



Participant Observation Study of Use and Usability on five Assisted Living Facilities for the Old in Gothenburg Sweden

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Abstract

This participant observation study was conducted November 2009-February 2010 in 14 units in five assistant living facilities for the old in Gothenburg, Sweden. The aim is to study the daily use and aspects of use, related to the design of the physical environments. Areas of interest, based upon these aspects and related to usability, are presented and discussed in this paper. The study is the first part of a case study, within a PhD-project, comprising participant observations and qualitative interviews. More knowledge about assisted living facilities is asked for both by the eldercare providers and by the construction clients in order to enable appropriate care environments for the oldest. This knowledge is now produced in the architecture academies. The City of Gothenburg and Chalmers jointly finance the project and are the primary users of the project results. This paper presents and discusses some preliminary findings and gives a short description of methods and the research field.

Keywords: Assisted living for the old, care environment, eldercare, usability

Introduction

Background

In Sweden, like in many countries in Europe, we see an increasing number of elderly and old people, and a decreasing number of people working to support them. Almost 20 % of the municipal budget in Sweden is consumed by the eldercare but only 5,8% of the Swedish population 65 or older lives in assisted living (Socialstyrelsen 2008). The share of the population 65 years or older is forecasted to rise from 18% in 2008 to 25% in 2050, the group 80 years or older from 5% to 9% in the same time span (SCB 2010). The need for eldercare in Sweden is therefore likely to increase continuously until 2050 (SCB 2010). The Gothenburg prognosis extends only to 2040 but shows a similar but slightly less dramatic increase of persons 65 or older, partly due to a temporary decrease in the group 80 years or older until 2017 (City of Gothenburg 2010).

EU shows a matching development until about 2040 after which EU will have a slightly larger part 80 years or older, than Sweden (SKL 2009). This development has great implications on public economy and planning and the Government has proposed a number of measures (Swedish Government 2008). A new subsidy to municipal senior housing, so called *Trygghetsboende*, has been introduced to offer an alternative between ordinary and special housing, requiring a facility for common activities, a house-host and personal security alarms. More specialized care units are also proposed. Home Help Care and Home Care are suggested to facilitate for people to stay in ordinary housing for a longer time. The number of apartments in assisted living has decreased dramatically during the past 10 years (Socialstyrelsen 2008).

This study is part of a PhD project that explores assisted living facilities for the old in Gothenburg 2009-2013. Four different methods are practiced. In a participant observation study in 2009-2010, the daily use in 14 care units is explored. Semi-Structured Interviews with staff and residents in 2011 are then conducted to further explore use and usability in the same facilities. Document studies are performed throughout the project. To be able to compare results with the case study and within a large selection, a questionnaire survey is scheduled for 2012, addressed to staff and residents in thirty other assisted living facilities. All facilities are situated in Gothenburg and used as assisted living facilities for old, owned and managed by the City of Gothenburg. Indoor unit areas are studied during day and night, weekdays and weekends.

Several research-studies in Sweden and in Europe state the importance of skillful and detailed programming or briefing before the design phase (Blyth & Worthington 2001, Fristedt & Ryd 2001). Less effort put into the programming phase often results in changes done soon after the delivery. With high costs for correcting mistakes, the importance of briefing or programming has become more evident for Construction Clients.

Aim of this study and expected outcome

The aim of this study is to identify factors in the physical environment, related to the daily use. The purpose is to increase knowledge about assisted living facilities for the old from an architectural research perspective by studying and exploring the daily use of the facilities. The project puts the question: “How is the studied physical environment used and how does it relate to usability?” Research in gerontology and sociology provide knowledge about health, ageing and societal issues but more architectural research is asked for. Expected outcome of the project is a) to enable better architectural programming in eldercare- and related building projects, b) to facilitate physical resource planning in the eldercare sector and c) to allow guidelines for appropriate property management.

The City of Gothenburg has an outspoken interest in research findings that will increase the possibilities for better planning and programming, bringing forth relevant prerequisites concerning requirement assessments – requirements of the district committees, the staff and the residents. A Research & Development Unit, *Senior Göteborg*, has been established to promote better conditions for the elderly living in ordinary housing. There is also a lack of knowledge of how well existing facilities for assisted living serve their purpose, and of aspects affecting use. Hopefully, the studies in this project will contribute to this knowledge and to improve design of the common unit areas, where important interactions take place between staff and residents. Both the municipalities, responsible for the eldercare, and the architecture academies, providing research excellence for the building sector, have a great interest in this knowledge.

Definitions

The study includes common indoor areas in 14 units in 5 different facilities built 1972, 1980, 1993 (two objects) and 2001. Apartments are excluded but will be included in the subsequent studies. Measurements are here given in square meters, *sqm*, or usable area, *BRA bruksarea* (SS 021053).

The Swedish term “*särskilt boende*” corresponds to the English terms “assisted living”, “sheltered housing” and “special housing”. Assisted living is used commonly in both UK and the USA and is used

as the sole term in this paper. According to the Social Service Act, the municipalities in Sweden have the responsibility to provide aid to old and handicapped (Law 2001:453). This includes assisted living facilities. After an application to the municipality, a so called aid assessment, or assistance assessment is conducted. This can lead to a decision to provide an apartment in assisted living or other forms of aid. The City of Gothenburg manages 92 buildings with assisted living facilities for the old in Gothenburg. Of these, 60 are directly owned by the city. The vast majority of them are operated by municipal eldercare, with the exception of handful private care providers outside the municipality. Due to the temporary decrease in the number of persons 80 years or older, a subsequent reduction in the number of residents is ongoing. In January 2010, there were about 5200 residents in the facilities in Gothenburg out of a population of 507330 or 1,025% (Lokalsekretariatet 2010, GR 2010). In Sweden the corresponding figure for 2008-12-31 was 94 000 residents out of a total population of 9256347 or 1,015% (Boverket 2009, SCB 2010). This shows that the situation in Gothenburg is similar to the national.

An *old* person is in this paper defined as 65 years or older. This definition is used by the Swedish Government and other official institutes (Swedish Government 2010, SKL 2008). It has also been the age of retirement in Sweden until 2005, when the law was changed and opened up for more flexible age of retirement (Swedish Government 2003). The age group in assisted living are predominantly 80 years or older, referred to as *oldest old* by official statistics and by official organs in Sweden. The average age of moving in is 85,21 in the selection covered by this study, covering 131 residents in 14 units. The youngest was 61 and the oldest 101.

The concept of usability is defined as: “*Effectiveness, efficiency and satisfaction with which a specified set of users can achieve a specified set of tasks in a particular environment.*” (ISO 9241-11, 1998). The concept was originally developed for technical products (Schackel 1991, Keinonen 1997), but applications on the built environment is being developed (Alexander 2006, Granath & Alexander 2006, Rasila et al 2010). Use itself could be defined as a prerequisite for experiencing and appreciating architecture, or the built physical environment. Without being in, seeing it (directly or indirectly), feeling it, a full appreciation of the environment is not possible. One could also argue that pictures or VR (virtual reality) represent reality itself or at least come close to some form of reality but to be able to assess the physical environment through all the imponderable occurrences of daily life, use in the form of personal presence is required. Efficiency means that the artefact allows the user to perform easily and with use of little resources. Effectiveness describes the ability of the artefact to deliver a certain desired effect. Satisfaction would mean the degree of congruence between the ideal vision of the function and the subjective experience of the outcome, also described as the user’s feelings and attitudes towards the artefact and its effects (Alexander 2006).

The five assisted living facilities, described in the study are referred to as “facilities” or “environments”. Facility/facilitate derives from lat. *facilis*, meaning easy, simple. Facility is described as “something such as a room or a piece of equipment that is provided at a place for people to use” or “an area or building used for a particular purpose” (Macmillan 2007). In this context it is synonymous with the five studied facilities, constituting the prerequisites for the activities taking place: Living and working. The 14 care units are referred to as “units” and are a subdivision of the facilities, representing an organizational level within the facilities. Environment is described as “surrounding” or “circumstances of life of person or society” (COD 1982). The term is used neutrally to describe either a particular setting or the studied facilities in general, depending on the context given accountancy for.

Research in Sweden

Few similar studies have been done in the Swedish architectural academies. In KTH, specific research about assisted living is presently conducted by Jonas E Andersson (2005), aiming to evaluate facilities built after the Ädel Reform (Swedish Government 1990). An overview of the research field has also been done (Andersson & Rönn 2006). Solvej Fridell has analyzed the environment in a Stockholm nursing home, Stockholms Sjukhem (1998). At Chalmers, there is current research on housing issues, old persons living conditions, assisted living and handicap. There are a number of publications within the field (Paulsson & Almberg 1991, Almberg 1997, Paulsson 1998, 2002, 2008, Paulsson & Ringsby

2008). A Research Center for Healthcare Architecture has been started at Chalmers in 2010 on initiative from professor Peter Fröst. Multidisciplinary research with a sociological approach is conducted at NISAL, the National Institute for the Study of Ageing and Later Life at Linköping University and Catharina Nord is here doing research within the architectural field, concerning the design of future housing for the oldest old with extensive help needs. A report on planning assisted living facilities has been made by Sophia Lövgren (2002). In Lund University Carlbonde Christiansson (1981) has described architectural dimensions of designing private areas in old age homes and nursing homes. There has also been specific architectural research about assisted living (Åhlund et al 1995, Åhlund & Ohara 1997).

On many academies in Sweden, research about old people, quality of life and care environments is carried out within the medical and sociological fields. At Umeå University studies about care environments is carried out (Edvardsson 2005). Vårdalinstitutet conducts care research and CERTEC in Lund, research on design for all. In 2008 a research center for technical aids in ordinary housing was opened in Lund on initiative from professor Tore J Larsson. Centre for Ageing and Supportive Environments - CASE - at Lund University is conducting interdisciplinary research about older people and home environments. At Gothenburg University, Helle Wijk has conducted research about colour perception in old age (2001). Hanna Falk has studied how older persons' experiences of QoL (Quality of Life) is affected by environmental change in residential care (2010). On the Nordic horizon, an extensive overview of eldercare and eldercare research has been edited by Martha Szebehely (2005).

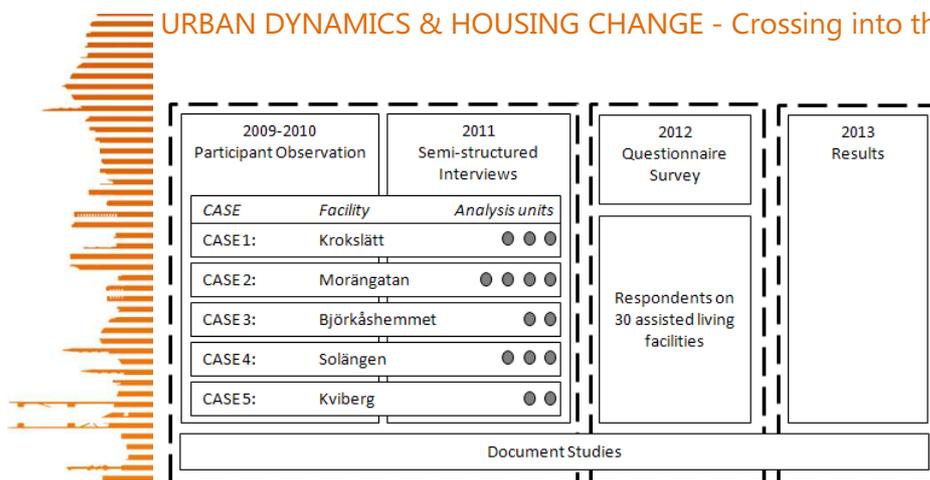
A literature search made 2010-03-31 on "assisted living" on Scopus gave 455 hits. Adding "environment" to refine the results within the search, 163 hits were displayed. 14 of these were considered relevant to this project and included some kind of assessments of the physical environment, research overviews or use of similar methods. The others dealt with QoL, supportive technology, independence, medication, workplace issues, etc. A search on "special housing" gave 26 hits, of which 3 were considered relevant: 1 contained a questionnaire survey to eldercare nurses and 2 dealt with ordinary housing. Finally, a search for "sheltered housing" produced 78 hits of which 11 were relevant and 3 of them concerned Swedish conditions.

Theory and Methods

This study is the first part of one case study in two parts, comprising five cases, i.e. five assisted living facilities for the old in Gothenburg. The second part is an interview study. The cases in this context are equivalent to the five facilities. Each case contains 2-4 analysis units (Yin 2009). They correspond to the 14 care units. The analysis unit is also the interpretative unit, constituting the physical and organizational background to the 20 observation occasions. To display complex interrelationships, thick descriptions are used (Geertz 1973, Stake 1995). The degree of participation is moderate, allowing the observer to interact, without actively participating in the action (Dewalt & Dewalt 2002). Interaction in this context means for instance having conversations or adapting to the situation by moving around. The units were studied at all days of the week and all parts of the day.

The project puts the question: "How are the studied facilities used and how do the physical environments affect the usability?" Mixed research strategies are used to try to answer the question. Figure 1 shows a research design scheme. Participant observation, semi-structured interviews and document studies are qualitative, exploratory methods (Patton 2002). The questionnaire survey is mainly a quantitative method (Ornstein 1988). It provides opportunity to test the results with the case study and compare results within a large selection. This means that the project uses different sources of data, along with a combination of qualitative and quantitative methods (Yin 2009, Flyvbjerg 2006, Groat & Wang 2002). Different document types that may be relevant to the project are collected in this study: Drawings, photos, notes, artifacts, prints, etc. Their purpose is to a) illustrate, b) to support or contradict theories and hypotheses, c) to give background to prevailing circumstances and d) give validity to obtained data. All the methods in the project are empirical and evidence-based and the results will be triangulated between the studies (Stake 1995, 2005).

Figure 1: PhD-project design.



The philosophical foundations for these qualitative research methods are found in phenomenology and mean a focus on the meaning of or the understanding of a phenomenon, rather than on the phenomenon itself. It also implies an inductive approach, based on empirical data rather than theories (Szklański 2009). However, the results in this study are derived from both inductive and deductive conclusions, with regard to basic assumptions and pre-conceived knowledge about the situation and about the facilities. The project design is best described in a bottom-up perspective. If one theoretical extreme point is theory development in Grounded Theory, the other would be the testing of precise hypotheses (Fangen 2005). The project is explorative and the formulation of the question contains initially a high degree of flexibility (Fangen 2005, Dewalt & Dewalt 2002, Miles & Huberman 1994). The base of knowledge for the project and for this study are my own profession, experiences as a geropsychiatric nurse and as a manager of assisted living facilities, collected data, existing research and the experience and knowledge of residents and staff.

By observing the daily use of a facility, patterns and problems are defined. Table 1 shows an overview of the 20 observations on 14 different units. Assessments can then be made about a) what kind of activities are performed, b) whether they can be related to features in the physical environment, c) whether the occurrence is negatively or positively influenced by the design of the physical environment, d) to what degree of independence tasks are performed by the resident(s) or e) access to requested equipment or space. The results can then be related to spatial aspects like material, lighting and acoustics, equipment and organization. Assessments of whether the physical design facilitates or hinders the intended or preferred use prerequisites a careful study of how usability is perceived and will later be developed and further penetrated in the sequent interview study.

Analysis method strategy

The analysis of the data from the study follows a flow-model of the data organization: Data collection - data reduction - data displays – conclusion/verification – analysis (Miles & Huberman 1994). Excel and Word have been used to organize, quantify and analyze data from the study. Excel has often been considered a program for handling figures but Meyer & Avery (2009) have presented a model for analyzing qualitative interview data in Excel (2009) and shown how its structure, data manipulation capacity and display features can be used for qualitative analysis. This model focuses on handling and organizing transcript data and to make them practically searchable. The model is applied on the observations, with some alterations.

To find an analysis matrix for the material, three different concepts have been studied. Firstly, there is the concept of usability. Secondly, POE (Post Occupancy Evaluation) and FPE (Functional Planning Evaluation) with focus on building performance (Preiser et al 1987, Blyth & Gilby 2006). Thirdly, SCEAM (Sheffield Care Environment Assessment Matrix), attempting to merge building aspects, support for care and QoL (Parker et al 2004). All three concepts deal with aspects of the physical environment and the human comprehension of it. All three also comprise some sort of relational assessment of the physical environment contra individuals or groups of individuals. In this study, the focus has been to study the daily use and thereby identify areas of interest, related to the physical

environment. These questions will later be asked to staff and residents in the 16 units. This means that the focus on use in this study will change to an increased focus on usability in the sequent interviews.

Table 1: Facilities, analysis units and observation schedule. Size in square meters (SS 021053).

Case / Facility				Analysis Unit / Care Unit			
Facility	Built/rebuilt	Size	Position	Analysis unit (20 occasions in 14 units)	Res.	Time	Day of the week
Krokslätt	1971/ 2005	8915	Central		75		
				Dementia	9	13-21	Thursday
				Somatic 1	8	07-15	Friday
				Somatic 2	8	11-14,30	Sunday
				Somatic 2-4	25	21-07	Thursday-Friday
Morän-gatan	1980/ 2009	8924	Central		89		
				Dementia 1	7	13-21	Tuesday
				Somatic 1	15	07-14	Wednesday
				Somatic 2	15	21-07	Wednesday-Thursday
				Dementia 2	7	15-18	Sunday
Björkås	1993	2103	Suburb		24		
				Somatic 1	10	13-21	Wednesday
				Somatic 2	10	07-15	Friday
				Somatic 1	10	21-07	Monday-Tuesday
				Somatic 2	10	11-14,30	Saturday
Solängen	1993/ 2007	1764	Rural		20		
				Dementia 1	6	14-21,30	Thursday
				Somatic 1	7	07-15	Friday
				Somatic 2	7	11-14,30	Sunday
				Mixed	20	21-07	Monday-Tuesday
Kviberg	2001	4060	Suburb		72		
				Dementia 1	8	12,45-21	Thursday
				Somatic 1	16	07-15	Wednesday
				Somatic 1	16	21-07	Thursday-Friday
				Dementia 1	8	15-18	Sunday

Some preliminary findings

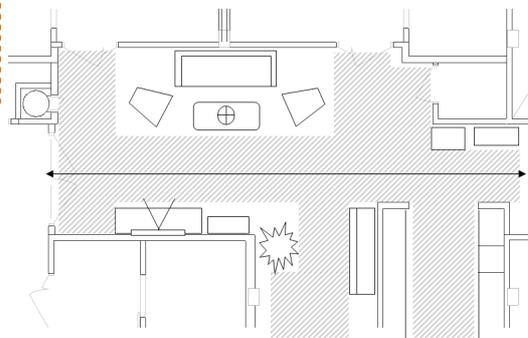
This paper presents four types of preliminary findings. First of all, quantifiable material about the physical environments, organizational aspects or about people has been found and systemized. Secondly, areas of interest that may be related to use and usability have been found. Thirdly, there is an abundance of stories. The fourth type of finding is the knowledge that subsequently derives from the other three and from experiences from the observations as a whole; notion about the daily life in the studied facilities.

The facilities

Localities and equipment differ between the facilities and units. Common areas (drawing room, dining room, kitchen) vary in size between 40-110 sqm/unit. On three facilities, the common areas are smaller on the dementia units than on the somatic units in the same facility. Only in 5 of the units, the kitchen is

separate from the drawing room. This has implications on noise and disturbance, as residents suffering from dementia or/and anxiety are likely to get agitated from noise from e.g. dish-washers (Ragneskog 2004). There are also safety implications since the same residents tend to pluck with different things, like kitchen utensils, knives etc. Communication areas account for a great part of the studied areas. This may have implications on usability and effectiveness, while there may be competition about the areas between staff and residents.

Figure 2: The hatching shows communication areas in a combined TV- and drawing room.



The number of residents varies between 6-16 per unit, in dementia units between 6-9. This makes an average of 9,5 residents/unit in the selection. 131 residents have participated in the study: 41 on dementia units and 90 on somatic units. The average age when moving in was 85,21 years and the average time of residing around 3 years. The longest residential period was 17 years at the time of the observation. The youngest moving in was 61 at the time and the oldest 100. The oldest 5 individuals will celebrate their 100:th-102:nd birthday in 2010 and 60 individuals will turn 90-99 years old. During the observations, staff have worked 100 shifts, with an average of 8,3 hours. The highest manning has been between 12:00 and 16:00.

Sanitary utilities for handling bedpans etc are lacking in 7 units. In 4 of these, the utilities are common for two or more units and accessed from a neutral space, in 3 cases through another unit. There are laundry rooms in 7 units. The others have access through other units or neutral spaces. In 4 units the laundry room is combined with other sanitary utilities. Waste and recycling rooms are in 7 units located with access from outside. In all units, waste is stored in either the rooms for sanitary utilities with the dirty laundry or in rooms intended for other purposes. In one case waste and dirty laundry was stored together with household articles with the door immediately opening on to the kitchen and dining room. The lack of waste disposal area on the unit has resulted in this solution. The smell sense gives us bad or good feelings and is difficult to seal off, like bad smell from diapers or garbage in a dining room. This affects usability and user satisfaction.

Figure 3: Provisional documentation space in residents' drawing room.



Photo: Morgan Andersson

In 6 units there are separate rooms for documentation. The rest have common rooms for the facilities. On one of the studied dementia units, there is no room for documentation or any kind of paper-work, which has led to a provisory, where a part of the drawing room has been transformed into an office for the staff. On a somatic unit in the same facility, there is an open documentation area with only curtains towards the corridor, labeled “writing room” on the drawing. Documenting of residents’ status, ordering goods, keeping in contact with relatives etc requires physical space. This may have implications on usability, since a desired function is lacking.

Lighting and coloring of walls, floors and furniture vary in many aspects. On one somatic unit, observed throughout the day, only 3 out of 24 lights were on in the corridor. It was in the middle of the winter and there were only 3 windows in the corridor. This is related to the quantity of natural and artificial light but also to routines. How lights are placed, how they fulfill their purpose and if they dazzle are quantitative aspects. All people suffer from lens confusion at old age, meaning blurred vision and increased negative sensitivity to dazzling (Brunnström 2004). It is evident that the orientation capability is affected by the visual environment. Research has shown that we keep our color perception into old age and that it also applies to people suffering from dementia (Wijk 2001). We also know that lighting affects the health of night working staff (Santhi, N et al 2008, Navara et al 2007). Colors and lighting has therefore a great significance in the studied environments, affecting how the localities are perceived. This may be related to usability and satisfaction. The acoustic environments differ in quality due to the properties of indoor surfaces and to type of plan. Most of the facilities have an open plan for kitchen, dining room and drawing room, which affects the acoustic quality in the common areas.

Work tasks for the night staff differs greatly between the facilities. In one facility they put residents to bed, made three night rounds, did the laundry, baked, wiped the floors and made breakfast. In another facility all residents slept or were in their apartments when the night staff arrived and they then made three checking-up rounds during the night. This of course has implications on the work load of the night staff as well as for the daytime personnel, but may also affect the use of the localities in terms of the degree of use.

A view that is often expressed by the staff is that the use of the common areas is more frequent and more evenly spread over the day on dementia units, while on somatic units, they are less frequently used and almost exclusively at meals or other common activities. This has to some extent been confirmed by the observations, but has to be further analyzed.

The principle of Aging-in-Place is consistently applied. If a resident in a somatic unit is diagnosed with dementia, he or she may stay in the unit. In 1992, the municipalities took over the responsibility for old and handicapped from the regions (Swedish Government 1990). This also meant that the patients became residents with own contracts and apartments of their own. A government committee suggested already in 1956 that “The measures in the eldercare must primarily, to the greatest extent and with all means focus on helping the old to live independently and as long as possible in their own homes without too much personal pressure” (SOU 1956:1). This was ratified by the parliament in 1957 and is still valid. This has implications on how we design special dementia units. It also puts the questions about efforts and costs put into research and construction for the target group of users in facilities specially made for them.

Three main groups of documents are identified or used in the project. Firstly there are pictorial representations of the environment. Photos are used in combination with other methods (Fangen 2005). Drawings are depictive and more or less historical and provide with both quantitative and qualitative data (Patton 2002). Secondly we find other descriptive documentation about the premises and activities along with routines and design, building and rebuilding processes. Thirdly governing documents on different levels, scanned to explore present use and original purpose of the facilities. They may also assess the prerequisites of the environments and illustrate changes in connection with redesign, renovation or changed use. Governing documents on three levels have been identified. 1) Supra-national and national documents, including government, UN and WHO documents. 2) Regional and Municipal documents, covering eldercare and health policies, security and building routines. 3) Local document in

three sublevels: a) district committee level, b) facility level and c) unit level. Many operational goals and policies are found here.

An assisted living unit for the old

Most daily activities on the assisted living facilities follow routines. The description of this evening shift is derived from observations a dementia unit for the old on December 17:th 2009, between 13:00-21:00. The annotations are processed to make a coherent story and do not represent all annotations during the shift. Citations or direct transcriptions are written with quotation marks. The sources are direct observations, conversation with the staff and additional documentation, like schemes, photos, written routines or policies. I have been dressed in private clothes and clearly visible by residents and staff.

Table 2. Overview of age, residential period and mobility status in the presented dementia unit.

Resident	Age (2009)	Mobility status	Moved in	Res. period 2009-12-17
Monica	95	Walks without aid. Has her meals in her apartment.	2009-08-12	8 months
Mabel	87	Walks without aid.	2005-10-01	4 years, 3 months
Mary	94	Walks with a cane.	2009-01-20	11 months
Nanny	79	Sits in a wheelchair. Needs help to move around and to get into the wheelchair.	2008-07-15	1 year, 5 months
Anna	86	Sits in a wheelchair. Needs help to move around and to get into the wheelchair.	2006-03-15	3 years, 9 months
Bill	89	Sits in a wheelchair. Needs help to move around and to get into the wheelchair. Has his meals in his apartment.	2009-07-01	6 months
Charles	90	Uses a walker.	2009-08-10	4 months
Ted	74	Sits in a wheelchair. Needs help to move around and to get into the wheelchair. Has his meals in his apartment.	2007-02-12	2 years, 10 months
Tom	62	Sits in a wheelchair. Needs help to move around and to get into the wheelchair. Has his meals in his apartment.	2008-10-13	1 year, 2 months

The evening shift

Nine residents with diagnosed dementia live in the unit. Table 2 gives an overview of their age, mobility status and residence period. All names are fictitious. Four women work between 13:00-15:00, when two get off. One of them alter between two units during the evening shift. Nanna works 7:00-15:00 and lives about 3 km away. Lotte works 8:00-15:00 and lives in the immediate vicinity. Hannah and Elisabeth

work the evening shift 12:00-21:00. Elisabeth lives in the city centre and Hannah lives close to work. This is one of three dementia units located on the top floor in a four storey building with a basement. Ground floor consists of a secured entrance with electronic passage control, administration, activity premises and staff functions and three upper floors are for the units. The staff refers to the floor as “the unit” (*avdelning*) and to the unit as “the section” (*enhet*). In this paper, the unit represents the group, described here. Five staff members work on the three units in the evening, which means 5 residents per staff member between 15:00-21:00. There are no common guidelines for dimensioning the manning in relation to number of care takers in assisted living in Gothenburg. The manning is based upon estimation of the total workload and is individually applied on each unit (Mårtensson 2010).

The daily routines in this unit follow the sequent scheme, with few exceptions. Almost every routine is documented in the “Yellow Binder”, with information about food preferences, defecation etc. Breakfast is served from 9:00. Everyone gets their meals as they have done their morning toilet. Some get their meal in their apartment and some eat in the dining room. Night shift doesn’t prepare the breakfast. Between 9:00-10:00 staff have their breaks. If there are social activities in the house, some residents leave the unit, e.g. at 12:00, when there occasionally is coffee with entertainment in the ground floor café. It is very calm until 12:00, when coffee with cakes is served and evening staff start their shifts. Most residents visit the bathrooms, with or without help. After the coffee it is calm until 14:00, when there’s lunch. Lunch and evening meal is fetched in an adjacent building at about 13:30. It is transported in canteen wagons with heaters. There may also be social arrangements in the afternoon. Snacks are served at 16:00. After lunch some residents are helped to the bathroom or put to bed and it is very calm in the common areas of the unit. Between 14:30 and 15:00, the evening-staff have their break and it is again very calm in the unit until 18:00, when the evening meal is served. Some residents are already in bed and some are put to bed shortly after the meal. After 19:00, few residents are seen in the common areas as the staff make their final round in the apartments. If someone is still up, refreshments are served during the evening. Report to the night shift is given 20:50-21:00. The night shift makes three rounds, at 21:30, 02:30 and 03:30. Medicines are administered at 06:00. Alarm calls are continuously answered during the shift.

I sit in the dining room at 13:00. Hannah tells me that she has worked here for 10 years. She and Elisabeth are preparing lunch. The dish-washer is noisy. All ceiling lights are on. At 13:20, Nanna, Lotte, Mary and Mabel are sitting in the sofa in the combined TV- and drawing room and talk with a male nurse from the other unit. It is tidy and decorated, with electric candles, stars and a Christmas tree. There are no paper sheets on the chairs and table cloths on each table. Ted’s wife is visiting him in his apartment. At 13:35 staff and residents are watching the comedy show *Albert & Herbert* on a DVD. It is calm and peaceful. No one is calling or shouting anywhere, but Monica’s TV is making a mumbling sound through the slightly ajar door. The sound absorbing ceiling is muting the sounds. She changes channel. It is a subdued beige tone in the common areas, broken by the dark blue color around the entrances to each apartment. Anna, Nanny, Charles, Mary and Mabel are sitting in dining room awaiting the lunch to be served.

The bright blue canteen wagons are pushed into the unit from the elevators at 13:50. Hannah, Elisabeth, Nanna and Lotte empty the wagon and put the stainless steel canteens on a serving trolley, from which the food is put on dishes by the staff and served. The wagon has a cool compartment at the bottom and a warm at the top. Elisabeth puts the evening meal in the fridge. A delivery with household articles arrives at the entrance. The delivery man is thickly dressed in outdoor clothes and draws the pallet truck over the linoleum flooring. The truck makes wet marks from the snow outside. Lotte signs the delivery and returns to the lunch. The delivery man leaves. To get to the units on each side, you can either go outside over the balcony or pass through our unit. Since there is a threshold to the balcony, deliveries are easier the indoor way. The same applies for residents, staff and visitors to the other units. The doors between the units are always wide open.

The staff are serving lunch or helping some residents. It is 14:00, quiet and peaceful. No residents talk to each other during the meal. Hannah and Elisabeth take their break in the report room on the adjoining unit. It’s easier than going to the lunch room on ground floor. Lunch is over and Lotte pushes the wagon to the elevator. Around 14:30 it starts to get dark outside. The dining room is empty, ceiling lights

turned off. The dish-washer makes a noise. Ted's wife empties his tray in the kitchen and washes her hands in the wash basin beside the sink. At 14:40 Hannah and Elisabeth return from their break and turn on the light. Some minutes later Nanna and Lotte leave the unit. "Bye, bye!" Hannah joins me in the dining room while Elisabeth washes the kitchen floor. "Kitchen and laundry room are washed every day, but apartments only every other week". There are separate rooms for laundry, recycling, sanitary utensils, linen, paper goods and documentation.

At 15:00 it is dark outside and Mabel is alone in the TV-room. TV is turned off. The beige tone is turning more reddish. The room lacks windows. People are passing through all the time - to go to the elevators or to the waste shaft. This is installed in a corner of the room and common for two units. Several times a day the shaft is cleared, making a noise. A curtain covers the shutter. On the drawing this room is marked "corridor". Originally there were two separate units on this floor. A rebuilding project in 2005 resulted in a solution with three units. Elisabeth and Hannah are preparing the evening meal. They have helped the residents in their apartments and it is now 16:00. I walk to the window and my reflection meets me there. The illuminated balcony looks yellow through the window. Through my own blurred face reflection I see the bright city, partly obscured by the neighboring buildings. The windowsill is placed 120 cm above the floor with windows facing the glassed balcony. This means that I have a limited view through the windows when sitting down. The balcony ceiling also limits the vision of the sky.

The door to Monica's apartment is open and her TV is on. Charles watches TV with her, which he usually does in the evenings. Sometimes Charles goes to the neighbor unit to admire the view from the window. The view is better there. Ceiling lights are very strong in dining room and TV-room. Elisabeth, Mabel and Mary are watching TV from the sofa. It is now 17:00. Charles goes to the dining room table to sit down. He tells Hannah that he does cross-stitches and gymnastics and that he "doesn't want to watch TV all the time!" A lady from the neighboring unit asks me how to get home. I show her back. By 17:45 Elisabeth starts to serve supper from the trolley. Only Charles and Mabel are eating in the dining room. The others eat in their apartments or are being helped. Mahalia Jackson sings "Oh, little town of Bethlehem" on a CD.

The waste shaft is suddenly cleared with a roaring sound that lasts for 15 seconds. After supper Elisabeth and Hannah help the residents in the apartments. Some are put to bed and some are helped to the bathrooms. It is quiet. The ceiling light is now dimmed and only Mabel goes in and out of her apartment. TV-sets are on in some apartments and someone is calling "Help!" It is 19:30 and it is still very quiet. Me, Hannah and Elisabeth are sitting in the sofa. The TV is turned off. It has been turned off for most of the evening. At 20:00 Elisabeth dims the light in the dining room and starts the dish-washer. The sound dominates the otherwise quiet environment. At 20:10 Elisabeth switches on the TV. We watch TV together until the night shift arrives at 20:50. The snow is falling outside and it is seven days till Christmas.

Discussion

The ISO-definition of usability is: "*Effectiveness, efficiency and satisfaction with which a specified set of users can achieve a specified set of tasks in a particular environment*" (ISO 9241-11). It contains three ingoing parameters: users, environments and tasks. In this study, users and operating environment are fixed while tasks vary. Alexander (2006) describes three factors determining usability - effectiveness, efficiency and satisfaction: Effectiveness is described as the ability of the artefact to deliver a certain effect. Efficiency means that the artefact allows the user to perform easily and with use of little resources. Satisfaction describes the user's feelings and attitudes towards the artefact and its effects. By relating this approach to the study, the artefact in this context is the studied environment and its ingoing elements. Effectiveness can consequently only be assessed if we know the effect the environment is supposed to deliver, delivers, or is perceived to deliver. Likewise, efficiency can be measured only by comparing what is, or considered to be, ideal, optimal or best practice with the perceived reality. To assess satisfaction it is necessary to define the users and ask them what they think about the environment.

A number of observations have been accounted for in this paper. Numerous questions can be formulated as a result of the gathered material, in different ways related to the architectural design and the physical environment and its components. The aim has been to study and describe the facilities and the daily use going on in them. The rich material exemplifies diversity in use. To relate this diversity to aspects in the physical environment will be the focus in the sequent interview study. In order to relate the results to usability aspects, knowledge development in this field must consider the specific conditions for use in these specific environments.

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