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What is This?
Experiences of using a memory aid to structure and support daily activities in a small-scale group accommodation for people with dementia

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Abstract

Background: Use of technology to structure and support the daily activities of the residents in a small-scale group accommodation (SSGA) for dementia is a new innovation in the Netherlands. This paper presents the process of development of this new way of structuring activities and the findings of a pilot study looking at the experiences of using this device in people with dementia.

Method: A qualitative method was chosen, data were collected using individual interviews with the residents (n = 6), focus groups interviews with informal carers (n = 5) and members of staff (n = 6). Data were analysed using Ritchie & Spencer’s framework (1994).

Findings: Three main themes emerged: issues regarding the implementation, needs for further development and the learning experiences acquired during the development. The majority of the residents were happy with the use and function of the memory aid. However, the occurrence of installation errors, limited ease of use and a lack of knowledge regarding the function and use of the memory aid were issues that prevented a successful implementation. Findings highlighted shared views about ways of improving through adaptation of the software program and additional technological applications; internet connectivity, improving its accessibility by using a remote control and adding videos and photos.

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Conclusion: Lessons are learned about the use and transferability of this innovation in people with dementia and other vulnerable target groups including those with learning disabilities as well as its limitation and the needs for further development.

Keywords
Memory-aid, dementia, small-scale group accommodation, technology, user centred design

Introduction
In the Netherlands, currently 243,000 people have dementia and it is expected that this number will raise to 565,000 in 2050 (Alzheimer Association the Netherlands, 2011). People with dementia are increasingly dependent on others, initially this care is often offered by informal carers, but as the diseases progresses, admission to a nursing home is inevitable. The policy for elderly people and ageing pursues a de-institutionalization of care (Ministry of Housing, Regional Development and the Environment & Ministry of Public Health, Welfare and Sports, 2007). This policy is in line with the desire of elderly people to remain at home for as long as possible, acknowledging that, a time will arrive when a transfer to an institute is necessary. In order to create a homely atmosphere, increasingly more small-scale group accommodations (SSGA) are developed for people with dementia. These are defined as ‘accommodations for care for a maximum group of 6 to 8 residents, together forming one household’ (House of Representatives, 2009, p. 1). Based on positive results (Depla & Boekhorst, 2007), SSGAs are encouraged; however, it is expected that the increasing demand for these kinds of accommodations cannot be met. This causes a tension between offering the quality of care and the constant pressure on care to save costs and the expected labour shortages in care. Due to this, other supporting measures are necessary to meet the desires and needs of people with dementia with regard to independence, safety, and the quality of life. From this perspective, the government emphasizes 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 (House of Representatives, 2008, 2009).

People with dementia have difficulties remembering appointments and usually benefit from a fixed daily schedule. A number of technological applications such as night and day calendar, remote day planner, COGKNOW Day Navigator, the BlueCall Phone, a pictogram watch and other electronic memory aids (EMAs) are currently developed to support the daily structure for people with dementia. The results from small-scale uncontrolled population studies (Baruch, Downs, Baldwin, & Bruce, 2004; Davies et al., 2009; Gilliard & Hagen, 2004; Hagen & Bjorneby, 2007; Oriani et al., 2003) show that the deployment of memory aids offers support in the self-management of people with dementia. Some studies show that people with dementia are able to use simple aids (Baruch et al., 2004; Davies et al., 2009), whereas other studies show that people with dementia constantly have to be reminded to use the product and how to use the product (Cahill, Begley, Faulkner, & Hagen, 2007; Oriani et al., 2003). The development of memory aids is in conformity with the needs of people with dementia and their informal carers (Van der Roest et al., 2007, 2009).

Hancock, Woods, Challis and Orrell (2006) highlighted the most common unmet needs of people with dementia who were admitted into old people’s and nursing homes were: daytime...
activities, sensory problems (eyesight/hearing), psychological distress, memory problems and lack of company. 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. Made-to-measure technology is therefore desired, whereby an inventory of the needs of people with dementia has frequently to be assessed. User involvement or so-called user-centred designs is necessary for successful technological innovations for people with dementia (Kinzie, Cohn, Julian & Knaus, 2002; Orpwood, Gibbs, Adlam, Faulkner, & Meegahawatte, 2005; Sixsmith, Gibson, Orpwood, & Torrington, 2007). This paper presents the development process of a memory aid for a small-scale group accommodation for people with dementia and presents the experiences of utilizing the product from the users’ – residents, informal carers and staff – perspectives.

Method

Development process of memory aid

A care organization in the Eastern part of the Netherlands offers care to elderly people, both externally and internally. An auxiliary branch of this care organization started an SSGA in the spring of 2008 for eight residents, aged 60–80, with a mild to moderate form of dementia. The characteristic of this group is its diverse forms of dementia in combination with psychiatric problems. In this SSGA, the care organization intended to use technological applications to (i) better attuning care and service to the individual resident, (ii) improving self-management of residents, and (iii) increasing the effectiveness of care provision. A joint project therefore started in collaboration with the Saxion University to develop a memory aid that structures and supports the daily activities for people with dementia.

In order to get a clear picture of the technological applications, an extensive phase of data gathering with active involvement of the staff of the SSGA took place and the development of a memory aid in the form of digital planning boards for the living room of the SSGA and for the bedrooms of the residents was planned. It was agreed that the digital planning boards which are interconnected via a wireless network should focus primarily on the support of the resident’s memory with regard to the day structure. The fixed daily schedule is presented on the board in the living room under the photographs of all of the residents. It includes breakfast, lunch, etc. It also provides an overview of personal activities that are not private, such as housekeeping activities. The boards have a touch screen; by tapping on a resident’s picture the personal activities are highlighted. The boards in the bedrooms display both private activities, such as taking a shower and other personal activities. The intention is that residents – with help from staff – indicate which information they want to share with other residents and which information should stay private on their individual board. All 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 signaled by a computer sound in the living room, and the activity concerned is highlighted. Staff members use a computer to schedule activities to show on the planning boards.

We 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 program of requirements came into being on the basis of the following aspects: design, safety, environmental factors, comfort and use. This was piloted to ensure the digital planning boards meet its requirements. The digital planning boards were
installed in the SSGA in the summer of 2009. The pilot took place from January 2010 up to and including March 2010. In the development of this memory aid, it was ensured that the residents and staff were actively involved in making an inventory of the users’ needs and processing the information. Figure 1 gives a diagrammatical overview of the steps taken in the developmental and implementation of this device. In this paper, we focus on a pilot study looking at the users’ experiences with the memory aid (step 4). The aim of the study is to evaluate the implementation of the digital planning boards in practice and to collect data to improve the use of these devices from the users’ perspectives.

**Research method**

*Theoretical design and sampling*

The epistemology for this study draws on the interpretative paradigm (Giorgi, 2003), focusing on how people attach meanings to social reality that then influences their action. In order to explore the experiences of using the memory aids, we chose a qualitative method (Denzin & Lincoln, 2005) and collected data through individual and focus group interviews where appropriate. Purposive sampling strategy consistent with this methodology and the aim of the study is utilised to recruit users (Patton, 2002). The users were three sub-groups: the residents, the informal carers and the staff members. Using a semi-structured interview schedule, individual interviews with the residents were carried out to gain an insight or understanding of their personal experiences with the memory aids.

All residents were invited to participate in the individual interviews to obtain maximum information, although it was recognized some residents would not be willing to or able to participate. All residents (n = 8) and their informal carers (due to the residents’ state of dementia) gave consents for the individual interview. Seven individual interviews took
place; one resident withdrew from the study due to her physical condition; this resident passed away later.

Focus group interviews are considered as an appropriate means of stimulating interactions and facilitating an understanding of the shared experiences amongst group of people (Bryman, 2008). Focus group interviews were therefore used to explore staff and informal carers’ views about the effectiveness of the implementation and the ways in which the memory aids need to be developed further. All informal carers ($n = 8$) were invited to participate, six gave their consent, and five participated in a focus group interview. Similarly all staff members ($n = 12$) were invited, six agreed and participated in another focus group.

**Ethical procedure and data collection**

The Medical Research Ethics Committee (MREC) and the Regional Ethics Committee (REC) were consulted and approval was granted prior to the start of the study. All participants gave their permission to record the interviews. The ethical principles; respect for autonomy, honesty, beneficence, non-maleficence, justice and Research Governance framework (Department of Health, 2005) were adhered during recruitment, data collection, analysis and reporting.

To ensure confidentiality and anonymous presentation of findings, all respondents were given a number with a letter to identify their gender as male (m) or female (f). In addition, a number 1–3 was allocated to each participant to identify whether they were the resident (1), informal carers (2) or members of staff (3) respectively.

**Data collection and analysis**

All focus group interviews were recorded on videotape and then transcribed. This process enabled the researcher to capture the total context of focus group interviews including; the non-verbal communications, interactions and group dynamics (Rabiee, 2004). Residents might not understand the implications of videotaping and to avoid them becoming anxious, the individual interviews were audio-taped and then transcribed.

The framework analysis by Ritchie and Spencer (1994) was used to analyse the data. The five key stages from the framework analysis were applied as follows.

*Familiarisation.* The tapes of the individual and focus group interviews were listened to repeatedly and the videos watched. The notes that were taken during the individual and focus group interviews were scrutinised and supplemented. Subsequently, the tape-recordings and videotapes were transcribed. The transcripts were then read and corrected simultaneously by 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.* Themes were created from the topics guides, and sub-themes from the notes and the transcripts of the three sub-groups: the residents, informal carers and staff. See Table 1.

*Indexing.* All of the respondents’ quotes were related to one or more themes or sub-themes 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.
## Table 1. Main themes, themes and sub-themes.

<table>
<thead>
<tr>
<th>User Groups</th>
<th>Meaning of Planning Boards</th>
<th>Use of Planning Boards</th>
<th>Other Impacts</th>
<th>Needs for Further Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents</td>
<td></td>
<td>- Advantages/disadvantages</td>
<td>- Provided information and instruction</td>
<td>- Types of activities and how these should be displayed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Provided information and instruction</td>
<td></td>
<td>- Desirable other applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Other existing systems for daily structure</td>
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<tr>
<td>Informal carers</td>
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<td>Members of staff</td>
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**Main Themes: findings of user groups combined and triangulated.**

Issues regarding the implementation of the memory aid, The needs for further development and, The learning experiences acquired during the development process.
Charting. The quotes were then taken from the original context by placing them with one or more themes or sub-themes of the thematic framework concerned. Some quotes were joined together due to repetitions. Colour coding was used to continue recognising the individual respondents.

Mapping and interpretation. This stage involved making sense of the individual quotes, and also describing the relationship between the quotes and the data as a whole.

Findings

Findings from interviews in each user group were analysed separately; the results were then combined and triangulated (Denzin & Lincoln, 2005). To present similarity or different views and experiences from residents, informal carers and members of staff, they are presented under the following three main themes emerged from data (Table 1):

(1) Issues regarding the implementation of the memory aid.
(2) The needs for further development and.
(3) The learning experiences acquired during the development process.

It was not possible to include all the data generated from the interviews in this paper; therefore, extracts are selected to illustrate the main content of the findings.

Issues regarding the implementation of the memory aid

The majority of the residents use the planning board, although the degree of usage and the support experienced 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’ (1f1).

Some of the staff also indicate 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 when it is time for an activity. 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’ (3f2).

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

The disadvantages experienced most strongly from the three user groups are installation errors that often occur, inefficient use, limited ease of use and a lack of knowledge regarding the function and use of the memory aid. 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 indicated that there are other ways that help them with memory support, for example, that staff can draw their attention to the activities that are taking place and the use of other aids, such as a personal agenda or medication alarm.

‘Nurse X drops by and says, hello, it’s time to take your medications….. You don’t need a planning board’ (1f3).

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. Informal carers suggested that the activities have to be presented to the residents in another way; by adjusting to the needs of each resident’s, for example, by introducing the times for medication and smoking or introducing activities of housekeeping which are normally carried out by certain residents.

‘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’ (2m3).

The use of the memory aid is experienced as too complex by both informal carers and staff. 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 that occur in the control of the planning board. The planning board automatically turns to a screen saver, showing an aquarium, if it is not touched.

‘Nobody activating the planning board. It is a black screen or fish.’ (2m5).

The needs for further development

The findings from the three perspectives show specified needs for improving the use of the memory aid; 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 may differ for the residents and the informal carers; this is often related to the severity of the memory problems (type of dementia and usually progressive development of the disease, but also due to the personal and environmental factors). 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). An informal carer indicated:

‘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 y already knows what he/she has to do, and does not need it. So he/she does not check it’ (2m4).

The same applies to the display of fixed activities that take place every day versus the sole display of the specific person-oriented activities;
because some residents mentioned that they can remember the fixed activities that take place daily.

‘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 the planning board’ (1f2).

One resident indicated that 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’ (1f6).

In contrast with the residents and informal carers, the members of staff pointed out the needs for repetition of messages for 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 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’ (3f2).

The residents and staff were more reserved then the informal carers about proposing and introducing other technological 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 now, in my opinion. Yes, a nice landscape, beautiful deer, for example’ (1m5).

The residents’ views differed about having digital photo frame on the planning boards. One resident would have loved this, whereas another indicated that she uses existing photo frames for this.

Most staff would have liked 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.

All informal carers indicated that an Internet connection would make it possible displaying pictures and images from present and the past, such as their home and family on the planning board. They mentioned factual information like the weather forecasts could also be retrieved and displayed. A couple of informal carers mentioned that the operation of the planning board can be improved by activating the planning board via a big red button in a central location in the living room. The informal carers also highlighted a number of ideas about other desirable applications that should be added to the planning board such as: contact with family members via a webcam, playing a DVD on the planning board and making images visible through a 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’ (2f2).
Another informal carer mentioned:

‘What I would like is a camera on the chicken coop, for example. So the chickens become visible on the planning board’ (2m5).

This in turn relates to the residents’ wish to make the planning board more natural.

**The learning experiences acquired during the development process**

Although the development of the memory aid took place in a user-centred way, this is not always perceived by the users. The residents, informal carers and members of staff indicated that they received insufficient information and instructions regarding the function and use of the memory aid during the development of this project.

‘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’ (1f3).

The findings also show that the informal carers and staff had other expectations regarding the function and use of the memory aid.

‘Well, I expected that it would be connected to the Internet and that information from the world outside could be put on it; Newspaper, articles or so’ (2m3).

The staff indicated that the pre-conditions, such as extra time for information and instruction during the work, failed to implement the memory aids 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’ (Rogers, 1995).

‘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’ (3f6).

Issues raised by some members of staff indicate that an experimental phase is necessary to be able to identify the needs for further development adequately.

‘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’ (3f2).

**Discussion**

The findings provide a clear understanding of the innovation characteristics, the importance of including people with dementia in research and how users were involved in the development of the digital planning boards. These three main overarching themes are further discussed.

**Innovation characteristics**

The findings indicate a number of issues regarding the experience and use of digital planning boards in the living room and bedrooms. It points out that installation errors, a lack of
knowledge, limited user-friendliness and inefficient use are the factors effecting the optimal use and full implementation of the planning board. These findings can be summarized, according to Rogers (1995), as the innovation characteristics that need to be developed further to influence the users’ attitude towards the planning board in a positive way. These innovation characteristics are: relative advantage, compatibility, trialability, observability and less complexity. Our findings show that the digital planning board to some extent contributes to support the residents’ memory. Advantages that are indirectly mentioned include: confidence, peace of mind and convenience. This echoes the findings in other studies concerning memory aids for people with dementia; the results of small research populations in uncontrolled studies (Baruch et al., 2004; Davies et al., 2009; Gilliard & Hagen, 2004; Hagen & Bjorneby, 2007; Oriani et al., 2003) show that the deployment of memory aids offers support to people with dementia and their carers in the problems that they encounter. Despite these advantages, the users also experience disadvantages, which influence the characteristic ‘relative advantage’, but also other innovation characteristics in a negative way.

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’. Nijhof, Gemert-Pijnen, Dohmen and Seydel (2009) also argue 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 Haas-De Vries and Jochemsen (2007) advocate that there has to be attention in the views on care for technology and its role in the care process for a successful implementation. As highlighted by the Netherland House of Representative (2009) that technology has to become an integral part instead of an ‘extra’ to the existing organization as it is experienced now, that is why the implementation of good applications often fails to materialize.

The planning board’s ease of use is experienced as too complex by informal carers and staff, this in part refers to introducing the activities in the planning board which is too timeconsuming. It also refers to problems that occur in the control of the planning board. The informal carers and staff indicated that the planning board is not frequently touched or operated by the residents, as was the original intention. For some residents, this is not possible due to physical impairments and therefore another solution will have to be considered. However, other residents 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. (2009) 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. Kessels, Feijen and Postma (2005) argue that in people with dementia of the Alzheimer type, the explicit (conscious) memory is disturbed more than the implicit (subconscious) memory. In practice this means that a patient with dementia of the Alzheimer type cannot 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. People with dementia are capable of learning new skills through the implicit memory. Dirkse, Kessels, Hoogeveen and van Dixhoorn (2011) suggest that this is possible by using the method of errorless learning. Errorless learning refers to a learning condition that involves the elimination of errors during the learning process (Dirkse et al., 2011).
The findings indicate that the residents received a limited amount of information and instructions regarding the function and use of the planning board. In addition due to having dementia, some residents were not adequately familiar with the planning board’s function and use, which could have influenced their experiences of planning board and its significance. Only a few members of staff – called ‘early adopters’ by Rogers (1995) are well-informed of the function and use of the planning board. The members of staff indicated that the circulation of knowledge among colleagues is limited due to a lack of time; the work pressure experienced and inability to explain adequately its use to one another. It can be concluded that the possibilities of trying out 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 failed, because the positive experiences are eclipsed by installation errors, limited ease of use, etc. Although all of the innovation characteristics need to be developed further, 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, van den Hoogen, & Moes, 2008; De Veer & Francke, 2009).

The importance of including people with dementia in research

Our findings show that the needs of residents and their carers (informal carers and staff) can differ, an issue also highlighted in previous studies (Dröes et al., 2006; Orrell et al., 2008; Van der Roest et al., 2009). This clearly indicates that responding to the needs of people with dementia outlined solely from the perspectives of the informal carers and staffs is not sufficient. It also demonstrates that people with dementia are capable of participating in research and making their needs clear (De Boer et al. 2007; Dröes et al., 2006; Hancock et al., 2006; Orrell et al., 2008; Van der Roest et al., 2007; Van der Roest et al., 2009). In addition, studies regarding the development of technology (Davies et al., 2007; Orpwood, 2009; Orpwood et al., 2005) 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 strengthens 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 (De Boer et al., 2007). Various authors (Hellström, Nolan, Nordenfelt, & Lundh, 2007; McKeown, Clarke, Ingleton, & Repper, 2010; Wilkinson, 2002) indicate that people with dementia are one of the most excluded group in research. McKeown et al. (2010) emphasis that exclusion of this group delays the development of scientific knowledge, Hellström et al. (2007) on the other hand indicate that the exclusion of people with dementia is justified by the belief that others would protect them against possible emotional distress. According to Hellström et al. (2007) the question is not: ‘should we involve people with dementia in research? But: ‘how to involve people with dementia in research’?

Although people with dementia suffer from cognitive impairments, this is not a reason to neglect them. Our study also highlights that some residents actually liked being able to make a contribution and that their input mattered, and it was remarkable to see how articulate they were about their needs.
'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 the planning board' (1f2).

'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' (1f6).

However, the complexity of data collection and analysis within this group is worth mentioning. The timing of the interviews carefully considered the residents physical and mental state. Due to their condition, it was often difficult for the residents to match the answers to the right question. Findings of the focus group interviews with the informal carers and staff were useful in confirming or accentuating the value of the findings from the interviews with the residents. Collecting data from three users’ perspective was therefore an advantage and added to the strength of this study.

User involvement in the development of the digital planning boards

User involvement in the development and implementation of technologies in care is as important as providing regular care. The shifts from supply-oriented care to demand-oriented care; also called patient-centred care (Hart, 2010) and emotion-oriented care (Pool, Schumacher, & Mostert, 2003) in the care for people with dementia, strongly supports this approach. The care should constantly be attuned to the needs of a client and his/her family/carer. 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 careers. This is not only in conformity with the principles of emotion-oriented care (Pool et al., 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 (Te Boekhorst, Depla, Lange, Pot & Eefsting, 2007).

Successful implementation of technology and its use is however determined by the degree of its connection to the user’s needs. Assistive technology with the intention to support clients will not be used if it does not meet the user’s needs.

As mentioned earlier, the development of the digital planning board took place in a user-centred way, however based on the findings of our study it is important to reflect the extent to which users were involved. In user-centred designs, it is the intention that users of the technology are constantly involved in an interactive process of gathering data, designing, testing, implementation and evaluation (Kinzie et al., 2002). 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 clearly indicate that the ‘users’ were not fully involved in all phases of the project’s development. It also highlights that the attuning with the care organization during the implementation was not clear; hence the care organization was less prepared to support the implementation adequately.

Although the development process did not completely run in conformity with the principles of a user-centred design as highlighted by some members of staff, this study clearly indicates that an experimental phase was necessary to identify the needs for further development. Our findings gave some clear direction with regard to the further development of the digital planning board and provided valuable input for similar development projects in the future.
Conclusion

In summary, this study provides a comprehensive picture regarding the use, usefulness, limitations and the needs for further development of the memory aid by capturing perspectives from residents, informal carers and staff. The occurrence of installation errors, inefficient use, limited ease of use and a lack of knowledge regarding the function and use of the memory aid are highlighted as the most important constraints for a successful implementation. It is however concluded that the memory aid offers many possibilities of supporting residents with their memory function, through meeting their individual needs and the display of the activities on the planning board. It is recommended that for further development a new inventory is made on the basis of users’ perspectives by means of specific examples, with regard to the desired design; the display of the activities and introducing the activities as well as other desirable applications such as Internet, contact at a distance, remote control, showing photographs, and so on.

Lessons learnt from this project provided clear insight into actions required for further development of the memory aids in this SSGA and other settings. During the process of further development input from users should be incorporated to improve the use of the resulting applications. Finally the findings can be transferable for development of technology in other care setting in health and social care including other target groups such as people with learning disabilities, provided that their input is also recognized and utilized during the development. The pilot is followed by the development of a more advanced version of the memory aid in close cooperation with Saxion University, a software company and a care organization for people with learning disabilities. Hopefully this will lead to a successful implementation in the future within a number of vulnerable target groups.

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Conflict of interest declaration

None.

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