, Brodaty, Fratiglioni, Ganguli, Hall, Hasegawa, Hendrie, Huang, Jorm, Mathers, Menezes, Rimmer & Scazufca, 2005). In The Netherlands, there are over 200.000 people over the age of 65 at present, who have been diagnosed with dementia. In 2020, this number will be 250.000 and in 2050, almost a doubling of this number is expected, 400.000 people (Health Board, 2002). Innovations in care, aimed at guaranteeing the quality of care, but also to improve it, are stimulated and financed by the Ministry of Public Health, Welfare and Sports and are in full operation in order to anticipate to the increase in people with dementia on time, as well as to the expected shortages of professionals in care and the increase in the costs of health care (Ministry of Public Health, Welfare and Sports, 2005; TK, 2007, 2008). In order to provide insight into the size of the problem, the Health Board (2002) calculated that six new nursing homes have to be built every year in order to meet the increasing demand for care. The policy for elderly people and ageing' pursues a de-institutionalisation of care (Ministry of Public Health, Welfare and Sports, 2005). This policy is in line with the desire of elderly people to remain at home for as long as possible and are also in tune with the belief that informal care is cheaper than formal care and anticipates to labour shortages in care. Acknowledging that, a time can still arrive when a transfer to an institute is inevitable. In order to accommodate these situations as much as possible by creating a homely atmosphere, increasingly more SSGA's are developed for people with dementia, which are defined as: 'accommodations for group care in groups of a maximum of 6 to 8 residents, together forming one household' (TK, 2008, 2009, p. 1). Research by the Trimbos Institute (Depla & Boekhorst, 2007) showed that SSGA's are positive for the well-being, independence and social involvement of the residents. Also on the basis of these results, SSGA's are encouraged, however, it is expected that the increasing demand for these kinds of accommodations cannot be met. This causes a field of tension between offering the quality of care on the one hand and the constant pressure on care to save costs and the expected labour shortages in care on the other hand. Due to this, other supporting measures are necessary for meeting the wishes and needs of people with dementia with regard to independence, safety, and the quality of life. From this perspective, the government emphasises the importance of technological applications in SSGA's for people with dementia,

for which research is necessary to stimulate the deployment of technology on a large scale (TK, 2007, 2008; TK, 2008, 2009).

1.2.   *The development of digital planning boards in a SSGA for people with dementia*

A care organisation in the eastern part of The Netherlands offers care to elderly people, both externally and internally. Stimulating SSGA's forms part of this care organisation's strategic view. An auxiliary branch of this care organisation is Residence Care Centre X in which an SSGA was started in the spring of 2008 for eight residents, aged between 60–80, with a mild to moderate form of dementia in combination with psychiatric problems. Internal research mainly shows positive results in the social behaviour of the residents since the start of this small-scale group. Characteristic for this group is the diversity of the different forms of dementia. The most common form is Korsakov, but vascular dementia, lewi-body dementia, frontotemporal dementia, Alzheimer's and dementia left undefined exist in this unit. Despite the diversity, the group was composed in this way due to a number of common characteristics:

- The residents need supervision. They can function independently for a large part under the supervision of care providers, by offering a fixed structure with unit rules and trusted people. However, they cannot be left alone.
- The memory problems are less in the foreground by offering a fixed structure.
- Residents have problems with executing functions, the approach, keeping an overview and planning activities.
- With the exception of 1 resident, they have no insight into their own functioning, but are aware of their illness.
- Due to the related psychiatric problems, these residents are less suited to function in a group.

In this SSGA, the care organisation intends to use technological applications to make a positive contribution to the development of the dementia process, the care, treatment and safety of residents and efficiency of providing care by an effective deployment of people and

means. A joint project was started in cooperation with the TiZ&W lectureship of University X with the following objectives (Verschueren, 2008):

- *The technology developed contributes to the provision of care and service that is more attuned to the individual.*

- *The technology developed contributes to the reduction of undesired behaviour and the reinforcement of positive behaviour.*

- *The technology developed contributes to the effectiveness of care provision.*

An extensive phase of data gathering took place in which the staff of the SSGA was intensively involved in order to get a clear picture of the technological applications. Eventually, the development of a digital planning board for the living room of the SSGA and individual digital planning boards for the bedrooms of the residents was opted for, which are interconnected via a wireless network (Verschueren, 2008). It was agreed that the digital planning board and individual planning boards will focus initially on the support of the resident's memory with regard to the day structure. The digital planning board in the living room gives a clear view of the activities that have to be carried out by whom, where, on what day and at what time for all of the residents. The individual planning board only provides the information that is relevant to the resident concerned and is therefore suitable for individual use. The intention is that residents – with help from the staff – can indicate which information they want to share with the other residents and which information can only be viewed on their individual planning board. Staff members have to use a computer to introduce the activities of the residents, which are subsequently displayed on the digital planning boards. Students of the university carried out the research with regard to the desired design of the digital planning boards. Findings of the research were submitted to and tested by the residents of the SSGA. A definitive programme of requirements came into being on the basis of the following aspects: design, safety, environmental factors, comfort and use. The next group of students piloted whether the digital planning boards meets its requirements (Verschueren, 2008). The digital planning board was installed in the living room of the group in the summer of 2009 and then individual digital planning boards were placed in every resident's bedroom. In the development of the digital planning boards, it was pursued that the residents and staff were involved optimally by making an inventory of the

users' needs and processing the information. This is also called a 'user-driven' or 'user-centred design' (Kinzie, Cohn, Julian & Knaus, 2002; Orpwood, Gibbs, Adlam, Faulkner & Meegahawtte, 2005; Sixsmith, Gibson, Orpwood & Torrington, 2007). This means that the users of the technology are constantly involved in an iterative process of analysis (gathering data), designing, testing, implementing and evaluating (Kinzie et al, 2002). In the first instance, the study aimed to carry out an impact evaluation in a pre-test and post-test design. It soon turned out that this type of evaluation was impossible, because an advanced implementation of the digital planning board was required, and this was not the case. Figure 1 gives a diagrammatical overview of the steps that have already taken place (steps 1 through 3) and the steps that still have to take place (step 4 in part and step 5).

Figure 1 development digital planning board

Process of analysis	Design	Testing	Implementation	Evaluation

1. User needs investigation

2.Programme of requirements

3. Prototype testing, University

4. Refinement and exploration of users' experiences

5. Refinement and impact evaluation

January 2008 till July 2009 location University   September 2009 location SSGA
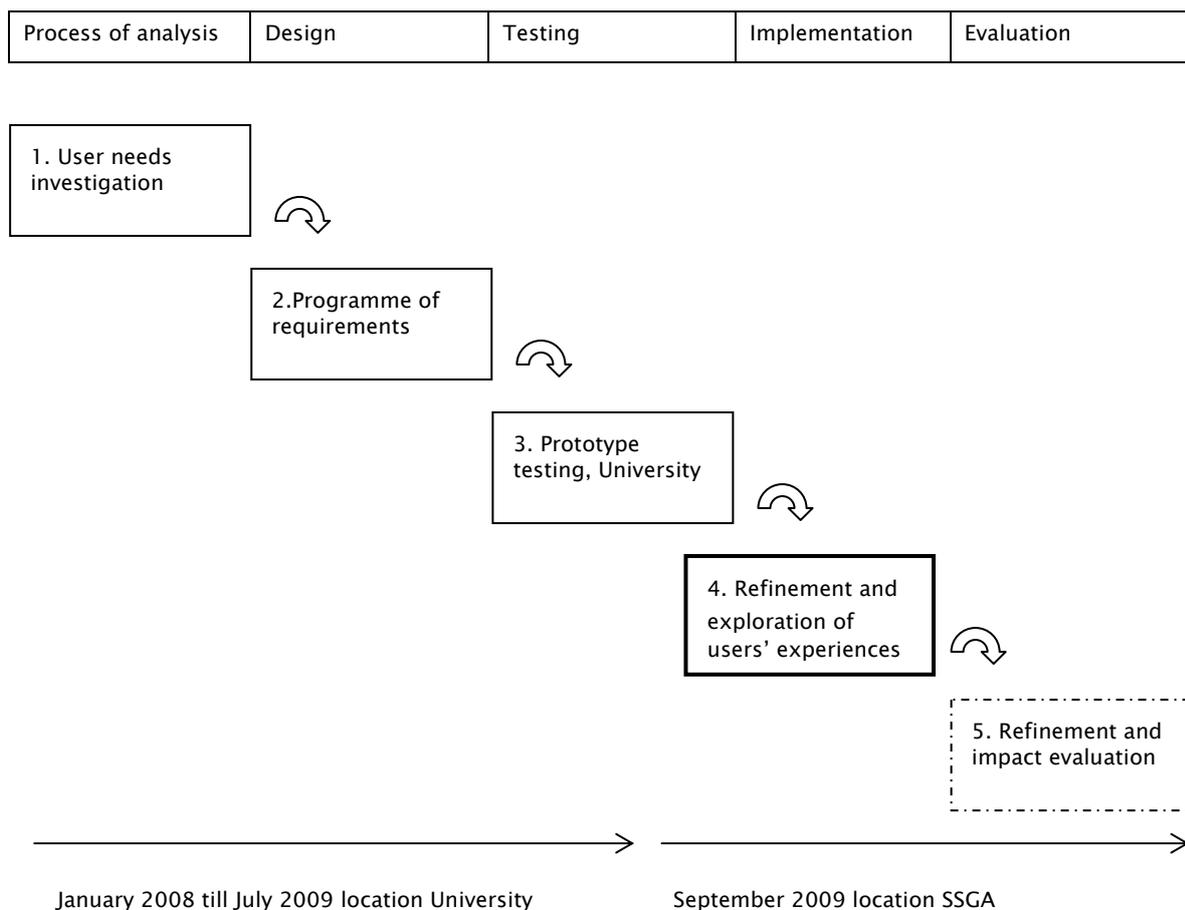
In this study, an exploration of the users' experiences is central (step 4). Step 5 is in a preliminary text box, because the content of this step is determined by the outcomes of this

study. Figure 1 show that step 4 comprises both a small part of of the test phase in the 'real life setting' and the implementation phase. This had a number of reasons: there were many installation errors in the system to begin with, which is why the planning board did not function, and moreover, not all of the requirements from the programme of requirements had been processed. The digital planning boards were adjusted to this (refinement).

1.3.   Research regarding the experiences with the digital planning boards

Although the digital planning boards are finally functioning, evaluation is necessary to assess their effectiveness and further development. Residents, their informal carers and staff have to become familiar with the devices by using them and integrating the devices in their daily infrastructure. Residents have to check the boards and sometimes touch the board in the living room to activate it. The role of informal carers and staff is to encourage residents to regularly check and touch the digital planning boards. Additionally, staff members have to become familiar with introducing the residents' activities to the program developed for this purpose. What is also important is that the digital planning boards are frequently adjusted to meet the users' needs. The optimal involvement of users in the implementation process is essential in accordance with its 'user-centred design' and for this reason, it is important that the user's needs are identified. In the light of above, the following actions were taken: an information meeting with informal carers and staff was organised during which instruction manuals were handed out with regard to the function of the digital planning board; several staff instruction meetings were held, and the unmet needs of users were addressed and solved while working with the devices (refinement of the digital planning boards). For further development of these devices, it is important that a number of potential advantages as well as unanswered questions about using these devices are explored. For example, what are the experiences during the process of development and implementation? Were the actions taken sufficient and what can be learned from the cooperation in practice? Exploring the initial outcomes is also important, e.g. how were the devices used and does its usage result in changes in the behaviour of residents? Does the use of these devices influence the orientation in time and place, physical activities of residents, communication and social interaction? What are the consequences on the working process on the ward? How can the

digital planning boards be improved? Memory support is the main function of the digital planning boards, but there are also possibilities for expanding the functions of the digital planning boards, for example, listening to music, watching films and looking at photos. Is there a need for expanding the functions of the digital planning boards and have other functions already been explored/used? In a nutshell, for the further development of these devices, exploring some of the above unanswered issues would be valuable. For this reason during this stage of the implementation process, evaluative qualitative research is planned for exploring the experiences of users with the digital planning boards. The process of this approach is outlined in the chapter on methodology.

1.4.   Advanced (Nursing) Practice

According to Catsledine & McGee (2003, p. 24), the definition of advanced nursing practice is: 'A state of professional maturity in which the individual demonstrates a level of integrated knowlegde, skill and competence that challenges the accepted boundaries of practice and pioneers new developments in health care'. This definition is not only applicable in the domain of nursing, but can also be interpreted as Advanced Practice in the domains of health care, social care as well as the domain of education. In the context of this study, two skills are required of the advance practitioner; a successful implementation of the digital planning boards, and the research regarding the progress of its implementation. So, this entails a dual role of leadership: one regarding the implementation of change and one regarding the research. Furthermore, additional skills are required with regard to how these two processes can be managed in relation to the target group's vulnerability and the nature of the change, dementia and technology.

2.   Literature review

This chapter presents a review of the relevant literature and consists of 4 sections. The policy of the Dutch government regarding the care for people with dementia is briefly outlined in section 1. Section 2 clarifies the terms of dementia, small-scale accommodation and care technology. Subsequently, in section 3 reality orientation therapy (ROT), the needs of people with dementia and the practice of technological applications for people with dementia, including electronic memory aids are discussed. Section 4 deals with the views and theories regarding the development, implementation and acceptance of technology. This section is concluded by ethical aspects. Each section starts with a brief outline of the search history and the chapter closes with a summary of the key factors that provide a rationale for the study.

2.1.   Dutch Government policy with regard to care for people with dementia

To gain a view of the policy of the Dutch Government, information was sought on the website of the Ministry of Public Health, Welfare and Sports (VWS). The search term dementia was used for this, whereby all publications from 2002 up to and including 2010 were searched. This resulted – also by means of the snowball method – in different usable documents, including chamber papers, reports, notes and research articles.

The government is currently faced with the challenge of population's aging profile on the one hand, including the expected increase of people with dementia and the shortages of labour in the care and welfare sector on the other hand. De-institutionalisation of care is pursued (Ministry of Public Health, Welfare and Sports, 2005), whereby the government recognises that a large expansion in the support of informal carers is necessary. At present only one third (35 %) of the people with dementia uses residential care and two-thirds (65%) lives at home (Health Board, 2002). The Nivel studies (Peeters, Francke, van Beek & Meerveld 2007; Zwaanswijk, Peeters, Spreeuwenberg, van Beek & Francke, 2009) shows that twenty per cent of the informal carers is severely strained and a significant number of informal carers (67%) points out having a greater need for information and advice as well as

professional support. Other needs are that the diagnostics and treatment can be improved and that coherence in the care for people with dementia is desired. These results are based on national surveys among 984 (Peeters et al, 2007) and 1526 (Zwaanswijk et al, 2009) informal carers of people with dementia. Both informal carers of people with dementia in the home situation and informal carers of people with dementia admitted in a nursing home participated in these surveys. A limitation of the survey in 2007 is that the recruitment of participants took place via professional care organisations that the informal carers received assistance from. Informal carers of people with dementia who do not use professional help are not represented in this survey. This has possible consequences for the representativity of this survey (Peeters, van Beek, Meerveld, Spreeuwenberg & Francke, 2010). No information is known about this from the survey in 2009. In March 2008, the programme of Integrated Care Dementia started; in this programme, important partners work together on the development of a structural supply of comprehensive dementia care, which connects to the needs and wishes of people with dementia and their next of kin (Ministry of Public Health, Welfare and Sports, Health Insurers Nederland, Alzheimer Nederland & ActiZ, 2009). It is expected by the Ministry of Public Health, Welfare and Sports that no later than 2011 the structural supply of comprehensive dementia care financed by health insurances is in practice in the whole of The Netherlands. The responsibility for the development of good integral dementia care regionally is the task of care offices, municipalities and care suppliers. Also on the basis of positive research results (Depla & Boekhorst, 2007), small-scale group accommodations for people with dementia is expected to form a structural part of the supply. Depending on the severity of the problems that the disease entails, the capacity of the informal carers and the availability of formal and other informal care, it is believed that 23% of the 35% of the people with dementia who uses residential care needs intensive residential care (Waarde & Wijnties, 2007). This group appears to be suitable for small-scale group accommodation. In the view of double aging (Health Board, 2002) this will be a strongly growing group. This means that places in small-scale group accommodations for people with dementia need to be extended markedly in the coming years (TK, 2008, 2009). To meet providing quality of care on the one hand and the constant pressure on care to save on costs as well as the labour shortages expected in care on the other hand, the

government needs to encourage the large-scale application of technology in small-scale group accommodations for people with dementia (VROM & VWS, 2007; TK, 2007, 2008; TK, 2008, 2009).

2.2.   Clarification of terms

This clarification of terms is given to indicate what is understood by the terms concerned in this study. The search terms included dementia, small-scale accommodation and (assistive) technology in all of the articles in the Journal on Gerontology and Geriatrics (2005–2010). A handbook on dementia regarding the latest insights into the diagnostics and treatment (Jonker, Slaets & Verhey, 2009) and a Guideline on the diagnostics and medicational treatment of dementia (Dutch Association for Clinical Geriatrics, 2005) were found. The search also included the criteria and stages of dementia in the DSM-IV-TR (2000) and DSM-III-R (1987). For a clarification of the terms regarding small-scale accommodation and assistive technology, documents were also used that were applicable with regard to other sections of this literature review.

2.2.1. Dementia

The syndrome of dementia includes a compilation of symptoms that can be caused by different disorders (Verhey & Pijnenburg, 2009). The DSM-IV-TR (2000) distinguishes between the following disorders/forms: dementia of the Alzheimer type, Vascular dementia, dementia due to other somatic disorders (HIV, skull trauma, Parkinson Dementia Complex, Lewi-body-dementia, Huntington's disease, Pick's disease, also called Frontotemporal dementia, Jakop-Creutzfeld's disease, persistent dementia due to Korsakov, dementia due to multiple causes and dementia left undefined. Dementia of the Alzheimer type is the most common in The Netherlands, which is followed by Vascular dementia, and subsequently frontotemporal dementia, Parkinson Dementia Complex and Lewi-body dementia occur regularly (Breteler & Schrijvers, 2009). For the diagnosis of dementia, the criteria in the DSM-IV-TR (2000) are used almost always and everywhere (Verhey & Pijnenburg, 2009):

- Memory impairment: reduced ability to learn new information, (imprinting disorders) or learned information to remember (reproduction disorder).

- One of the following cognitive disorders: aphasia, apraxia, agnosia, disturbances in executive functioning.

- The cognitive impairments must be severe enough to cause impairment in social and occupational functioning. Importantly, the deterioration must represent a decline from a previously higher level of functioning.

- Finally, the diagnosis of dementia should not be made if the cognitive deficits only occur during the course of a delirium.

In contrast with the WHO definition (1990), the DSM-IV-TR (2000) no longer requires – like previous versions of the DSM – that the disease has a progressive or irreversible development. Dementia that is temporary (reversible) is also named as dementia according to the DSM-IV-TR (2000). The number of complaints in dementia usually increases during the course of the pathological process, as well as their severity. In the DSM-III-R (1987), three stages of dementia are distinguished:

- The first stage (mild dementia): periods of apathy, sometimes varied with periods of irritation. Work and social activities are impeded. Personal hygiene and judgement are sufficient to be able to continue to live independently.

- The second stage (medium dementia): disturbances of different functions (memory, realisation of time and place, practical and intellectual skills, language and behaviour). Living independently becomes risky. Supervision is necessary, possibly to a limited extent;

- The third stage (severe dementia): the patient is no longer able to perform daily activities (such as minimal personal hygiene). The patient is entirely dependent on help and often no longer recognises his/her family or environment.

In the SSGA where the study is held, different forms of mild to medium dementia exist. Most of the residents are diagnosed with Korsakov Syndrome. Although Korsakov and other types belong to the general diagnosis of dementia (DSM-IV-TR 2000), it is necessary that the characteristics of the different types are examined. Korsakov caused by a deficiency of vitamin B1 as a result of self-neglect due to the use of alcohol. Typical for Korsakov is that

patients confabulate; gaps in memory are filled with fantasy stories. Korsakov is not a progressive disease; cognitive deficits are stable or become less severe after stopping drinking (Jue & Schilt, 2009). Korsakov patients usually benefit from structure, a structured environment and daily routine (www.alzheimer-nederland.nl). The other residents were diagnosed with dementia of the Alzheimer type, Vascular dementia, Lewi-body dementia, Frontotemporal dementia and dementia left undefined. Both in the Alzheimer type and in Vascular dementia, memory problems are in the foreground. In the Alzheimer type the problems mainly become manifest in storing new information (Scheltens, van der Flier, Rozemuller & Pijnenburg, 2009). In Vascular dementia, there is a link between the dementia and a cerebrovascular disease. The symptoms depend on the area of the brain that is damaged (Dutch Association for Clinical Geriatrics, 2005). Lewi-body dementia is characterised by attention and concentration disorders, hallucinations and signs of Parkinsonism (Dutch Association for Clinical Geriatrics, 2005). Finally, frontotemporal dementia involves behavioural problems more to begin with and memory problems are less in the foreground (Seelaar, Pijnenburg & Van Swieten, 2009). Although the literature distinguishes several kinds of dementia, each with its own specific characteristics and consequences, this division remains coarse. It is claimed increasingly often that a combination of the different types of dementia is involved (Health Board, 2002; Breteler & Schrijvers, 2009; Kelley & Minagar, 2009). This is true for some residents; moreover, underlying psychological problems are involved in many of them, which makes an exact distinction of the types of dementia even more difficult.

2.2.2. Small-scale group accommodation for people with dementia

In most cases, there is a time when living at home is no longer possible or responsible. In order to create a homely atmosphere, and meet the needs of people in these situations, increasingly more small-scale housing provisions for people with dementia are developed, which are defined as: 'provisions for group care in a group with a maximum of 6 to 8 residents, who form a household together (TK, 2008, 2009, p. 1). Another definition originates from the Expertise Centre of Housing-Care of Aedes-Actiz: 'We use the term 'small-scale accommodation' when a small group of people, needing intensive care and support, live together in a group accommodation, which makes it possible for them to live

an as normal life as possible' (www.kcwz.nl/dossiers/kleinschaligwonen). This definition is still too general, the core of what small-scale accommodation is not sufficiently clear. Boekhorst, Depla, de Lange, Pot & Eefsting (2007) speak of small-scale accommodation if it meets the following characteristics:

- A resident remains a resident for better or for worse. This roughly means that the resident can stay until his/her death.

- A normal household is kept. For example, being able to receive visitors in the resident's own room and residents cook themselves.

- The resident has the control of the design of his/her daily life. Self-determination and freedom of choice regarding the daily course of affairs.

- The staff form part of the Household. Care and living take place in an integrated way. There is a steady team of staff members, who create a homely atmosphere and are familiar with the residents' life stories.

- The residents form a group together. The residents live together as a family, in which their families are always welcome.

- A small-scale group accommodation is located in the archetype house. The environment and design equals that of a normal house as much as possible.

There are 4 types of small-scale accommodation forms (Wijnties & Paquay, 2004):

1. Stand-alone group houses in the community.

2. Group houses close to or in residential homes.

3. Group houses close to or in nursing homes.

4. Group houses as a part of a community-oriented care supply.

This study involves group houses close to or in the nursing home.

Research by the Trimbos Institute (Depla & Boekhorst, 2007) showed that small-scale accommodations are positive for the wellbeing, independence and social involvement of residents with dementia. It also has positive effects on the informal carers and staff. For example, informal carers are content with the staff's personal attention, both with regard to the residents and to the informal carers themselves. The staffs are positive about the more intensive contact with residents and the greater responsibility that is experienced. The more intensive contact with residents requires a greater relation/person-oriented attitude than a

task-oriented attitude from the staff. The study of Depla & Boekhorst (2007) consists of several data collection methods: the observation of two accommodations, a traditional nursing home unit of 15 residents and a stand-alone group house in the community of 6 residents. A controlled trial, consisting of an experimental group of residents in stand-alone group houses in the community (n=67) and a control group of residents in large-scale nursing homes (n=97). Surveys among informal carers (n=164) and staff (n=200) of the residents from the experimental and control group. A limitation of the study is that group houses close to or in nursing homes were not evaluated. Research by Royers (2005) shows similar results. An important addition is that working in small-scale forms of accommodation requires from staff that they have knowledge of group dynamics and that improvements in this field are desirable. The study is based on a mix of qualitative and quantitative research methods. Focus groups among 12 informal carers and staff, a survey among family members (n=16) and the behaviour observations of residents in small-scale group accommodations (n=28) were compared to residents in a traditional nursing home unit (n=30). Despite the small number of participants, this study took place in group houses close to or in nursing homes which is comparable with the SSGA in this study.

2.2.3. Care technology

According to Martins & Del Sasso (2008, p.13), 'technology has three layers of significance. The first layer concerns physical objects, such as instruments, machines, material. The second concerns a form of knowledge, in which significance is conceived of an object through our knowledge of how to use it, repair it, protect it, and produce it. The third layer forms part of a complex set of human activities. It should be comprehended as a creation and as a phenomenon, for it transcends the simple definition of machinery. Technology reveals the way in which people deal with nature, and create the conditions for interaction, which we then use to relate to one another. New technologies, present in the moments of people's lives, alter the structure of their interests, or rather, the things about which they think. They alter the character of the symbols, or the things of which we think and alter one might as well say the nature of communities as the arenas in which thoughts are developed'. This view on technology is the starting point of this study, because of its wide scope and its social impact. Despite the odd combination of dementia and technology, this definition is

also suitable due to the fact that the residents' generation were not raised with the use of technology. Still, demarcating technology in the broadest sense of the term further to technology in care is desirable; however, the above view on technology should be taken into account. Technology is used in care in many ways. In conformity with De Witte (2007), three groups can be distinguished:

1.   technology that supports clients (night-and-day calender).

2.   technology that supports informal and formal carers (hoist).

3.   technology that supports the process (electronic patients' file).

Because the digital planning boards focus on supporting memory with regard to day structure in the first instance, it largely comes under technology that supports clients. However this to a certain extent also leads to support family and professional care providers in their activities, the term often is used is assistive technology. According to Eizmendi & Azkoitia (2007, p. v) assistive technology can be defined as 'as a scientific & technologic approach to the development of products and services oriented to support the elderly and people with disabilites in their daily activities, maximizing their personal autonomy, indepence, health and quality of life'. This definition embodies a holistic view on disability and also includes the physical, mental and social consequences of dementia. Figure 2 maps out housing situations schematically in relation to the various stages of dementia and the use of technology. To begin with, technology forms the centre, focusing on the support of people with dementia; for example, technology to support memory, ADL, etc. Technology that supports family and/or professional care providers becomes increasingly important in accordance with the pathological process; for example, monitoring and safety.

Figure 2 the housing continuum for persons with dementia (van Hoof, Kort & van Waarde, 2009).
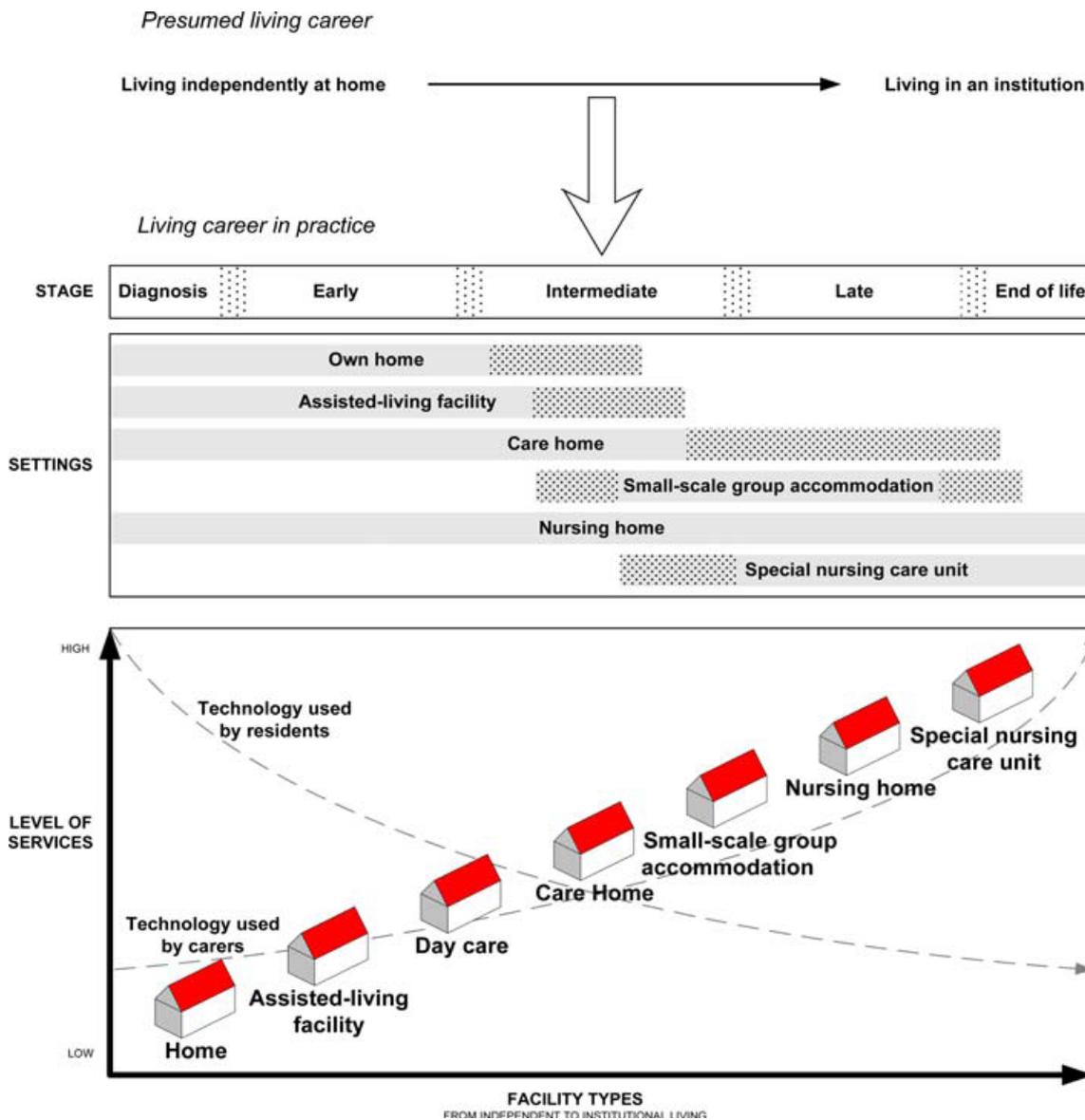
2.3.   Needs of people with dementia & application of technology

This section provides a comprehensive discussion of the literature about reality orientation therapy (ROT), the needs of people with dementia and the practice of technological applications for people with dementia, including electronic memory aids. The search involved dementia, ROT, cognitive rehabilitation, cognitive training, psychosocial interventions, nursing concepts for patients with dementia, subjective needs, needs assessment, unmet needs, residential care, care homes, patient perspectives, assistive technology, technology, electronic memory aids, prospective memory aids, electronic

calendar, electronic agenda, forgot-me-not calendar and remote day planner. The following data bases were consulted: springer link, pub med, science direct, Medline, Cochrane libary, picarta and Google scholar. Only studies involving people with dementia were included.

2.3.1. Reality orientation training

In view of the fact that the residents from the unit where the study takes place benefit from a fixed structure due to memory problems, but also due to problems keeping an overview and the planning of activities, the work on the unit takes place in conformity with the principles of reality orientation therapy (ROT). ROT was first described by Folsom in 1966 (Spector, Orrell, Davies & Woods, 2000). The objective of ROT is to re-orient people with dementia by constant stimulation and the repetitive supply of correct and realistic information about the environment (Metitieri, Zanetti, Geroldi, Frisoni, de Leo, Dello Buono, Bianchetti & Trabucchi, 2001), which hopefully results in an increased sense of self-control and self-respect (Spector et al, 2000). ROT can be offered both to groups (formal) and in a 24-hour context (informal). Formal ROT is characterised by a structured 30-minute meeting in a separate room. In informal ROT, the orientation in time, place and person is supported by a systematic approach by both professional and informal carers during 24 hours per day. Aids for the support of memory are used to support people with dementia in that, such as calenders, clocks, signposts, etc (Metitieri et al, 2001). There are various studies looking at the effectiveness of ROT (Metitieri et al, 2001; Spector, Thorgrimsen, Woods, Royan, Davies, Butterworth & Orrell, 2003; Onder, Zanetti, Giacobini, Frisoni, Bartorelli, Carbone, Lambertucci, Silveri & Bernabei, 2005). A non-randomised study (n=46 in the experimental group and n=28 in the control group) by Metitieri et al (2001), a RCT (n=97 in the experimental group, n=70 in the control group) by Spector et al (2003) and a RCT (n=70 in the experimental group, n=67 in the control group) by Onder et al (2003) indicate that ROT is effective for people with mild to medium dementia. The results are mainly related to an improvement in cognitive functioning, in which Spector et al (2003) also show an improvement in communication and the quality of life. In a systematic review to assess the evidence of effectiveness for the use of ROT (Spector et al, 2000), studies were also found that ROT even shows positive results in the cognitive functioning and behaviour of people with severe dementia. Six RCT's were included with a total of n=67 in the experimental

group and n=58 in the control group. Both studies by Metiteire et al (2001) and Onder et al (2005) involve people with Alzheimer's living in the home situation, while the review by Spector et al (2000; 2003) includes people with other types of dementia, residing at a nursing home. A limitation of the study of Metiteire et al (2001) and Spector et al (2000; 2003) is that only the formal ROT was evaluated, whereas Onder et al (2005) researched formal and informal ROT. It remains unclear, however, whether the effects in this study are related to formal or informal ROT. In a recent systematic review to evaluate the effectiveness and impact of cognitive training and cognitive rehabilition for early-stage Alzheimer's disease and vascular dementia (Clare & Woods, 2008), no positive, or negative effects are found. However, 8 RCT's were included, which did not involve pure ROT as an intervention but also other cognitive training interventions.

With regard to the present study, the digital planning boards serve as an aid to support informal ROT on the unit. The daily fixed structure in presented on the planning board in the living room under the photographs of all of the SSGA's residents, such as breakfast, lunch and dinner, etc. It also provides an overview of the specific personal activities, which are not private, such as cycling with the volunteer and housekeeping activities. The planning boards have a touch screen, by tapping on a resident's picture: the plan and activities of the resident concerned becomes more visible. The planning boards in the bedrooms display both private activities, such as taking a shower, a visit to the hospital and other specific personal activities. All planning boards are equipped with a digital clock and a display of the day and date. When it is time for a certain activity, this is supported by a sound in the living room, and the activity concerned also lights up.

2.3.2. The needs of people with dementia

Generalising the needs of people with dementia is difficult. Marshall (2009) justifiably remarks that we are all unique and become even more unique as we grow older and acquire life experience. Moreover, the disease manifests itself differently in everyone, this depends, among other things, on the type of dementia, personal factors and environmental factors. The progressive development of the disease is also responsible for constant changes in these needs. A large-scale research took place recently with regard to the needs of people

with dementia (n=236) and their informal carers (n=322) (Van der Roest, Meiland, Comijns, Derksen, Jansen, Van Hout, Jonker & Dröes, 2009). In this study, both people with dementia and their informal carers indicated a high priority to more (professional) memory support. This is confirmed by a literature review consisting of 34 mainly qualitative studies regarding the subjective needs of people with dementia (Van de Roest, Meiland, Maroccini, Comijs, Jonker & Dröes, 2007). The studies (Van Roest et al 2007; 2009) included all stages of dementia, although the majority of the participants were faced with mild to medium dementia. The study by Van Roest et al. (2009) included all types of dementia, whereas Alzheimer was mainly diagnosed in the literature review (Van Roest et al, 2007). The disadvantage of both studies is that – in addition to it being related to people with dementia remaining in the home situation – it is not very specific about the type and stages of dementia where more (professional) support is desirable with regard to memory. A study by Hancock, Woods, Challis & Orrell (2006) made an inventory of the needs of people with dementia (n=238), who were admitted into old people's and nursing homes. The most common unmet needs were for daytime activities, sensory problems (eyesight/hearing), psychological distress, memory problems and lack of company. All types and stages of dementia were included in this study. This study, too, gives little detailed information as to how and in what way memory support is exactly desired. Orrell, Hancock, Galboda Liyanage, Woods, Challis & Hoe (2008) also researched the needs of people with dementia in care homes and included the perspectives of residents (n=149), staff (n=238) and informal carers (n=81). Residents reported higher unmet needs for psychological distress, company and information, and high unmet needs for daytime activities and eyesight/hearing problems. Residents and informal carers had the lowest percentage of agreement of 63% compared to that of 77% between residents and staff pairs. A limitation of the study is that the low agreement between residents and informal carers' pairs may in part reflect the fact that only around one-third of the residents had informal carers that could be included in the study. However, it is important to bear in mind that reliance solely on assessment by staff or informal carers may lead to under recognition of unmet needs (Orrell et al, 2008).

2.3.3. The practice of technological applications for people with dementia

Recent reviews (Lauriks, Reinersmann, Van der Roest, Meiland, Davies, Moelaert, Mulvenna, Nugent & Droes 2007; Nijhof, van Gemert-Pijnen, Dohmen & Seydel, 2009; Barucha, Anand, Forlizzi, Dew, Reynolds, Stevens & Wactlar, 2009; Fleming & Sum, 2010) show that there are many developments in the field of technology to support people with dementia - both in intramural and extramural settings – in the problems they encounter. Where Barucha et al (2009) conclude that hardly any study was undertaken in 'real life settings' regarding people with dementia, however both Lauriks et al (2007) and Nijhof et al (2009) give an overview of different 'real life' studies, organised in accordance with the most common areas of needs, summarised from studies mentioned previously (Van Roest et al, 2007 & Hancock et al, 2006). These four needs and themes pertaining to them are organised in table 1. Fleming & Sum (2010) also provide an overview, but use a slightly different format.

Table I the needs of people with dementia

Needs	Specific themes
1. General and personal information	Diagnosis, prognosis, treatment, supply of care and help, legislation, financial arrangements.
2. Support for the symptoms of dementia	Support for ADL, support for cognitive, behaviour and mood disorders. Psychosocial support.
3. Social contact and company	Support for how to remain in contact with (social) environment and how to be useful.
4. Health monitoring and safety	Feeling that you are looked after and certainty about this when the disease gets worse.

In general, the studies included in the three reviews show (Lauriks et al, 2007; Nijhof et al, 2009; Fleming & Sum, 2010) that the application of technology helps to reduce the impairments of people with dementia (among others Gillard & Hagen, 2004), that it supports informal carers in the care for their next of kin, which made it possible for people with dementia to continue to live at home longer in some cases (among others Woolham, 2006). Furthermore, the results show that technological interventions reduce the feeling of isolation of both people with dementia and their informal carers, and is also responsible for reducing depression, concern and stress and increases the sense of independence (among others Ager & Aalykke, 2001; Beauchamp, Blair, Irvine, Seeley & Johnson, 2005). In Nijhof's review

(2009), studies were included regarding the application of home automation[1] in SSGA for people with dementia (Nouws, Sanders & Heuvelink, 2006; Lauriks, Oste, Hertogh & Droes, 2008). In both studies, the freedom of movement of people with dementia was increased by means of technology and there were fewer incidents of falling. Whether the deployment of technology results in a more efficiënt provision of care, cannot yet be determined adequately, it seems to depend greatly on the user-friendliness and maturity of a product or service. The reviews (Lauriks et al, 2007; Bharucha et al, 2009; Nijhof et al, 2009; Fleming & Sum, 2010) show that technological applications are still under development. The majority of the studies concerns small research populations, in which further development forms the centre. The results often show that a product or service is not yet ready for commercial use. Lauriks et al (2007) emphasise that more product development and research can be done that can support people with dementia and their informal carers with regard to need 1: personal information and need 2: support for the symptoms of dementia, such as behaviour problems and changes, memory problems, problems in ADL and leisure time. Orpwood, Gibbs, Adlam & Faulkener (2005) as well as Sixsmith et al (2007) emphasised earlier that the problems and wishes of people with dementia should not be discussed too unilaterally. To meet the needs of people with dementia it takes more than just stimulating and guaranteeing safety.

Various authors (Lauriks et al, 2007; Bharucha et al, 2009; Nijhof et al, 2009; Carrillo, Dishman & Plowman, 2009; Fleming & Sum, 2010) indicate that structural scientific research regarding technological applications for people with dementia are still very limited. RCT's in actual 'real-life settings' are necessary for stimulating further development and, subsequently, the market for a product on a large scale, so that technological innovations in the care for people with dementia can make a good start. These studies should not only focus on the effect, but also on the acceptance and adjustment of the product in a certain setting. At present, not all technological applications are compensated for by Insurance companies, whereas they often have a preventive effect and this means that costs can be

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[1] 'Home automation' stands for house-oriented high technological applications for the support of elderly people and other target groups of care to live independently longer. It concerns a coherent package of technology in a house, but also on the side of the care supplier involved (Van der Leeuw & Willems, 2007).

saved eventually. By proving the effectiveness of these applications, there is a good chance
that insurers will start compensating for the purchase of these new care and welfare
services. The issue is, however, to be able to prove the effectiveness of these products, the
so-called semi-finished products need further development, where an inventory has to be
made of the users' needs time and time again; the financial means for this often fall short
(Carrillo, Dishman & Plowman, 2009).

2.3.4. Electronic Memory Aids (EMA's)

Although Lauriks et al (2007) give a more detailed overview than Nijhof et al (2009) of the
studies regarding technological applications for the memory support of people with
dementia, the function of the technology and the results are only discussed in brief. It is due
to this that studies with comparable technological functions, such as the digital planning
board were requested and read. Additionally, the search looked into the databases
mentioned earlier on the basis of the search terms mentioned earlier with regard to memory
aids.

A European project, ENABLE, running from September 2001 up to and including June 2004
developed and tested a number of products that can support people with mild to medium
dementia with their memory, leisure time and communication. The tests were carried out in
Ireland, Great Britain, Finland, Lithuania and Norway. The results were presented in a cross-
national analysis report (Gilliard & Hagen, 2004). The results regarding the night and day
calendar are important for this study. The calender's objective is time orientation and the
prevention of walking about at night and calling regularly to informal carers at night. The
day and night calendar has a display, stating the day, date and time (morning, afternoon,
evening and night). The use of the day and night calendar was tested in the home situation
in all of the countries. Interviews were held three months later, both with people with
dementia (all types) and with their informal carers (n=38 paren/dyads), whereby a great
majority used the product and found it practical. The qualitative statements from both the
people with dementia and their informal carers' refer to the fact that it contributes to the
orientation, that it stimulates self-confidence and the independence of people with
dementia. These results are comparable to the results obtained from a previous study

(interviews, n=21) by Holthe & Bjorneby (1998), in which 15 participants used the calendar daily, both in an extramural and intramural setting. An article, in which only the results of a study in Ireland regarding the ENABLE project was presented, described that the presence of informal carers is desirable to draw the person with dementia's attention to the use of the products (Cahill, Begley, Faulkner, Hagen, 2007). For the day and night calendar, this was the case in 50% of the users (Cahill et al, 2007). The development of a remote day planner was also worked on in the ENABLE project (Hagen & Bjorneby, 2007). It is possible for informal carers to introduce appointments and activities into their own computer, which can subsequently be seen on the computer of people with dementia in their own homes via a website. The same as with the development of all products in the ENABLE project, (focus group) interviews with people with dementia and their informal carers took place first, to make an inventory of the needs and to attune the product development. Finally, the remote day planner was evaluated after four months of use by interviewing people with dementia (n=4). The findings were positive and the participants indicated that it supports them with remembering appointments and activities. A combination of a day and night calender with a remote day planner – almost comparable to the digital planning board with regard to the technical possibilities – was found in a case study (n=1) of Barach, Downs, Baldwin & Bruce (2004). The various functionalities were presented to the user on a computer screen in the bedroom and living room. The findings were positive, because a constant orientation in time was possible and thanks to an overview of the daily activities, the feelings of stress, confusion and anxiety decreased. The interest in the aid by the user was remarkable. A comparable product is being developed at this moment by another European project, the COGKNOW project (Davies, Nugent, Donnely, Hettinga, Meiland, Moelaert, Mulvenna, Bengsston, Craig & Dröes, 2007), which started in September 2006. Six European countries are working on the development of different technological applications integrated into one aid for people with mild dementia at home. The aid is to meet four unfulfilled needs of people with dementia: memory support, social contact, leisure time and increasing the sense of safety. The project is in the first phase of development. The requirements of people with dementia (n=17) and their informal carers (n=17) with regard to four unfulfilled needs were explored further by means of (focus group) interviews in three countries: Ireland, The

Netherlands and Sweden. With regard to memory, there was a need for: item locators, means to remember names of person based on pictures of faces and reminding functionality for common activities, for example, appointments and support for remembering day and time. This inventory together with other inventories of needs in the remaining 3 unfulfilled needs resulted in a computer with a touch screen, in which all desired functionalities were processed. Additionally, a mobile telephone with a touch screen was developed with the same functionalities, but which also offers the services outside of the home. A first prototype was tested with people with dementia and their informal carers in the home situation (n=16 pairs) in the above project in Ireland, The Netherlands and Sweden. The services that were offered via the aids for memory support were evaluated as positive. One comment was that memory support should be able to meet the personal requirements and needs to cover, for example, how certain activities are presented (Davies et al, 2007). The majority of the users evaluated the ease of use of the touch screen computer as positive. The mobile telephone screen was considered too small and therefore experienced as poorly readable. Other EMA's were tested in a study by Oriani, Moniz-Cook, Binetti, Zanieri, Frisoni, Geroldi, de Vreese & Zanetti (2003) and in a study by Wilson, Emslie, Quirk & Evans (2001). In Oriani et al (2003), the results of 5 people with mild to medium dementia (Alzheimer) were compared in 3 different situations. Verbal (i) and written (ii) reminders are given of the activities carried out at that moment without the EMA and a reminder is provided with the aid of an EMA (iii). The tasks were programmed with a time and date in a device that sounded an alarm at a certain time that the patient had to carry out a task. It was required that the patient pressed a central button at the moment when heard an alarm, subsequently, the device informed the patient verbally of the task. Compared to a verbal reminder or a reminder in writing without an EMA, the use of an EMA supports a patient's memory better, because visibly fewer mistakes were made and the tasks were carried out on time. The disadvantage of the EMA is that patients have to press a button, usually, people with dementia have problems remembering this (Oriani et al, 2003). Wilson et al (2001) evaluated the use of a paging system in an RCT crossover design (n=173); included were people with an acquired brain injury due to: an accident, CVA, MS, meningitis, Alzheimer, etc. The appointments and activities of all patients/residents were introduced in a computer,

including time and date and this was transferred to an individual pager when the appointment/activity had to take place, supported by an alarm. The pager can be clipped on to a waistband/belt or carried in a handbag/pocket. It was concluded that a pager supports the planning and execution of daily activities/appointments for people with mild cognitive impairments. One condition is, however, that good sight is necessary to be able to read the activities on the individual pager (Wilson et al, 2001). A disadvantage of the study is that only few people with dementia participated in this study and that the results were not differentiated in accordance with the different target groups.

In general, the studies show that EMA's for people with dementia are under development. It is positive that the needs of people with dementia are increasingly taken into account, because potential users and their informal carers are actively involved in the development. Although small research populations in uncontrolled studies are usually involved, the results show that the use of EMA's contributes to memory support for people with dementia, Some studies show that people with dementia are able to use simple aids (Davies et al, 2004; Barach et al, 2004), whereas other studies show that people with dementia constantly have to be reminded to use the product and how to use the product (Cahill et al, 2007; Orani et al, 2003).

2.4.   The development, implementation and adoption of technologies in care

This section provides a theoretical framework about the development, implementation and adoption of technologies in care. To connect optimally to the needs of users, a user-centred design is increasingly used in the development of technology nowadays. This design does not yet have a scientific foundation due to the young nature of technological developments in long-term care, but is based on positive experiences in previous development projects (Kinzie et al, 2002; Orpwood et al, 2005; Pagliari, 2007 & Davies et al, 2008). Subsequently, scientifically motivated implementation and adoption theories are considered: The diffusion of innovation by Rogers (1995) and the Technology Acceptance Model (TAM) 3 by Venkatesch & Bala (2008). The section is concluded with the ethical aspects in the context of dementia and technology and focuses in on the aspects relevant to this study. The search

included the terms: dementia, user-centred-design, user-involvement, user-driven-design, dementia, ethics, technology, acceptance, adoption, diffusion, innovation. The databases 'Science Direct' and 'Picarta' were consulted.

2.4.1. User-centred designs

All kinds of technologies have already been developed to support patients with dementia and their carers in their daily activities. Unfortunately, technology in the care for people with dementia is less common and often not used. Cordia & Mathijs (2008) relate the limited use of technology to financial obscurity, or the anxiety that technology is going to substitute support by humans. Care is nevertheless a human matter and cannot be replaced by a technical process (Haas- de Vries & Jochemsen, 2007). Another point worth mentioning is the odd combination of dementia and technology, as coping with technology suggests a certain level of mental functioning that a person may not be able to rely on anymore in case of suffering from dementia. Additionally, dealing with unfamiliar technology can cause confusion and anxiety (Orpwood et al, 2005). Various authors (Orpwood et al, 2005; Pagliari, 2007; Marshall, 2009; Nijhof et al, 2009) argue that the implementation of technology in care might be more successful if patients with dementia and their carers become more involved in the designing process of technology. Orpwood (2009) claims, that in the past the development of technology by designers often took place in an isolated way. Sixsmith et al (2007, p.1) discuss that the development of technologies should be user-driven: 'to ensure that devices and systems are grounded within a thorough understanding of the needs, preferences and desires of potential users'. User involvement in the design and development process is considered an inevitable method for creating useful innovations that meet the field's needs. The role of informal and formal carers is important for addressing the needs of demented people, who might be less capable of expressing them. User involvement should be started from the beginning and continued in an iterative process of analysis (gathering data), design, testing, implementation and evaluation (Kinzie et al, 2002). The challenge is to involve users constructively in the process by, for example, a meaningful elicitation of unarticulated needs or by bridging the gap between users and designers of technology for defining and evaluating conceptual ideas or prototypes. This approach to develop technologies is also called 'a user-centred design' (Kinzie et al, 2002).

Orpwood et al (2005) emphasise that – during the test phase – people with dementia should only be involved once a well-advanced prototype is developed. In case of problems, there is the risk that people with dementia become extra uncertain and this can influence the acceptance of technology in the future in a negative way (Orpwood et al, 2005). To solve this problem in this phase, informal carers should preferably be used to present the personal needs of people with dementia adequately. The figure below gives an impression of a methodology[2] for the development of technologies that were developed in a 'user-centred' way. This method is considered successful in previous development projects by Orpwood et al, (2005) and Orpwood (2009).

Figure 3 general design of methodology used for assistive technology (Orpwood et al, 2005).
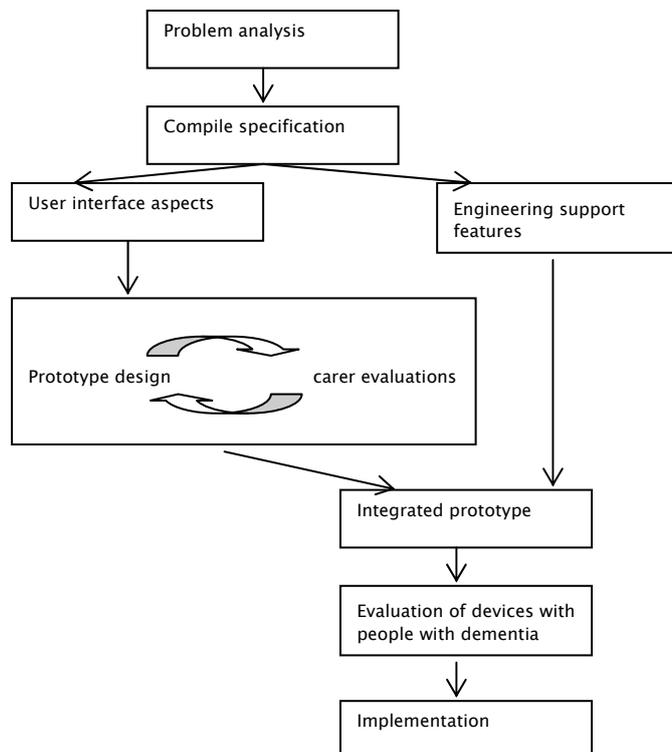
Based on interviews with people with dementia and their carers, an exploration of needs takes place concerning a joint search regarding possibilities where technology can offer a solution (problem analysis). Subsequently, the requirements that the technology has to meet can roughly be determined (compile specification). By user interface aspect, the aspects are

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[2] Other examples of user-centred designs can be found in Kinzie et al (2002), Pagliari (2007) & Davies et al (2008).

understood, which are related to how the product presents itself to the user, for example, with regard to the design, comfort and use. For people with dementia, it is important that the product is recognisable to them (Orpwood et al, 2005). An initial prototype is submitted to the informal carers and evaluations take place repeatedly to attune the prototype increasingly further to the wishes and needs of the users. Only when a well-advanced prototype exists, people with dementia are involved in the evaluation. The engineering support features are integrated in the final prototype (integrated prototype) and evaluated in 'real life situations' with people with dementia, after which the implementation can take place. What is understood by engineering support features is features related to how the apparatus functions technically (Orpwood et al, 2005).

Pagliari (2007) emphasises that interdisciplinary cooperation is necessary in the development and implementation of technology between designers of technology and researchers in health care. This will stimulate that methods of involving users optimally in the development are carefully followed on the one hand and these stimulate the quality of 'user-centred designs'. On the other hand, the effectiveness of the technology deployed can be mapped out in due course; this can stimulate the deployment of technology in care on a large scale. Pagliari (2007) considers it a challenge to be able to deal with the field of tension between the necessity for direct innovation and following the procedures required for doing research, which usually slows the development of technology down.

2.4.2. The implementation and adoption of technologies in care

Implementation can be described as an introduction of renewals and/or improvement (of proven value) in accordance with a process and plan, with the objective that these get a structural position in (professional) practice, in the functioning of (an) organisation(s) or in the structure of health care (Hulscher, 2000). Another comparable definition of implementation is: 'active and planned efforts to mainstream an innovation within an organisation' (Greenhalgh, Robert, Macfarlane, Bate & Kyriakidou, 2004, p. 582). Many terms exist for realising improvements in practice: innovation, implementation, dissemination, diffusion, adoption, the transfer of knowledge, education, quality improvement and care renewal. The diversity of terms reflects the different theories/views on implementation and

the policy regarding this subject (Grol & Wensing, 2006). In Rogers (1995, p. 11), the technological innovation forms the centre, which is implemented or adopted by means of diffusion. Rogers (1995, p. 10) defines: 'diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system'. In the first instance, a change takes place via social networks in the target group, whereby different target groups influence one another. Rogers (1995) distinguishes between innovators, early adopters, early majority[3], late majority[4] and laggards. The availability of genuine innovators in such a social network is essential for an effective implementation in the total group. This theory is based on a natural adoption (or rejection) of the innovation by the target group, which takes place in accordance with the Innovation-Decision Process 'This is the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to the implementation of the new idea, and to the confirmation of this descision' (Rogers, 1995, p 163). Rogers (1995) distinguishes five phases in the Innovation-Decision Process (see figure 4): *knowledge* (a person becomes informed of the innovation and gets an impression of how it functions), *persuasion* (a person forms either a positive or negative attitude towars the innovation), *decision* (a person tests the applicability which results in the adoption or rejection of the innovation), *implementatation* (a person applies the innovation) and *confirmation* (depending on the experiences, a re-consideration of the decision takes place to continue with it or to reject the innovation).

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[3] Thoughtful and careful people accepting change more quickly than the average (Rogers, 1995).
[4] Skeptic people will use new ideas or products only when the majority is using it (Rogers, 1995).

Figure 4 a model of stages in the Innovation-Decision Process
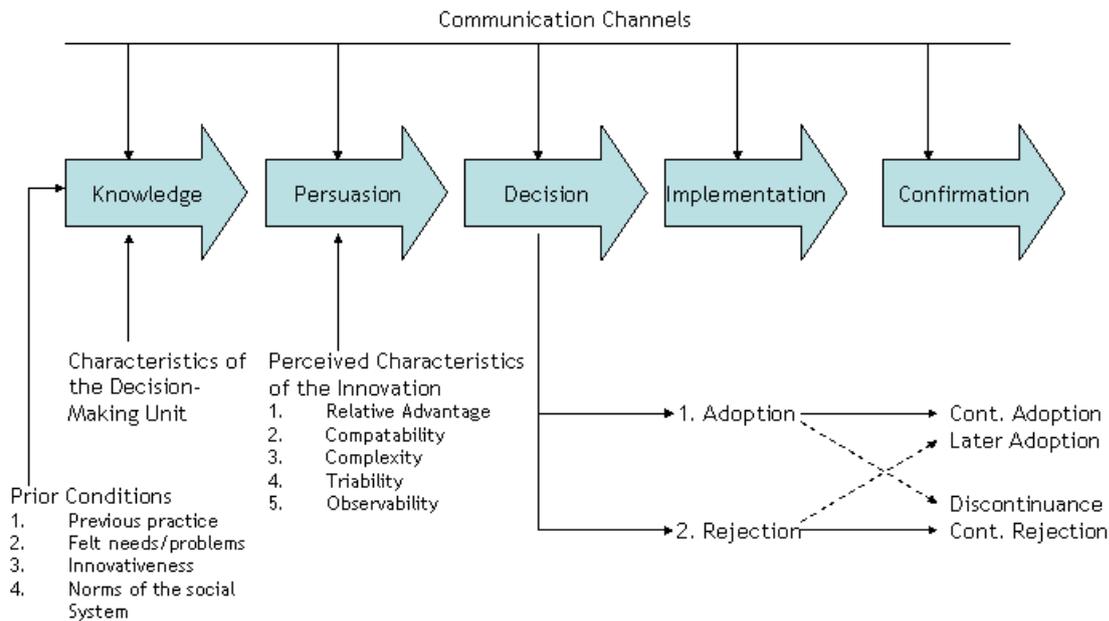
In the persuasion phase, the attitude is influenced by the following innovation characteristics (Rogers, 1995, pp 15-16):

- 'Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes.

- Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.

- Complexity is the degree to which an innovation is perceived as difficult to understand and use.

- Trialability is the degree to which an innovation may be experimented with on a limited basis.

- Observability is the degree to which the result of an innovation is visible to others'.

These innovation characteristics are more or less recognisable in TAM 3 (Venkatesh & Bala, 2008) whereby the use of technology depends on the terms perceived usefulness, defined 'as the extent to which a person believes that using information technologies (IT) will enhance his or her job performance' and perceived Ease of Use, defined 'as the degree to which a person believes that using IT will be free of effort (Venkatesh & Bala, 2008, p. 275). These terms both consist of a number of determinants (e.g. job relevance, output quality with regard to the first mentioned and computer anxiety, perceived enjoyment with regard to

the latter) which can be decisive for the implementation/adoption of a technological innovation.

2.4.3. Ethical aspects

People with dementia need extra protection, because – due to the consequences of the disease – they have difficulty estimating what risks they run and because they are less able to stand up for their rights. People with dementia can be regarded as vulnerable people, depending on their situation (Rauhala, 2009). Autonomy, beneficence, non-maleficence and justice are principles from medical ethics that can serve as a guideline to assess whether a technological innovation suits people with dementia (Beauchamp & Childress, 1994). It is possible that these principles are in conflict with one another. Weighing up the principles is important then and – depending on the situation – choices can be made which principle is prioritised and whether technology offers a solution or not (Rauhala, 1997). Marshall (2000) emphasises that in weighing whether the deployment of technology is ethical, it should also be considered whether the current interventions in the care for people with dementia are the best choice. Sometimes, the conclusion is that it is unethical not to deploy the technology. Although EMA's for people with dementia are still in development stage, it can be concluded from these studies that they want to meet the conditions of the four principles. This study is not about reconsidering the choice for the development of the digital planning board. It may be assumed that a well-considered choice was made together with the work field. However, the findings can provide information as to how these principles are guaranteed during the development project. In this study, the principle of autonomy, and more specifically, the subject of informed consent deserves extra attention, because it involves people with dementia. Informed consent consists of 3 components (Downs, 1997):

1.   Provision of sufficient information and consequences of the various options.

2.   The participation in a research project on an entirely voluntary basis.

3.   The competencies that the person possesses to reason and consider the options.

With regard to informed consent, the assessment whether a person is competent or incompetent is relevant. In the latter case, the person with dementia needs someone to represent his/her rights: a representative. Usually, informal representation is sought, for example from a partner, parent, child, brother or sister (Dute, 2000). The assessment

whether a person is incompetent should take place by the care provider in the first instance and, preferably, this assessment is based on consultations with various colleagues (Dute, 2000). However, guard has to be kept that incompetent people with dementia are labelled as such in all situations. Both Downs (1997) and Dute (2000) emphasise that incompetence depends on the moment in time and nature of the decision; simple or complex decisions. People with dementia can still have clear moments even at an advanced stage of dementia and absorb certain information. It is important in a study in which the participation of people with dementia is desired - regardless of the assessment of competent or incompetent – that people are informed about the study in details. The challenge is to find a connection with the dementing person's level of understanding, so that the informed consent can meet the components mentioned above as much as possible (Downs, 1997). How this study dealt with the subject of informed consent is described in chapter 3.

2.5. Summary literature review

Technological applications for people with dementia, including EMA's, are in full development. Although there are few small evaluative studies, a number of them show that the deployment of technology offers support to people with dementia and their carers in the problems that they encounter. The development of a digital planning board for memory support is in conformity with the Dutch Government's policy that desires to stimulate technological applications in SSGA's for people with dementia. It also meets the needs of people with dementia and their informal carers, who find more (professional) memory support benefical. Due to the different types of dementia and usually progressive development of the disease, but also due to the personal and environmental factors, generalising the needs of people with dementia is difficult. For an as optimal connection as possible, made-to measure technology is desired, whereby an inventory of the needs of people with dementia has to take place time and time again. User involvement or so-called user-centred designs is necessary for successful technological innovations for people with dementia. This study was therefore planned to find out whether an optimal user involvement was carried out during the development of the digital planning board, what consequences this has on the implementation and adoption of the digital planning board and which

learning experiences are relevant to the continuation of this project and its development in the future.

3.   Methodology

This chapter starts with the research question of the study and then provides detailed information about the research design. The choices were based on the nature of the research question and therefore taking into account the most suitable epistemology by reviewing briefly the positivist and the interpretative paradigm. Then the rationale for evaluative research within the interpretative paradigm and its consequences is discussed. The process of data collection and data analysis starts with a theoretical background for applied policy research. The quality of the methodology is discussed by describing the reliability and authenticity. The chapter is concluded by addressing the ethical issues with regard to the study.

The aim of the research is: *'to evaluate the implementation of the digital planning boards in practice and to improve the use of these devices from the users' perspective'*.
The users are: the residents, informal carers and staff. Two kinds of data are necessary, data about the process of developing and implementing the digital planning boards. This concerns an understanding of how unmet needs were identified/ solved and how the cooperation during the implementation was experienced. It also includes data about the use and effectiveness of these devices. An understanding of the impact of these devices is examined with a view to explore whether it provides memory support by structuring daily activities and results in potential benefits for the residents' behaviour and the planning of care. The above issues result in the following research question: *What are the users' experiences with the digital planning boards during the implementation?*

This study is the first phase of an overall evaluation. Currently, there are several reasons why carrying out a full impact evaluation is impossible. First of all, the development of the digital planning boards is new and has not been used before. Information is required about the experiences of using the digital planning boards and improvements need to be made to this development in practice by involving the users. Therefore, as the question indicates this study will focus on the implementation phase.

3.1. Reviewing the positivist's and interpretative paradigm

There are two main contrasting epistemological paradigms in scientific research; positivism and interpretivism. Within these paradigms, a number of different views and approaches are possible according to different resources and authors. According to Bryman (2008, p.13): 'Positivism is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond'. Objectivism, repeatability and accountability, are important characteristics of this approach using the experiment as the most common research method. Additionally, the principles of deductivism imply testing of theory and inductivism to provide material for the development of laws. Although the above description suggests that methods of the natural sciences are applicable in the social sciences, the evolution of science shows that transformation is not always appropriate, because it has limitations with regard to measuring social reality. In social science, people are the core business instead of objects and therefore isolating them from the context in which they operate and making them amenable for observation is not desirable. Nowadays the contrasting epistemology, interpretivism, is gaining ground. According to Bryman (2008, p. 16): 'Interpretivism is a term that usually denotes an alternative to the positivist orthodoxy that has held sway for decades. It is based on the view that a strategy is required that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action'. As mentioned above, this approach includes a diversity of opinions and contradictions, which lack clear boundaries. Some principles are identified in each flow. Depth, proximity and inductivism for building a theory are general features of interpretivism. Or, in other words, theory should fit the data in contrast with the positivist approach that data should fit the theory (Glaser & Strauss, 1967). It is important that concepts are developed that fit the field of examination by using open methods: 'sensitizing concepts' (Blumer, 1969). This implies that the user's point of view has to be included. The researcher must be able to put him/her in another person's shoes; this is also called role-taking (Wester & Peters, 2004). Furthermore, it is a task of rigorous empirical research to transform the 'sensitizing concepts' into 'definitive concepts' (Blumer, 1969). Wester & Peters (2004, p. 30), summarises the most important characteristics of qualitative research in table I below. In

practice, positivism is usually equated with quantitative research and interpretivism with qualitative research. Although qualitative research derived from interpretivism is not a clear comparison, because the terms differ in abstraction, and therefore it is better to speak of nomothetic versus idiographic, extensive versus intensive and causal-analytical versus interpreting (Hart, van Dijk, de Goede, Jansen & Teunissen, 1998). Objectivism versus constructivism is an important addition. The interpretative approach also has some weaknesses, for example, it is time consuming and the reliability can be challenging, because unlike the positivism approach, there is less control over actual behaviour events (Yin, 2009).

Table II the characteristics of qualitative research.

Characteristics	Explanation
Perspective of the actor	Role-taking, participation.
Research question	Is being developed on the basis of field concepts
Theory development	Inductive and based on 'sensitizing concepts'
Attention to the material	Triangulation, using multiple data collection methods
Phased approach	The change of research questions

As the digital planning boards are very new, there is no information with regard to users' experiences with these devices and their impact on their behaviour, therefore this pilot study is aimed at exploring the experiences of users with the digital planning boards prior to their full implementation. Furthermore, people using these devices are small in number; 8 residents, 8 informal carers (most important carers) and about 11 members of staff. This is why qualitative instead of quantitative methods of data collection were chosen to get an understanding of users' perspectives. The findings of this study will be used to help develop directions for further implementation also in other divisions of the care organisation and other nursing homes where dementia or other cognitive disorders exist. The project was developed on the basis of a 'user-centred design'. User involvement is crucial, as innovations are more useful if they meet the needs of users, not just those of professionals. Therefore, in order to stimulate and not limit the development of the digital planning boards, users' experiences are essential. Martins & Del Sasso (2008) argue that technology is

more than just the use of instruments. In their opinion, technology has three layers of significance. The third layer underlines how technology functions in the context of people; it should be seen as a creation and as a phenomenon. This emphasises even more the importance of assessing the experiences by using open methods and not measurable outcomes. Figure I give an outline of the process used in the study. In this study, the experiences of users in practice form the most important sources. Therefore, an inductive approach is suitable where the involvement of the users in practice is vital by role-taking, to grasp the context of the situation and the phenomenon. These are the main principles of the interpretative paradigm and it is very important that these are addressed in this qualitative evaluative research.

Figure 5 flowchart research process
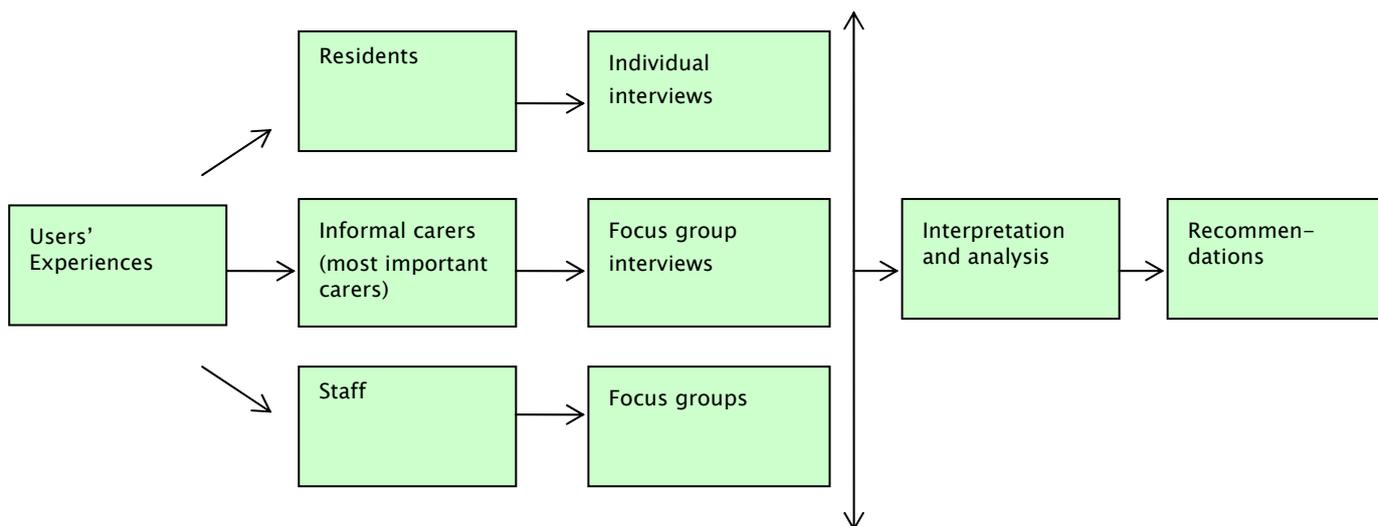
3.2.   Evaluative research

In recent years, health authorities are increasingly judged by the quality of care they provide. The increasing complexity of care, client-centred care and altered finance systems – including competition and budgeting – are some of the reasons why care must be clearly justified and transparent. Health authorities are more directly accountable for the care they provide and to achieve this, they have to meet high standards of quality care. Evaluative research is regarded as the most useful means of making the quality of care transparent and accountable (Patton, 2002; Robson, 2002). Robson continues with the argument that 'the

purpose of an evaluation is to assess the effects and effectiveness of something, typically some innovation, intervention, policy, practice or service' (Robson, 2002, p. 202). It is not a new or different research strategy, because within evaluative research, fixed (quantitative) or flexible (qualitative) designs are possible (Robson, 2002). However, it is the way that they are used that differs. A qualitative evaluative study is appropriate, because this study intends to assess users' experiences with the digital planning boards to achieve improvement. Additionally, Patton (2002) emphasises that the personal nature of qualitative research respects the participants by making their points of view the important source of data for the evaluation, so personalising and humanising the evaluation. Although the effects and effectiveness are explored, the innovation is too new to allow the evaluation of its impact at this stage. Robson's (2002, p. 208) description of a formative evaluation fits in well with this study as it 'is intended to help in the development of the programme, innovation or whatever is the focus of the evaluation'. Robson (2002) also underlines the importance of combining the process and outcome evaluations. Therefore, this is the first phase of an overall evaluation. In general, it is important that some challenging issues are addressed in evaluative research. Special attention is needed for suitability and appropriateness in evaluative research, because the findings can be regarded as sensitive. The researcher must be sensitive to the political dimension, which is inevitable in evaluative research (Robson, 2002). Communication and listening skills during data collection are very relevant, so that participants feel free to share their experiences. Good writing skills are needed so that important stakeholders can accept the evaluation in its totality. Negotiating skills are required with regard to making decisions about further development and with regard to presenting the final recommendations.

3.3. Process of data collection and data analysis

3.3.1. Theoretical background
The focus of the interpretative paradigm is to build a theory that fits the data. For developing a new theory, theoretical sampling, coding, theoretical saturation and constant comparison (Bryman, 2008) are important tools. The intention is that theoretical sampling is essential until a category has been saturated with data (Bryman, 2008). The researcher

returns to the research field with new questions arising from shortcomings to ground the theory. This study does not intend to establish a new theory regarding the experiences of the digital planning boards. First of all, the study is too small-scale; theoretical sampling and saturation are not the purpose. In other words, the researcher does not return to the research field with new questions. Secondly, the aim of the study is to improve the use of the devices from the users' perspective and to provide, in the context of the SSGA, directions for further implementation. Therefore, this study is an applied policy research. 'Applied research can be broadly distinguished from 'basic' or 'theoretical' research through its requirements of meeting specific information needs and its potential for actionable outcomes. The social policy field makes use of both applied and basic research, but a great deal is of the former kind' (Ritchie & Spencer, 1994, p. 173).

3.3.2. Data collection

3.3.2.1.   Data collection methods
In order to explore the experiences of the digital planning boards, qualitative method was chosen and data was collected through individual and focus group interviews. This method allows collecting a wealth of information about the total context of a situation in a short time scale and therefore allows sufficient views to be captured with regard to the use of the digital planning boards. Both methods of data collection; individual and focus group interview create opportunities for the users' optimal involvement in the further development of the digital planning boards. Although participant observation is a very common method in the interpretative paradigm, temporarily being part of the SSGA is not desirable. This is because the group of people with mild to moderate dementia have a great need for security and structure and the researcher's presence could cause restlessness and anxiety.

Focus group interviews
Focus group interviews among staff members and informal carers were appropriate for stimulating interaction and a joint discussion (Bryman, 2008) about the ways in which the digital planning boards need to be developed further. An underlying motivation for focus group interviews among staff members and informal carers is that it enables them to share

their experiences with each other and jointly consider the effectiveness of the implementation of the digital planning boards in practice. Krueger & Casey (2000, p. 12) support this approach by suggesting that 'focus groups are used to gain understanding of a topic so decision-makers can make more informed choices'. They have been helpful in 'finding out how customers make decisions about using or not using a product or service, testing new programmes and ideas, improving existing programmes and evaluating outcomes' (Krueger & Casey, 2000, p.19). Another advantage of focus group interviews are that they often produce data that are deeper and richer then other qualitative methods such as individual interviews because of their synergistic potentials, its group dynamics and social interactions (Denzin & Lincoln, 2005). Disadvantages of focus group interviews are that participants may not say what they really think and feel because they do not feel comfortable. However, the topics for the focus groups' discussion were relevant to participants; which means the subject under discussion was not emotive, but practical, and this hopefully encouraged the participants to share their thoughts and feelings about the subject. The complex role of the moderator[5]; asking questions, listening, keeping the conversation on track and providing equal opportunities for participants to engage in the discussion is challenging (Krueger & Casey, 2000). However, the researcher is an experienced teacher and has worked with groups in the past. Additionally, through critical reflection, she has developed her moderator and facilitation skills further. The focus group interviews was recorded, so that the moderator only focused on this role and did not get distracted by having to take important notes.

Individual interviews

Individual semi-structured interviews with the residents were chosen to get an impression of the personal experiences with the digital planning boards. Focus group interviews with the residents were not desirable due to the group's features. Too many factors can possibly affect the residents to provide a representative picture of reality. With regard to some residents, it is difficult to understand exactly what they are saying and with regard to others, group interviews would be too exhausting. Moreover, creating a confidential environment is

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[5] The moderator, the interviewer and the researcher are the same person.

important for patients with dementia, so they feel free to tell their story. This is one of the advantages but also challenges of individual interviewing (Denzin & Lincoln, 2005). For this reason, the individual interviews took place in the residents' own setting, that is, the setting where the SSGA is situated. Several visits had already taken place on the ward, so the participants were familiar with the interviewer. As the topics were not emotive, but practical, this hopefully inspired the participants to share their thoughts and feelings about the subject. The complex role of the moderator in focus groups interviews is comparable with the role of the interviewer. Patton (2002, p. 341) emphasise that 'the quality of the information obtained during an interview is largely dependent on the interviewer'. So the same actions took place to fulfil this role, such as being reflective and recording the individual interviews on tape. It is also worth mentioning that the researcher has experience as a nurse and worked with patients with dementia in the past. The choice for semi-structured and not open interviews was to create a possibility of collecting data related to the issues of the research question. The sequence of questions and answers in this method was flexible; however, the topics were predetermined (Bryman, 2008; Wester & Peters, 2004; Patton's, 2002).

3.3.2.2.   Sampling

The generalization of the findings is of great importance in quantitative research. Reliable generalisation depends on larger samples selected randomly. These samples also are called probability samples (Robson, 2002; Patton, 2002). While in qualitative research, the strength of sampling lays in selected information, depth and richness of data rather than in empirical generalisations (Patton, 2002). As this is a qualitative study, purposeful sampling is appropriate. Looking at the aim of this research, the users offer rich and in-depth-information about the experiences with the digital planning boards. According to Patton (2002), homogeneous samples of the users are required to describe some particular information in depth. The users are: the residents, the most important carers and the staff members, and they form three homogeneous subgroups in this study. Due to the character of the SSGA, the existing number of participants is not big; there are 8 residents, 8 most important carers and about 11 staff members. In order to gain maximum information, the total number of the population was used.

Focus group interviews

The ideal size of a focus group interview is usually from 6 to 8 participants (Krueger & Casey, 2000). For the focus group interview among informal carers, 8 most important carers were invited to participate. If the most important carer was unable or not willing to participate, this carer was asked to appoint another informal carer from the resident's social network who could replace this carer. Despite the fact that 5 most important carers and 1 informal carer gave their consent only 5 participated in the focus group interview.

In a staff meeting, during which the researcher explained the study, all staff members were invited and asked if they were willing to participate in the focus group interview. The plan was if more than 8 participants agreed, the group would be divided into two focus groups. However, in the end only 6 members of staff agreed and were able to participate in one focus group.

Individual interviews

All the residents were invited to participate in the interviews to gain maximum information, but it was recognised some residents would not be willing to or able to participate. Despite the fact that 8 residents gave their consent, only 7 individual interviews took place.

3.3.2.3.   *Data collection procedure*

The topics for both methods, individual and focus group interviews, were established by taking the interpretative paradigm and several issues related to the research question into account. With regard to the interpretative paradigm, topics must be formulated with open questions and the number of questions is limited to enable probing and to explore the key issues from the users' point of view. For this study, the process and short-term impact evaluation, data was needed from two areas:

- Development and implementation of the digital planning boards. This concerns an understanding of how unmet needs were identified/ solved and how the cooperation during the implementation was experienced.

- The use and effectiveness of these devices. An understanding of the impact of these devices is examined with a view to explore whether it provides memory support by

structuring daily activities and results in potential benefits for the residents'

behaviour and the planning of care.

The questions for the individual and focus group interviews were carefully thought out with a

sequence potential to stimulate a focused discussion (Krueger & Casey, 2000). This process

was informed by Patton's (2002) idea of an interview guide and ways of formulating

questions and topics (see appendix A and B). To follow the tenets of client-centred care and

to reinforce the importance of the residents' experiences, the data collection started with the

individual interviews, which were followed by the focus group interview among the most

important carers and finally by the focus group interview with the staff members. This also

meant that issues from the first group could be considered in later data collection.

Before starting data collection, all participants received information in writing as well as

verbally inviting them to be part of the study. It also contained further information about the

study and they were informed with regard to the official permission given by the Regional

Ethics Committee. See the section on ethical considerations and the appendices. All focus

group interviews were recorded on videotape and then transcribed. Video-taped focus

groups are a valuable dimension in the analysis of the data (Rabiee, 2004). These support

the capture of the total context of focus group interviews; the non-verbal communications,

interactions, indications of group dynamics, the general content of discussion and the

interviewer's role. Residents might not understand the implications of videotaping and to

avoid them from becoming anxious due to videotaping, the individual interviews were only

recorded on tape and then transcribed. During and after the individual and focus group

interviews a reflective diary was kept to reflect on the interviewer's role and to take short

notes. After the focus group interviews, it was agreed that transcripts would be sent to two

participants to check the transcripts' accuracy. After the analysis, all transcripts were

destroyed.

3.3.3. Data analysis

3.3.3.1.   Data analysis method
In applied policy research, the framework analysis by Ritchie & Spencer (1994) is suitable

and this was used to analyse the data. According to Ritchie & Spencer (1994, p. 177),

framework analysis is: 'an analytical process which involves a number of distinct though highly interconnected stages'. An advantage of the framework analysis is that it provides, based on the stages, a step-by-step guide that is easy to follow and easy to access. The stages ensure a transparent analysis so that policy-makers and practitioners can see that decisions and actions were based on the findings obtained from qualitative methods (Ritchie & Spencer, 1994). Another advantage of framework analysis is that it is a general approach that can be applied to a wide variety of qualitative methods (Ritchie & Spencer, 1994), in this case to analyse the data of the individual and focus group interviews. Despite the practical aspects, this also provided the possibility of learning during the process and this hopefully benefits the quality of the analysis. Finally, the framework analysis allows themes to develop from the research questions and topics guide as well as from the participants' narratives (Ritchie & Spencer, 1994).

3.3.3.2.   *Data analysis*
The five key stages from the framework analysis were applied as follows:

Familiarisation:

In this phase, the tapes of the interviews and the focus group meetings were listened to repeatedly and the videos watched. The notes that were taken during the interviews and focus group meetings were scrutinised and supplemented. Subsequently, the tape-recordings and videotapes were transcribed. Then the transcripts were read and corrected simultaneously listening to tapes or watching the videos. Surplus quotes, such as repetitions and irrelevant subjects to answering the research question were removed.

Identifying a thematic framework:

In this phase, categories and sub-categories were made of the notes and findings of the respondents based on the interview and focus group guide, which resulted in separate thematic frameworks of the three different target groups: the residents, informal carers and staff.

Indexing:

In this phase, all of the respondents' quotes were related to one or more categories or subcategories which corresponded with the thematic framework concerned. This was carried out by comparing the transcripts of the individual interviews as well as the focus groups interviews.

Charting

In this phase, the quotes were taken from the original context by actually placing them with one or more categories or subcategories of the thematic framework concerned. Some quotes were joined together due to repetitions. Colours were used to continue recognising the separate respondents.

Mapping and interpretation:

During this phase, the themes were identified by placing the categories and accompanying subcategories of a lower level of abstraction under a category of a higher level of abstraction. This resulted in the description of the findings based on the themes, which are different for all target groups to some extent. This stage involved making sense of individual quotes, but also describing the relationship between the quotes and the data as a whole.

3.4.   Trustworthiness and Authenticity

According to Lincoln and Guba (1985), in qualitative research trustworthiness and authenticity are more appropriate than validity and reliability. Some aspects of validity and reliability are comparable within the criteria for assessing trustworthiness; credibility, dependability, conformability and transferability. In this section, these four criteria and the criteria for authenticity are discussed.

Credibility:

Credibility is comparable to internal validity (Lincoln and Guba, 1985) and implies that the researcher can demonstrate to other people that the research was carried out in conformity with the canons of good research and that the researcher understood the social reality as it

requires asking confirmation from the participants in the study (Bryman, 2008). Member check, peer debriefing and triangulation are important techniques in this study to ensure its credibility (Lincoln and Guba, 1985). Member check among the participants took place during and after data collection. During data collection the interviewer restated and summarized information and then questioned the participants to determine accuracy. After data collection two participants of each focus group interview were asked to review the researcher's interpretation of the findings whether these concerned a correct representation of what was said. Due to the group's nature, member check among residents after the interviews was not possible or desirable. Therefore, the technique of peer debriefing with a fellow teacher focused on the correct interpretation of the findings from the individual and focus group interviews. In this study, a triangulation of data took place as more than one source of data and method for data collection were used to approach the social phenomena (Bryman, 2008). The formation of the topic list is another important aspect with regard to providing credibility. The topics were carefully chosen; they were derived from the issues related to the research question and aimed to assess the process and short-term impact evaluation. They were tested in advance by discussing them with the same fellow teacher and the supervisor. Next, a pilot interview was planned with one of the staff members working at the SSGA division. Finally, the credibility depends on the researcher's reflection skills. To stimulate 'role taking', it is important that the aspect is reflected on with regard to an optimal dialogical relationship that promotes communicative symmetry in individual interviews according to Maso & Smaling (1998) and that the moderator skills in focus groups interviews are reflected on according to Krueger & Casey (2000).

Dependability:

Dependability is comparable to reliability (Lincoln and Guba, 1985) and refers to the researcher's openness with regard to how decisions were made and that there is no ambiguity about the choices that were made. According to Lincoln & Guba in Bryman (2008, p.378): 'the researchers should adopt an 'auditing' approach'. According to Polit & Beck (2004, p.435) this is 'a systematic collection of materials and documentation that allows an independent auditor to come to conclusions about the data'. In this study, individual and

focus group interviews were taped and transcribed, so there was no loss of data during the data collection and so that the interviewer could adequately respond to the research situation instead of being disturbed by having to write things down. After each individual and focus group interview, a reflective dairy was kept and short notes were taken. A preliminary pilot interview took place; this contributed to both the dependability and credibility of the topic list. When it was tested, certain topics were not too open to interpretation, unrecognisable or not concrete enough. The pilot interview also made testing the interviewer's skills possible and raised the awareness of how the interviewer's role influences the dependability and credibility both in a negative and positive way. Finally, the individual and focus group interviews were typed and analysed based on the framework analysis by Ritchie & Spencer (1994). The five key stages of this approach provided an open and transparent analysis.

Conformability:

Conformability refers to the objectivity or neutrality of the data (Polit & Beck, 2004). The conformability of the study partly overlaps that described by dependability. The conformability of the research was further provided by the researcher's critical and reflective attitude.

Transferability:

The transferability is comparable to external validity (Lincoln and Guba, 1985) and refers to the utilisation value in other theoretical settings, or in other words, to what extent can the study findings be transferred? It is the researcher's responsibility to provide the report with profound descriptions, so that the reader is able to judge the findings as meaningful and applicable to their own setting. This is also called a thick description (Lincoln and Guba, 1985). Framework analysis is designed to provide thick and detailed descriptions and so facilitated transferability.

<u>Authenticity:</u>

According to Lincoln & Guba in Bryman (2008) fairness, ontological authenticity, educational authenticity, catalytic authenticity and tactical authenticity are criteria of authenticity. The authenticity was difficult to assess during or on the immediate completion of the study as most of the criteria depend on reflection on the project in time.

3.5.   Ethical principles

Before reflecting on relevant ethical principles, it is necessary to mention that in Netherlands the procedure for ethical approval is different, and this study was subject to the WMO review. Research governed by the Medical Research Involving Human Subjects Act (WMO) must be reviewed by an independent committee of experts. The study may not be conducted without this committee's positive judgement (http://www.ccmo-online.nl/main.asp?pid=14). Studies are subject to the WMO if they meet the following two criteria:

- it concerns medical/scientific research, and
- people are subjected to procedures or are required to follow rules of behaviour.
  (http://www.ccmo-online.nl/main.asp?pid=10&sid=30&ssid=51).

According to these criteria, there was uncertainty as to whether this study was subject to the WMO, but this Act also includes requirements for working with participants, who are incapacitated because of an illness in any way. That is why the Medical Research Ethics Committee (MREC) of the Medical Spectrum Twente (MST) and the Regional Ethics Committee (REC) were consulted; see appendix C. Their judgement was that the study is not subject to the WMO, see appendices D and E. However, the REC only emphasised that the ethical principles before, during and after the data-collection are taken into account. According to Diener and Crandall in Bryman (2008) four principles are important:

- No harming participants;
- Informed consent;
- Violation of privacy;
- Deception.

No harming participants

First of all, it is very important that extra consideration is given to this question due to the residents' vulnerability. Some actions to respect the residents were already set out in the data collection procedure. The data collection started with the individual interviews with the residents in their own setting; their views formed the starting point for further data collection. Something worth mentioning is that the individual interviews were only recorded on tape and not video-taped. Secondly, the methods chosen were acceptable, not only because of their relevant and applicable nature, but also because the researcher used these methods very carefully. The individual interviews pursued maximum dialogical relationship as well as communicative symmetry according to Maso & Smaling (1998). The moderator skills according to Krueger & Casey (2000) were followed in the focus group interviews. Although it is unpredictable whether the questions cause harm to the participants, this was not intended nor expected, due to its general and less emotive character. The issue of harm to participants is addressed in the ethical principles in further detail as well as whether there is a lack of informed consent and violation of privacy.

Informed consent

The participants recruited were informed in advance that they took part in the study; see appendices F, G and H. Prior to the individual and focus group interviews, information in writing was provided first with regard to the various issues of the study, see appendices I, J and K. The following issues were clarified:

- The aim of the study,

- The contents of the study,

- Voluntariness,

- Confidentiality,

- Informed consent,

- Information with regard to how the researcher could be contacted.

Important issues with regard to voluntariness include that: 'their participation is voluntary, they are free to refuse to answer any of the questions, they could withdraw from the individual and focus group interviews at any time and they could withdraw their data within

two weeks of the interview' (Bryman, 2008, p. 123). Verbal information was provided at several occasions. There was an information meeting with the informal carers and staff members at the start of the implementation of the digital planning boards. The purpose and research methods were briefly discussed during this meeting. After 3 months and just before the start of the data collection, the researcher explained the study during a staff meeting. In this meeting it was agreed that letters would be sent to the residents and that the SSGA would be visited for giving the residents extra individual information and an explanation. The most important carers were called 3 days after they received the information in writing. Subsequently, if the participants agreed that they had received sufficient information and that they still wanted to take part in the study, they were asked to give their official confirmation regarding this by signing an informed consent form (see appendices L and M). For the individual interviews with the residents, the most important carers were asked to give their permission and to fill out and sign this form. This was done to protect the residents as they are incapacitated in some way.

Finally, 7 residents gave their consent, both verbally and in writing, to participate in the study. One resident only gave his/her verbal consent. 7 of the residents' most important carers gave their consent for the individual interview both verbally and in writing. 1 most important carer only gave his/her verbal consent. For the focus group interviews, 5 most important carers and 1 informal carer signed the consent form and 6 members of staff gave their verbal consent.

Violation of privacy

This study contained no questions that could violate the participants' privacy. The questions that were asked were quite general in nature and were intended to outline the experiences with the digital planning boards. However, the researcher was unable to give a precise estimate to what extent the participants understood the questions in advance. Furthermore, the following actions were taken to prevent the violation of the participants' privacy:

- The anonymity of the participants in the interviews and focus groups was guaranteed. No information in the transcripts and final research report could violate the participants' privacy. No information can be traced back to any of the participants.

- The participants of the focus group interviews had the opportunity to read the transcripts with regard to privacy issues.

- Approval was asked with regard to the inclusion of quotes in the research report.

- After analysis, the transcripts were destroyed.

Deception

First of all, deception was avoided by giving 2 participants of each focus group interview the opportunity to review the researcher's interpretation of the findings. Because reviewing was neither possible nor desirable with the residents, a fellow teacher was asked to give feedback with regard to the interpretation of the findings from the interviews. The open methods and the different sources of data enabled the fairness in the study, as various points of view were included. Furthermore, the individual and focus group interviews were transcribed and carefully analysed on the basis of the framework analysis. Finally, a false representation was avoided through regular communication with the staff members of SSGA, a fellow teacher, the lecturer of the lectureship TiZ&W and supervisor with regard to the study's progress.

4.   Findings

This chapter starts with a description of the findings from the individual interviews with the residents. This is followed by the findings regarding the focus group interviews with the informal carers and staff. The framework analysis by Ritchie & Spencer was used to analyse the data and the following steps were applied:

-    Familiarisation.

-    Identifying a thematic framework.

-    Indexing.

-    Charting.

-    Mapping and interpretation.

The chapter is concluded by a summary of brief description of the similarities and differences between the three different sub-groups (users).

4.1.   The findings of the interviews with the residents

Interviews were held with seven residents in March 2010. One resident withdrew from the study due to her physical condition; this resident passed away later. The complexity of data collection and data analysis of the target group is worth mentioning. Although the moment of interviewing was carefully adjusted to the residents' physical and mental state, but due to their condition placing their answers in the right perspective remains difficult. The majority of the residents gave contradictory, unclear information and/or information that did not relate to the question during the interview at some points. This can mainly be explained by the different kinds of dementia, sometimes in combination with psychological problems, typical for the target group. It is beyond the scope of the study to describe the specific behaviour of the resident per interview as this compromise the residents' anonymity as well as their privacy. In general, the following behaviour was striking during the various interviews: a certain degree of forgetfulness, sometimes accompanied by confusion, a varying degree of insight into the disease, sometimes limited concentration due to fatigue or unrest, sometimes suspicion and/or disinterest. How the behaviour manifested itself differed per resident, as it was strongly related to the type of dementia, the underlying psychological

problems, the individual character traits and resident's state of mind at the time of the interview. It is therefore important that the residents' findings are viewed against this background. However, the findings of the focus group interviews with the informal carers and staff can be practical for confirming or accentuating the value of the findings from the interviews with the residents. The findings of the interviews with the residents are described on the basis of four themes; the meaning of the planning board, its use, other impacts and needs for further development. For the consistency with regard to the content, it is necessary that the residents' statements are made recognisable. After stating a quotation, the indication 'resident' (R) 1 through 7 is used.

4.1.1. The meaning of the digital planning board[6]

In this theme, the findings are first described with regard to their factual knowledge of the function of the planning board and, subsequently, what it meant to the residents. The following four categories can be distinguished:

1.   the function of the planning board is not clear to the resident

2.   the function of the planning board is not immediately clear to the resident, but it becomes clear later.

3.   the function of the planning board is clear to the resident and the experience is positive.

4.   the function of the planning board is clear to the resident and the experience is negative.

One resident belongs to the first category and indicated that he/she is not familiar with its function, because he/she has made little use of it.

'Well, I don't have much experience with it, so there is not a lot I can say about it. I can say something, but that is worthless. It won't be of any use to you'. R6.

Most residents belong to the second category. To begin with, it appeared that their factual knowledge did not correspond with the function of the planning board.

'You can call me later if something is up; at least, that is what I understood. Then I can answer myself. Isn't that about it'? R3

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[6] From this point onwards, the term planning board will be used instead of digital planning board

'Yes, I thought that conversations would be recorded'. R4

Although these residents gave unclear information about the function of the planning board at the start of the interview, it appeared later that its function became clear during the progress of the interview.

'I wanted to ask, this planning board, what is the point? So that everybody knows everything because it appears on the planning board in the living room. And when it appears on the planning board of the bedroom, then only you can see it'. R2

The same resident indicated a couple of minutes later:

'Well, what is happening that day. Or if something is up or things like that. Otherwise, you do not know if something is up. But if the planning board is on, I always check what is on it first. And, if it is something special, I read it. If it is not special, then, never mind. Then it's not my business. So, actually, I think it is a good idea that it is there'. R2

The third category consists of two residents, who are familiar with the function of the planning board and experienced this as a positive thing.

'Yes, it can say what I have to do at certain times. For example, when I have to eat again. If we eat around a quarter past twelve. And that I know that I can have another cigarette at half past two. And when I can have a cup of coffee. This makes things easy'. R1

'What activities there are that day?' R7

The fourth category consists of a resident, who is familiar with the function of the planning board, but his experiences with this device are negative.

'Well, what I think of it? It is not something I need. It is okay, but it is a dead thing. All my life, I was a man of nature, and nature is alive to me. The planning board does not mean anything to me. It is a nice invention; I think it is a nice thing that was invented in this way. This was impossible in the old days. The invention did not exist, but it does not mean a thing to me'. R5

4.1.2. Its use

This theme describes the findings related to the use of the planning board in the living room and in the bedroom. It also covers factors (categories and subcategories of the thematic framework) that encouraged or hindered the present use of these devices. These factors include: the advantages and disadvantages experienced with regard to the planning board, experiences with regard to the information and instruction provided on the function and the use of the planning board and the other existing systems used for memory support.

The use of the planning board coheres with the meaning that residents attribute to the planning board. The two residents, who were familiar with its function from the start and experienced the planning board as a positive thing, also use it.

'I am so happy that, when I am here in my room, it states the time and I know exactly what I can do. And when I'm in bed at night, lying on my side, I am happy because I can see what time it is'. R1

The three residents with regard to whom the function of the planning board in the first instance did not correspond with its factual function also indicated that they did not use it. Later on, it turned out that they did use it, one resident more than another.

'If it occurs to me and if I need something, I check the board'. R4

Although both planning boards are used, this seems to relate to where the residents spend most of their time. Three residents indicated that they spend little time in their own bedroom, so they use the planning board more in the living room. One resident uses the planning board more in her bedroom. However, it is remarkable that three residents said that they have difficulty reading the planning board in the bedroom, but also in the living room.

'The letters are too small, for they go criss-cross. The way it states my name, that is how big the letters should be, otherwise I cannot read what it says'. R6

The function with regard to which the planning board is used varied. Two residents use the planning board in the bedroom largely for looking up the time, whereas the planning board in the living room is used by four residents to gain a view of the activities that take place in a day.

One resident claimed that he/she uses the planning board in the living room to see if the fish are still swimming[7].

'Yes, I do check it for the times, because I am supposed to have something at nine and at ten o'clock, one thing after another'. R3

'Well, I like having it, because there are things that I do not know, and they are on it. Then you know it for that day'. R2

'It is just a routine, if you like. Something to check and to see, are the fish still there'. R3

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[7] The planning board in the living room showing the day structure automatically turns to a screensaver, showing an aquarium. By tapping the planning board, the day structure appears again.

4.1.2.1. The advantages and disadvantages experienced

Three residents indicated that they know what they should do thanks to the planning board. It provides information, structure and a realisation of time. Five residents considered it an advantage that the planning board functions as an extra memory support for activities, which are actually known, but that they sometimes did not realise that they are taking place and are therefore forgotten. Two residents indicated that they feel more certain when the planning board is on. Rest and ease are also mentioned by a few residents.

'Well, then I know everything. The time of something. That you know that. That you think: oh yes, this happens at this time or something else that time'. R2

'Then I remember'. R7

'I check the board. It gives me some correction for myself whether it is right or not'. R3

One resident indicated liking the fact that all the photographs of the residents are stated with their names on the planning board. This is extra memory support for her that she does not forget anyone of the eight people that she lives together with.

'Yes, that is pleasant. That line with eight pictures of us. All of the residents are on it. I know them all. I know all of their names and where they are. You might think, oh, I forgot, but I do not forget'. R2

Despite the fact that advantages are mentioned, the residents also pointed out many disadvantages. The most common disadvantage that residents experienced is that the technology does not always function. This is mentioned by three residents. One resident even mentioned that he/she becomes uncertain if the technology does not function.

'I am happy with it, but then it has to work, of course. And you have been here so often, and if it still does not work, I do not like it. It makes me a little insecure'. R1

The location of the planning board in the living room is experienced as a disadvantage by two residents. One resident indicated being unable to read it from that distance and the other resident indicated forgetting sometimes because the planning board is behind the resident[8]. It was described earlier that three residents have difficulty reading the planning board.

'But there are things that I think I would like to read, and if I cannot read them, then I'll walk up to it. I did that once, but not often; because residents X and Y are sitting there and then I cannot reach it'. R2

Two residents mentioned that they are unable to turn the planning board on themselves or

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[8] All residents have their own seat in the living room.

touch it. It is not clear whether this is experienced as a disadvantage. It is remarkable that two other residents indicated that the aquarium is boring.

'Here you see the fish, and they swim all day. Then it goes under again. It is the same every day'. R5

Three residents are annoyed that they are confronted with activities on the planning board that are no fun or are too much.

'I don't mind helping once or twice, but don't let them demand too much from me, because they demand an enormous amount from me here, you have to do an enormous lot here'. R1

Although the photographs of the residents on the planning board offer a handle for one resident, another resident indicated not liking the photographs on the planning board.

'Why do these pictures have to be on it, I don't like pictures'? R6

4.1.2.2. Experiences with regard to the information and instruction provided on the function and the use of the planning board

Two residents indicated having received sufficient information and instruction. These are the residents to whom the function of the planning board was clear from the start and experienced it as a positive addition. Two residents indicated not having received sufficient information about the function and use of the two planning boards.

'You were here once. There was a man with a small pair of spectacles, but he spent all day at it and did not say a word and then left. You cannot say that we were informed sufficiently. I don't know what the others have to say about it, but I think they say exactly the same.' R3

One resident assumed that this was done, but forgot.

4.1.2.3. Other existing systems that are used for the daily structure

It is striking that the residents use other existing systems that help them structure their day. Four residents indicated that they are not dependent on the planning board with regard to the daily structure, because the care providers draw their attention to the activities that take place.

'Nurse X drops by and says, hello, this time …. It is not an item that you cannot do without or that I would like to have'. R3

It is remarkable that six residents indicated that they can remember the fixed activities that take place every day themselves.

'I can remember everything, you know. I don't forget these things'. R1

'Then you know that the coffee is there and you automatically go downstairs'. R3

'But there are things that I think, that are today and that is today, but, you know that anyway'. R2

One resident indicated that he/she likes to just wait and see what happens during the day, whereas another likes activities to take place unexpectedly. Another resident indicated that there is little point in planning sometimes, because this strongly depends on the physical wellbeing. Three residents use different aids that help them with their day structure. These are an agenda, a medication alarm, a clock or the position of the sun.

'And I also like it that when I'm asleep he says you have to get up. We are going cycling. Oh, hell, you didn't know. No, I like it so much. Oh, we're going cycling this afternoon. I jump out of bed, great, fun. It is the unexpected that you don't know.' R5

'There are no rules for that. No, it is more or less when it is suitable. Sometimes it is, sometimes it isn't. Is it because of the disease. Sometimes it is really hard and sometimes not. R3

'When I've been to the hospital, and they say you have to return then and then, I get my agenda and write it down.' R2

4.1.3. Other impacts

This theme describes the effects not directly noticed by the residents, but which do occur. Indirectly, the planning board is responsible for exercise. It also ensures interaction with the nurses and interaction with the other residents. Although the latter is noticed by a few residents, the majority of the residents did not point out activities to the other residents neither did they ask each other what is on the planning board.

'When I get out of bed in the morning, I get my walker and check if it is on and what it says.' R2

'But then I just ask (my fellow-residents): is there anything on it?' R4

'Yes, sometimes. I think: what does it say? Or I ask a nurse: what does it say? And then they tell me.' R2

4.1.4. Needs for further development

In this theme, the residents' needs for future improvement of the planning board are indicated. Although initially most residents had no idea of what should be changed about the planning board, these needs are expressed as the interview progressed. These needs can be organised into the following categories: types of activities and how these should be displayed on the planning board and other desirable applications.

4.1.4.1. Types of activities and how these should be displayed on the planning board

These needs differ strongly per individual apart from two generic needs. Firstly, most residents liked the fact that private activities are displayed on the planning board in the bedroom.

'I do not need to have everything in the living room. They know when I have to take a shower. It is none of their business.' R1

Secondly, the majority of the residents thought it is desirable that the display of the activities is adjusted on the planning board both in the living room and in the bedrooms, because they have difficulty reading it. One resident prefers only written text, whereas another resident also likes to see a picture. The residents also differ with regard to which activities they can remember themselves and for which activities they need extra support. One resident liked having a complete overview of the day and also of the following days, whereas another resident benefited more from having an outline of the activities planned in the short term. One resident liked that both the fixed daily structure and the special personal activities could be seen on the planning board, whereas another could remember these him/herself and was more interested in only outlining the special personal activities. Although some residents also gave contradicting information on these points.

'But, if there is something special that you have to know, that they put this on the planning board is a good thing. Well, in fact, you know what is happening. But if it is something special, it is nice that it is on there.' R2

It is remarkable that one resident indicated that he/she would like to have a say with regard to the activities that take place in a day and that these should be displayed on the planning board.

'Well, they could discuss with you what things you already have to do. And that you can say that, I do not want, and that I do want to do. Then you have an overview. Then the things you do not want to do are gone.' R6

4.1.4.2. Desirable other applications

For one resident, it was important to do something about the monotony by making the planning board lively and natural.

'Well, a nice nature film, for example. Like you have on television. It is a dead thing, in my opinion. It does not mean a thing to me. Yes, a nice landscape, beautiful deer, for example.' R5

The residents also differed with regard to their wishes of having photographs, a kind of digital photo frame on the planning boards. One resident would have loved this, whereas another indicated that she uses existing photo frames for this.

4.2. The findings of the focus group interview with the informal carers

Five informal carers of the residents participated in the focus group interview. Four of them were also the most important carer of the resident. One most important carer was unable to participate, because of a traffic jam. It can be noticed that the informal carers sometimes gave experiences from their own perspective and sometimes from the resident's perspective. In some cases, this even involved a combination of both perspectives; a clear indication of which perspective is involved will be presented. The findings of the informal carers' interview will be described on the basis of three themes; the meaning of the planning board, its use and needs for further development. The statements from the informal carers are made recognisable by using the indication 'carer' (C) 1 through 5 after a quotation.

4.2.1. The meaning of the planning board

This theme describes the findings regarding the meaning of the planning board for the residents from the informal carers' perspective. It also discusses the meaning of the planning board for the informal carers themselves. All informal carers thought that the residents are not familiar with the function of the planning board. The following reasons were mentioned; the residents have too little experience with it, the planning board is often not switched on, the planning board is not used effectively, disinterest due to dementia and finally due to their age the residents did not grow up with the use of modern technologies.

'Modern stuff. My father did not like, so my mother does not like it either.' C2

'The residents' interest is very important, too, there is not a great deal of interest.' C1

'That thing should be on continuously. The hard thing is their age. I grew up with these things, so I love it.' C5

The informal carers were, however, positive with regard to the development of the planning board and the function for which it was developed. They mentioned that the effective use of the planning board should be encouraged.

'Well, I like the system. It will need to be motivated, but other things should also be put on that planning board.' C3

'I think it is great, the repetition. Fantastic! It is really good for resident X.' C5

4.2.2. Its use

This theme describes the findings related to the use of the planning board in the living room and in the bedroom. It also covers factors that encouraged or hindered the present use of these devices. These factors include: the advantages and disadvantages as well as experiences with regard to the information and instruction provided on the function and the use of the planning board. The findings are outlined both from the perspective of the informal carers themselves and from the perspective of the residents as highlighted by the informal carers.

The meaning of the planning board already gave some indication of how the informal carers themselves experienced the use of the planning board. All informal carers indicated that at present little use is made of the planning board in the living room by the residents.

'It is hardly used. The planning board in the living room is always on the aquarium. Sometimes it automatically turns over to the pictures of the residents and then it stops. That is all.' C3

'I agree that it is not used sufficiently. I'm not saying it is no good, but, the residents themselves cannot do anything with it' C1

According to the informal carers, the planning boards in the residents' bedrooms are not used by the residents at all. The reasons for this are: that the planning boards often are not turned on and that some residents spend very little time in their bedrooms. The planning boards in the living room and bedrooms are also not turned on or hardly used by the informal carers themselves.

'I tried it with her/him a few times, but it always says the same thing. It stops there. There is no direction from it, none at all.' C3

'I think they are all turned off in the bedrooms, too'. C2

4.2.2.1. The advantages and disadvantages experienced

Despite the fact that many disadvantages are mentioned by the informal carers, some advantages are mentioned, too, from which it appears that the residents do use planning board. One informal carer indicated that he/she considered it a positive matter that the activities on the planning board are repeated over and over, due to which he/she noticed

that the resident concerned started recognising certain things, giving him/her a certain structure.

'The positive thing is that things are repeated continuously. I notice that he/she recognises certain things. You see the time more often. The time for dinner, for example. Despite the fact that he/she did not grow up with computers, it is still a point of recognition to him/her.' C5

Another informal carer indicated that it stimulates the interaction between the residents.

'If there is a message on it for a certain resident and if someone sees resident X , then he/she says so to the resident: you are on the planning board. This happens'. C3

The most important disadvantages mentioned relate to the ease of use and the effectiveness for which the planning board is used. The ease of use is limited because the residents do not control the planning board themselves. After a while, the planning board in the living room on which the day planning is indicated, automatically turns to a screensaver, which shows an aquarium. By touching the planning board, the day planning is shown again. However, the informal carers indicated that most residents do not touch the planning board themselves, which is why the aquarium is displayed all the time. Not touching the board themselves has several reasons. Not all residents are able to walk up to the planning board due to a physical handicap. Possessing the skill to touch the planning board also seems to be a problem.

'Yes, but at certain moments the planning board turns off automatically and the residents cannot turn it on. So, none of the residents turns it on.' C3

'They wouldn't for the life of them know where to push. I have tried, but it just doesn't work. Can't get it done. I sometimes tell resident X. to give the computer a push.' C3

The effectiveness is related to the fact that most informal carers think that the planning board is not used effectively. For some residents, too little information and few activities are on it, which is why they are not motivated to use the planning board. This is also because some residents can remember certain, fixed daily activities themselves.

'I think it is such a pity that there is so little information on it. Resident X says sometimes, hey, the damned thing is on. If too little information is on it, some residents get really irritated. Ten o'clock coffee, half past two coffee and dinner at five and then the fish are back and resident X says: 'I know when it is coffee time or dinner time.' C4

4.2.2.2. Experiences with regard to the information and instruction provided on the function and the use of the planning board

All informal carers think they received insufficient information and instruction regarding the function and use of the planning board.

'I don't think, and various other don't think, that we had a picture of what it exactly means.' C3

'The only text was: there will be a digital planning board'. C5

Two informal carers also indicated that they had different expectations regarding the use of the planning board. That access to the Internet would increase the effectiveness of its use.

'Well, I expected that it would be connected to the Internet and that information from the world outside could be put on it. News paper articles or so'. C3

It was also expected that the planning board would be used more effectively for supporting specific activities, such as taking medication, or certain activities of housekeeping.

'For example, if you indicate via the planning board when resident X has to have his/her medication, you have a certain direction in it, a goal for which it is on the wall. Now it just hangs on the wall as an aquarium and nothing else is done with it.' C3

4.2.3. Needs for further development

This theme outlines the desires and needs that the informal carers indicated for the improvement of the planning board, which would increase its use in the future. The informal carers expressed many ideas about this during the focus group interview. These ideas can be organised into the following categories: types of activities and how these should be displayed on the planning board, the responsibilities of the staff with regard to the board's use and desirable other applications. The findings are outlined both from the perspective of the informal carers themselves and from the perspective of the residents by the informal carers.

4.2.3.1. Types of activities and how these should be displayed on the planning board

There are different opinions among the informal carers with regard to which activities should be displayed on the planning board. These differences are often related to the individual needs and nature of the memory problems. Not every resident benefits from a display of the fixed day structure, because some residents can remember the day structure themselves. To

stimulate these residents, only the special personal activities should be on the planning board. Furthermore, it seems desirable that not just the activities for the short term are displayed, but also the activities for the longer term for these residents.

'For example, they're playing shuffle board tomorrow evening; put that on the planning board. Then they have something to look forward to, but it is just coffee and dinner. And some are fairly clever, for resident X already knows what he/she has to do, and does not need it. So he/she does not check it.' C4

Another informal carer indicated that it is very important for some residents that the fixed day structure is displayed every time.

'For some, it becomes annoying if the planning board is turned on all the time, but for some it is very important. To see the regularity. Constantly seeing: o, yes, I'm going for coffee, dinner or a cigarette.' C3

It is also desirable that the effectiveness of the planning board is increased by especially displaying activities with regard to medication, housekeeping, and the times for smoking. All informal carers indicated that pictures, preferably supported by sound, should be used more and more prominently in the display of the activities.

'A cigarette, for example, for the cigarette breaks.' C2

'Would be fun combined with sound.' C5

4.2.3.2. The responsibilities of the staff with regard to the use of the planning board

All informal carers viewed it as a task for the staff to draw the residents' attention to the planning board, so that the residents are stimulated to use the planning board. Additionally, it is important that the members of staff encourage one another to use the planning board, so that everyone can work with it eventually. It is remarkable that some informal carers are worried that this will increase the staff's work pressure.

'I think that the residents need to be stimulated by the staff to use the planning board, otherwise it will never work. The rotten part is that when I am here, the nurses are very busy and have to work with that thing on top of everything else.' C4

4.2.3.3. Desirable other applications

The informal carers indicated that the ease of use needs to be improved. At present, it is difficult for the residents to control the planning board, which is why the same image is often seen (aquarium). It is important that the planning board is made more accessible for the residents. An idea is expressed that the planning board be equipped with a big red button to activate it.

'Nobody activates the planning board. It is a black screen or fish. A red button, let's check what we are doing today. A push on the button and it starts again'. C5

Additionally, increasing the potential use of the planning board is important. If the planning board was to be connected to the Internet, numerous possibilities would emerge to improve memory support. According to the informal carers, the recognisability of the image can be improved, something that has meaning to the residents, and which optimises the wellbeing of the residents. Internet makes displaying old and new photographs/images and news articles on the planning board possible. An Internet connection would also make displaying weather forecasts on the planning board possible. Various informal carers are also enthusiastic about contact at a distance via the planning board.

'My brother has agoraphobia, but he has a computer and a webcam. My mother would like to see him, but he does not come here and my mother cannot go there anymore. That would be really great'. C2

' I like that'. C1

Other ideas that are expressed by the informal carers are: playing a DVD on the planning board or working with an image in an image.

'Films were made of our trip to Germany last year, it would be ideal if these were displayed on the planning boards in the bedrooms of the residents.' C3

'What I might like, is an image in an image. A camera on the chicken coop, for example. So the chickens become visible on the planning board'. C5

4.3.　The findings of the focus group interview with the staff

The focus group interview took place during a team meeting of the staff. Six members of staff were present. Similar to the informal carers, the members of staff sometimes outlined experiences from their own perspective and sometimes from the residents' perspective. In some cases, this even involved a combination of both perspectives; a clear indication of which perspective is involved will be presented. The findings of the staff interview will be described on the basis of the following four themes; the meaning of the planning board, its use, the staff's learning experiences and needs for further development. The statements from the staff members are made recognisable by using the indication 'staff' (S) 1 through 6 after the statement of a quotation.

4.3.1.　The meaning of the planning board

This theme describes the findings regarding the meaning of the planning board for the residents from the staff's perspective as well as the meaning of the planning board for the staff themselves. The members of staff indicated that not all residents are aware of the meaning that the planning board can have to them. According to the staff, there is a variety of reasons for this. The planning board does not function as it should due to installation errors and when it is functioning; its use is not yet optimal. This implies, among other things, that its function is not clear to the residents, as it is insufficiently attuned to personal needs.

'Indeed, they do respond to it. However, there are at least two or three residents who ask us to turn the thing off in their bedrooms. I do not need television in my room. They do not see the added value of a screen on the wall.' S4

'Actually, I explained to a resident this week what it was for, but he/she did not want to be connected to a computer in the living room. S4

'I think that there should be something of their own in it first'. S2

Although the above statements may give suspicion of something else, a number of staff members pointed out that the residents find the presence of the planning board and what is presented on it fairly normal.

´Anyway. Also in their years. I was just thinking of the telephone. It is wireless now, and they just wander off with it. It is also quite normal for this generation. They also move along with technology.

Like the washing machine. One of the first machines for them. Then the computer came along at a certain time. Yes, it is all for the youngsters. But they just move along with it unnoticed. But how it develops or who introduces it? No, that is not interesting to them´. S1

Staff members also pointed out that it is important that the meaning that the planning board can have is explained to the residents over and over again and this does not occur sufficiently. This is partly related to the fact that some members of staff did not grow up with technology, which makes it difficult for them to become motivated for this, but it is also related to a lack of knowledge regarding the function and use of the planning board as well as frequently being faced with the challenges of installation errors.

'I also think that we have to explain the value of the screen very often'. S1

´Very little. The computer. I manage turning it on and starting it up and looking something up, but, Internet, no. I understand very little of the planning board, but maybe that should be explained very clearly some time'. S5

´Youngsters have the advantage that they already start with computers. Sometimes they start as early as at pre-school. I really do not have great deal of interest in it. I hardly use it at all, because it does not interest me ´. S5

'Yes, I don't get it. I feel the same about the electronic clients' file. I sat there for two hours. I do know certain things, but the next morning I feel my ears between my shoulders (cramped up). But I have the same at home with computers'. S3

It is important for all staff that the added value of the use of the planning board is seen and this is experienced in varying ways. Some members already see an added value now, others do not yet. This seems to cohere with the information whether the members of staff use the planning board or not.

4.3.2. Its use

This theme describes the findings related to the use of the planning board in the living room and in the bedrooms. It also covers factors that encouraged or hindered the present use of these devices. These factors include: the advantages and disadvantages of the planning board, experiences with the information and instruction provided about the function and use of the planning board, the expectations regarding the use and the pre-conditions. The findings are mainly outlined from the perspectives of the staff members themselves.

The meaning of the planning board already gave an indication with regard to the degree of the use of the planning board by staff. The members of staff who already have a positive view of an added value of the planning board actively used the planning boards in the living and bedrooms. Those who did not experience this added value as much, hardly used it or did not use it at all. In general, the planning board in the living room is used more by staff than the planning boards in the bedrooms. The most important reason for this is that residents spend little time in their bedrooms during the day and that there is hardly a difference with the activities on the planning board in the living or in the bedrooms. However, the use of the planning boards in the bedrooms is motivated by introducing more special personal activities on them.

'Yes, I tried to introduce some things for each resident, but I also noticed that they spend very little time in their rooms. You can put lots of personal things in it, but if you are not in your room, you won't see these things. For example, more exercise for the elderly and the men's social club are both in it, but I marked them as general. It is private, but not anything that others should not know. But because they are in the living room, for example, resident X and resident Y. At quarter past nine in the morning, they receive a message in their bedrooms: 9.30 end of breakfast. This is just to activate them that it is almost half past nine. We should hurry up'. S1

4.3.2.1. The advantages and disadvantages experienced

Most members of staff thought that showing activities on the planning boards in both the living room and bedrooms ensures reaction and interaction among the residents and between residents and staff.

'In my opinion, it is not perfect yet. But it already has an added value. I can safely say that. An added value, yes. This mainly concerns the moments, showing that there is an activity. Coffee time, dinner time. The tune that can be heard. You are often early or late. And then there is a resident, saying: Hello, the coffee, or dinner, should already be here. Or, we are already having coffee. Just the fact that something is happening up there. I consider that a positive thing'. S2

The most important disadvantages are related to installation errors. Too many errors still occur. The majority of the staff did not know what to do to solve errors. Another problem was that the planning boards in the bedrooms often do not function well; the time on the planning board does not always correspond with the actual time. Additionally, it is

experienced as a disadvantage that the planning board does not automatically indicate the day structure during an activity which is taking place. It was mentioned that someone has to activate the planning board first by tapping it otherwise the planning board remains constantly on the aquarium screensaver. It is also experienced as a disadvantage that they cannot consult an expert immediately in case of errors. They have to contact the university first and these communication lines are experienced as too long.

'I haven't experienced it functioning that often, honestly. The screen is often black or on the aquarium. And sometimes I hear a sound. But I haven't seen it in operation so often'. S4

'And there is no real expert that you can call in to check what is wrong. It takes an e-mail first, and then you have to contact X. These lines are too long'. S2

'Then you need to get that page up front. You hear the sound, but you will have to press it yourself first, so that the day structure appears again, in front of all of these people. I also think that all those photographs are unnecessary'. S2

Other disadvantages that were mentioned were related to the software programme: the lay-out of the planning boards and introducing activities in the computer in a programme developed for that. Regarding the lay-out; it is experienced as a disadvantage that too many activities are shown on the planning board, making it crowded. Moreover, they stated that text alone is insufficient if it is not supported by a recognisable picture of the activity. Also, the use and attractiveness of the photographs of the residents, which are always on the planning board, was debated. With regard to introducing activities, it is experienced as a disadvantage as it takes a great deal of time and that there is insufficient room for one's personal creativity.

'I announced last week that you and someone else would be coming. One of the residents had a visitor. I introduced that. But that is one line. Too small, it is not noticed. It does not arouse anyone's curiosity. In this case, I would like to be able to adjust the letter size, for example, for Mother's day'. S1

4.3.2.2. Experiences with regard to the information and instruction provided on the function
   and use of the planning board

The use is limited because the circulation of knowledge among the staff is insufficient at present. There are too few members of staff who really knew how the planning boards function, what they had to do in case of errors and how activities could be introduced.

Additionally, there appeared to be a lack of the transfer of knowledge, concerns about the lack of time, and increasing their colleagues' workload as well as uncertainty about the proper functioning of the devices. The members of staff indicated that their regular activities do not allow explaining the function of the planning board well to other colleagues. According to one member of staff, too little knowledge of the function of the planning board also influences the residents' use of the planning board.

'I think there is insufficient knowledge. If you have knowledge, you can also make people more enthusiastic and show the advantages. If I don't know anything about something, I feel that I should wait and see. An awaiting attitude is not wrong, but...'. S1

'It should be effective first, and then we can instruct others. You can tell someone how something works, but if another error occurs the next day, they give up. That's only logical'. S2

4.3.2.3. Expectations with regard to its use

The members of staff indicated that there were high expectations with regard to the function of the planning board. These were mainly fed by the long period of two years that the project took to start up, during which various groups of students participated. It was expected that the planning boards would function smoothly; this is not the case and resulted in decreased enthusiasm for its use.

'We had a project run-up of two years. First, they give you ideas. Then you start writing things down on paper. Then a group of students joins the team to check. So, you are made enthusiastic. Then there is a following group of students. I believe we've had four groups now. We visited the university once. Finally, the project moves to the background due to the long wait for the screen. Then this screen props up... You think, here it is, it is ready now. But, actually, it is not ready yet. Everyone thinks: I'll wait until it really starts'. S2

'I, for myself, like to write things down on paper, the things you want to do, in a timetable, and I like having it finished in six months. I cannot stand things that take a long time. My enthusiasm decreases'. S6

The visits by different groups of students to the unit were experienced as irritating; however the added value is appreciated.

4.2.3.4. Pre-conditions

The work pressure experienced does not really allow time for experimenting with the planning board. The members of staff indicated that their regular activities have priority, which is why a 'well-functioning' planning board has a low priority. This is also related to the fact that the planning board does not yet function the way it should.

'Before it finally functions. It's all plus this and plus that. You hardly have time to transfer information about the patients. Transferring information about the residents is important, and you do not feel like explaining the planning board on top of that.' S6

One member of staff indicated that he/she spent quite a lot of his/ her own free time on a 'well-functioning' planning board.

'Actually, I spend a great deal of time on it. In the first instance, during work hours, but also during my time off'. S1

4.3.3. The learning experiences

This theme gives an outline of the most important learning experiences of the staff, which they acquired during the development of and while working with the planning board. These experiences mainly apply to the members of staff that actively making use of the planning board. The learning experiences are related to the personal responsibilities regarding its use. It is crucial that staff encourage one other and the residents to use the planning board correctly. This can be fulfilled by sharing knowledge of the function of the planning board and how the planning board should be used. Adjusting the high expectations that arose during the course of time is important, by not adopting a wait-and-see attitude, but by taking an active role to get the planning board to function well.

'Actually, our expectations were too high. Here it comes, and everything is fine now. Turn it on and we never have to plan anything anymore, and this was never the case. It is a process of awareness, what do we need to do to get it to function properly. For it absolutely has an added value'. S2

On the other hand, the learning experiences are related to the process of awareness that the planning board was a new innovation and that experimenting the process was necessary in order to be able to explore the needs for further development.

'And, you know, they see a text. But they do not remember a text. They remember pictures better. But you learn this during the process. We were not aware of that before, this is gradually growing on us. I think the planning board has no disadvantages, we only need to get a great deal more out of it'. S2

4.3.4. The needs for further development

This theme outlines the needs that the staff indicated for the improvement of the planning board, which would increase its use in the future. The members of staff expressed many ideas with regard to this during the focus group interview, which can mainly be classified as types of activities and how these should be displayed on the planning board. A few ideas come under the category of desirable other applications. The findings are mainly outlined from the staff's own perspective.

4.3.4.1. Types of activities and how these should be displayed on the planning board

There was consensus amongst the members of staff about ideas regarding the display of the activities on the planning boards. It was indicated that the planning board in the living room should only show the fixed daily activities and the planning boards in the bedrooms show the (specific and private) personal activities for the residents. It was desirable for the planning board in the living room that the aquarium disappears as soon as it is time for an activity and that a picture showing the activity concerned appears.

'I would prefer it if it is time for coffee in the morning that the aquarium disappears and a cup of coffee appears'. S2

It was mentioned that pictures should also be used more on the planning boards in the bedrooms, preferably supported by sound. Adjusting these planning boards to the residents' personal needs was also highlighted and the suggestion was that this should not be just related to the display of activities.

'Would it be possible for the little screens to have sound or something spoken? Like a poem or so? That it would be in big letters or a poem? Again, I'm no computer person; I'm a-technical, but that a person reads the poem out loud?' S3

In order to stimulate the use of the planning boards in the bedrooms, it was regarded as useful that a range of all daily activities could be seen while the residents are getting up, because some residents spend little time in their bedrooms. The members of staff, who used the planning board actively, found that introducing activities in the computer should become more efficient and more user-friendly, because currently it is experienced as too labour-intensive. According to these members of staff, it would also be nice if they had more influence on the lay-out of the day structure on the planning boards.

'Mother's day. A nice screen filled with flowers, something creative like that. We have plenty of ideas, but we are unable to start working on them'. S2

Finally, it seemed valuable that the planning board contributes to the effectiveness of care in the future, because residents are offered a structure, both with regard to the fixed daily activities and the (special and private) personal activities. Also the activities of housekeeping that they have to do in their group should form part of this.

'I put in 'empty out the dishwasher' for resident X and that has to return every day. But now I did not hear it this afternoon. I think, because you say it should support us, too, that resident X will get some rhythm in this. Or that a resident gets some rhythm in the objectives that he/she should realise. Oh, yes, I have to empty the dishwasher then. I think, things will be added on to that in the future, so that there is a certain structure for the residents. And, of course, we see that. This gives us some relief and we do not have to be occupied with that. The directing is then in the resident's hands and and not so much with us'. S1

4.3.4.2. Desirable other applications

The members of staff indicated that they find a connection with the Internet valuable, so that the most important carers could plan appointments, and, subsequently, that these are displayed on the residents' planning boards in the bedrooms.

4.4.   Summary of the findings

The findings indicate a number of issues regarding the experience and use of digital planning boards in the living room and bedrooms. It highlights that installation errors, a lack of knowledge, limited user-friendliness and inefficiënt use are the factors effecting the optimal use and full implementation of the planning board. However, the findings also show – beit to a limited extent – that the digital planning board contributes to the support of the residents' memory. A number of ideas and needs are mentioned from three different perspectives that will stimulate the use of the planning board and which will help to support the residents' memory even better in the future. The needs from each group sometimes correspond but there are differences, too. These are often related to the residents' individual needs and these are related to the type of dementia, personal factors and environmental

factors. Finally, the findings provide information about the development process, how the involvement of the users was experienced in the process, the existing expectations and the cooperation with the university. In Summary, the findings on the basis of the three perspectives highlighted:

1.   the state of affairs regarding the implementation of the digital planning board,

2.   the needs for further development and,

3.   the learning experiences acquired during the development process.

These three themes form the centre of chapter 5, the discussion.

5.   Discussion

In this chapter, the themes emerged from the findings from three perspectives – residents, informal carers and staff – are discussed as follows:

1.   The state of affairs regarding the implementation of the digital planning board.

2.   The needs regarding further development.

3.   The learning experiences acquired during the development.

The chapter is followed by discussing the role of the Advanced Nurse Practitioner (ANP) and concluded by a summary of the discussion & implications for practice.

5.1.   *The state of affairs regarding the implementation of the digital planning board*

Rogers' theory (1995): 'diffusion of innovations' focuses on the implementation of technology in particular and offers a scientific foundation for this. That is why placing the findings regarding this theme in this theoretical context was opted for. Rogers (1995) claims that five innovation characteristics influence the pace at which innovations are accepted. These innovation characteristics are: relative advantage (i), compatiblilty (ii), trialability (iii), observablitity (iv) and less complexity (v). Looking at the implementation of the digital planning board with regard to above innovation characteristics is useful. It provides insight into the current state of affairs and gives a direction to the further development of the implementation.

Rogers (1995, p. 15) describes 'the relative advantage (i) as the degree in which an innovation is perceived as better than the idea it supersedes'. Important measures in this include experiencing an economic advantages, social status, ease and contentment. Relative advantage is also described by Brouwer et al (2008, p. 6) as 'the degree of appreciation for the fact that the innovation improves the existing practice'. It appears from the findings that the majority of the residents use the planning board, when it worked, although the degree of usage and the degree of support experience differs among the residents. Advantages that are indirectly mentioned include: confidence, peace of mind and convenience.

'Yes, it can say what I have to do at certain times. For example, when I have to eat again. If we eat around quarter past twelve. And that I know that I can have another cigarette at half past two. And when I can have a cup of coffee. This makes things easy'. R1

'Well, I like having it, because there are things that I do not know, and they are on it. Then you know it for that day'. R2

Some of the staff also indicates that they see an added value already, for example, that residents respond about activities that have to take place by communicating about these.

'In my opinion, it is not perfect yet. But it already has an added value. I can safely say that. An added value, yes. This mainly concerns the event, showing that there is an activity. Coffee time, dinner time. The tune that can be heard. You are often early or late. And then there is a resident, saying: Hello, the coffee, or dinner, should already be here. Or, we are already having coffee. Just the fact that something is happening up there. I consider that a positive thing'. S2

This is confirmed by some informal carers, who also mention the advantage that the planning board keeps repeating activities, which increases the recognisability of the activities that take place in a day.

'The positive thing is that things are repeated continuously. I notice that he/she recognises certain things. You see the time more often. The time for dinner, for example. Despite the fact that he/she did not grow up with computers, it is still a point of recognition to him/her.' C5

Similar results were found in studies, which were comparable with regard to technology of the digital planning board (Gilliard & Hagen, 2004; Barach et al, 2004; Hagen & Bjoneby, 2007; Cahill et al, 2007). Despite these advantages, the users also experience disadvantages, which influence the characteristic 'relative advantage', but also other innovation characteristics in a negative way. The disadvantages experienced most strongly from the three perspectives are installation errors that often occur, inefficient use and limited ease of use. One resident indicates feeling uncertain when the planning board is not functioning or is not working. As only a few members of staff know what they have to do to solve these installation errors, the planning board is not used by the majority of the staff when these errors occur. When the planning board is working, both informal carers and staff think it is not used efficiently. Residents indicate that there are other ways that help them with memory support, for example, that staff draws their attention to the activities that are taking place and the use of other aids, for example, a personal agenda or medication alarm.

'Nurse X drops by and says, hello, this time …. It is not an item that you cannot do without or that I would like to have'. R3

The efficiency can be improved by using the planning board more effectively, making it possible for other aids to be replaced by the planning board. The activities have to be presented to the residents in another way, by adjusting them better to the needs of each resident's individuality, for example, by introducing the times for medication and smoking, introducing activities of housekeeping, which are normally carried out by certain residents, etc.

'For example, if you indicate via the planning board when resident X has to have his/her medication, you have a certain direction in it, a goal for which it is on the wall. Now it just hangs on the wall as an aquarium and nothing else is done with it.' C3

Overviews like these are of benefit to both the residents' memory support and the effectiveness of care, because the residents' independence is stimulated by this. Orpwood (2009) states, that it is better to remind people with dementia than to take their memory from them.

Comparing the three perspectives it can be concluded that the planning board is not used in an efficient way. It has not yet been integrated in the care process, which is why it is experienced as 'extra'. Rogers (1995, p. 15) also uses the term compatiblity (ii) 'as the degree in which an innovation is perceived as being consistent with the existing values, past experiences and needs for potential adopters'. Nijhof et al (2009) also confirm that technology is deployed too often in an inefficient and unfounded way. In general, there is no view on the effects of technology with regard to either; the quality of life of people with dementia and staff job satisfaction (Nijhof et al, 2009). In addition to the above, it is concluded in a report by the inspection of health care (2009) and in a study by De Haas-De Vries & Jochemsen (2007) that there has to be attention in the view on care for technology and its role in the care process for a successful implementation. In a parliamentary paper (TK, 2008, 2009) of Public Health, Welfare and Sport the Minister of State emphasised that technology has to become an integral part instead of an 'extra' to the existing organisation as it is experienced now, which is why the implementation of good applications fail to materialise.

The planning board's ease of use is experienced as too complex by informal carers and staff. Rogers (1995, p. 16) defines complexity (iii) as 'the degree in which an innovation is perceived as difficult to understand and use'. The members of staff who actively use the planning board indicate that introducing the activities takes too much time and that there is no room for personal creativity. However, the ease of use is strongly influenced by the installation errors and problems mentioned above and problems that occur in the control of the planning board. The planning board stays on the aquarium as a screen saver if it is not touched. Apart from the fact that it is desirable that the planning board is activated automatically as soon as it is time for an activity, the residents, informal carers and staff indicate that the planning board is not frequently touched/operated by the residents, which was the intention originally. For some residents, this is not possible due to physical impairments and another solution will have to be considered. This also applies to other residents who may need more support and instruction with regard to the use of touch screen or operating the device before concluding that a touch screen is not feasible for this target group. Research by Davies et al (2007) shows, that people with mild dementia are capable of operating a touch screen. Although Oriani et al (2003) and Cahill et al (2007) comment that continuing to remind people with dementia of the use of devices and how it is used is necessary. This is also important in the context of ROT (Metitieri et al, 2001). A study by Kessels, Feijen & Postma (2005) shows that in people with dementia of the Alzheimer type, the explicit (conscious) memory is disturbed more than the implicit (subconscious) memory. In a rough translation, this means that a patient with dementia of the Alzheimer type can not remember who came to visit anymore, but is able to play a game of cards and apply the accompanying rules correctly or learn a new route on the nursing ward.

When the three perspectives are compared it can be concluded that the residents only received a limited amount of information and instructions regarding the function and use of the planning board. Only a few members of staff – called 'early adopters' by Rogers (1995) are well-informed of the function and use of the planning board. Despite the fact that the residents have been diagnosed as having dementia, this can also be a reason why some residents are not adequately familiar with the planning board's function and use, which can

influence their experience of planning board and its significance. The members of staff indicate that the circulation of knowledge among colleagues is limited due to a lack of time, the work pressure experienced and not be able to explain the use adequately to one another. Additionaly, the 'early adopters' think that the planning board should function better first.

'I think there is insufficient knowledge. If you have knowledge, you can also make people more enthusiastic and show the advantages. If I don't know anything about something, I feel that I should wait and see. An awaiting attitude is not wrong, but...'. S1

'It should be effective first, and then we can instruct others. You can tell someone how something works, but if another error occurs the next day, they give up. That's only logical'. S2

Comparing the three perspectives it can be concluded that the possibilities of trying out – also called trialability (iv) by Rogers (1995, p. 16) and defined as 'the degree in which an innovation may be experimented with on a limited basis' were limited to the 'early adopters' and that the use of the digital planning board was hardly experimented by all of the members of staff. Finally, the observability (v): 'the degree in which the results of an innovation are visible to others' (Rogers, 1995, p. 16) failed, because the positive experiences are eclipsed by installation errors, limited ease of use, etc. Some of these innovation characteristics can also be found in the Assistive Technology (AT) acceptance model by McCreadie & Tinker (2005) and the Technology Acceptance Model 3 (TAM3) by Venkatesh & Bala (2008). McCreadie & Tinker (2005, p. 100) state that 'the acceptability of AT depends on the interactions between a 'felt need' for assistance, the recognition of 'product quality'– the efficiency, reliability, simplicity and safety of the technology or device, and its availability and cost'. In TAM 3, the terms 'perceived usefulness' and 'perceived ease of use' play an important role in the acceptance of a technological innovation (Venkatesh & Bala, 2008). The determinant 'computer anxiety' of the term 'perceived ease of use' particularly is supplementary to the innovation characteristics mentioned/used above. 'Computer anxiety' is defined as: 'the degree of an individual's apprehension, or even fear, when she/he is faced with the possibility of using computers' (Venkatesh & Bala, 2008, p. 279). It appears from the findings that computer anxiety is also present in the minds of some residents and members of staff.

'Yes, I thought that conversations would be recorded'. R4

'Yes, I don't get it. I feel the same about the electronic clients' file. I sat there for two hours. I do know

certain things, but the next morning I feel my ears between my shoulders (cramped up). But I have the

same at home with computers'. S3

Computer anxiety possibly decreases if the users are informed and instructed adequately, the planning board's ease of use improves and it is experienced that the use of the planning board has an added value.

Finally, it can be concluded that the implementation of the digital planning board – which takes place in accordance with the Innovation-Decision Process according to Rogers (1995) – stagnates in the first phases, knowledge and persuasion[9]. Research among nurses shows that especially the innovation characteristic of 'relative advantage' and, more specifically, an improvement in quality for the patient, has the greatest influence in the implementation or acceptance of technology (Brouwer et al, 2008; De Veer & Francke, 2009). Nevertheless, all of the innovation characteristics need to be developed further to influence the users' attitude towards the planning board in a positive way. In this study, various needs and ideas were introduced from three perspectives that can contribute to this.

5.2.   The needs for further development

The findings from the three perspectives show specified needs for improving the use of the planning board; such as adjusting more to the residents' personal needs with regard to the types of activities and how these should be displayed. However, the needs here differ from the perspectives of the residents themselves and the informal carers; this is often related to the severity of the memory problems (type of dementia). Some residents need a display of the activities in the short term (one day), whereas other residents indicate needing a display of the activities in the longer term (several days).

'For example, they're playing shuffle board tomorrow evening; put that on the planning board. Then

they have something to look forward to, but it is just coffee and dinner. And some are fairly clever, for

resident X already knows what he/she has to do, and does not need it. So he/she does not check it.' C4

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[9] 'This is the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude towards the innovation (persuasion), to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision' (Rogers, 1995, p 163).

The same applies to the display of fixed activities that take place every day and the specific person-oriented activities versus the sole display of the specific person-oriented activities, because the residents can remember the fixed activities that take place daily themselves.

But, if there is something special that you have to know, that they put this on the planning board is a good thing. Well, in fact, you know what is happening. But if it is something special, it is nice that it is on there.' R2

It is important that it is evaluated thoroughly whether the residents can really remember the fixed daily activities themselves. De Boer et al (De Boer, Hertogh, Dröes, Ribhagen, Jonker & Eefsting, 2007) in a literature review, 'suffering from dementia- the patient's perspective' argue that people with dementia, can deny symptoms of dementia, because they do not accept their disease. The majority of the residents in this study indicated that they can remember the fixed daily activities themselves. In addition to the fact that some residents can indeed remember these themselves, it can also be related to limited insight into the disease, which characterises the residents of this SSGA. In contrast with the residents and informal carers, the members of staff point out the needs much more from the perspective of the residents as a group. For example, that the fixed daily activities should be presented per day on the planning board in the living room and that the more special, person-oriented activities should be presented on the planning boards in the residents' bedrooms. It is important that the display of these special person-oriented activities is attuned to the residents' personal needs.

'Would it be possible for the little screens to have sound or something spoken? Like a poem or so? That it would be in big letters or a poem? Again, I'm no computer person; I'm a-technical, but that a person reads the poem out loud?' S3

Residents and staff agree that the private activities should be respected and that these should only be displayed on the planning boards in the bedrooms. It is necessary for the further development of the planning board that the types of activities are divided into: fixed daily activities, special person-oriented activities, private activities and group activities and that these are re-defined. This promotes both the uniformity among the residents, informal carers and staff as well as the planning board's ease of use. Additional needs, which are only mentioned from the residents' perspective are: the display of the activities only in text

versus in text and image, making the planning board more natural, having a say in the activities that take place every day and that the location and legibility of the planning board is improved. Various studies (Hancock et al, 2006; Orell et al, 2008) show that the problems with vision are often underestimated in people with dementia. Residents, informal carers and staff indicated that – apart from a few residents – the residents spend most of their time in the living room. This can influence which activities are displayed where. The informal carers and staff agree that the display of the activities has to be supported better with bigger and recognisable images/photographs.

'I would prefer it if it is time for coffee in the morning that the aquarium disappears and a cup of coffee appears'. S2

It was described earlier that both informal carers and staff think that the planning board should be used more efficiently and that the activities should be displayed more effectively. The members of staff would also like to see that the aquarium as a screen saver disappears from the planning board in the living room as soon as it is time for a certain activity and that introducing the activities becomes more user-friendly with regard to the effort in time and room for personal creativity.

'I announced last week that you and someone else would be coming. One of the residents had a visitor. I introduced that. But that is one line. Too small, it is not noticed. It does not arouse anyone's curiosity. In this case, I would like to be able to adjust the letter size, for example, for Mother's day'. S1

The informal carers introduced plenty of ideas about all sorts of desirable other applications that should be added to the planning board; the residents and staff were a little more modest. Some residents would like it if the planning boards in the bedrooms were also used for displaying photographs of their children and grandchildren; another resident indicated that there are photo frames for this. The staff would like it if a connection with the Internet were attained, because this would enable the informal carers to introduce personal appointments/activities for the residents by means of an account. The informal carers indicate that an Internet connection would make displaying pictures and images from now and from the old days possible on the planning board, for example, about their place of residence. Actual information can also be retrieved and displayed, for example, the weather forecasts for that day. It was mentioned earlier that the operation of the planning board can

be improved. According to the informal carers, this would be possible by activating the

planning board by means of a big red button in a central location in the living room.

'Nobody activates the planning board. It is a black screen or fish. A red button, let's check what we are

doing today. A push on the button and it starts again'. C5

Other applications mentioned by the informal carers include: contact with family members

via a webcam, playing a DVD on the planning board and making an image in an image

possible. An example that is mentioned with regard to this is that by placing a camera in the

SSGA's chicken coop, the chickens become visible on the digital planning board. This – in its

turn – connects to the residents' wish to make the planning board more natural. It is not

clear why the staff mentioned so few other desirable applications. This could be related to

the fact that the staff lost their faith in a well-functioning planning board and have a more

hesitant attitude due to this. What applies to the residents is that it is hard for them to

imagine this or, as Van der Roest et al (2007) argues, that they ventilate their wishes less

spontaneously. For this reason, it is desirable that extra attention is paid to this by

introducing specific examples.

The findings show that the needs between residents and their carers (informal carers and

staff) can differ. The fact that there is no correlation between these different groups is also

shown in various other studies (Dröes, Boelens, Van der Knoop, Bos, Meihuizen, Ettema,

Gerritsen, Hoogeveen, De Lange & Schölzel-Dorenbos, 2006; Orell et al, 2008; Roest et al,

2009). These studies show that responding to the needs of people with dementia outlined

solely from the perspectives of the informal carers and staffs is not sensible. It appears from

the findings of this study as well as of other studies that people with dementia are capable

of participating in research and making their needs clear (Dröes et al 2006; Hancock et al,

2006; De Boer et al 2007; Roest et al 2007; Orell et al, 2008 & Roest et al, 2009). Studies

regarding the development of technology (Orpwood et al, 2005; Davies et al, 2007;

Orpwood, 2009) also show that people with dementia are well capable of stating their needs.

De Boer et al (2007, p. 1035) state that: 'people with dementia often find participation in

research a positive experience in the sense of positive feelings arising as a result of being

heard or being useful strengtens the opinion that they should be involved'. Furthermore,

they mention that in case of mild dementia, more awareness is involved than in medium to severe dementia and that people with mild dementia are therefore the most representative for the future needs and wishes of people with dementia (Boer et al, 2007). This study also higlights that some residents actually liked being able to make a contribution and that their input mattered. One resident walked into the living room straight up immediately after the interview; normally, this resident walks with hunched shoulders.

It is remarkable that the findings from this study also show that some residents like having a say in the daily activities.

'Well, they could discuss with you what things you already have to do. And that you can say that, I do not want, and that I do want to do. Then you have an overview. Then the things you do not want to do are gone.' R6

'I don't mind helping once or twice, but don't let them demand too much from me, because they demand an enormous amount from me here, you have to do an enormous lot here'. R1

Working with a digital planning board offers staff the possibility of attuning the activities more accurately to the needs of the residents in consultation with their informal carers. This is not only in conformity with the principles of emotion-oriented care (Pool, Schumacher & Moos, 2003), but also a characteristic of small-scale accommodating, in which the control of the design of daily life is in the resident's hands. Self-determination and the freedom of choice are central in this (Boekhorst et al, 2007). The fact that self-determination and the freedom of choice often are the unfulfilled needs of people with dementia is also mentioned in a study by Dröes et al (2006) and this is supplemented by 'being of use'. Studies by Hancock et al (2006) and Orrell et al (2008) show, that more can be invested into offering and stimulating daily activities for the prevention of boredom and passivity.

In this study needs from three perspectives provides a more complete picture, in which staff outline their needs more from the SSGA's perspective and interest and the informal carers generally provide better insight into the specific needs of their loved one with dementia. This is related to the degree of involvement of the informal carers with their loved ones with dementia. A study by Orrell et al (2008) shows a greater correspondence in the needs mentioned between residents and staff than between residents and informal carers. This is

due to the fact that informal carers do not always have the possibility of visiting their loved one with dementia in the nursing home and therefore have less insight into these needs.

The findings confirm the fact that generalising the needs of people – the same as with other people – is difficult. Moreover, the needs are also determined/influenced by the severity of the memory problems (type of dementia), personal factors and environmental factors (Marshall, 2009). Due to this, a field of tension can develop between making the planning board suitable for the total target group and meeting the residents' individual needs. After all, one resident benefits more from stimulating his/her independence by remembering certain activities him/herself, where another resident is no longer capable of this. An inventory will have to be made for each resident specifically for which objectives the planning board is deployed and what results are expected. This is to increase an effective deployment of the digital planning board. Based on a number of different design, such as fixed daily activities or not, a planning per week or not, etc., and with the aid of specific examples regarding both the desired design (display of the activities) and desired other applications, the needs of each resident can be mapped out. Finally, choices have to be made on the basis of the issues raised above in order to meet the needs of the total group as well as of the individual resident as much as possible. Kinzie et al (2002); Orpwood et al (2005 & 2009); Sixsmith et al (2007) emphasise the importance of attuning the needs of people with dementia constantly to the development of technology and to start from user-centred/ user-driven designs.

5.3.   *The learning experiences acquired during the development*

This section of findings provides information about how the project was developed and the learning experiences gained during this process. Both the residents and informal carers indicated that they received insufficient information and instructions regarding the function and use of the digital planning board during the development of this project. Most of the members of staff also experienced a lack of knowledge.

'You were here once. There was a man with a small pair of spectacles, but he spent all day at it and did not say a word and then left. You cannot say that we were informed sufficiently. I don't know what the others have to say about it, but I think they say exactly the same.' R3

The findings also show that the informal carers and staff had other expectations regarding the function and use of the digital planning board.

'Well, I expected that it would be connected to the Internet and that information from the world outside could be put on it. News paper articles or so'. C3

'We had a project run-up of two years. First, they gave you ideas. Then you started writing things down on paper. Then a group of students joined the team to check. So, you are made enthusiastic. Then there was a following group of students. I believe we've had four groups now. We visited the university once. Finally, the project moved to the background due to the long time waiting for the screen. Then this screen props up... You think, here it is, it is ready now. But, actually, it is not ready yet. Everyone thinks: I'll wait until it really starts'. S2

The staffs think that the pre-conditions failed to implement the planning board adequately. They experienced a lack of time with regard to giving colleagues good instructions, hence the knowledge regarding the function and use of the planning board is limited to the 'early adopters'.

'Before it finally functions. It's all plus this and plus that. You hardly have time to transfer information about the patients. Transferring information about the residents is important, and you do not feel like explaining the planning board on top of that.' S6

Interestingly one member of staff stated coming back in here/his time off to introduce the residents' activities to the planning board.

'Actually, I spend a great deal of time on it. In the first instance, during work hours, but also during my time off'. S1

Although it was described in the background informatie (chapter 1) that the development of the digital planning board took place in a user-centred way, it is important to find out to what extent and in what way users were involved. In user-centred designs, it is the intention that users of the technology are constantly involved in an interative process of analysis (gathering data), designing, testing, implementation and evaluation (Kinzie et al, 2002). In this study the term 'users' means people with dementia, their informal carers as well as the staff. The first phase of the digital planning board's development (gathering data) took place among staff. In the second phase of designing, the residents were involved in the development, while the informal carers were not involved until the phase of the

implementation. The phase of testing took place in a laboratory situation at the University without involving the actual users. After this, the planning board was installed in the small-scale group accommodation for people with dementia. Orpwood et al (2005) emphasise that during the phase of testing, people with dementia should only be involved once an advanced prototype exists, which is already adjusted as specifically as possible to the inventory needs of the target group. In case of problems, there is a risk that especially people with dementia become extra uncertain and this can have a negative influence on the acceptance of technology in the future (Orpwood et al, 2005). In this phase, it is preferable that informal carers are used as ambassadors to represent the personal needs of people with dementia adequately. On the one hand, the findings regarding the lack of knowledge, having other expectations about the function and use of the planning board and the lack of time experienced for instructing colleagues adequately can be explained by the fact that the 'users' were not optimally involved in all phases of the project's development. On the other hand, they can be explained by the fact that the attuning with the care organisation during the implementation was not clear. Due to this, the care organisation was less prepared to support the implementation adequately.

The commitment of care organisations in innovations is also confirmed in other literature regarding implementation theories (Grol & Wensing, 2006; Greenhalgh, 2004). Moreover, studies in other care settings with other target groups also show that it is desirable that technology connects well to the needs by making inventories of these needs (Johnson, Bamer, Yorkston & Amtmann, 2009; Peeters & Franke, 2009). User involvement is not only gaining ground in the development and implementation of technologies in care, but is also on the foreground in providing regular care. There is increasingly stronger shifts from supply-oriented care to demand-oriented care; also called patient-centred care (Hart, 2010) and in the care for people with dementia, the term emotion-oriented care is used (Pool et al, 2003). In this approach, the care is constantly attuned to the needs of a client and his/her family (Pool et al, 2003). In fact, this applies to the deployment of technology and to nothing else in the provision of regular care. Obvious in the deployment of technology is that its use is determined by the degree of connection. Technology that supports a client (assistive

technology) will not be used if it does not connect to the user's needs. The user has a freedom of choice in this, which is often not the case in many aspects of care, because it provides for the first necessities of human life, such as eating, sleeping, going to the toilet, etc. Whether this care connects seamlessly to the needs of users is less clear, because the user's freedom of choice is limited.

Although the development process did not run in conformity with the principles of a user-centred design according to Orpwood et al (2005), issues raised by some members of staff indicate that an experimental phase was necessary to be able to identify the needs for further development adequately. The findings do not only give a clear direction with regard to the further development of the digital planning board, but also provide valuable input for development projects in the future, which is outlined below.

After a phase of gathering data among residents, informal carers and staff, a sound phase of designing and testing has to take place at the university, in which informal carers and staff are involved. Only when an advanced prototype exists, the planning board can be tested in the 'real life setting' and residents are involved. Subsequently, the actions regarding a good implementation have to be anchored in an implementation plan, in which both the care organisation and university are responsible for the execution. Greenhalgh et al (2004) state, among other things, that it is important that the organisation supports the implementation, that people are trained in acquiring the competencies that the new development requires from them, that there are sufficient financial means to support the implementation and feedback is involved; just in time information about the impact of the implementation process. What is also important is that the care organisation's ICT department supports the implementation, so that this department can be called with regard to errors and the communication lines are experienced in a shorter time than they were currently experienced by staff.

'And there is no real expert that you can call in to check what is wrong. It takes an e-mail first, and then you have to contact X. These lines are too long'. S2

Pagliari (2007) emphasises that in the development and implementation of technology, interdisciplinary cooperation is necessary between the designers of technology and researchers in health care. As this will stimulate the methods of involving users to be followed carefully in the development and promotes the quality of 'user-centred designs', but also allows assessing the effectiveness of the technology and increasing the deployment of technology in care setting on a large scale. It is important to bear in mind that this process takes time, as shown in other studies regarding technological innovations (Orpwood, 2005; Davies et al, 2007). With regards to the further development of the planning board, long-term and intensive cooperation is necessary between the care organisation, university and a software company. The needs of users have to be considered yet again in order to ensure an effective implementation including the integration of the digital planning board in the care process. Then the planning board is not the objective in itself, but only a means to realise the objectives determined in advance that can support residents, their informal carers and staff in simplifying care processes and stimulating independence.

5.4.   The role of the Advanced Nurse Practitioner (ANP)

In general, it is important that a link is made between the designers of technology and employees in health care in all of the phases of the development process (process of analysis, designing, testing, implementation and evaluation). The role of the ANP is to adopt a leading function in this, because she/he can make the connection between care and technology. The ANP can monitor that users are optimally involved in the development in all of the phases of the development process by following this process by means of applied research. This does not only stimulate the quality of 'user-centred designs', but will indirectly also ensure that ethical principles; autonomy, beneficence, non-maleficence and justice (Beauchamp & Childress, 1994) are guaranteed as well as possible in the care for people with dementia. Emphasising that the ANP has to guarantee and improve the quality of care is important. Technology should only be deployed if it makes a contribution to this. Depending on the nature of the technological innovation, both qualitative and quantitative research methods can be used in supporting 'user-centred designs'. In the first phases of the development, qualitative research methods are more in the foreground, whereas in the

phase of evaluation, quantitative research methods are accentuated more. Effect studies are necessary for stimulating the deployment of technology in the care setting on a large scale. During the phase of implementation, the ANP is expected to adopt a dual role of leadership: one regarding the implementation of change and one regarding the research. That is why in this phase, action research is recommended, because it combines research and action. Gathering knowledge is directly linked to the application of this knowledge (Migchelbrink, 2007). In action research, the ANP works closely together with the users of in this case the digital planning board to gain insight into the process and the problems of the users involved.

5.5.   Summary of the discussion & implications for the practice

The occurrence of installation errors, inefficient use, limited ease of use and a lack of knowledge regarding the function and use of the digital planning board are the most important findings that get in the way of a successful implementation. These findings can roughly be reduced to the innovation characteristics by Rogers (1995) that need to be developed further to influence the users' attitude towards the planning board in a positive way. In this study, needs and ideas were introduced from three perspectives that can contribute to this. By including the needs from three perspectives, a more complete picture emerges and, moreover, it prevents the needs from the residents themselves to be snowed under. The planning board offers many possibilities of supporting residents better in the future with their memory function, on the one hand, by meeting the individual needs regarding the display of the activities on the planning board. On the other hand, choices have to be made with regard to this so that the planning board in the living room is also suitable for the total group. It is important that a new inventory is made on the basis of three perspectives by means of specific examples, with regard to the desired design (the display of the activities, introducing the activities, etc.) as well as other desirable applications (Internet, contact at a distance, remote control, showing photographs, etc.). Although the development process was not entirely in conformity with the principles of a user-centred design, lessons were learnt that can have an impact to development processes in the future. Additionally, the findings also provide clear insight into which actions need to be taken to

stimulate the further development of the digital planning board in this SSGA. Long-term and intensive cooperation is necessary between the care organisation, a software company and the university. Users need to be optimally involved in the further development by means of applied research, which will not only stimulate the quality of user-centred designs, but also an effective deployment of the digital planning board. The Advanced Nurse Practitioner has to adopt a leading role in the further development of the digital planning board, but also in other development processes, because she/he can make the connection between care & technology and has experience with carrying out applied research.

6.   Critique

This chapter presents a view from the personal perspective of the researcher and presents reflections on the strenghts and weaknesses of this study. This chapter also presents an insight in the learning process of the researcher as an individual. It begins with a critical discussion regarding the appropriateness of methodology, including the methods and the study sample that was used. It follows by a critical reflection regarding the quality of the methodology by discussing the trustworthiness and authenticity. The chapter is concluded by adressing the ethical considerations with regard to the study.

Appropriateness of methodology

In the first instance, the study aimed to carry out an impact evaluation. For this, an advanced implementation of the digital planning board was a condition; at closer scrutiny, this turned out not to be the case at that time. In retrospect, this means that the study could only have taken place after the phase of testing in 'the real life setting' and the actions regarding the phase of planning board's implementation had been carried out. This resulted that the researcher, prior to undertaking the actual study, had to take several practical actions, such as: to improve the functioning of the planning board, inform informal carers and staff, instruct staff, make minor adjustments for usage based on informal suggestions, etc. Due to this unexpected development needs, the researcher was less prepared for actions that had to take place to ensure a good implementation. The consequence of this was that the attuning with the care organisation was not clear, and due to this, the organisation was also insufficiently prepared to support the implementation of the planning board adequately. Moreover, it also turned out that the original study design had to be adjusted with regard to fundamental parts, because an impact evaluation was not possible at this stage. The choice for an evaluative qualitative study was logical, as it provided possibilities for exploring users' experiences and for involving users optimally in the further development of the planning board. However, had the researcher been earlier aware of a dual role of leadership that had to be fulfilled, one regarding the implementation of change and one regarding the research, the choice for action research would have been better. In this type of study, combining

action and research is the intention. Another advantage of action research is that the members of staff are co-responsible for the implementation to succeed (Migchelbrink, 2007).

Methods used

The researcher is content with the methods chosen in this study. Although interviewing the residents was experienced as complex, data analysis a challenge, it is a good thing that the residents were involved in the study. Even though the residents sometimes provided contradicting, unclear information or information that did not connect to the question, the experience is that this decreased during the course of the interview. Looking at the findings, they gave a great deal of valuable information, which provided a more complete picture together with the findings from the focus group interviews. Despite the researcher's experiences as a teacher and as a nurse, the combination of the many roles and tasks as an interviewer is difficult. Being competent at this from the start is impossible. As an interviewer, you are the leader in the conversation, as well as a partner in the conversation and a researcher, during which a great variety of tasks need to be fulfilled. Guarding the topics and simultaneously listening and exploring were experienced as an art in itself.

The data analysis according to the framework analysis by Ritchie & Spencer (1994) was experienced as pleasant and clear. The framework analysis offers good support for working from concrete to abstract, in other words, for induction of the research material. An advantage of the framework analysis is that it allows themes to develop from the research questions and topic guide as well as from the participants' narratives. A disadvantage could be that the topics lead too strongly whereby the themes from the participants' narratives can be snowed under. Looking at the analysis, it can be concluded that the researcher found a good balance in this. Nevertheless, the researcher found this study to be time-consuming in terms of data-collection and in-depth analysis.

Study sample

It was the intention that all users (n= 8 residents, n=8 most important carers and n=11 staff members) would be involved in the study. Unfortunately, this did not go entirely according to the plan. Although all users were very cooperative and generally responded quite enthusiastically to participate in the study. Due to personal circumstances, a few most important carers (n=3) and one resident did not have the opportunity to participate. The focus group interview with the members of staff took place during a staff meeting; it was impossible for every member of staff to be present, as it is usually planned on an afternoon that many members of staff don't work. Only one member of staff needs to be present during that time on the ward, however 6 participated. The findings show that the digital planning board is not of equal interest to all members of staff, because they have made too little use of it. Speculating, this may also be a reason why a number of staff members were not present. Despite this, the choice for three homogeneous groups (Patton, 2002) was a good choice, because it provided an image from three separate groups, each with its own role in the SSGA and they outlined their experiences from their own roles.

Trustworthiness and authenticity

With regard to the credibility, member check (Lincoln & Guba, 1985) took place in the analysis of the findings, but this could have been done more meticulously. By also involving the participants of the focus group interviews in the phases of: identifying a thematic framework, indexing and charting. This only took place during the phases of familiarisation and interpretation. The member check did not take place with the residents due to their physical condition. The most important carers and/or staff could have been involved in this. Due to fear of overasking, the researcher did not ask for cooperation for this. What did take place was peer debriefing (Lincoln & Guba, 1985). The research interpretations from all groups were submitted to a colleague with the objective to guarantee the consistence with regard to the content of analysis.

Weaknesses regarding the study's dependability or conformability (Lincoln & Guba, 1985) are that the residents generally had difficulty with the open questions, which is why closed questions were also asked. The complexity of the target group – as described earlier – that

the researcher was confronted with during the individual interviews, influence the dependability or conformability to a certain extent.

The transferability (Lincoln & Guba, 1985) in this study is limited, but this is inherent to the interpretative paradigm. Hopefully, the researcher succeed in giving in-depth descriptions in this research report, so that the reader is able to assess to what extent the findings are applicable in his/her own setting.

Authenticity (Lincoln & Guba in Bryman 2008) was pursued in this study by serving the users' interest by involving them. Their views stimulate an effective deployment and hopefully, with that, a successful implementation of planning boards in the future.

Ethical consideration

Consulting an Medical Research Ethics Committee (MREC) was necessary to find out whether this study was subject to the Medical Research Involving Human Subjects ACT. The MREC only stated that this study was not subject to this Act. Coincidentally, the Regional Ethics Committee (REC) was consulted, too. Although they gave the same judgement, they emphasised that the ethical principles described in chapter 3 need to be taken into account. The researcher was aware of these ethical principles even without consulting the REC. It was odd that the MREC did not give advice about these issues, which can result in the fact that the following of these principles depends on a researcher's arbitrariness. The researcher is aware of a different and very rigrous procedure under the Research Governance Framewrok for Health and Social Care in UK (Department of Health, 2005).

In this study, the researcher was confronted with the fact that the phase of testing only took place at the university without involving the actual users. Moreover, it appeared during the testing in the real life setting that the phase of testing failed, because there was no well-functioning planning board. Orpwood (2005) emphasises that people with dementia should only be involved once an advanced prototype exists. The question is to what extent the ethical principles of beneficence and non-maleficence (Beauchamp & Childress, 1994) were affected or not in this situation. Nevertheless, the findings show that an experimental phase was necessary for carefully identifying the needs for further development and this will

eventually contribute to guaranteeing the four principles from medical ethics. This also means that – in further development of the digital planning board and in future development processes – the phase of testing has to take place with great care, before a technological innovation becomes operational with regard to people with dementia.

This study shows that people with mild to moderate dementia are capable of participating in a study and that it is important that an inventory is made of their needs. Although it was commented that some residents were uncertain whether they gave the right answers, the majority enjoyed being able to make a contribution and that their input mattered. This is confirmed by De Boer et al (2007), who states that the participation of people with dementia in research reinforces their sense of 'being of use'. Atkinson (2004) takes this a step farther by claiming that research can make a contribution to the empowerment of people with learning difficulties by putting their life stories central. To what extent this study made a contribution to the empowerment of residents is hard to say. On the one hand, the study is limited to one interview per resident and on the other hand, this study did not centre on the resident's life story, but on the experiences with the digital planning board. Still, the outlines of the interviews show that room is offered to the residents to tell their (life) stories. The researcher stimulated this by pursueing an optimal relation of dialogue (Maso & Smaling, 1998).

Finally, plenty of learning experiences were acquired in addition to the above reflections that make a positive contribution to the researcher's professionalism. Thanks to this study, the researcher is better informed of the standards that apply in qualitative research. Although it was difficult in the beginning to make a good estimate of these standards, what they exactly entailed became evident along the process. The same applies to the requirements set for academic writing in English. The two processes took the researcher a great deal of extra time. However, the knowledge that the researcher received in return was more than worth this time investment. As a member of the circle of expertise of the lectureship for technology in care & welfare, a lot was learnt about technological innovations in care, which enables the researcher (as an ANP) to make the connection between care & technology even

better in the future. Expertise was also acquired about how to approach and support the target group. This knowledge can also be used in research and development processes concerning other vulnerable target groups.

7.   Conclusions and recommendations

Based on the findings from this study the conclusions and recommendations focus on the further development of the digital planning board in care organisation X, and on technological innovation projects in the care for people with dementia in the future. The findings confirm that many difficulties still exist and that the use of the digital planning board has to be optimised both in the living room and bedroom. The occurrence of installation errors, inefficiënt use, limited ease of use and a lack of knowledge regarding the function and use of the digital planning board are the most important findings that get in the way of a successful implementation. These findings can roughly be summaried to the innovation characteristics described by Rogers (1995): relative advantage, compatibility, trialability, observability and less complexity, that need to be developed further to influence the users' attitude towards the planning board in a positive way.

The majority of the residents were happy with the use and function of the digital planning boards when it worked. The informal carers, however, were not very positive, indicated opportunities for improvement. This was echoed by the staff, although they saw an added value for the current use of this electronic device. The findings although highlighted the diverse needs of different users, pointed to shared views about ways of improving through:

1. adaptation of the sofware program: the display of the activities and introducing the activities.

2. adding other technological applications: Internet connectivity, improving its accessibility by using a remote control, adding video and foto's, contact at a distance, etc.

This study shows that people with dementia are capable of participating in research. It also shows that the needs of people with dementia do not always correspond with their carers. For a complete picture, it is important that needs of people with dementia are evaluated from various perspectives and constant attuning with technological innovation is pursued. In this, the desired starting point includes 'user-centred designs', in which users are involved

in an iterative process of analysis (gathering data), designing, testing, implementation and evaluation (Kinzie et al, 2002). The phases of the development process should be followed by means of applied research. During the test phase, it is important that people with dementia are only involved once an advanced prototype exists. In this phase, it is preferable that informal carers are involved to represent the personal needs of people with dementia. Although the development process of the digital planning board was not entirely in conformity with the principles of a 'user-centred design', the findings show that an experimental phase was necessary to identify the needs for further development.

Recommendation 1:

As the planning board was developed to support the memory of people with dementia, making an inventory of the individual needs by means of specific examples regarding this has priority. It should be evident for which purpose the planning board is deployed for a resident and what the expected results are. It is important that it is thoroughly evaluated how residents can receive optimal support, without affecting the residents' independence. This could be an inventory regarding the following aspects:

- A display or no display of the fixed daily activities in combination with special person-oriented activities on the planning board.
- A planning or no planning per morning/afternoon/evening and/or whole day and/or week.
- Support or no support of the activities by means of a picture and/or written text and/or spoken language.

Additionally, the resident's visual problems should be taken into account and where the resident spends most of his/her time, in the bedroom or living room and what influence this has on the display of the activities. Based on this inventory, choices need to be made for the use of the planning board in the living room, which meet the needs of the whole group as well as the resident's individually, if technically possible. In addition, the digital planning board offers staff the possibility of attuning the residents' daily activities in consultation with their informal carers. So, in the view of emotion-oriented care (Pool et al, 2003), it is recommended that members of staff re-access how residents want to spend their days. This

can also be part of the above inventory. Furthermore, it is important that the types of activities are distinguished and defined concerning fixed daily activities, special person-oriented activities, private activities and group activities. After this, or simultaneously, work can be done on the fulfillment of other desired applications, which were mentioned by residents, informal carers and staff. It is worth mentioning that some work regarding the further development has been started. Based on the findings, bachelor students already worked on two project assignments:

- Writing a programme of requirements for a remote control for residents with a physical handicap.
- Writing a programme of requirements for taking recognisable photographs for the support of the activities displayed on the digital planning board.

Recommendation 2:

For the further development of the digital planning board in care organisation X, an intensive cooperation between the care organisation, university and an ICT company is necessary. It is important that the phases of further development are followed by means of applied research. Based on the findings from this study and the above additional inventory, the software program needs to be adjusted and tested in the university's laboratory. Staff and informal carers should be involved in this test phase. Only when the planning board functions adequately, the new software program is put into operation in the SSGA of care organisation X. During the test phase in the 'real life setting', the needs of the users should be inventoried again for an optimisation of the use of the planning board. The implementation of the planning board should be anchored in an implementation plan, which emphasis the following actions:

- Informing and instructing users;
- Training the staff in acquiring the competencies that the new development requires from them;
- Making financial means available that support the implementation;
- Initiating cooperation with the care organisation's ICT department.

- Making an inventory of the users' needs for the optimisation of the use of the planning board.

An impact evaluation can take place once the implementation is advanced, which focuses on the effects on the residents' behaviour and on the effectiveness of the care process.

Recommendation 3:

The Advanced Nurse Practitioner has to adopt a leading role in the further development of the digital planning board, but also in other development processes, because she/he can make the connection between care & technology and has experience with carrying out applied research. This does not only stimulate the quality of 'user-centred designs', but will indirectly also ensure that ethical principles; autonomy, beneficence, non-maleficence and justice (Beauchamp & Childress, 1994) are guaranteed as well as possible in the care for people with dementia.

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Appendix A: interview guide

- Staring with an ice breaking question.

- Information research and informed consent.

- What does the participant think of the digital planning boards?

- Strengths, weaknesses

- Things liked, things disliked

- What were the experiences during the process of developing and implementation?

- Cooperation

- Information

- Instructions

- Identify unmet needs

- What is their experience in relation to effectiveness of the digital planning boards?

- Using the digital planning boards

- Helping daily structure

- How can the digital planning boards be improved?

Appendix B: focus group guide

- Starting with an ice breaking question.

- Information research and informed consent.

- What do the participants think of the digital planning boards?

- Strengths, weaknesses

- Things liked, things disliked

- What were the experiences during the process of developing and implementation?

- Cooperation

- Information

- Instructions

- Identify unmet needs

- What is their experience in relation to effectiveness of the digital planning boards?

- Using the digital planning boards

- Helping daily structure

- Influence behaviour of residents

- Influence other processes (work organisation, social interaction)

- How can the digital planning boards be improved?

Appendix C: Request to judge whether the study is subject to WMO

Medical Spectrum Twente

Medical Research Ethics Committee
T.a.v. Mrs S. Satink
Locatie Ariënsplein
Postbus 50000
7500 KA Enschede

Dear Mrs Satink,

Last Friday we had contact by telephone because I need to know whether my study is subject to the law on Medical Research Involving Human Subjects (WMO). You advised me to write a short summary of the content of my study with the request to judge whether the study is subject to the WMO.

X is a health care organisation in the eastern part of The Netherlands. It offers care for elderly people in home situations and nursing homes. Small-scale groups are admitted in the strategic view of X. One division of X is Y where a ward started a small-scale group in the spring of 2008 for 8 residents with mild to moderate dementia and residents with other cognitive disorders. The desire arose to apply assistive technology for a positive result in the process of dementia.

In cooperation with the university[10], the implementation of digital planning boards was opted for in a joint decision. Students from The university started a study regarding the desired design style; they also involved residents of the ward in the designing process. A programme of requirements emerged with regard to the following: designing style, safety, environmental circumstances, comfort and usability. Finally, this resulted in the development of a digital planning board in the living room, individual digital planning boards in the residents' bedrooms and a wireless web connecting the devices.

At present, the main task of the digital planning boards is to support the residents' memory by structuring the daily activities. The residents can decide what kind of activities they want or don't want to share with other residents on the digital planning board in the living room, if they don't want to share, these are only shown on their own individual digital planning board.

At this stage of the implementation, exploring the experiences with the digital planning boards in a qualitative approach is desirable. The study's objective is: *'to evaluate the implementation of the digital planning boards in practice and to improve the use of these devices from the users' perspective'.* The users are: the residents, informal carers and staff. Two kinds of data are necessary, data about the process of developing and implementing the digital planning boards. This concerns an understanding of how unmet needs were identified/ solved and how the cooperation during the implementation was experienced. It also includes data about the use and effectiveness of these devices. An understanding of the impact of these devices is examined with a view to explore whether they provide memory support by structuring daily activities and the potential benefits for the residents'

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[10] The Expertise Circle: Health, Social Care and Technology of university X and care organisation X, financed by provinces in the eastern part of The Netherlands to stimulate innovation in practice.

behaviour and the planning of care. The above issues result in the following research question: *What are the users' experiences with the digital planning boards during the implementation?*

Figure 1 flowchart research process
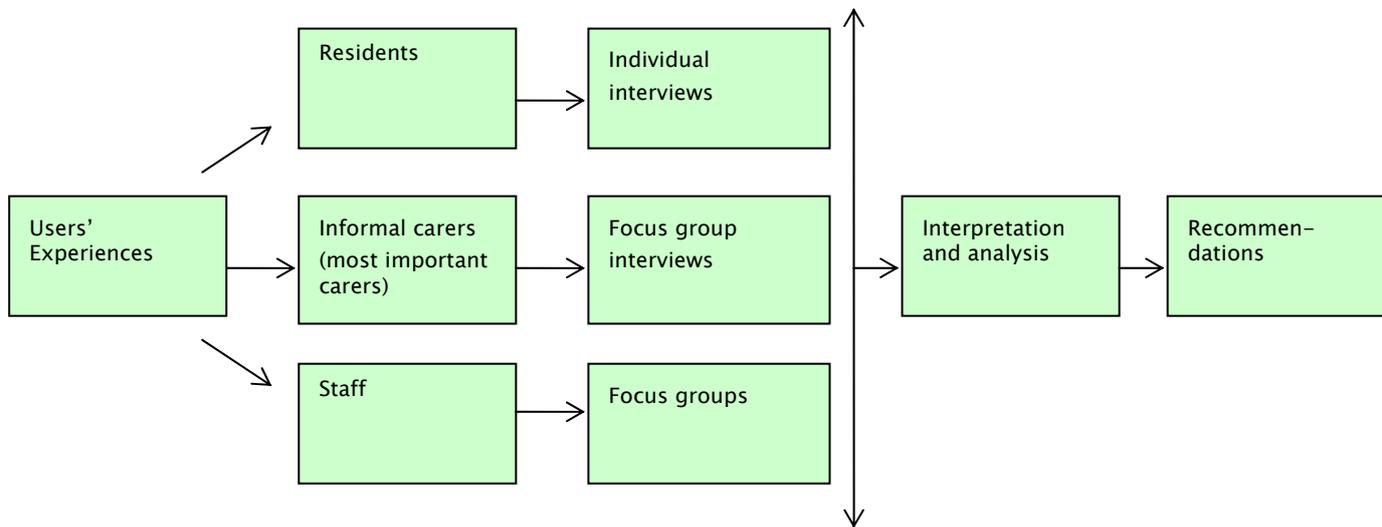
The following exploring topics are important:
- What do the participants think of the digital planning boards?
- What where the experiences during the process of developing and implementation?
- What is the experienced effectiveness of the digital planning board?
- How can the digital planning boards be improved?

So far, I hope I have given an impression of the content of the study. I am awaiting your response on the request to judge whether the study is subject to the WMO. Thanks in advance.

Kind regards,

Yvonne Kerkhof
Member expertise circle of Health Care, Welfare & Technology of University X

Appendix D: Response MREC request to judge whether the study is subject to WMO

Medical Ethical Committee (METC)

Medisch Spectrum Twente

Secretariaat METC, Medical School Twente, Instituut voor Toegepast Wetenschappelijk Onderzoek,
Postbus 50.000, 7500 KA Enschede Telefoon +31(0)53 487 30 11 Fax +31(0)53 487 2042 Email: metc@ziekenhuis-mst.nl
Ambtelijk secretaris, telefoon +31(0)53 487 20 46

Saxion
Academie Gezondheidszorg
T.a.v. Yvonne Kerkhof
Postbus 501
7400 AM Deventer

Enschede, 15 February 2010

ID number: METC/10044.ker

Tittle: Experiences with the electronic smart board and tablet PCs in the perspective of the residents, carers and professionals
K-nr.: K10-04

Dear madam Kerkhof,

The Medical Ethical Committee of Medisch Spectrum at Enschede, the Netherlands, declares that your study entitled: **Experiences with the electronic smart board and tablet PCs in the perspective of the residents, carers and professionals**, does not meet the criteria necessary for an assessment by a medical ethical committee according to Dutch law.

For your information, the criteria for are:
1) The study pertains to medical/scientific research AND
2) People are subjected to procedures or are required to follow rules of behaviour.

The first applies, but the second does not because in your study only an electronic smart board and tablet PC are used which will be part of the normal treatment system. This study is a behaviour observation study. Also professionals are included in this study; these are exempted from ethical review anyway.
Overall this study is considered to be exempt from a medical ethical assessment, according to Dutch law.

Sincerely,

J.F.F. Lekkerkerker
Chairman
Medical Ethical Committee Medisch Spectrum Twente

Appendix E: Response REC request to judge whether the study is subject to WMO

Ms. Y. Kerkhof
Teacher university department of health
Irisstraat 2
8012 DZ Zwolle

Goor, 8 December 2009.

Dear Ms. Kerkhof,

Regional Ethical Committee X read your study set-up regarding 'experiences with the use of a digital planning board in the care for people with dementia' with great interest. We took your question whether your study is subject to the WMO into consideration.

Because the study has no influence on the direct physical or mental health of a client and is not aimed at influencing behaviour, it seems to us that your study is not subject to the WMO. However, it is important that privacy is maintained, and that informed consent and the careful dealing with the clients' interests are looked after, as they are incompetent. For this reason, the client's representative has to be informed of the study and give permission.

We think that you can do your study if you include the following points in the set-up and execution:
*   Anonimising personal details of clients, family and staff (Privacy).
*   Arranging a meeting for the contacts with explanations and the possibility of asking questions about: The objective of the study, advantages and disadvantages, permission (yes or no).
*   Giving the resident a verbal explanation (adjusted to a person's level) regarding the objective of the study, the advantages and disadvantages, what interference may be expected (Informed consent).
*   A meeting for staff explaining the consequences to them, the objective of the study, advantages, disadvantages, what interference may be expected.

Yours sincerely,
On behalf of Regional Ethical Committee X

Y, BA
Chairman of REC X

Appendix F: letter to participants individual interviews for residents

Name
Address
Place and postal code

Concerning: participation in an interview, a study regarding the experiences with a digital planning board.

Deventer, The Netherlands, March 2010

Dear resident X,

In November, the planning boards were installed in the living room and in your bedroom. I would like to find out what your experiences with these are so that the two planning boards can meet your personal wishes and needs better in the future (among other things, regarding a good day structure). This is why I would like to interview you.

The interviews take place in March at your accommodation. For extra information regarding the study, I refer you to the accompanying information form. If you are prepared to participate in the interview, I kindly request you to sign the consent form personally and to have it co-signed by your first contact (family member). You can return the consent form in the pre-stamped and addressed envelope. I will be at your accommodation on 9 March at 14.30 to make an appointment with you for an interview. You can also ask me any questions you may have with regard to the interview. If you need any extra information, please do not hesitate to contact me. My telephone number can be found on the information form.

Thank you for your attention.

Kind regards,

Yvonne Kerkhof
Teacher/researcher University X

Appendix G: letter to the participants of the focus group interview for informal carers

Name
Address
Place and postal code

Concerning: participation in a group interview, a study regarding the experiences with a digital planning board.

Deventer, The Netherlands, March 2010

Dear first contact,

In November, the planning boards were installed at accommodation X in the living room and in the residents' bedrooms. I would like to make an inventory of the experiences with the boards, so that both planning boards can meet the residents' personal wishes and needs better (among other things, with regard to a good day structure). In order to get a good view of this, I will interview the residents and will organise focus group interviews with the residents' first contacts as well as with the staff.

I would like to invite you to participate in a group interview with the other first contacts of the residents (totalling 8 persons). The group interview is planned on 24 March from 19.30 till 21.00 in the AB room on the left of the entrance to accommodation X. For extra information regarding the study, I refer you to the accompanying information form. If you are prepared to participate in the group interview, I kindly request you to sign the consent form. You can return the consent form in the pre-stamped and addressed envelope. If you are unable to attend on the given date, I would like to ask you if it is possible that you ask a family member/friend to replace you (within the network of your father/mother/sister/brother/etc). If you need any extra information, please do not hesitate to contact me. My telephone number is on the information form. I will approach you by telephone within a few days to give you the opportunity to ask questions and to give you some extra information about the study.

For the interview with the resident, I sent a letter to all residents separately. For participation in the interview, I need your permission in addition to the resident's consent. For this reason, you signature is also requested on the consent form in the letter addressed to the resident.

Thank you for your attention.

Kind regards,
Yvonne Kerkhof
Teacher/researcher University X

Appendix H: letter participants focus group interview for staff members

Name
Address
Place and postal code

Concerning: participation in the group interview, a study regarding the experiences with the digital planning board

Deventer, The Netherlands, March 2010

Dear employee Y,

In November. the planning boards were installed in the living room and residents' bedrooms. I would like to make an inventory of the experiences with these devices, so that both planning boards can meet the residents' personal wishes and needs better (among other things, for a good day structure). To get a good impression of this, I will interview the residents and will organise focus group interviews with the residents' first contacts and with the members of staff.

I would like to invite you to participate in a group interview with the other members of staff (totalling 8 persons). The group interview is planned on 25 March from 14.00 till 15.30 in the AB room. For extra information regarding the study, I refer you to the accompanying information form. If you are prepared to participate in the study, I kindly request you to sign the consent form. You can return the consent form on the day that the group interview is planned. If you need any extra information, please do not hesitate to contact me. My telephone number can be found on the information form.

Thank you for your attention

Kind regards,

Yvonne Kerkhof
Teacher/researcher University X

Appendix I: information regarding the individual interviews, the study regarding

'experiences with the digital planning boards'

The study's objectives are:
- Mapping out the experiences with the planning board in the living room and the planning board in your bedroom.
- Making recommendations with regard to how the planning board in the living room and the planning board in your bedroom have to develop on the basis of your wishes regarding the planning boards

What does the study entail?
The study consists of an interview, in which you will be asked about your experiences with the planning board in the living room and planning board in your bedroom. If you are prepared to participate, you will be interviewed. I will visit your accommodation for this. The interview will take approximately 30 minutes. To prevent me from having to write a great deal during the interview, it is recorded on tape. After the interview is transcribed on paper, the tape recording is destroyed.

Voluntariness
Participation in the study takes place on an entirely voluntary basis. Refusing to participate in the study has no influence on the care that you receive in any way. You are free to withdraw from the study at any time.

Confidentiality
The anonymity of the participating persons is guaranteed absolutely. No details will be included in the study report on which basis anyone could recognise you.

Consent
If you are prepared to participate in this study, I would like to ask you to sign the accompanying consent form and return it to me in the enclosed envelope.

Questions about this study
If you have any questions about the study, you can contact me:
Yvonne Kerkhof
Member of the Expertise Circle of Technology in Care & Welfare of University X
Mobile phone: 06-41502134 (please leave your message on the voice -mail, I will call you back as soon as I can)

Appendix J: information regarding the focus group interview with informal carers,

the study regarding 'experiences with the digital planning boards'

The study's objectives are:
- Mapping out the experiences with the planning board in the living room and the planning boards in the residents' bedrooms.
- Making recommendations with regard to how the planning board in the living room and the planning board in the residents' bedrooms have to develop on the basis of your wishes regarding the planning boards

What does the study entail?
The study consists of a focus group interview, in which you will be asked about your experiences with the planning board in the living room and the planning boards in the residents' bedrooms. If you are prepared to participate, you will be interviewed in a group interview with the other first contacts of the residents. A total of 6 to 8 persons will participate in the group interview. The group interview will take approximately an hour and a half. To prevent me from having to write a great deal during the group interview and to be able to analyse the information adequately afterwards, the interview it is recorded on video. After the group interview is transcribed on paper, the tape recording is destroyed.

Voluntariness
Participation in the study takes place on an entirely voluntary basis. Refusing to participate in the study has no influence on the care that the resident receives in any way. You are free to withdraw from the study at any time.

Confidentiality
The anonymity of the participating persons is guaranteed absolutely. No details will be included in the study report on which basis anyone could recognise you.

Consent
If you are prepared to participate in this study, I would like to ask you to sign the accompanying consent form and return it to me in the enclosed envelope.

Questions about this study
If you have any questions about the study, please contact me:
Yvonne Kerkhof
Member of the Expertise Circle of Technology in Care & Welfare of University X
Mobile: 06-41502134 (please leave a message on the voice -mail, I will call you back as soon as possible)

Appendix K: information for the focus group interview with staff members, the study regarding 'experiences with the digital planning boards'

The study's objectives are:
- Mapping out the experiences with the planning board in the living room and the planning boards in the residents' bedrooms.
- Making recommendations with regard to how the planning board in the living room and the planning board in the residents' bedrooms have to develop on the basis of your wishes regarding the planning boards

What does the study entail?
The study consists of a focus group interview, in which you will be asked about your experiences with the planning board in the living room and the planning boards in the residents' bedrooms. If you are prepared to participate, you will be interviewed in a group interview with the other members of staff. A total of 6 to 8 persons will participate in the group interview. The group interview will take approximately an hour and a half. To prevent me from having to write a great deal during the group interview and to be able to analyse the information adequately afterwards, the interview it is recorded on video. After the group interview is transcribed on paper, the tape recording is destroyed.

Voluntariness
Participation in the study takes place on an entirely voluntary basis. Refusing to participate in the study is of no consequence in any way. You are free to withdraw from the study at any time.

Confidentiality
The anonymity of the participating persons is guaranteed absolutely. No details will be included in the study report on which basis anyone could recognise you.

Consent
If you are prepared to participate in this study, I would like to ask you to sign the accompanying consent form and return it to me on 25 March.

Questions about this study
If you have any questions about the study, please contact me:
Yvonne Kerkhof
Member of the Expertise Circle of Technology in Care & Welfare of University X
Mobile: 06-41502134 (please leave a message on the voice-mail, I will call you back as soon as possible)

Appendix L: informed consent regarding the individual interviews for the study on

'experiences with the digital planning boards'

The undersigned declares that:

1.   he/she received information, both verbally and in writing about the objective and
     set-up of the study mentioned above;
2.   he/she had sufficient opportunity to think about and ask questions about the
     study;
3.   he/she agrees to participate in the study on an entirely voluntary basis;
4.   he/she is informed of the possibility to withdraw from further participation in the
     study at any moment, without this having consequences of any kind.

Resident's name   --

Date   --

Signature   --

Name of first contact ---

Date   --

Signature   --

Researcher's name   --

Date   --

Signature   --

Appendix M: informed consent of the focus group interviews regarding the study on ‘experiences with digital planning boards’

The undersigned declares that:

1. he/she received information, both verbally and in writing about the objective and set-up of the study mentioned above;
2. he/she had sufficient opportunity to think about and ask questions about the study;
3. he/she agrees to participate in the study on an entirely voluntary basis;
4. he/she is informed of the possibility to withdraw from further participation in the study at any moment, without this having consequences of any kind.

Participant's name   --

Date   --

Signature   --

Researcher's name   --

Date   --

Signature   --