FORGET-ME-NOT

PROCESS REPORT

Linnea Forss
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ABSTRACT

This master thesis deals with the design of a new service system for nursing homes that aims to improve mealtime experiences focusing on aspects related to communication and social interaction.
The project is based upon qualitative data collected during fieldwork studies at a nursing home revealing that barriers to communication between residents and caregivers exist and it is contributing to isolation and lack of togetherness among residents.
From an empathic design approach and use of service design tools, the service “Forget-Me-Not” is designed as a tool to trigger and support face-to-face communication benefiting both residents and caregivers. The service is delivered through a big touch screen to be used in common areas hanging on the wall or as brought to couch areas. The main touch point is an application with the two modules “Icebreaker” and “Life stories”. Both modules provides visual means for communication, where the former provides topics for conversations that are easy to grasp, and the latter focus on the life stories of the residents as basis for more personal and deep conversations. Improving mealtime experiences by a focus on social interaction further touches upon preventing problems of malnutrition, which is a problem in Danish nursing homes in general. This is based on the notion that sitting with people you know and like makes you sit longer at the table and possibly eat more.
Test results showed that a lo-fi prototype of Forget-Me-Not contributed to trigger and improve communication, generated more conversations, and further contributed to caregivers learning more about residents. However, further tests with a digital prototype of the service must be carried out to measure success more carefully.

Scenario from a nursing home in Denmark

"At our nursing home the residents eat together around small tables of four people. At one of the tables Gerda, Anna, Dorit and Ingrid sit. The four usually eat together. The food tastes delicious. They enjoy it and pay compliments to the staff. When Gerda gets sick and cannot participate at the mealtime, the three remaining women do not think the food tastes good anymore. When Gerda dies they are generally dissatisfied with the food and regularly make complaints. The woman who moves into Gerda's old apartment does not eat nicely and the three women are still not satisfied with the food. After they have "beaten the new in place", they are happy with the food and again start praising the staff."

(Kofod, 2005, p. 38)

PREFACE

This master thesis is written by two project group members, and is the final project of the Master's programme in "Service Systems Design" at Aalborg University, Copenhagen. The project was conducted between February and May 2015 in close cooperation with the client nursing home.

The purpose of the thesis is to design a (product) service system while mastering the service design skills obtained during the two-years' Master's programme.

Reading instructions

The project consists of a process report and a project report. The process report is aimed at our supervisors and examiner for assessing the process behind our service-product proposal, while the product report additionally is aimed at the client and external service provider to present the service concept and business case, and provide a framework for future technical development.

Full data set including audio files, transcripts and design drafts can be found in Appendix. The process report and project report and appendixes are also found online (See direct links in the end of this report).

Illustrations used in the report are made by the project group. Photos in the report are taken by the project group, if no other reference appears.

Keywords

Service design, mealtime experiences, nursing homes, communication, social relations, quality of life, life stories, elderly care

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Project group

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LEGEND

THE NURSING HOME

Resident 1

Resident 2

Resident 3

Resident 4

Permanent caregiver 1

Permanent caregiver 2

Substitute caregiver

Caregiver trainee

Kitchen staff

Activity staff

Administration

IT Contact

Board of directors

Service Provider

Funding organization

Relatives

LEGEND

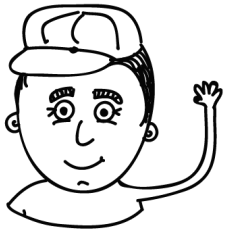
EXTERNAL ACTORS

Relatives

Hairdresser

Foot care

Food provider



Volunteers

Municipality

Kitchen staff

Service Provider

Sponsors

Funding organization

TABLE OF CONTENTS

INTRODUCTION

The proportion of elderly people in Denmark is growing. The number of people above 65 years of age will increase within 81% over the next 30 years; from 823,000 in 2006 to 1.49 million in 2045. In the same period, the population of the working age group, 25-64 years, will decrease by 14% (Dst, n.d).

In Denmark, more than 40,000 elderly people over the age of 65 years live in nursing homes, and every fourth Dane moves into a nursing home at the end of their life (Rostgaard, 2012 p. 19).

The majority of people who move into nursing homes are highly physically or mentally impaired, and deeply dependent on the help they receive at the nursing home. It is estimated that 2/3 of the residents in the nursing homes suffer from a kind of dementia, which require extra attention from the management and personnel in order to create a life where the resident's needs are met (Ældrekommissionen, 2012, p 8).

Moving into a nursing home can be a big change for the individual residents (Rostgaard, 2012 p. 8). SFI - The Danish National Centre of Social Research has completed a study about "Caring and quality of life in nursing homes" which examines if the care at the nursing homes helps maintain or even enhance residents' quality of life (Rostgaard, 2012 p. 21). The study was conducted in 38 nursing homes through observation of residents and interviews with residents, care workers, and relatives. Eight needs of caring have an influence on the residents' quality of life:

- Control over daily life
- Personal care
- Food and drink
- The apartments
- Feeling safe
- Activities
- Social contact
- Dignity

SFI's study shows that social interaction is highly important for the residents' quality of life. Another study reveals that one out of four residents in nursing homes feel lonely (Wahl-Brink, 2012). Most residents have family members or friends who visit them but about a third have rarely visit more than once a month (Rostgaard, 2012).

Moreover, food and drink is on list. The study shows that food and drink is one of the areas where there is a great potential for improving the residents' quality of life (Rostgaard, 2012). The residents' quality of life could be improved by ensuring that the food tastes and smells good. However, it can equally be by focusing on the framework for the meal in terms of shaping an environment of togetherness (Rostgaard, 2012, p. 30). The before mentioned are aspects contributing to food intake, and in the elder care it is assessed that up to 60 per cent of the elderly are at risk of becoming malnourished (Arla, 2014).

The caregivers also face different challenges, as it can be difficult to fulfil the residents' needs. In SFI's study, every 10th caregiver evaluate that they never feel they meet the residents' need for care and 1 out of 4 employees feel that the quality of care they provide is not sufficient (Rostgaard, 2012). According to the caregivers, the reasons to why 25% do not feel that they can provide optimal service for the residents are due to the following (Rostgaard, 2012 p.13):

- Time pressure
- Colleagues being sick
- Poor planning (or lack of influence)
- Lack of professional skills
- The caregivers attitude to care of the residents
- Poor management

In relation to this, every sixth employee is considering resigning (Rostgaard, 2012 p.13).

PROJECT PROPOSAL

This master thesis project has been conducted in collaboration with a nursing home, which from now on is referred to as "NH". The starting point for the assignment was a project proposal published by NH (Appendix 1). The project proposal states that NH wants to solve the problem of malnutrition for the elderly in nursing homes. NH experiences that many elderly people today are malnourished and neglected in general.

In the project proposal, the following problems are identified as being the underlying cause of neglect:

- LACK OF PROFESSIONAL TRAINING OF CAREGIVERS
- USE OF TEMPORARY WORKERS
- ISSUES RELATED TO COMMUNICATION

As a result, NH sought out students from relevant studies to help develop a solution that would solve these problems, with a focus on optimizing the caregivers' work processes and documentation processes. The solution would furthermore provide the caregivers with readily available information and knowledge about the residents' food intake and other relevant elements e.g. in terms of telling life stories about the residents' eating habits.
The solution must be prepared for a future NH nursing home since NH at the moment is under construction as a part of the municipality's modernization plan for nursing homes. The construction of NH began in 2014 where the former NH was demolished. The residents were moved to temporary buildings in another location where they live currently until the new nursing home is occupation. The new NH is scheduled to be completed in 2016. NH contains 100 apartments for elderly people.

After developing a more concrete solution, it is planned that company will take over the concept, develop it further and finalize the product for implementation.

THEORETICAL FRAMEWORK

The following section creates an understanding of the framework in which the project is carried out. Throughout the thesis references are made to the framework, which answer the questions; how it is to move into a nursing home, who moves into nursing homes and finally, what it is like to live in a nursing home.

Moving into a nursing home

Moving into a nursing home is connected with big life change for most elderly people and their relatives (Rostgaard, 2012 p. 6). They have to deal with the thought that for the majority, moving into a nursing home, means that they have come to the last part of their lives. The nursing home is viewed as "a place where people go to die" (Hockley, 2002 s.58).
Moving into a nursing home means that the elderly people have to leave their homes, which often is a place they have lived for many years and experience intimacy and security (Kofod, 2015). Most of the elderly people have either lived alone or with a spouse much of their lives. They have to get used to living in a place where they live with others that they did not choose to live with themselves (Ældrekommissionen, 2012). Furthermore, the majority of the elderly people who move into a nursing home need help with personal hygiene. The combination of the fact that they cannot perform these activities themselves anymore, on top of the new physical and social environment can create indecent exposure and a sense of worthlessness (Hall. 2012).

Aalborg Kommune has in relation to the design of "The future nursing" developed a hypothetical model, called "Livsfasemodellen" ("The life phase model"), which illustrates the stages of life a nursing home resident tendentiously will go through (Fremtidensplejehjem, n.d.).

The residents will go through five stages:

Crisis: The starting point is a problematic situation of change and the resident will experience a crisis.

Healing: The resident will reach a turning point where he has to adapt himself to the nursing home.

Efflorescence: In this phase the residents' needs and wishes appear, their senses and abilities are being revived, and untapped potentials are found.

Refugium: The resident has a need for a sanctuary with silence and contemplation.

Hospice: In this final phase the resident takes leave of life.

On average, a person lives in a nursing home for 30 months (Ældrekommissionen, 2012 p. 18-19).

Who moves into nursing homes

When elderly people move into a nursing home, they are on average almost 84 years old (Ældrekommissionen, 2012 p 18). Their need of moving into a nursing home is a result of physical or mental disability, which have caused them to no longer able to fully maintain their own home (Hall. 2012). The elderly often have experienced losses that affect their lives, such as the loss of skills, friendships or relatives (Ældrekommissionen, 2012 p. 26).

Dementia

One of the main reasons why elderly people have to move into a nursing home is that they suffer from a type of dementia (Ældrekommissionen, 2012 p 8).
Dementia denotes a number of symptoms of deteriorating brain function. It appears mainly by poor memory and reduced ability to function in everyday life (Servicestyrelsen, 2008).
Three different types of dementia exist (Servicestyrelsen, 2008 page 21). The primary type is degenerative dementia (such as Alzheimer) which is the most common form of dementia. This type of dementia may be hereditary or caused by age. The second type of dementia is secondary degenerative dementia, which can be caused by alcohol, blow to the head or infections. The last type of dementia is blood vessels dementia (vascular dementia), which can be a result of a stroke.
The symptoms of dementia are psychologically and will show as delusions, misinterpretation, insomnia, and anxiety but also behaviourally such as physical agitation, verbal aggressiveness and wandering (Servicestyrelsen, 2008). According to the specialist Naomi Feil, the progression of dementia as and illness can be divided into four stages (Ivarsson, 2015 p. 81)

Stage 1: *Poor orientation*
The person is unsettled and has an incorrect assessment of reality. Difficulties with everyday tasks occur and the person often expresses irritation and aggression.

Stage 2: *Time confusion*
The person will loose their cognitive abilities, experience difficulties in time perception and worsening of the ability to walk, dress and eat.

Stage 3: *Repetitive behaviour*
Their speaking ability disappears.

Stage 4: *Vegetate*
The ability to communicate, eat and control their bodily functions will stop.

Reminiscence

For people with dementia, activities and social communities are fundamental aspects to obtaining a meaningful life (Servicestyrelsen, 2008; Kofod, 2015 p. 122).
In addition, people with dementia, can take great pleasure in focusing on memories from the early years of their life through reminiscence. Reminiscence is about creating memories and recollections by introducing objects from the past or showing the person's life story. The person hereby has their senses stimulated and help the person to evoke memories. The goal of working with reminiscence is to maintain a sense of identity and increase quality of life (Socialstyrelsen, n.d).

To live in a nursing home

The residents of a nursing homes are often very weak and dependent on help from others, and they are therefore in a vulnerable position (Ældrekommissionen, 2012). Due to this, there is a strong focus on maintaining and / or increasing the residents' quality of life. Several studies have been conducted about quality of life for elderly in nursing homes and most indicate, that there is a positive correlation between firstly; the quality of life and the feeling of being valued and secondly; to enter into social relationships and to have friends and get their support (Rostgaard, 2012).

Social death and loneliness

Moving into a nursing home often has consequences for the elderly's social life and identity. In the last years of the elderly's lives, many experience that their body fails when they try to take part in the world around them. The problems with their body isolate them in their homes, and thus isolating them from social encounters (Kofod, 2015 p. 7). Slowly they loose initiative, their social life dies out and they get lonely. To die socially settles your identity (Kofod, 2015 p. 8).

To be lonely can be seen as a hidden disease. People who suffer from loneliness have an increased risk of depression, do not exercise and tend to have bad eating habits. As a result, they are more likely to catch common illnesses like the flue, or to come down with other seriousness illnesses (Wildevuur, 2013 page 93).

Malnutrition

Besides loneliness, malnutrition is a big problem in nursing homes. A large proportion of elderly Danes do not eat properly. Nearly half of the senior citizens who receive home care or live in nursing homes experience unplanned weight loss. The weight loss has serious consequences for the elderly people's physical, mental and social functional ability and over time it can lead to lower quality of life (Bügel, 2015). Besides these human consequences malnutrition also has economic consequences for the society, for example in terms of longer and more hospital stays (Arla, 2014).

There are several reasons to why elderly are malnourished. With age, the human anatomy changes which influence the food intake. It includes poor dental status, problems with swallowing, change of the tongue taste receptors, reduced smell and sight, the feeling of satiety increases while the feeling of hunger is inhibited and loss of memory occurs. Additional factors like economic, family and social conditions have an impact on the elderly's food intake (Bügel, 2015).
Several aspects must be fulfilled in order to provide the elderly people with the best meal experience possible. Keller (2014) has developed a conceptual model of "Making the Most of Mealtimes" (M3) for elderly people in nursing homes (Keller et al. 2014).

Mealtimes - A conceptual framework

Figure 1 provides a conceptual framework for mealtimes and for linking malnutrition, loneliness and quality of life.

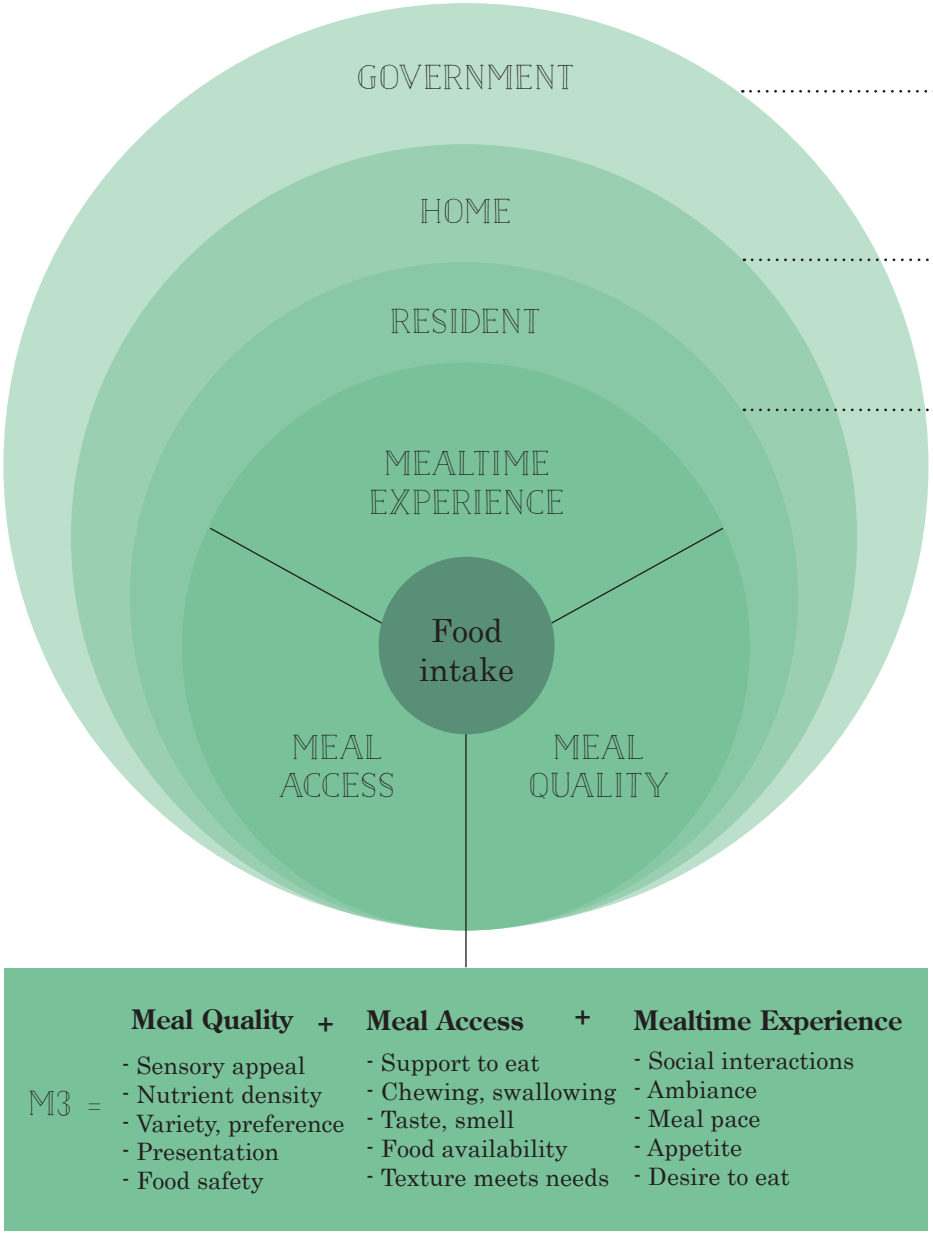
The M3 framework describes three main aspects of mealtimes in nursing homes with the intermediate outcomes of 'food intake' and ultimate outcomes of 'quality of life' and 'status' among other aspects (Keller, 2014).

The first criterion that must be fulfilled for mealtimes to provide the best outcomes (properly food intake and ultimately quality of life) is "Meal Quality". This aspect focuses on the food itself in the terms of taste, variety and nutritional composition. The next criterion is "Meal Access" that can limit food intake based on the elderly's capacity to eat, chew, swallow, taste and smell. Finally, there is the criterion "Mealtime Experience" focusing on the eating environment in terms of social interactions, meal pace, appetite and general desire to eat, which further affects food intake. With the M3 framework it can be confirmed that mealtimes are complex, and besides this framework mealtimes are further influenced by factors surrounding the resident, such as staff (e.g., training), home (e.g., dining room environment), and system (e.g., governmental food budget allocation, regulations) (Keller, 2014, p. 4).
According to Keller (2014), apathy and depression have been found to be independently associated with weight loss with long term care residents, and may be linked to the mealtime experience (p. 2).

The M3 model will serve as the framework for the description of mealtimes for this project.

The importance of staff

Mealtime is often the highlight of the day for residents, providing opportunities for social interaction as well as development of social relationships with care providers and dining companions however, many elderly people miss the social aspect during the mealtime today (Bügel, 2015). The personnel in nursing homes often try to create a "Danish family meal" which is a place where residents and personnel meet and socialize and the vast majority of residents are encouraged by the personnel to attend these meals (Kofod, 2015 p. 102). During the meal the personnel have an important task of preventing that the meals lead to yet an experience of social death and even less desire to eat (Kofod, 2015).



Food budget allocation, Policy, Regulations (food, staffing)

Menu planning; food sources, food production/delivery, food/dining handling policy
Model of care, seating, physical environment, staff ratio, time for dining activities, staff training
Professional support (e.g. dietician, speech)

Dementia, depression, disease state, disability/functional dependende, medication, dentition/oral health, communication capacity, tablemate compatibility, gender, ethnicity

Figure 1. *The M3 model for "Making the most out of mealtimes" (Keller, 2014)*

CAREGIVERS' EDUCATION

The caregivers at the nursing home have a social and health education (SOSU). The education includes two steps, where they first finish as SOSU helper (after 2 years) and then SOSU assistant (Takes almost 3 years). Not all choose to become an assistant (Ug, n.d).

DELIMITATION

All research presented in this thesis is conducted at NH nursing home between February and May 2015. During this period, the nursing home was located in temporary buildings in two different locations.

- This study has only been conducted in only one of the locations. On this location, the field research is conducted and based on five floors.
- Observations and tests were primarily conducted on the 5th and 4th floor.

In total, 32 people have been directly involved in the design process (i.e. interviews, focus group, co-creation workshop or tests). These include: 14 caregivers, 9 residents, 4 kitchen personnel, 1 physiotherapist, 1 nurse, 1 manager, 1 relative, and 1 external expert. In addition to this, more caregivers and residents have provided input for this project based on 20 hours of observations.

VALIDITY AND RELIABILITY

Validity refers to how true the claims made in the study are or how accurate the interpretations are. Reliability signifies the overall practice of conducting research in a systematic manner and whether the results of the study are repeatable (Bryman & Bell, 2007).

As there does not exist "one right answer" to how to go from A to B in the design process, it is impossible to establish accurate measures for stating the causal relationship between variables leading to conclusions. However, some general considerations are relevant to note.

Validity was throughout this project improved by using direct quotes and observations as main input for synthesizing findings, leaving only some areas to interpretation. Validity was further constructed from comparing data with theoretical material and secondary research related to the same areas.

Limitations were found in the access to informants, especially residents, whom it was difficult to interview. Also, it was difficult to establish contact to relatives, as NH in general did not have much contact with many of them, and they were acting as intermediate between the project group and the participants from NH.

Reliability was constructed from collecting data from many different sources and informants. It made it possible to triangulate data, which insured that the conclusions derived from different sources. Constraints include the limited timeframe of four months, which reduces the reliability where longer studies might have provided more systematic answers. Only one of the two locations of NH was included in the research due to time constrains, whereas the reliability would have been improved by including both.

SERVICES AND THE ROLES OF SERVICE DESIGNERS

The world is changing. In recent decades the developed economies have moved from an industrial economy to a 'service economy' (Meroni & Sangiori, 2011, p. 11). Corporate strategies are more and more challenged to bring production in line with complex demands, which require a substantial shift from the production of goods to the provision of knowledge-intensive systemic solutions (Morelli, 2002). Services have unique features that differ from those of products. Services are not tangible, cannot be stored or owned, consumption happens at the same time as production and they are complex experiences that happens over time (Mouritz, 2005).

All these factors have changed design as a whole. Design is not only crafting details of products anymore. It is a field that designs complex and interactive experiences, processes and systems. Service systems design (or just "service design") can help organizations, both public and private, to better plan complex service systems, as service design covers not only the design of every detail that happens on stage, but also process, organization, business and preparation back stage for the whole system to work together (Mouritz, 2005, p. 40). In practice, service designers have the skills to:

> *"Visualize, express and choreograph what other people can't see, envis*age *solutions that do not yet exist, observe and interpret needs and behaviors and transform them into possible service futures, and express and evaluate in the langu*age *of experiences, the quality of design"* (Evenson et al. n.d., p. 4)

As Evenson et al. (n.d.) point out, designing "experiences" are an essential part of service design, and they emphasize the human-centered focus and intangible nature of services. The overall experiences is a combination of the experiences of all touch points, hence designing valuable touch points is another vital part of service design (Mouritz, 2005, p. 31).

In addition to Evenson et al.'s (n.d.) statement of observing and interpreting needs and behaviors of people, we would argue that a valuable aspect of service design is active involvement of participants in co-creating processes based on the premise that the client and (possible) users are experts in their knowledge and experience (Sanders & Stappers, 2008). The role of the designer hence changes from traditional ways of designing for users, to designing with users - from being a translator to a facilitator providing the right means for expression (Sanders & Stappers, 2008, p.11).

Our role at the nursing home

Returning to the case of NH, they were interested in getting design solutions from external master students, who could face the increased levels of complexity. Complexity that was difficult to cope with for a partially public organization with hierarchical structures, and where time was a scarce resource. With a new future nursing home soon to open its doors, many new opportunities arose for creating innovation and doing things differently. However, until now the emphasis had been on efficiency (e.g. by implementing LEAN) rather than in design, and inspiration was needed to translate the visions to practice. The main area of interest was to optimize the mealtime processes of caregivers to prevent malnutrition of residents and neglect in general, but where to start and would other aspects be relevant too? This was the starting point for the project group.

METHODOLOGY

This section will present the methodology as presented by Arbnor & Bjerke (2009) to outline the framework for our work in the context of Service Systems Design.

Paradigmatic framework

According to Arbnor & Bjerke (2009), the methodological approach derives from ultimate presumptions about reality and scientific knowledge available, and shapes the way we look at problems.

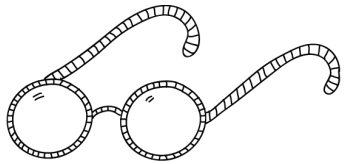


Figure 2. *The designer's glasses*

Borrowing Arbnor and Bjerke's definition we would define design thinking as a paradigmatic conditions that characterize the way designers explore, understand and get to know the artificial world and the way designers contribute to the creation and maintenance of the artificial world (Cross, 2001). Design thinking can be defined as,

> *"A deeply human process that taps into abilities we all have but get overlooked by more conventional problem-solving practices. It relies on our ability to be intuitive, to recognize patterns, to construct ideas that are emotionally meaningful as well as functional, and to express ourselves through means beyond words or symbols"* (IDEO, n.d)

Design thinking challenges conventional means of problem solving by establishing creative ways of fostering innovation and creating new business models. Design thinking is exploratory in nature and based on the premise that there is no "one best way" to move through the process, but solutions must emerge from the iterative process of generating, developing and testing ideas (Brown, 2009, p. 16). According to Tim Brown (2008), potential 'design thinkers' have the following characteristics:

Empathy
Imagining the world from multiple perspectives - those of colleagues, clients, end users and customers (current and prospective). By taking a "people first" approach, design thinkers can imagine solutions that are inherently desirable and meet explicit or latent needs".

Integrative thinking
Not relying only on either/or choices, but also exhibit the ability to see all of the salient - and sometimes contradictory - aspects of a confounding problem and create novel solutions that go beyond and dramatically improve existing alternatives.

Optimism
Assuming that no matter how challenging the constraint of a given problem, at least one potential solution is better than the existing alternatives.

Experimentalism
Posing questions and exploring constraints in creative ways that proceed in entirely new directions.

Collaboration
The increasing complexity of products, services, and experiences has replaced the myth of the lone creative genius with the reality of the interdisciplinary collaborator.

How designers know

Adding to Brown's definition of design thinking, Nelson & Stolterman (2012) refer to "Design knowing" as how knowledge is made available as an outcome determined by the primary mode of design inquiry (p. 44). Nelson & Stolterman (2012) suggest that design is based on a compound of inquiry, composed of true, ideal, and real approaches to gaining knowledge (p. 38). The kinds of outcomes available to a change process (here, change in terms of a new service system) vary widely, depending on the inquiry approach being used.
The *"ideal"* focus on knowledge that says something about how the world 'ought' to be in respect to some higher order and is devoted to the realm of norms and values. Inquiry into what is *"true"* is the most common form of inquiry and is associated with scientific thinking with outcomes perceived as truths (facts). Inquiring into the *"real"* is referring to something particular (but not universal or general) as result of action, taken through judgment, and formed by intention (Nelson & Stolterman, 2012, p. 38).

Where scientists are revealing what is true, we are as designers additionally interested in that which is ideal and what which is real. We will never be able to ground design on the idea that the 'right' design is out there, embedded in reality just waiting to be discovered. To the contrary, design will always be about creating something that does not yet exist (Nelson & Stolterman, 2012 p. 31).
We would argue that all three forms of inquiry are essential to us as designers, since although design is focused on that which does not yet exist, design has to be grounded in what is already real, as well as what is already true (Nelson & Stolterman, 2012 p. 45).

Design thinking as different from reductionist thinking

We borrow Nelson & Stolterman's (2012) ultimate believes that in design, decisions cannot, and are not, made rationally, since the world is much too complex to be understood comprehensively by rational means. In this framework Nelson & Stolterman (2012) describes design thinking as "conscious not-knowing", whereas reductionist thinking can be described as "conscious knowing" (p. 45).
As an alternative to the rational approach, design utilizes a process of composition, which pulls a variety of elements into relationship with one another. (Nelson & Stolterman, 2012, p. 22). This leads us to the "Systems" aspect in "Service Systems Design", since we would argue that "systems design" implies a strong attention towards designing systems with cultural, social and organizational dimensions, and understanding and improvement of functional members of a system in isolation from the purpose or ends of a system is not perceived as possible (Nelson & Stolterman, 2012, p. 74).

As designers, we believe that we need to view the world from this systems perspective paying attention to relationships in nature and human activity, when the purpose is to create something new, and not just to describe, explain, control or predict. From this perspective, all successful designs are compositions of elemental parts in interrelated relationships that evoke the emergence of desired qualities in its ever-changing environment (Nelson & Stolterman, 2012, p. 74).
We would argue that systems thinking provides a framework for describing the complex, interconnected and non-linear dynamics of organizational systems, while design thinking provides the framework for how to visualize and bring into existence in functional form serving human purpose (Nelson 1994 in Cliver, 2010, p. 393). In this way, systems theory describes patterns of relationships, and design prescribes unique patterns. By integrating the two, design can create new links between elements and provide new meanings of cultural and social significance (Cliver, 2010).

It is important to note that system thinking as presented here is only scratched on the surface, as a relevant aspect of design. However, we acknowledge that 'systems thinking' is a complex paradigm in itself, which requires a more thorough investigation in order to understand the term fully and provide a profound definition.

Methodological approach

The ultimate presumptions about how the world is perceived and what our roles as designers implies leads us to a methodological approach, which has a double relation in that it encompasses certain ultimate presumptions, and at the same time it provides the framework for a more concrete approach (Arbnor & Bjerke, 2009). For this project an "Empathic approach" has been adopted rooted in design thinking, while at the same time providing a concrete framework to guide knowledge creation.

Empathic approach

Empathic design is a user-centered design approach that support design teams in building creative understanding of users and their everyday lives (Postma et al. 2012). This design approach is based on the following four principles: (Postma et al. 2012).

Balancing rationality and emotions
Combining observations of what people do with interpretations of what people think, feel and dream.

Making empathic inferences about users and their possible futures
Envisioning possible future situations of product use through empathy.

Involving users as partners in new development
Users are seen as the experts of their experiences and crucial partners in building creative understanding of these experiences.

Engagement of design team members as multi-disciplinary experts in performing user research
Researchers and designers join forces in designing and conducting user research to make sure that the user perspective is included.

Operative paradigm

Following Arbnor & Bjerke's (2009) framework, methodological issues become operative activities, which is the practical part of developing knowledge (p. 7). Thus, methods and their adaptation to the context constitute the designer's operative paradigm (Arbnor & Bjerke, 2009). An operative paradigm is therefore a sort of toolbox, in which designers are supposed to collect tools and methods borrowed from other disciplines and use them according to specific design case. This toolbox is what we have tried to create by borrowing and adapting methods from ethnography, sociology and other disciplines.

Ethnographic methods

Ethnographic methods and tools have been applied to collect primary data about the organization, actors, workflows and routines.

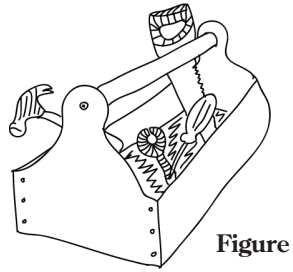


Figure 3. *Toolbox*

The main method applied is participatory observations, which has been carried out in natural settings, descriptive in nature, focusing on holism and capturing the point-of-view of those studied which match the basic principles of ethnographic studies (Blomberg et al. 1993, p. 125).

Conventionally, ethnographers "participates overtly and covertly in people's daily lives for an extended period of time, watching what happens, listening to what is said, asking questions, in fact, collecting whatever data is available to throw light on the issues with which he or she is concerned" (Hammersley & Atkinson, 1983, p. 2). However, due to time constraints and an iterative design process, the ethnographic approach has been adapted to the project timeframe and purpose. For this thesis, fieldwork studies have been conducted in shorter intervals of time during the project period of four months, and the methodology is therefore more accurately defined as "Rapid ethnography" (Millen, 2000, p. 280).

Borrowing ethnographic methods and tools helps us to understand "what is" (the real) in Nelson & Stolterman's (2012) framework - in this case understanding how the nursing home 'works' as a system of actors, cultures, and technology. The empathic design approach helps us as designers to prescribe what "ought" to be in the future based on the thoughts and feelings of the users (the ideal).

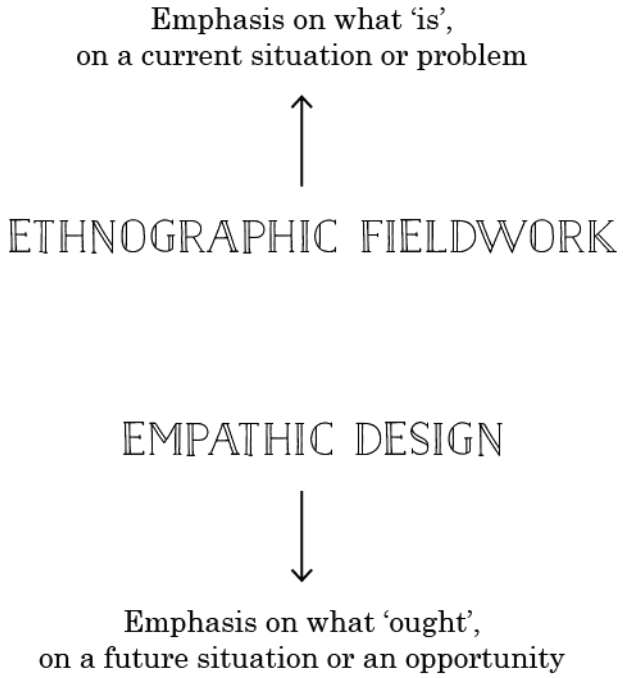


Figure 4. *Ethnographic fieldwork and empathic design. Borrowed from Steen et al. (2011).*

PROCESS MODEL & METHODS

The following model represents the design process adopted for this thesis accompanied with the methods used. It has been developed by the project group on the basis of the just presented methodologies and inspired by d.school's 'User-Centered Prototype-Driven Design Process' and Design Council's 'Double Diamond Model' (Dstudio, n.d.). The steps are intentionally not linked with arrows from left to right to illustrates the iterative way of working in repeated cycles of development opposed to stage gate models depicting that one step, or stage, should be completed before the next.

Ethnographic methods were discussed here since this is the foundation for the fieldwork in which problems are found creating opportunities for new design. However, also other methods and tools have been applied for this project, which will be presented next and explained in the following chapters according to use and problem at hand.

Figure 5. *Process model and methods used*

GAINING A BASIC KNOWLEDGE ABOUT NH

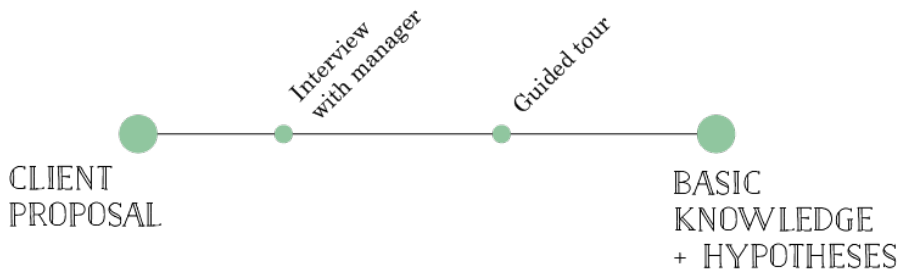


Figure 6. *Beginning the design process*

In this following section the development process begins. The first part of the process was about obtaining and understanding knowledge about NH as a nursing home, as it is now and in the future, along with its various actors and their processes.

Execution

An interview with the daily manager was conducted with the aim of achieving a basic knowledge and understanding of NH from the managers' point of view and get insights about the visions for the future nursing home 2016 that we were to design for. The interview questions was concerned with topics like the vision and goals for the future NH, the organization, the staff and the residents.

The interview was conducted at the manager's office and the duration being one hour. The interview was semi-structured, as some of the questions were predefined while other questions arose along the interview in order to get elaborative answers (Appendix 2) (Bryman & Bell, 2007).

Outcome

The interview with the daily manager specified aspects related to the organization and the different personnel at NH (Appendix 3). Based on this information an actor's map has been created (see figure 7), with the aim of providing an overview of all the actors in the current system, and identifying who might be important to know and involve in the design process (Schneider et. al, 2011).

In Figure 7 the residents are represented at the top of the diagram. Below are the different actors connected to NH, and they are divided into four levels depending on the type of interaction they have with the residents:

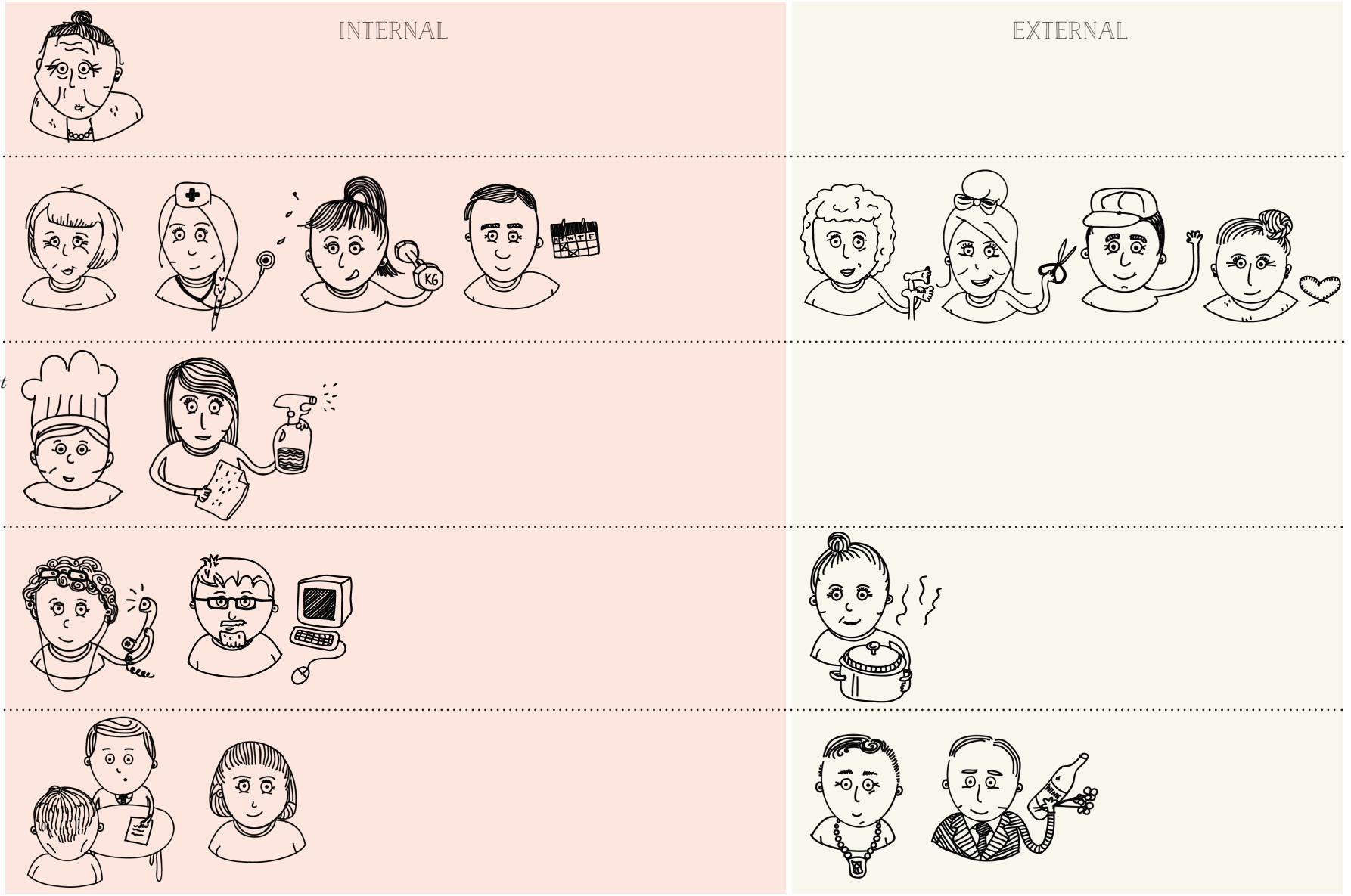
Frontline 1: *Direct contact*
The actors who are in direct contact with the residents and interact with them on a daily basis.

Frontline 2: *Indirect contact*
The actors who are also visible to the residents but do not interact with them on a daily basis.

Back office 1: *Frontline support*
The actors who are not in direct contact with the resident but support the frontline.

Back office 2: *Management and finance*
The actors who support back office 1.

Figure 7. *Actors at NH*



During the interview, the manager came up with some claims that were formulated to hypotheses, which will be explored and tested later in the process, since they might be of importance for creating a future solution;

- SOME OF THE CAREGIVERS ARE NOT ABLE TO UNDERSTAND DANISH FULLY AND HAVE CHALLENGES COMMUNICATING WITH THE RESIDENTS.

- SOME OF THE CAREGIVERS DO NOT SHOW INTEREST IN THEIR JOB, THEY ONLY WORK TO EARN MONEY WHICH COMPROMISES PROVIDING CARE FOR THE RESIDENTS.

Understanding the future NH

The vision

The board and the daily manager are currently finalizing a new vision for the future NH. The manager describes the vision of the new NH as a place where generations meet: The residents, the local community and families. The primary focus will be the life of the residents with a vision of preserving their quality of life when moving into the nursing home. This includes a higher focus on more personalized offers related to meals, care, activities and a wide variety of other services. It is important for the new nursing home, that the new NH is a place where people would like to live when they grow old.

The physical environment

The new NH will have a ground floor containing big halls for parties and gatherings, training areas and occupational therapy, a main kitchen, which will prepare all food to the residents, a café and a kiosk. The new building will include five floors each containing 19 flexible 2-rooms apartments opposed to 11 apartments with 1 room today. The apartments will be gathered around a small kitchen, a dining room and a living room. The small kitchens on each floor will be open and connected to the dining room, which is supposed to ensure easy contact between the residents and the caregivers plus providing a possibility for residents to participate in activities in the kitchen, while other residents have the opportunity to observe.

NH current state versus NH 2016

Since NH currently is located in temporary buildings there are a few differences in relation to staff, meals and physical environment, which are important to take into account when designing for the new nursing home. Below is an overview of the main differences between the current and future NH nursing home.

Evaluation

This method of interview was found useful as the interview provided the project group with a deeper insight and understanding of NH. The daily manager was able to answer the general questions asked and also guide the interview in directions relevant to her job and viewpoints. She also talk about the problems and possibilities as she experiences them.

ENGAGING WITH POSSIBLE USERS

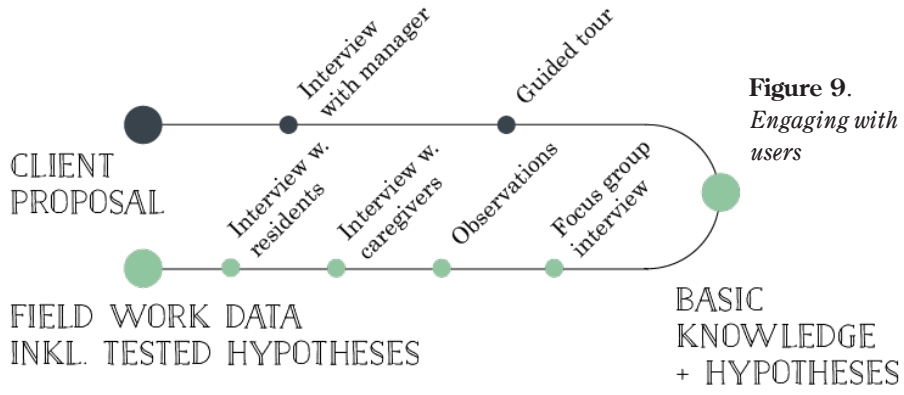


Figure 9. *Engaging with users*

When basic knowledge about NH was achieved, the next phase of the process was about engaging with the possible users of the service and thus obtaining a deeper insight in the daily life at NH to generate insights and validate the hypotheses.

Testing hypotheses

It was decided to engage the personnel at NH from the beginning in order to build awareness about the project framework and to create ownership of the project. Hereby creating a willingness among the personnel to participate in the rest of the project process. The aim was to test the hypotheses established from the initial interviews with the client and the manager which were as follows:

H1: LACK OF PROFESSIONAL TRAINING OF CAREGIVERS RESULT IN NEGLECTING OF RESIDENTS.

H2: NEGLECTING RESIDENT ALSO HAPPENS CAUSED BY TEMPORARY WORKERS

H3: SOME OF THE CAREGIVERS ARE NOT ABLE TO UNDERSTAND DANISH FULLY AND HAVE CHALLENGES COMMUNICATING WITH THE RESIDENTS.

H4: SOME OF THE CAREGIVERS DO NOT SHOW INTEREST IN THEIR JOB, THEY ONLY WORK TO EARN MONEY, WHICH COMPROMISES THE CARE FOR THE RESIDENTS.

Execution

Focus group interview

Focus group interview was chosen as the method, as it made it possible to discuss the project with a range of different employees and encourage a variety of viewpoints on the topic. Moreover, focus group interviews are well suited for early phases of new studies since the interaction between the participants may bring forward more spontaneous expressive and emotional view than individual interviews (Kvale, 2009).
The focus group interview lasted for one hour and three employees participated, each representing a type of personnel:

- An educated social and health assistant. She has worked as a caregiver at NH for 14 years.
- An educated nutrition assistant. She has worked in the main kitchen at NH for 4 years.
- An educated physiotherapist. She has worked with rehabilitation of the residents at NH for 3 years.

Picture 2. *Focus group interview at NH*

The agenda for the focus group interview was:

1. Presentation of the project group and project.
2. Explanation of the purpose of the focus group interview.
3. Introduction round of participants
4. Exercise: Facilitated discussion – testing hypotheses.

To start conversations, cue cards was made with either an open question or a (reformulated) hypothesis. The participants would take turns drawing a card and read it aloud (Appendix 4). The person who reads the question answers the question or hypothesis first. Afterwards, the other participants expressed their opinions and open discussion was generated. The participants carried out the facilitated discussion without much need of guidance and willingly answered all questions and hypothesis in an honest manner.

Outcome

The participants validated the hypotheses as followed (Appendix 5A+5B):

MY EDUCATION AND TRAINING IN DOING MY JOB IS DEFICIENT.
Confirmed

CONFUSION OCCURS FREQUENTLY DURING A SHIFT.
Confirmed

~~OFTEN MISTAKES HAPPEN IN RELATION TO THE NUTRITION OF THE RESIDENTS~~
Not confirmed

I AM TOO BUSY TO DO MY JOB THE BEST POSSIBLE.
Confirmed

~~THE NUTRITION PLANS OF ACTION RARELY WORK~~.
Not confirmed

~~BASED ON THE NUTRITION PLANS OF ACTION I DO NOT KNOW EXACTLY WHAT EACH RESIDENT SHOULD BE EATING.~~
Not confirmed

Direct quotes from the focus group interview will be highlighted and analyzed in the next phase.

Evaluation

The focus group interview was overall a valuable choice of method, as the participants were now engaged, and were willing to participate again later in the process. In general the participants had strong opinions about the subjects, which provided great knowledge and confirmed some of the hypotheses.

It was initially planned that five people would participate in this focus group interview but only three showed up, since something urgent had happened on one of the floors. The fact that only one caregiver, who have worked at NH for many years, participated provided a constrained verification of the hypothesis, which therefore needs further investigation and cannot definitively be confirmed or falsified yet. The composition of participants worked well as they each had their own perception of the different topics.

The focus group interview was only scheduled to last one hour, which meant that there was not enough time to answer all the questions in depth. It might had been a good idea to have fewer topics that could have been discussed more in depth.

Understanding the daily life at NH

After having been told a lot about the processes and practices at NH, it was found useful to see the daily life with own eyes, as there can be a difference in what people say they do, and what they actually do (IDEO, slide 8, 2014). Moreover, it was found useful to gain a more detailed insight of a typical day at NH from both the perspective of caregivers and the residents.

Picture 3. *Participant observation at NH*

Execution

Observation

Two observations were conducted on two different days in order to compare if events were typical or unique according to the specific day. The observations were direct observations, as the caregivers and residents knew they were being observed and why (Czarniawska, 2007 p. 55). The observations took place in the common areas (TV area and dining area). Actions taking place while caregivers were providing care for the residents in their rooms were not observed, as these are very intimate situations and it would be ethically wrong to intrude.

The duration of each observation day was 10 hours from 7.30, where the first residents start eating breakfast, to about 18.30 where the evening coffee is done and some of the residents are on their way to bed.

Non-participant observations

The first day of observation a non-participant observation was conducted (Bryman, 2007 p. 283). It was observed what was going on in the nursing home but there was no participation or direct interaction with the caregivers and the residents. The non-participant observation was somewhat structured since an observation template for notes was created in advance specifying time, (front- and backoffice) actions, and general notes to focus the data collection and to establish an overview of a typical day in sequential steps (Appendix 6) (Bryman, 2007 p. 283). The primary focus of this observation was the caregivers work processes and the characteristics and behaviors of the residents. The non-participant observation was preferred as a start not to interfere too much with the actors, as this might support getting a more "real" and objective picture of the daily routines.

Participant observations

On the second day of observation the project group role was participant-as-observer (Bryman, 2011 p. 454). The project group participated in various activities, such as drinking coffee with residents, being in the kitchen while food was prepared and participating in the mealtime by joining the residents at one of the tables. In these observations interactions took place between the project groups and the caregivers and residents to find out more details about the specific situation.

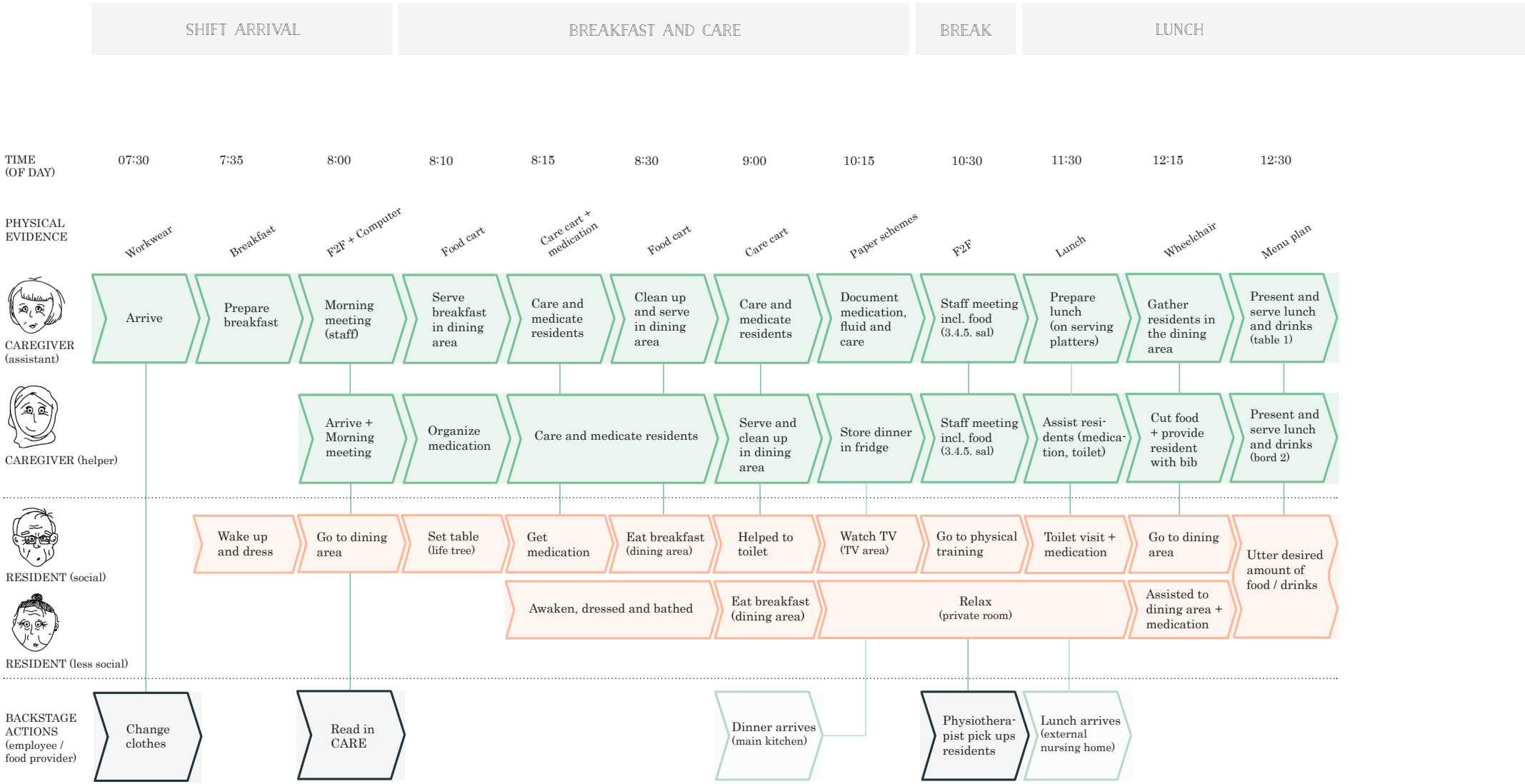
Outcome

The individual journeys of the caregivers and the residents that were captured in the observations are generalized into a blueprint that shows the macro picture of what happens on a typical day at NH (Polaine, 2009).

The blueprint takes its departure in the journeys of two caregivers as the activities of the residents are highly influenced by the chores of the caregivers and the pre-scheduled activities of the day. On a typical day, there are two to three caregivers on a day shift and one caregiver on an evening shift. Besides, there is a caregiver working night shifts, as there always needs to be caregivers present, however, this shift is left out in the blueprint, as the primary activity is sleeping and very little activity takes place.

Below, the journeys of two residents are shown in order to pinpoint the differences between residents spending most time in their rooms and residents spending more time in the common areas. Depended activities are connected with a vertical line. In the bottom lane, backstNHe actions are presented. To visualize what activities the caregivers and residents spend most time on throughout the day, the pie charts below shows estimated and approximate time according to activity extracted from the blueprint. The estimations are made based on a full day from the time they arrive/get up and go home/go to bed.

GENERAL BLUEPRINT (DAY SHIFT)



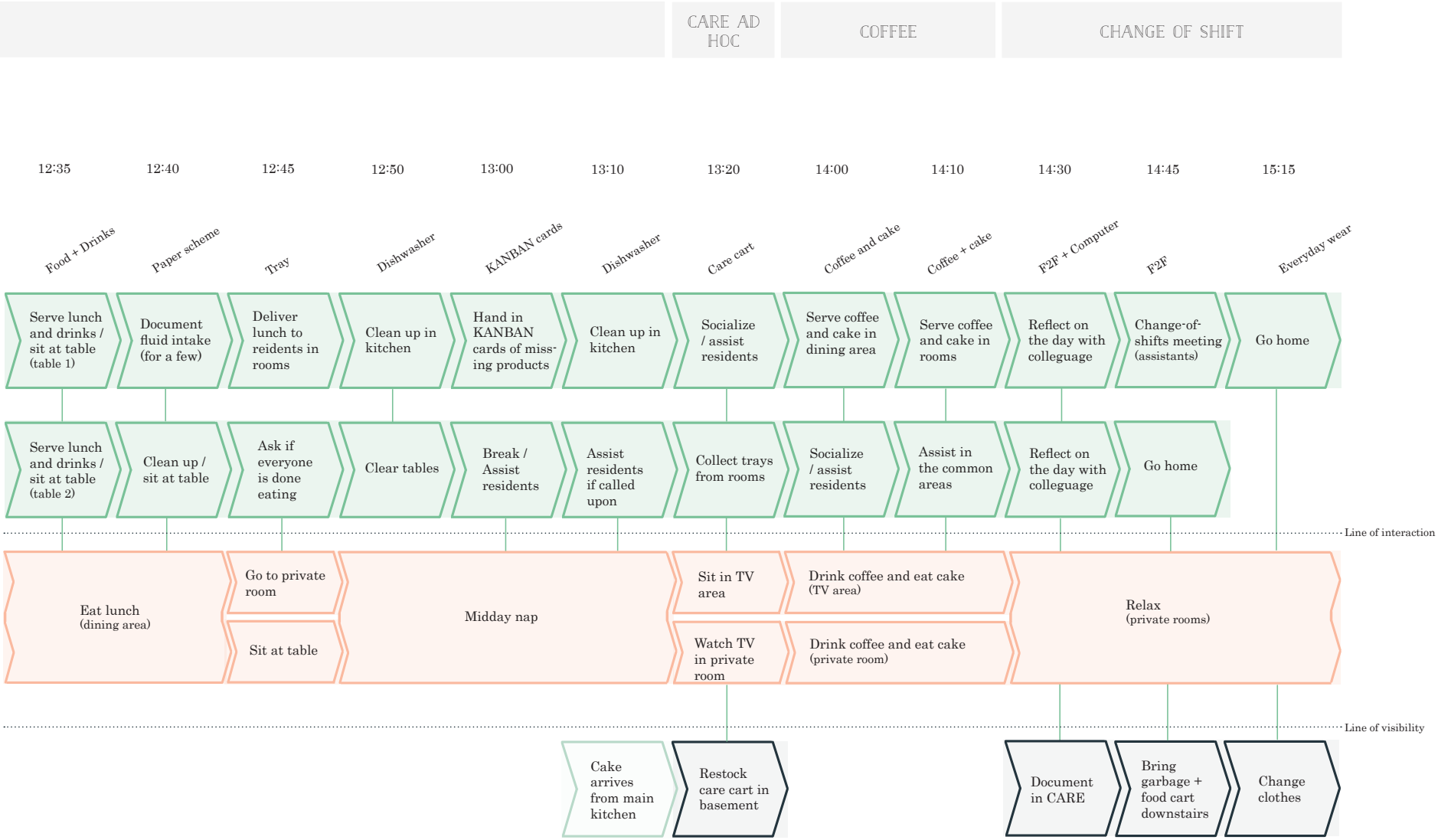
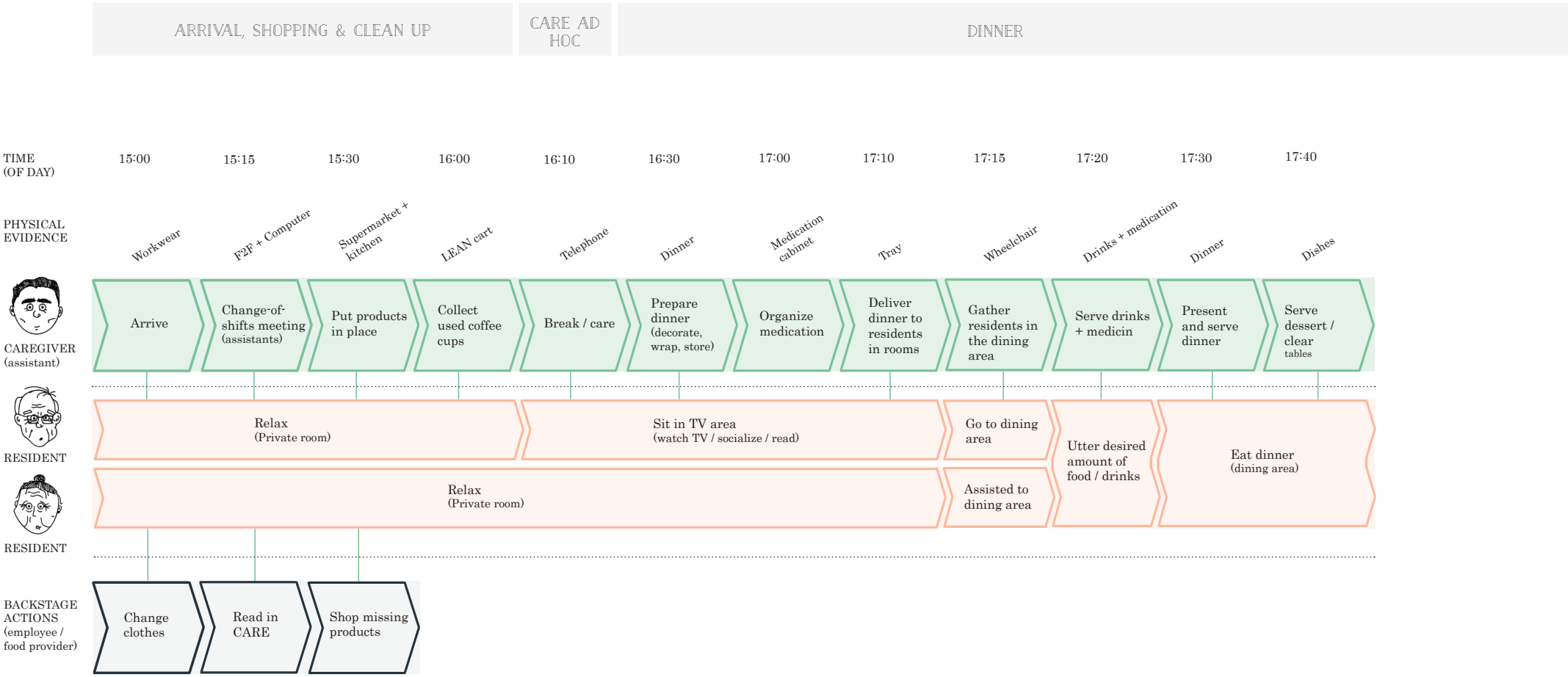
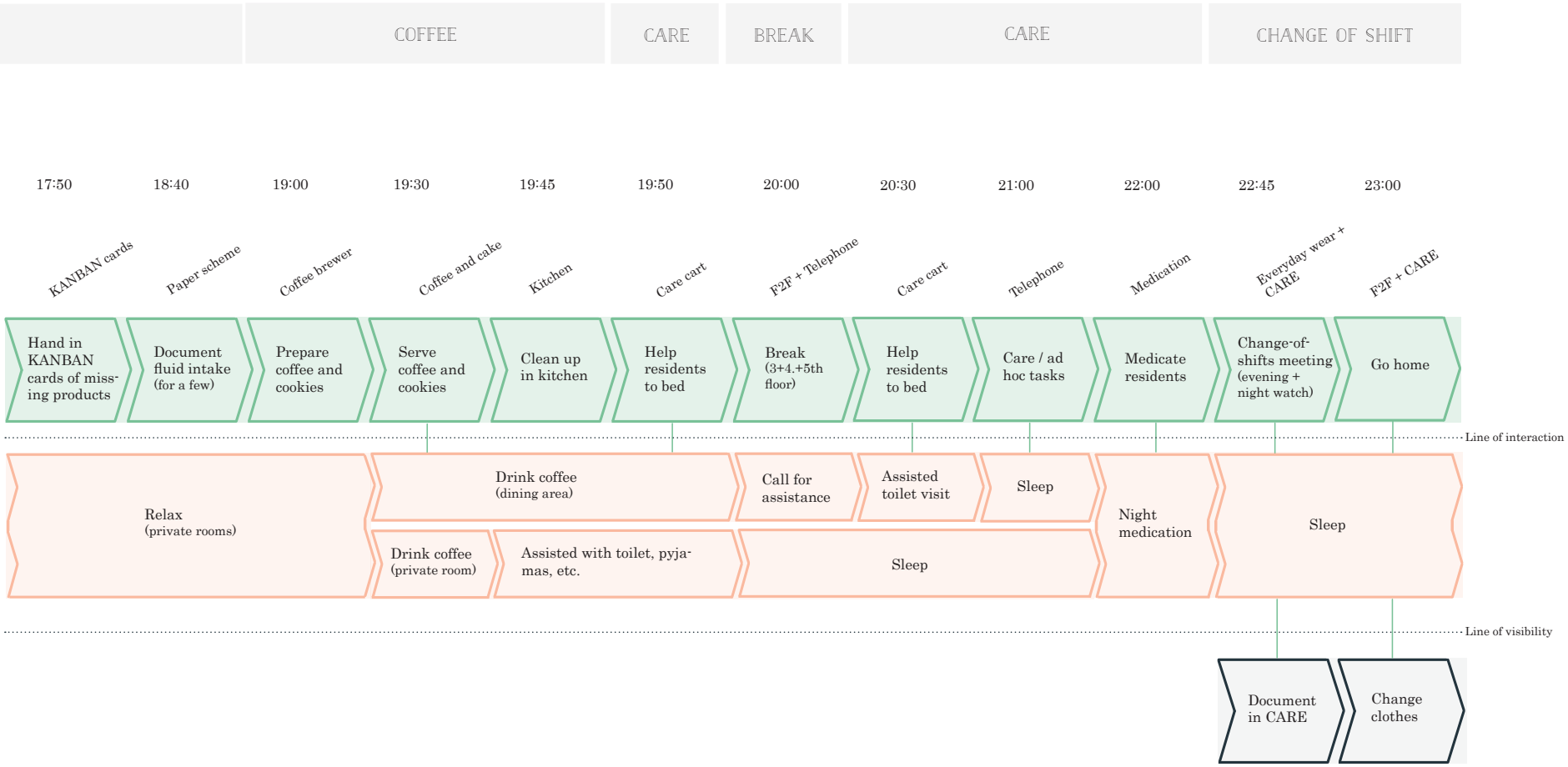


Figure 10. *General blueprint (Day shift)*

GENERAL BLUEPRINT (EVENING SHIFT)




COFFEE
CARE
BREAK
CARE
CHANGE OF SHIFT
17:50
18:40
19:00
19:30
19:45
19:50
20:00
20:30
21:00
22:00
22:45
23:00
KANBAN cards
Paper scheme
Coffee brewer
Coffee and cake
Kitchen
Care cart
F2F + Telephone
Care cart
Telephone
Medication
Everyday wear + CARE
F2F + CARE
Hand in KANBAN cards of miss-ing products
Document fluid intake (for a few)
Prepare coffee and cookies
Serve coffee and cookies
Clean up in kitchen
Help residents to bed
Break (3+4.+5th floor)
Help residents to bed
Care / ad hoc tasks
Medicate residents
Change-of-shifts meeting (evening + night watch)
Go home
Line of interaction
Relax (private rooms)
Drink coffee (dining area)
Call for assistance
Assisted toilet visit
Sleep
Night medication
Sleep
Drink coffee (private room)
Assisted with toilet, pyja-mas, etc.
Sleep
Line of visibility
Document in CARE
Change clothes

To visualize what activities the caregivers and residents spend most time on throughout the day, the pie charts below shows estimated and approximate time according to activity extracted from the blueprint. The estimations are made based on a full day from the time they arrive/get up and go home/go to bed.

Based on the blueprint and the estimated time in the pie charts it can be concluded that the caregivers are using almost all their time on chores and only a very little time on social activities with residents. It also appears that the residents are spending most of their time alone either in the common room or in their apartments.

Caregivers

- FOOD PREPARATION AND CLEANING
- CARE OF RESIDENTS
- SOCIAL WITH RESIDENTS
- DOCUMENTATION AND READING IN CARE
- PRACTICAL CHORES (LEAN)
- BREAKS
- MEETINGS

Residents

- CARE
- DINING
- NAP
- ACTIVITIES
- ALONE-TIME / RELAXATION IN OWN APARTMENT
- TV / READING MAGAZINES IN COMMON AREA

Figure 11. *Pie chart - Caregivers and residents*

The observations provided various insights, which will be addressed further later in the process (Appendix 7). Special attention was made to the following issues:

THE COMMUNICATION BETWEEN THE CAREGIVERS AND THE RESIDENTS IS SOMETIMES DIFFICULT

There were a lot of communicational issues between the caregivers and residents. The residents did not always understand what caregivers were saying and conversely.

THE CAREGIVERS FOCUS IS ON PROCESSES

Almost all communication between the caregivers and the residents concerned processes like “Are you finished eating” or ”do you want a glass of juice or lemonade?”. There were no personal conversations. The a few times that other than processes was mentioned, it was about the food.
To be a part of the meal provided an insight in that it is hard to start a conversation with the residents especially if you do not know them. The resident rarely talk unless you ask them directly and then they often only reply with yes or no.

THE MEALTIMES ARE QUICKLY OVER

There is a difference in how long the residents sit at the table during meals but in general it can be concluded that the meals are quickly over even though the meals are one of the few fixed points where residents meet.
Some residents were already leaving the meal table after 5-10 minutes, while others were leaving the table after 15 minutes. Furthermore, the caregivers did not sit at the table for longer periods of time, and sometimes not at all (e.g. for breakfast).

THE RESIDENTS ARE OFTEN LEFT ALONE

The caregivers had many practical chores, meetings and breaks that take place elsewhere than in the common space on the various floors. This often led to very empty and silent common spaces where the residents were left alone.

THERE ARE NO ACTIVITIES ON THE DIFFERENT FLOORS

It is very rare that activities are held at the various floors. The activities on NH are open for all residents to participate. This meant that there was no social cohesion on the individual floors, since they are not doing anything as a group. The only activity where all the residents of the floor meet was at the meals.

Evaluation

The two different types of observations provided different outcomes.
The first day of observation (non-participant observation) provided an insight in how a typical day is for the caregivers and the residents, in terms of processes, behavior, etc. The method was useful because even though the caregivers and the residents were aware that they were being observed from a corner in the common room, they behaved as usual and did not pay any attention to the project group.
The second day’s observation (participant-as-observer) provided a deeper insight into what it is like to be a caregiver and a resident. The opportunity to be part of a meal resulted in a change of attitude toward the meal. During the first day’s observation it was questioned why the caregiver did not talk more with the residents. By participating in a meal it was discovered that it is hard to start a conversation with residents that typical answers with yes or no.
In general, the observations confirmed the outcome of the previous interviews. The answers from the interviews will be compared with the outcome of the observation in the next phase.

Involving the caregivers

After observing it was planned to talk more deeply with some of the caregivers that were observed in order to get to know their viewpoints on different aspects related to their work. They should also elaborate on questions that had emerged during the observations. The questions specifically focused on work processes and their relationship with the residents (Appendix 8).

Execution

In-situ interviews

9 semi-structured interviews with caregivers were conducted. The nine caregivers had different educations and backgrounds and worked either day shifts or evening shifts. In addition, the interviews were conducted in situation (in-situ), which meant that the caregivers were in familiar surroundings while being interviewed and they could show us different things in the nursing home to compliment answers rather than only explaining.

Outcome

The interviews provided answers to the questions that had emerged in the process so far, as for instance characteristics of the residents' diseases and behaviors (Appendix 9). Moreover, they provided answers of why they had chosen that job, and what they liked and disliked about it, which would indicate their motivations, values and priorities related to their work. These are things, which could not be observed. This information about both residents and caregivers was useful in the later process of developing personas to represent future users (Cf. page 64).

Picture 4. *Interview with a caregiver*

In the interviews new information was provided which will be used later in the process:

- There is a high turnover of the residents
- The life stories are rarely completed
- The caregivers do not read the life stories that are completed due to lack of time
- Not all caregivers have access to the CARE systems
- Visits from relatives are rare

Evaluation

The method of semi-structed interviews was found useful as the questions in the interview guide directed the interview so that specific issues were explained while other questions were open to let the respondents narrate and to avoid forced answers. It was also beneficial that the interviews were conducted in situation since the caregivers could demonstrate the answers instead of only explaining it. A disadvantage of the in situation interviews were that the interviews were interrupted several times as the caregiver phone rang or a resident needed help. The interruptions made it difficult to get deeper answers.

Involving the residents

To obtain the overall purpose of getting the residents involved in the development process, dialogues with the residents were initiated. It was planned to find out how much and how the residents could be involved. Moreover, there was an interest in getting their opinion on what they think is most important during a meal, since the focus from the beginning had been on food and meal processes.

Execution

Interviews with three residents were conducted. The interviews were conducted by initiating short dialogues with the residents and afterwards one question was asked:
What is most important to you during a meal?

As people with dementia can have a hard time perceiving words and communicating clearly in general it can be an advantage to support words with impressions from other sensory channels e.g. with concrete representations (Center for ligebehandling af handicappede, n. d., p. 27). Therefore, a map with images of likely aspects were created and used during the interviews to support the communication (Appendix 10). The response options were based of the findings from a study of making the most of mealtimes suggesting relevant factors (Keller et al. 2014).

These response options of important mealtime aspects were:

- THE ATMOSPHERE
- SOCIAL INTERACTION WITH OTHER RESIDENTS
- INVOLVEMENT IN COOKING
- SOCIAL INTERACTION WITH THE CAREGIVERS
- FREEDOM IN CHOICE OF FOOD
- A LOT OF TIME

Picture 5. *Interview with a resident*

Outcome

The three interviewees agreed that the most important aspects in relation to mealtimes were:

Social interaction with the other residents

They explained that it is often difficult to be social with the other residents since the residents are very different in aspects such as health, personalities and interests.

Social interaction with the caregivers

The caregivers are trying to be social with the residents but often they are too busy.

Besides providing indications of what the residents thought were important during a meal, the interview provided general insights about the characteristics of the residents in terms of values and priorities (Appendix 11). This knowledge will be used later in the process when developing personas and will be elaborated in the next phase.

Evaluation

There was a big difference concerning the health conditions between the interviewees. One was very fresh and liked to talk and explain. The two others had some difficulties understanding the questions and to talk freely about what they would prefer in the future. They found it easier to talk about how they perceive the meal as it is now, as the future was difficult for them to relate to.

The method of using images worked well. It made it easier for both the interviewer and the interviewee to carry out the interview and benefit from it. The resident used the images both to understand the question but also when they answered. However, it was still difficult to maintain longer conversations.

Overall, it can be concluded that it is possible to involve residents in a small part of the further process, even though it was difficult to get two of them to answer specific questions. Next time the resident should be involved it is planned to involve the relatives along with residents in order to get deeper explanations and understanding.

Picture 6. *Interview with a resident*

Confirmed hypotheses

Below is a list over the hypotheses, which occurred and were confirmed during the fieldwork:

- THE CAREGIVERS' EDUCATION AND TRAINING IN DOING THEIR JOB IS DEFICIENT. (H1)
- CONFUSION OCCURS FREQUENTLY DURING A SHIFT.
- THE CAREGIVERS ARE TOO BUSY TO DO THEIR JOB THE BEST POSSIBLE.
- THE CAREGIVERS HAVE A PROCESS FOCUS INSTEAD OF A PEOPLE FOCUS.
- THE MEALTIMES ARE QUICKLY OVER SINCE THERE IS A LACK OF SOCIAL INTERACTION.
- SOME OF THE CAREGIVERS ARE NOT ABLE TO UNDERSTAND DANISH FULLY AND HAVE CHALLENGES COMMUNICATING WITH THE RESIDENTS. (H3)
- SOME OF THE CAREGIVERS DO NOT SHOW INTEREST IN THEIR JOB, THEY ONLY WORK TO EARN MONEY, WHICH COMPROMISES THE QUALITY OF CARE FOR THE RESIDENTS. (H4)

Picture 7. *Interview with a resident*

FINDING THE FOCUS

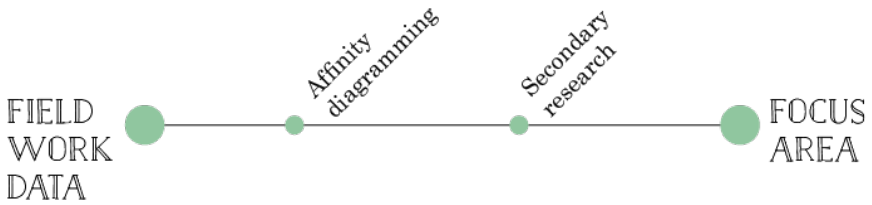


Figure 12. *From field work to focus area*

The next phase will synthesize all findings from the various fieldwork studies and 'realize' the scope and focus for the project. First, possible focus areas will be discussed.

Execution

Affinity diagramming

The method chosen for early sorting of data was "Affinity diagramming" serving the purpose of organizing large groups of information into meaningful categories (Wilson, 2012). First, each finding - observation, problem or quote - was written on a Post-it (see the complete list of findings in Appendix 7, 9,11).

The color of the Post-it was made from the immediate themes that came to mind during the fieldwork; however, this is not relevant for the further process, as the findings are now grouped again in a more structured way. The

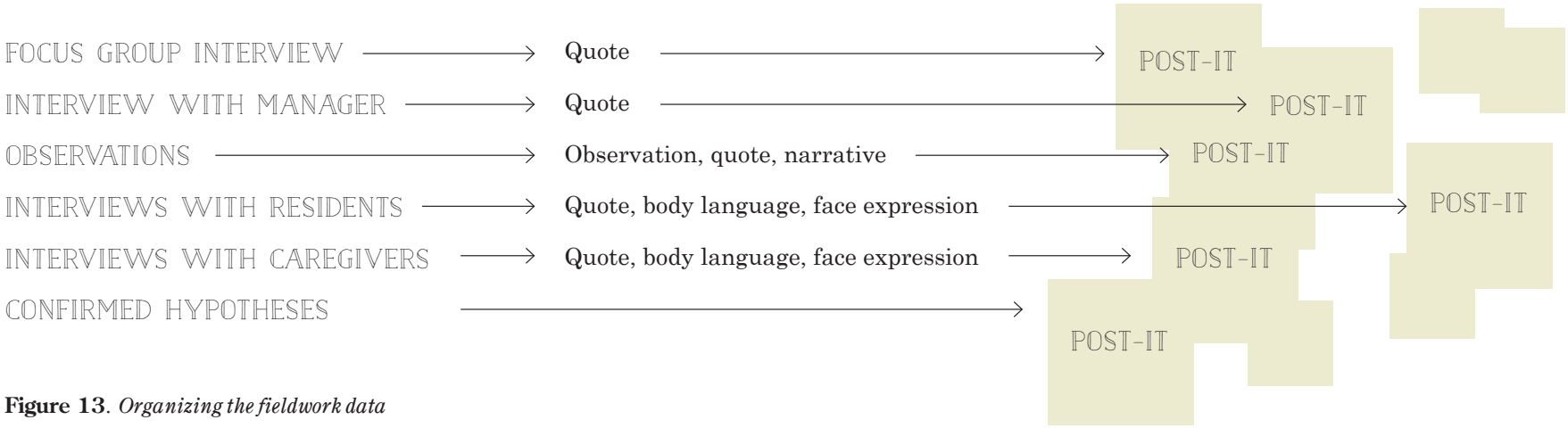


Figure 13. *Organizing the fieldwork data*

mapping was done from reading the Post-its one at the time and afterwards organizing them into groups based on similarity. 10 themes emerged.

Outcome

The following themes were found from diagramming by affinities:

PROCESS

COMMUNICATION

PRESSURE

SOCIALIZATION

LIFE STORY

FOOD

HEALTH

ENVIRONMENT

MEALTIME EXPERIENCE

QUALITY OF LIFE

Picture 8. *Affinity diagramming*

Elimination

Since it would be too much to encompass all ten categories in one focus area, they were next delimited to six. Next, the argumentation for which and why some categories were excluded is presented.

~~PROCESS~~

The category "process" could be divided into the two sub-categories: CARE and LEAN. The internal "CARE" system for internal information sharing and communication was quickly excluded. Even though problems were discovered, such as slow start up time, limited use, and different access rights, the system is obligatory to use according to politics of the municipality. As the system is very difficult to integrate with other systems, it would seem as a waste of time to design an alternative system, which most likely would result in redundant processes for the caregivers. The second sub-category LEAN was also excluded as the system worked well, and only caused problems when employees did not follow the specific rules.

~~FOOD~~

The category "food" related to the food itself; the preparation of it and the planned menu. This area was excluded, since many things will change for the future nursing home NH with the aim of improving food quality. In 2016, the food will be prepared and cooked in the nursing home's own kitchen, the hot meal will be served at dinner time instead of lunch, and an ecological wholesale company will supply high quality products.

~~HEALTH~~

The category "health" was mainly established from general notes about the physical and mental health of the residents. While "life quality" already existed as a separate category in the affinity diagram, the category refers to the physical aspects of health that can be monitored, weighed, and measured. The health of the residents is screened every second week to make sure that they are healthy. If the weight has decreased significantly, a personal nutrition care plan will be created with a special food plan (for instance adding extra protein in drinks). However, since only 4 out of 90 residents at NH have an individual nutrition care plan, this did not seem as an obvious focus area. Further, keeping in mind that we are designers and not doctors or nutrition experts, this area is left to professionals.

~~PHYSICAL ENVIRONMENT~~

As with the food, a new physical environment is already designed for the future nursing home. The new design will focus on 'homeliness' while supporting effective LEAN work processes, and is already designed. The dining area will have round tables, and more space in the kitchen inviting the residents to be involved. Therefore, this theme is also left out as primary focus area.

It is important to note that even though the above themes have been disregarded as main focus for this study, this does not mean that they are not important. All areas might be just as relevant, but for this study, they will from now on only inform the process as outlying factors.

Focus area: "THE GOOD MEALTIME EXPERIENCE"

Six themes remain: 'Mealtime experience', 'communication', 'socialization', 'life story', 'quality of life' and 'pressure'.

Mealtimes represented a natural focus area, as this was seen as being a central touch point between and among caregivers and residents on each floor, and most of the findings were centered towards this activity. This was the only time during the day where they were all gathered, and hence a good window for exploring social relations, communication and general well-being (i.e. the remaining themes).

While the fieldwork was initiated with a focus on caregivers work processes, the most striking observations were discovered during mealtimes. While you might expect mealtimes to be the social happenings of the day, a surprising observation was found: total silence and lack of facilitation by caregivers before, during and right after mealtimes. The residents were sitting 4-6 people around two tables with a serious look on their face and no communication. The caregivers did not spend much time at the table, but seemed busy serving or running back and forth between the tables and the kitchen, to clean up if they were not disrupted by other things. Very seldom did the caregivers start a conversation, and nor did residents. Most residents chose to eat in the common dining area, but they entered only minutes before the meal like most residents went directly back to their rooms, and stayed there most of the day after the meal.

In many studies regarding mealtimes in nursing homes, the focus has been on the nutritional perspective concerning those aspects of the meal that might increase residents' energy intake (Kofod, 2008). Less has been written about the facilitation and social aspects of mealtimes, which further prompts a motivation, since this is considered to be just as important for food intake and general well-being (Kofod, 2008; Holm, 2012; Keller, 2014).

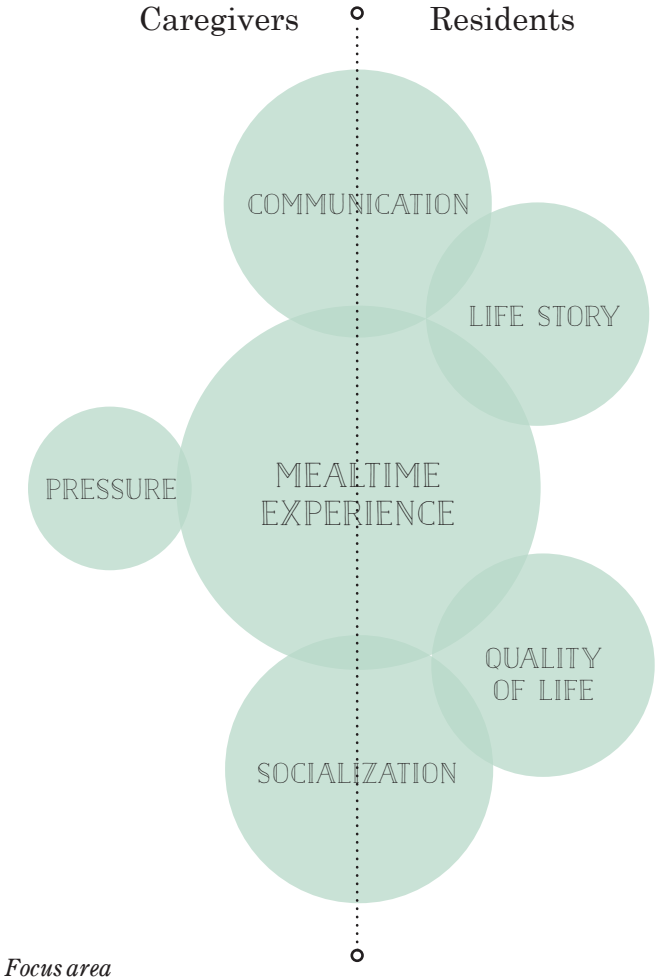


Figure 14. *Focus area*

After a short evaluation of the method, the next section will clarify the findings behind each category more explicitly and move from a macro perspective of researchers to the micro perspective of the people at NH.

Evaluation

The affinity diagram proved very useful to synthesize findings, and groupings seemed to emerge naturally. The only challenging aspect was to decompose interview transcripts into smaller units, which required some organization and time. Affinity diagramming helped the project group come to a consensus about what issues and concerns should be the focus of future design activities, but as stand-alone method for establishing ground for ideation, the process did not seem fulfilling when having an empathic approach. In order to maintain a user-centered approach for the project, it is relevant to investigate the pains and gains of main users, which brings us to the next section.

Providing meaning

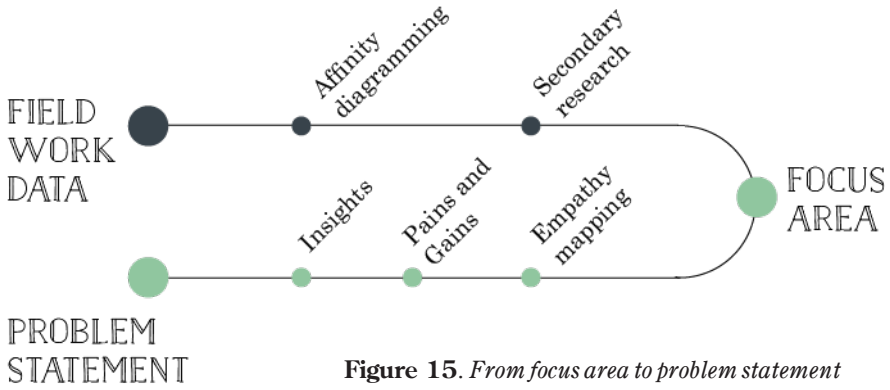


Figure 15. *From focus area to problem statement*

This section looks deeper into the needs of the users (caregivers and residents) in relation to the thematic framework just presented. This will serve as basis for generating insights and further feed into a problem definition and concept requirements for a future solution.

The overall purpose of exploring user needs derives from an empathic design approach seeking to understand "what it feels like to be another person - what that person's situation feels like from his/her own perspective" to ensure that a future service will meet rational as well as emotional needs (Postma et al. 2012, p. 60). This calls upon empathic abilities in making interpretations of what people think, feel and dream (Postma et al. 2012).

Execution

Empathy mapping

"Empathy mapping" was used as method for interpreting the field research findings from the viewpoint of users. The empathy map highlights six aspects: 'Think + feel', 'hear', 'see', 'say + do' and is often visualized with the user in the middle (Müller, 2010). The method was adjusted slightly to the application here. The aspect "See" (what the user sees) was omitted, and the part "Say + Do" was instead divided into separate sections. Separating "say" and "do" was a deliberate choice to make it easy to cross-compare what was communicated and what was actually observed in reality. This would leave space for possible conflicts on the background that "what people say they do and what they actually do are often different" (IDEO, slide 8, 2014). "See" was omitted, as this seemed very similar to "Do" and was not considered to serve a purpose that other areas could not reveal.

The mapping was done with the same post-its (findings) as for the affinity diagram, but now in the context of the two user groups (residents and caregivers) separately. The process itself started with excluding Post-its belonging to one of the eliminated categories ("CARE", "LEAN", "food", "environment", and "health"). An empathy map was drawn for the residents first. The post-its were placed in the map according to the four sections "hear" (e.g. what the caregivers or other people were saying directly to them or to another person), "say" (direct resident quotes from interviews or

observed conversations), "do" (observed actions) and "think/feel" (interpreted thoughts and feelings based on observations, body language, and facial expressions). Afterwards a similar map was created from the viewpoint of caregivers using the same post-its, disregarding those not belonging to the sphere of this specific user group (See the complete empathy maps in Appendix 12A + 12B).

Pains and gains

Besides the four ways of getting empathy with users described until now, two more fields: 'Pains' and 'Gains' were added to each empathy map. 'Pains' representing frustrations or obstacles that the user in question experience and 'Gains' representing user needs (Müller, 2010). The pains and gains were created after the initial empathy mapping and hence not direct observations, but interpretations made by the project group on the basis of the general findings.

Picture 9. *Empathy mapping - caregivers*

Residents

The most evident pain observed among residents was the tedious and lifeless atmosphere during mealtimes signalling lack of social cohesion among residents living on the same floor, and between the residents and caregivers. Residents spent most of their time alone, and expressed that they found difficulties with being social with other residents mainly caused by the variety of illnesses, some being relatively healthy, some having hearing problems and others having dementia. Also, a few residents suffering from severe dementia seemed to take up much space in a room, for instance by walking back and forth down the hallway or by talking loudly in inner monologues ("where am I? I don't know [...], Appendix 7).

The caregivers worked within a busy time schedule, and did not always seem to prioritize creating good conditions for meaningful experiences for residents. It was not only a result of personal prioritizations, as many caregivers had good intentions but different constraints. Some caregivers' lack of Danish skills provided a direct barrier to communication ("Do you speak Russian?" Appendix 7). Residents' body language and facial expressions showed displeasure being among caregivers where communication failed. The younger trainees did not always seem to know how to communicate with the residents, but was observed to sit quietly doing nothing after mealtimes even though they were not busy doing other chores (Appendix 7). This resulted in highly process-focused communication between residents and caregivers ("Are you done eating?", Appendix 7) contributing to an objectification of the residents. Most residents did not express dissatisfaction directly, but seemed to be in a state of acceptance ("I am privileged that someone will care for me and I know that they (the caregivers) are busy, so I cannot complain" (Appendix 11).

Gains from the residents' viewpoint would therefore be to enhance the social relations, physical or/and mental stimulation, fun and quality of life where attention is paid to the person behind the 'patient'.

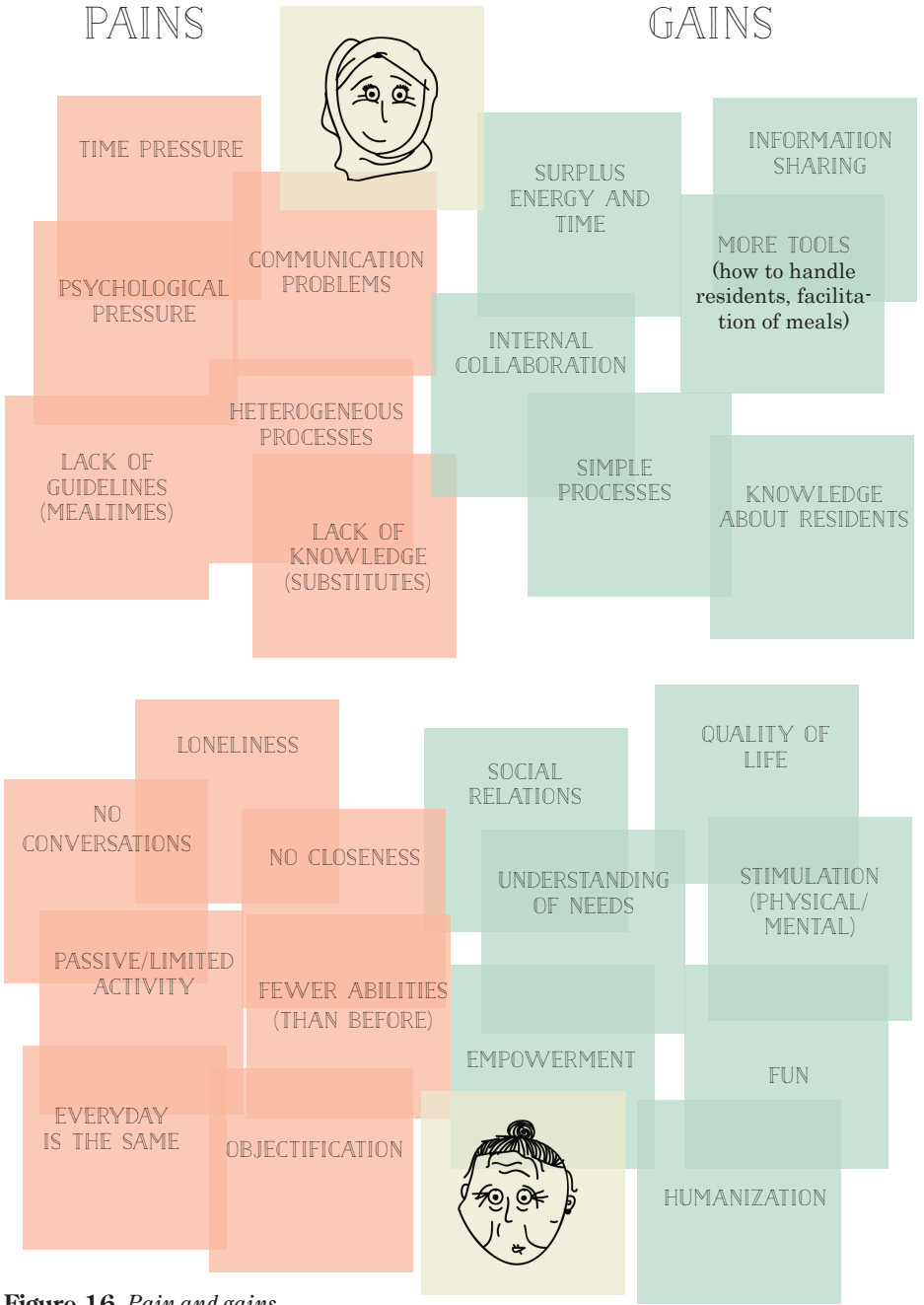


Figure 16. *Pain and gains*

Caregivers

The caregivers' biggest pain was the pressure of time, as most processes during the day were scheduled leaving only little time for spontaneous activities and closeness with residents. Besides the scheduled time of physical care for residents, spontaneous disruptions did often occur such as receiving telephone calls, having to accompany a resident to the doctor, attending internal staff meetings etc. (Appendix 7). Besides the organizational pressure of time, more caregivers did also feel a psychological pressure. Especially evening shifts found it difficult to handle residents as they were the only one on the shift, and sometimes had to deal with residents who tried to escape the nursing home or were loud and aggressive ("I have the full responsibility if anything happens to anyone, it is a constant psychological pressure" Appendix 7).
Communication problems made it difficult to obtain respect from residents, and seemed to impact the well-being of residents ("I think he is crazy", Appendix 7). Substitutes and students did not have access to information/ documentation systems with information about residents and documentation about occurrences of the day, which made them less aware of the different individuals needs and, of the events that had taken place during the day. On a personal level, the caregivers prioritized time differently, where some caregivers were very focused on making time to socialize with residents during mealtimes ("Goodmorning beautiful, have you slept well?", Appendix 7) while others focused on the serving and cleaning up, were looking at his/ her telephone or went outside to read in the small breaks that arose. This constituted a pain for the caregiver, who is assigned as the main responsible for a resident, as she/he sometimes feels that the resident does not get the care that is best for him/her (Appendix 7).

Gains from the caregivers' viewpoint would therefore be to retain surplus energy and time, communication tools to handle residents and facilitate meals, knowledge about residents and internal collaboration.

The pains and gains serve as basis for the concept requirements presented later in this section.

Evaluation

Opposed to the affinity diagram that maintained a relatively objective representation of findings, the empathy maps had the value of looking at findings from the perspective of residents and caregivers and establish empathy for each group. While the affinity diagram does only entail findings from observed or declared words and behavior, the empathy map adds another layer of hidden needs and emotions (think, feel, pains, gains). These were important for establishing user needs.
Another advantage of the empathy map is the ability to triangulate and compare findings from the different types of research due to the division of 'say', 'do', 'think' and 'feel'. This proved valuable, as not all findings matched. For instance, in the focus group interview, the caregivers expressed that residents considered the meals as a social activity, whereas observations and statements from residents showed the opposite ("I don't want to not sit for a long time at the table, but usually go back to my room right after mealtimes"). In the focus group interview, it was further articulated that the caregivers at mealtimes carefully coordinated work with one sitting at the table with the residents and one doing the serving. This was not consistent with observations, where the two caregivers would manage a table each and not sit for very long periods of time at the table.
One 'disadvantage' of the empathy map is that 'caregivers' and 'residents' are still considered as general groups even though different personalities and personal routines existed inside each group. Therefore, it is relevant to look further into different personas later on.

Insights

After having approached the research findings from different perspectives, established a focus area and defined needs of the users, it is now relevant to decompose findings into general insights. Insights are valuable, since they "bring an extra layer of clarity, extrapolate various individual stories into overarching truths, and provide meaning, which has previously been hidden" (IDEO, 2014). Hence, all the field research data collected are below synthesized into general insights, which serve as an important step towards defining one general problem statement to guide the design process.
The five main insights are listed below accompanied with the argumentation behind it.

TIME AND PSYCHOLOGICAL PRESSURE AMONG CAREGIVERS CONTRIBUTES TO STRESS AND LACK OF CLOSENESS WITH THE RESIDENTS.

Observations:

- *Caregiver: "I cannot find my phone!"*
- *The residents are alone on the floors several times during the day, where the caregivers are not present*

Interviews:

- *Only 1 out of 8 caregivers mentions socializing with residents when describing their typical day*

Focus group:

- *Confirmed hypothesis: I am too busy to do the best job possible*

COMMUNICATION PROBLEMS BETWEEN CAREGIVERS AND RESIDENTS LEAD TO RESIDENTS EITHER ISOLATING THEMSELVES OR BECOMING FRUSTRATED AND CONFRONTATIONAL.

Observations:

- *Resident: "I would like some coffee". Caregiver: "Do you want milk on it" (pronounced with an accent and with grammatical wrong combination of words) Resident: "No coffee!"*

Interviews:

- *"It is a problem that some employees can not read or write in Danish. This means that it is difficult to train them and they have difficulties communicating with residents."*

THERE IS NO FEELING OF 'TOGETHERNESS' ON THE FLOORS AS A RESULT OF DIVERSE DISABILITIES AND LACK OF SOCIAL STIMULATION DURING THE DAY. MANY RESIDENTS SPEND MOST OF THEIR DAY ALONE IN THEIR OWN APARTMENT.

Observations:

- *The residents spend most of the time during the day in their rooms, and only come out at mealtimes*

Interviews:

- *Resident after one of the other residents on the floor has died: "I hope that someone moves in, whom I can talk to".*
- *"There are not many visitors during a day, and many residents do not have many relatives left"*
- *Resident: "It is difficult to be social with the other residents, because many conditions in terms of health make it difficult"*
- *Resident: "I only leave my apartment to eat and t*hen *I go back* ag*ain. I don't want to spend more time with the other residents."*

CAREGIVERS DO NOT USE RESIDENTS' LIFE STORIES AS A TOOL IN THE DAILY CARE. THIS SUSTAINS A STRONG PROCESS-FOCUS; NOT MANY PERSONAL CONVERSATIONS AND RESIDENTS BEING OBJECTIFIED. REGULAR REPLACEMENTS OF RESIDENTS MAKE IT A RECURRING TASK TO GET TO KNOW NEW RESIDENTS.

Observations:

- *The conversations at mealtimes are centered on the food or the weather. Not many conversations are about personal matters.*
- *There is a regular change of residents. An example is March where 5 new residents moved in.*

Interviews:

- *Caregiver: "Life stories? No, we don't have that here on the floor. I think there are some binders with resident information on the 1st floor."*
- *Caregiver: "It is important to get to know the residents. It can be a bit difficult in the beginning, but after some time we get to know them well."*
- *Client: "Relatives are encouraged to fill in life stories at a start-up meeting, however, many life stories are incomplete or not filled in at all"*

LACK OF EDUCATION AND GUIDELINES AS WELL AS CAREGIVERS' DIFFERENT APPROACHES TO THE WORK CREATES CONFUSION AMONG RESIDENTS (ISOLATION OR AGGRESSIVENESS).

Observations:

- *Some caregivers approach the residents with kind words when they enter the dining room ("Good morning, your hair looks nice today"), whereas others see the mealtime as a task, and do not have the same friendly attitude .*
- *When a caregiver once poured residents coffee and serving dessert much earlier than usual, they were laughing and shaking their heads.*

Interviews

- *Caregiver: "We are missing fixed guidelines for how the mealtime should proceed"*
- *Manager: "The least educated employees are the ones, who spend the most time with the residents"*
- *Manager: "There are problems in mealtime situations. Many of the young caregivers are sitting with their mobile phones"*
- *Manager: "Some employees engage in the work while others are only here to make money.*

Framing opportunities

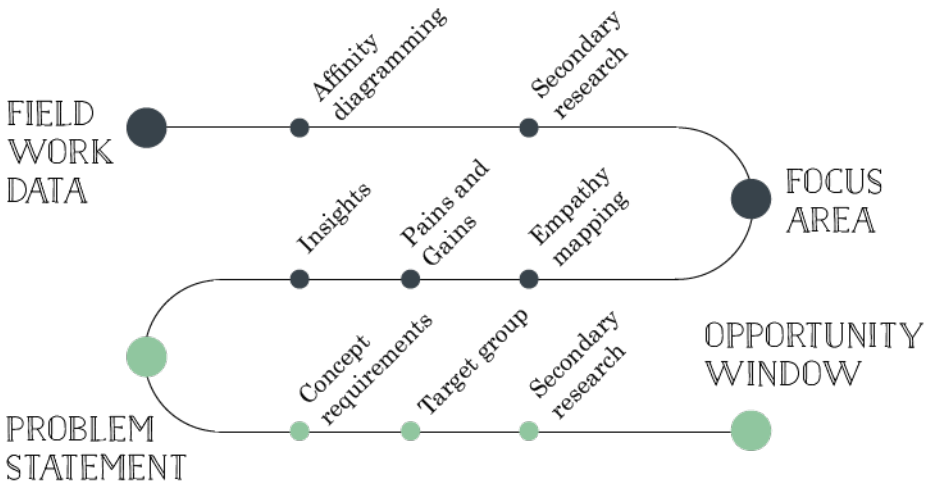


Figure 17. *From problem statement to opportunity*

The following section will point towards considerations for a future service concept by defining the problem statement, concept requirements, main target group(s) and the opportunity window in which opportunities for innovation exist.

Problem statement

"HOW CAN A SERVICE SYSTEM IMPROVE THE MEALTIME EXPERIENCE AT NURSING HOMES BY ENHANCING COMMUNICATION BETWEEN RESIDENTS AND CAREGIVERS, AND SOCIAL COHESION AMONG RESIDENTS?

The above problem statement establishes the direction for the further process with a focus on improving mealtime experiences with an emphasis on communicative and social aspects. The social aspects' relation to mealtimes have been highlighted before in other studies, as Keller (2014) in the M3 framework emphasizes; 'mealtime experiences', including social interaction being one of three factors determining food intake in a nursing home context, besides 'meal quality' and 'meal access'. Kofod (2011) further states that sitting with people you know and like increases food intake and contributes to quality of life. The aim of this study is therefore to design a service solution that seeks to strengthen communication and social bonds around mealtimes with a secondary benefit seeking to make residents at NH enjoy - and ultimately increase - their intake of food.

Concept requirements (CR)

A summary of the three themes presented in the problem statement will be provided below. Each theme is accompanied with concept requirements informed by the pains and gains as earlier defined. The concept requirements serve to guide ideation of new concepts and further represent success criteria that the future service system concept will be evaluated on.

Mealtime experience

The mealtime is the touch point where everyone meets and therefore it is an opportunity to create solutions to establish "togetherness" on the floors. Today, residents enter the dining room just before the meal; they sit quietly while eating and leave the table fast to go back to their private rooms after only 10-15 minutes. The caregivers do not have much spare time and energy, but are in a state of rush and often spend more time going back and forth to the kitchen than sitting at the table with the residents.

CR1: *Making the mealtime an meaningful activity that contributes to quality of life*

CR2: *Helping caregivers facilitate experiences while balancing time pressure*

Communication

Different educational and national backgrounds as well as attitudes towards the job as caregiver contribute to communication problems, which in the end leads to confusion or frustration among residents. Especially, the new employees and temporary workers find it difficult to communicate and socialize with residents as a result of missing guidelines and limited access to internal information systems, as well as incomplete written life stories of the residents.

CR3: *Providing a communication tool that can be used by all caregivers*

CR4: *Use of residents' life stories for better communication and understanding*

Social cohesion

Different variations of impairments posing difficulties in communication, and lack of stimulation during the day contribute to a life at NH with no strong feeling of "togetherness" among the residents living on each floor. Residents do not get many visits, but spend most of their time alone in their private rooms. At the same time residents have fewer abilities than before their stay and their individual needs are not always accounted for by the caregivers due to time pressure or lack of knowledge/tools/prioritization. This leads to loneliness and passiveness.

CR5: *Contribute to a feeling of "togetherness" among residents and between residents and caregivers*

CR6 *Empower/stimulate the residents.*

Change of direction

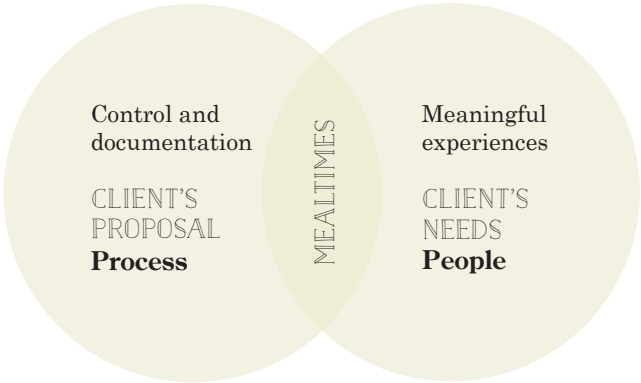


Figure 18.
Proposal vs. needs

From "process" to "people"

From the field research it was clear that the framework originally proposed by NH was no longer fitting seen from the project group's perspective. The idea proposed by NH focused on optimizing the caregivers work processes and increasing documentation, where the solution would provide NH with readily available information and knowledge about the residents' food intake and other relevant elements. However, when going into the field, only 4 out of 90 residents were following a personal nutrition plan, which seemed to diminish the need for a big system monitoring food intake as things were today. And more importantly, the findings did simply not point in that direction. What seemed striking from observing the daily practices at NH was the lack of smiles and conversations, especially at mealtimes. The field research have provided realizations of more intangible needs, such as social coherence, improved communication, and helping caregivers stimulate residents while balancing time pressure.

The change of direction was communicated to NH, and the client was fortunately positive towards the new direction.

Target group

In line with the change of focus the target group in question has slightly changed. From an initial proposal of designing for the processes of caregivers, the focus has changed towards designing for meaningful experiences for residents.

PRIMARY: **The residents**

The primary target group is the residents, and a future service concept should first of all seek to improve their situation. Many different levels of impairments exist among the residents thus making it difficult to target all residents.
Due to the communicational and social focus the solution for this project will target residents, who cognitively still function well or suffer from mild dementia, i.e. stage 1 and 2 in Naomi Feil's framework of stages (Cf. page 16). It is recommended by authorities that the day care services for residents with mild dementia should focus on good experiences and social contact with others above traditional therapy, care and treatment offered to people with dementia in the later phases (Buus, 2008). Residents suffering from severe dementia (stage 3 and 4) have lost many cognitive functions, such as empathy, situational awareness and social understanding. As these things make it difficult to sustain normal conversations (Buus, 2008) this group is not the primary target group. According to the life stage model developed by Fremtidens plejehjem, the target group for this project includes residents in the stages of "healing" and "blossom", as residents in the final stages of "refuge" and "hospice" have more inward needs of silence and introspection (Fremtidens plejehjem, n. d.).

Aspects related to life stories might on the other hand also target those residents with moderate dementia, and who are still able to remember past life experiences. Studies show that where the short-term memory is most often lost for people with Alzheimer's, people with dementia are still able to tell stories about primary school, when being a soldier or from work (Buus, 2008, p. 23).

SECONDARY: **Caregivers**

The caregivers represent the secondary target group, as they will be important actors in facilitating experiences. Moreover the caregivers can also benefit from gaining supportive communication tools and ready available knowledge about residents.

A new service is especially targeted new caregivers, temporary workers and caregivers who only have basic Danish skills. New employees benefit from communication tools and readily available information about residents' life stories because it helps them to get to know residents. Permanent staff would benefit in the same way when new residents move in. Caregivers with low to moderate Danish skills would benefit from gaining a tool where communication would not only be verbal, but accompanied by visual and/or other sensory identifiers supporting communication with, and trust from, residents. Temporary workers do not know residents in the same way as permanent staff, and would therefore also benefit from a future service seeking to enhance communication and use of life stories.

Opportunity window

Extending the mealtimes framework

In the mealtime framework, it is relevant to clarify when and where a new service concept can be used in context. When referring to mealtimes, this project does not solely focus on the short time of the day were residents sit at the table eating, but an extended definition has been adopted for this study that includes the period of time just before and just after the meal itself. The argumentation behind this derives from cultural as well as theoretical influences.

Theoretical aspects points to the time just before and right after mealtimes as influencing the mealtime experience too.

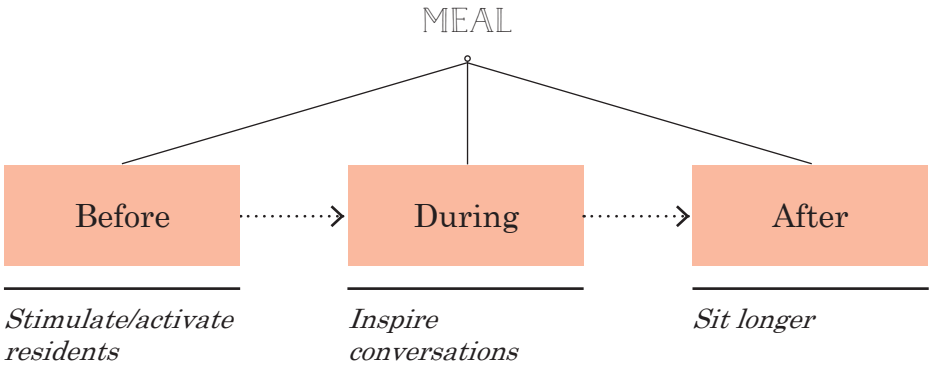


Figure 19. *Meal framework*

During the meal

Studies show that nursing home residents consider 'sitting with people they know' as the most important aspect of a positive mealtime experience. They value this before aspects such as 'tender meat' and that 'the meal looks appetizing' (Kofod, 2005). Kofod (2005) further argues that social context of a meal influences how residents perceive taste (Kofod, 2005) Therefore, is indeed relevant to look at the mealtime situation itself and encourage social interaction, but it must also be respected that not everyone values much interference in the situation where they are eating.
As already established, the mealtimes at NH did not include much social interaction. Some residents don't like too much noise and disruptions while eating (Appendix 9). Furthermore, some residents who have lived alone before moving to NH used to eat alone and prefer to keep it like that, which is relevant to not change that (Appendix 11). However, at NH many residents are able to participate in conversations and enjoy small talk during mealtimes.

Before the meal

According to Kofod (2011), activating nursing home residents before mealtimes makes them less tired and hence more willing to talk during meals (Kofod, 2011, p. 21). In addition, physical activity before meals contributes to a greater appetite (Kofod, 2011, p. 21). Therefore, physical stimulation before meals might increase the food intake of residents, while social and/or cognitive stimulation before meals create a social atmosphere that can help start conversations that are continued during the meal (Kofod 2011). As earlier indicated, prioritizing social stimulation also has a direct nutritional outcome, since it is recognized that "the better you know the

people you eating with, the more do you eat" (Kofod 2011, p. 6).
At NH, the majority of residents entered the dining room just a few minutes before meals or they were not brought to the area on the initiative of a caregiver (Appendix 7). Some residents were physically active 2-3 days a week, where a physiotherapist on scheduled days would train the residents in physical exercises using fitness equipment. Fewer residents were socially stimulated before mealtimes, and only few would participate in activities, such as 'bingo' or 'singing', which were coordinated by the nursing home's activity team at least once a week (Appendix 7).

After the meal

A rush to clean up signals that the mealtime is finished and that residents' presence are unwanted (Kofod, 2011). As an obvious result, residents leave the table quickly after finishing the meal. The facilitation of mealtimes is important for the overall experience, since this influences residents' willingness to sit at the table. If the residents fell comfortable and like the atmosphere surrounding the meal, they will sit longer at the table. And the longer they sit at the table, the more they eat. This makes facilitation of mealtimes and motivating residents to stay at the table an important aspect of mealtime experiences (Kofod, 2011).
Just as residents did not enter the dining area long before the meal, the residents also seemed to leave the table again right after finishing the meal (Appendix 7). The caregivers did not prioritize sitting calmly at the tables during and after residents were eating, but were disrupted by other tasks and also left the table several times to clean. After less than fifteen minutes the caregivers asked the residents if there were done eating and seemed to prioritize processes over meaningful conversations.

The three frameworks for mealtimes just presented serves as possible innovation windows i.e. areas in which a new service concept can be implemented based on different aspects of the mealtime: Stimulation of residents before mealtimes, prioritizing and encouraging conversations during mealtimes, and motivating residents to sit longer at the tables.

PERSONAS

After having synthesized all findings, identified focus area, user needs and main insights, personas for caregivers and residents were created. This was important in order to gain a deeper understanding of the target groups before a new service development was initiated. According to Pruitt (2003), designers often have a vNHue sense of their intended users and may base scenarios on people similar to themselves. Thus, the personas would be useful in providing guidance in the next phase of ideation and was especially relevant when working in a team, since the personas provide a shared basis for communication of the target group (Pruitt, 2003).

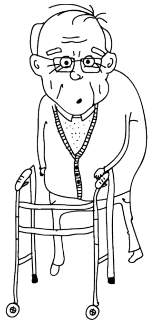
The personas were created based on the information and impressions gained during the fieldwork, herein mainly observations and interviews. Moreover, they are based on written information and characteristics about the residents, which were possible to access in NH's internal CARE system. The personas have undergone an iterative process from being roughly based on early research and later specified from further research and testing.

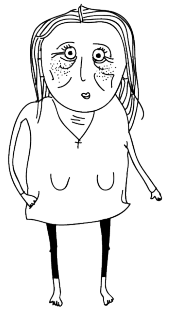
Four personas are created for each target group, i.e. the residents and caregivers. The residents are differentiated according to how social they are and the health conditions. The caregivers are divided according to how they experience stress and their social relationships with the residents.

The personas helped to maintain the perspective of the primary users throughout the design process.

RESIDENTS

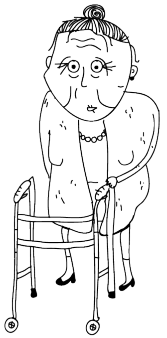
Social





Mentally healthy

Physically healthy



Unsocial

THE FRESH

Name: Kai
NHe: 72 years old
Years at NH: 1 year.

Mental healthy
Physically healthy
Social

Relatives: Wife, two sons and a grandchild.

Eats in the common room: Only for lunch, thereafter he hurries back to his apartment

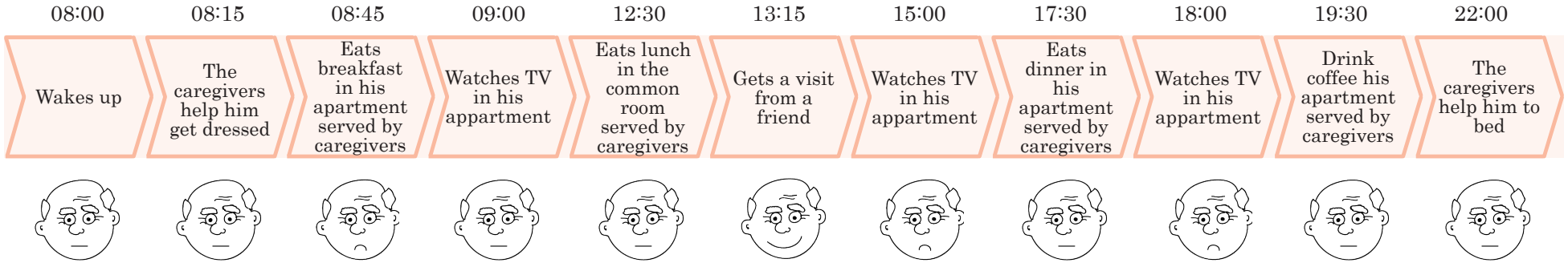
Participate in activities: No

Characteristics:
Kai is suffering from severe diabetes, which led to, that he got his leg amputated 2 years NH. Because of this he sits in a wheelchair.
Kai used to work as a truck driver. He misses the days on the highway and his "driver friends", which he unfortunately do not have contact with any more. He is also very interested in food and spends a lot of hours each day watching programs with cooking. He often tells jokes to the caregivers.

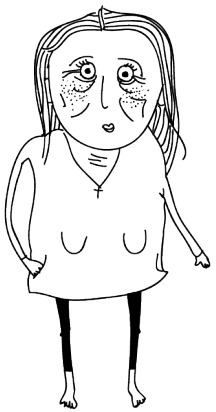
Needs:
- Kai often feels lonely in the nursing home; he misses having a friend.
- He would like to have something in common with the other residents.

Key Quote:
"PEOPLE ARE TOO DIFFERENT - WE HAVE NOTHING IN COMMON"

Journey of a typical day with emotions:



THE DISTURBED



Name: Hanne
NHe: 56 years old
Years at NH: 4 years.

Mental healthy
Physically healthy
Social

Relatives: No

Eats in the common room: Yes

Participate in activities: No

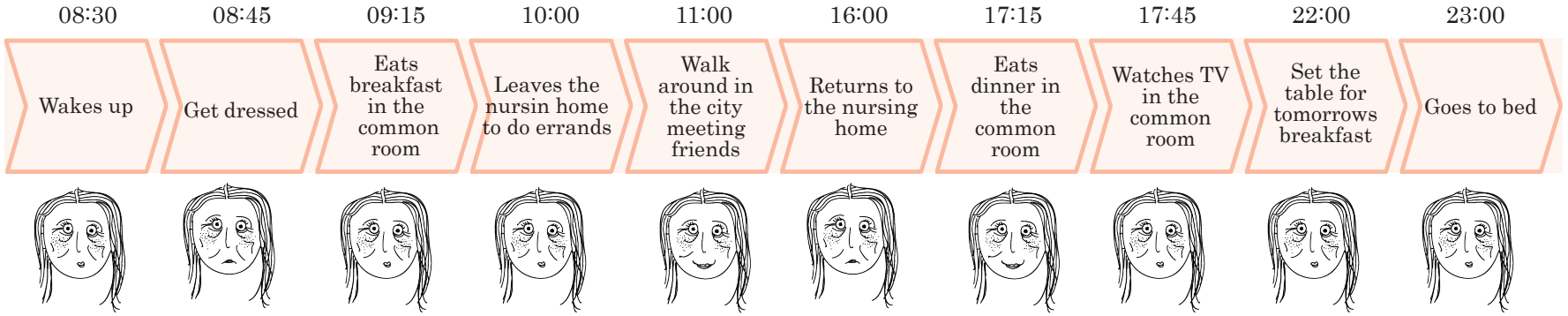
Characteristics :
Hanne is suffering from manic depression. She is mentally very frNHile and is former alcoholic. Hanne is happy to live at the nursing home and is often in a very good mood. She talks a lot with the caregivers and with the other residents however she can be very vocal which can be intimidating for the other residents.
Hanne often leaves the nursing home in order to do errands in the town. When she gets back she often a little drunk. She is very interested in art and culture and is happy to share her knowledge with the other residents and the caregivers.

Needs

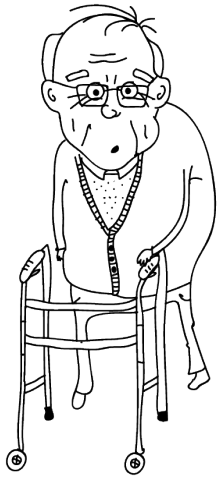
- Hanne misses more action in everyday life

Key Quote:
"WE NEED TO HAVE SOME FUN"

Journey of a typical day with emotions:



THE CONFUSED



Name: Henry
NHe: 87 years old
Years at NH: 3 month

Mental healthy
Physically healthy
Social

Relatives: Two sons who both live abroad.

Eats in the common room: Yes

Participate in activities: Yes

Characteristics:
Henry broke his hip four months ago and has trouble walking besides he suffers from dementia. He has stage 1 dementia, his memory is impaired and he quickly becomes very confused. He has a hard time accepting that he needs help which makes it very difficult for the caregivers to help him. Henry is not motivated to do anything doing the day. He prefers to sit in his armchair and look out the window. Henry likes to tell stories about his past but they are often a bit confusing and caregivers do not always believe that they are true. Henry is a retired banker and is very interested in society and economy.

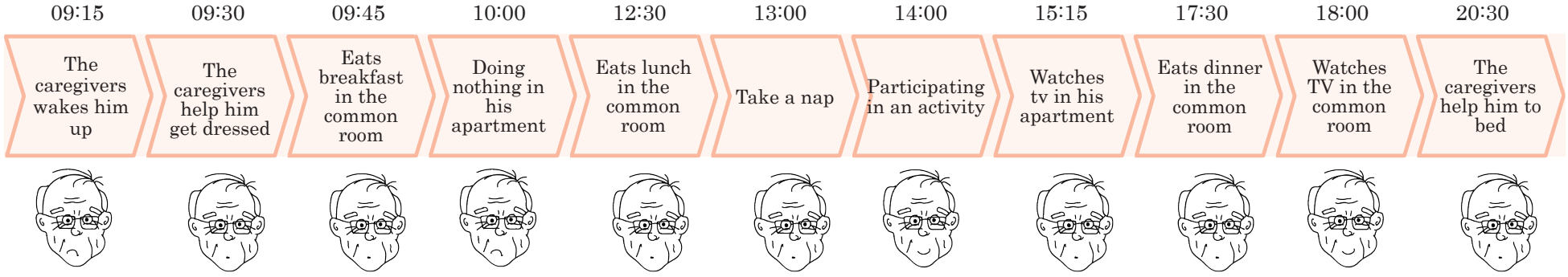
Needs

- Henry has a difficulty communicating with the other residents and the caregivers – he does not always get the feedback he wants.

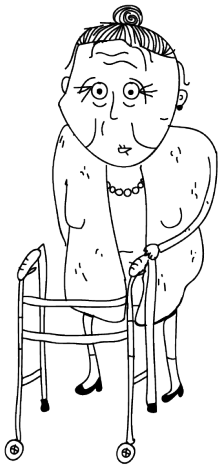
Key Quote:

"I WOULD PREFER TO TAKE CARE OF MYSELF"

Journey of a typical day with emotions:



THE AGGRESSIVE



Name: Lise
NHe: 81 years old
Years at NH: 2 years.

Mental healthy
Physically healthy
Social

Relatives: A son

Eats in the common room: Yes

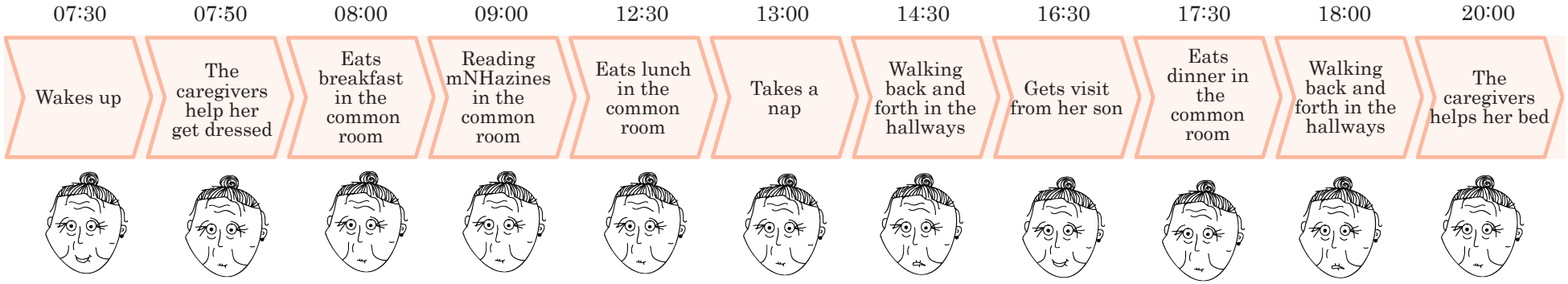
Participate in activities: No

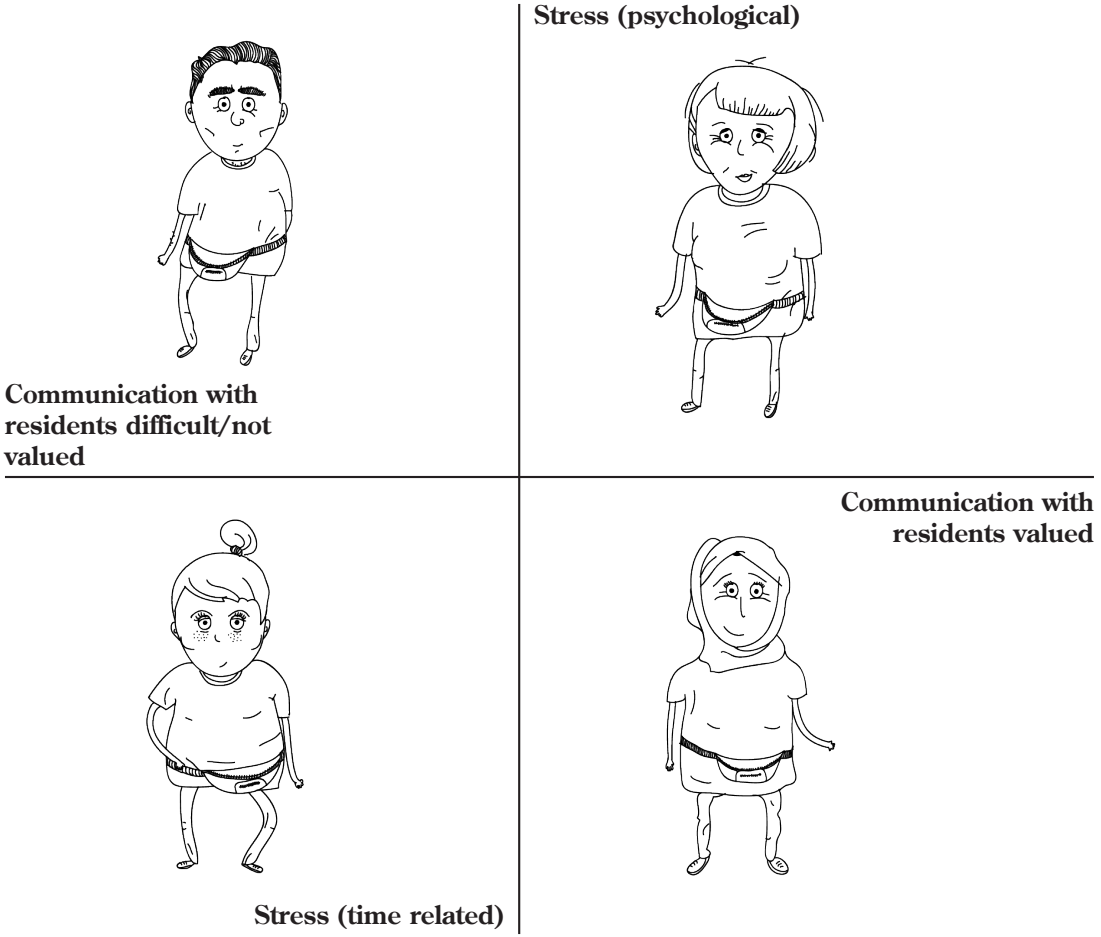
Characteristics:
Lise is suffering from Alzheimer in stage 2 and needs help with everything. She cannot remember how to care of her selves. Lise requires a lot of time from the caregivers, they need to know where she is all the time otherwise she leave the nursing home. She often believes that someone hates her and wants to hurt her. She often talks to the other residents but suddenly she gets confused and angry and calls them invective. Lise has always had a large network, but there are not many left and no one is healthy enough to visit her.

Needs:
• Lise and especially her son do not feel that her individual needs not always are accounted by the caregivers. Lise needs to get more mental stimulation otherwise she start invents story about people being after her.

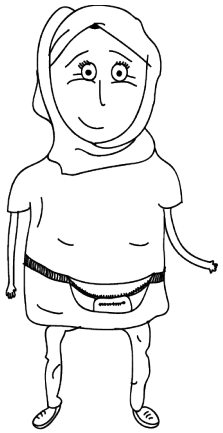
Key Quote:
"THE CAREGIVER WANTS TO HURT ME!"

Journey of a typical day with emotions:




Stress (psychological)
Communication with residents difficult/not valued
Communication with residents valued
Stress (time related)

THE STRESSED

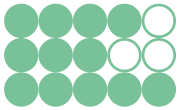


Name: Nasrin
NHe: 42 years old
Years at NH: 1 year.

Nationality: Iranian

Position: SOSU helper, substitute (day and evening shifts)

Danish skills
Knowledge about residents
Stress level (time)



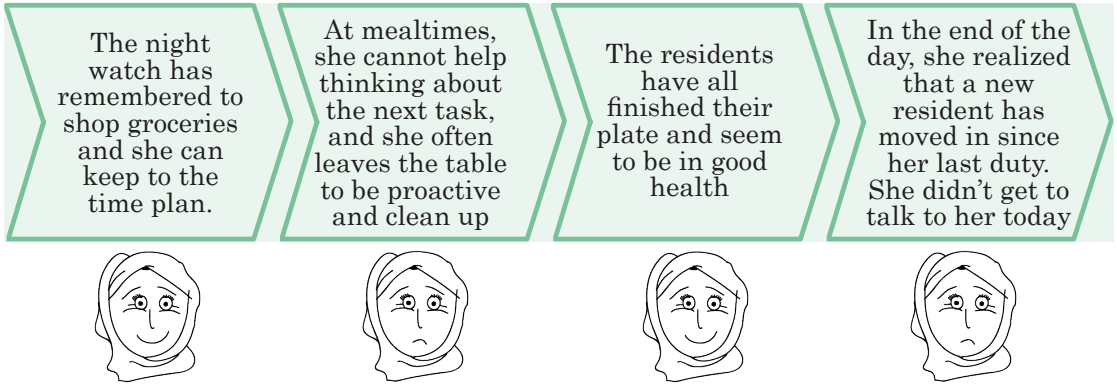
Personality and behaviour
Nasrin is a substitute SOSU helper and is originally from Iran, but speaks Danish well. She is very keen on doing a good job and providing the best care for the residents, however, many tasks, unforeseen events and residents who need extra monitoring during the day stresses her out. She doesn't feel that she has the time to sit down take care for or small talk with the residents as much as she wants to, which gives her bad conscience. Because not many residents have a written life story and she seldom meets the relatives during a day, she still doesn't know all residents well. From experience and stories from other caregivers, she now has a good grip on how to talk and behave according to the different individualities, but she knows very little about their lives.

Motivation
Motivated by the good deed of helping someone who needs it.

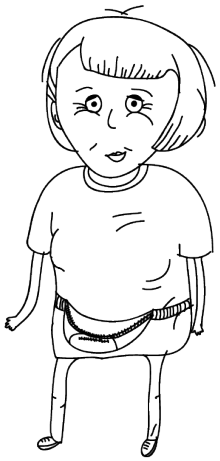
Needs
- Surplus time and energy
- Knowledge about residents

Key Quote:
"SORRY, CAN WE TALK A BIT LATER WHEN I AM NOT BUSY?"

Highlight and lowlight of the working day:



THE EMPATHIC



Name: Lone
NHe: 38 years old
Years at NH: 4 year.

Nationality: Danish

Position: SOSU assistant, day shifts

Danish skills
Knowledge about residents
Stress level (time)

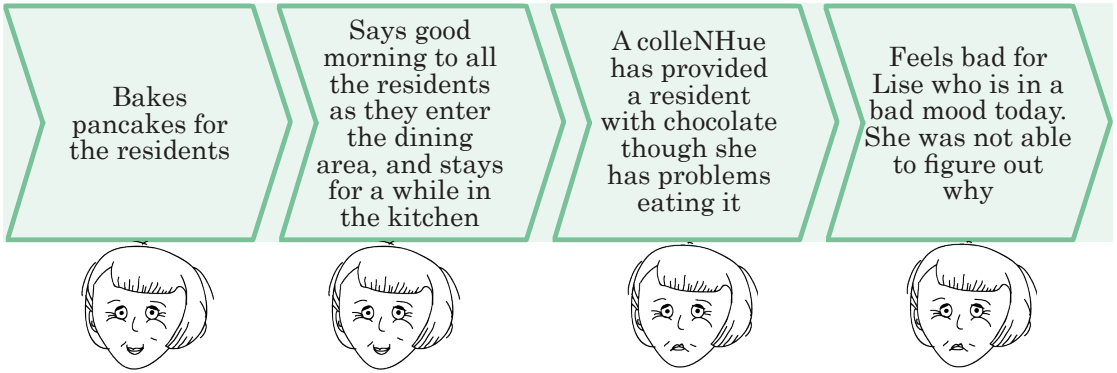
Personality and behaviour:
Lone is one of the caregivers who have been employed for the longest time. It is important to her to treat the residents with respect and she says good morning to everyone accompanied with a nice compliment. She knows processes and residents very well, and gets irritated if another caregiver is not doing things the way she believe they should be done or treating the residents with respect. Lone is independent at requires much of herself and others, though she knows that everyone are busy. Lone is very focused on observing if residents are happy and spends time talking with them or holding their hands if they would like that. This often results in other caregivers on the same shift leaves the 'soft aspects' to Lone as she is good at it, and focus on the processes instead.

Motivation:
Motivated by working with people, helping people who needs assistance, and see that the residents are happy.

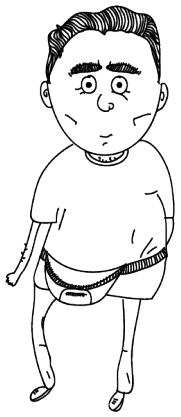
Needs
- Trust in colleagues
- More time with residents
- Relieve pressure of own expectations

Key Quote:
"GOOD MORNING, YOUR HAIR LOOKS BEAUTIFUL TODAY"

Highlight and lowlight of the working day:



THE LINGUISTIC CHALLENGED

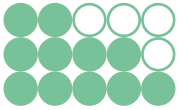


Name: Ali
NHe: 42 years old
Years at NH: 8 months

Nationality: Pakistani

Position: SOSU assistant, evening shifts

Danish skills
Knowledge about residents
Stress level (time)



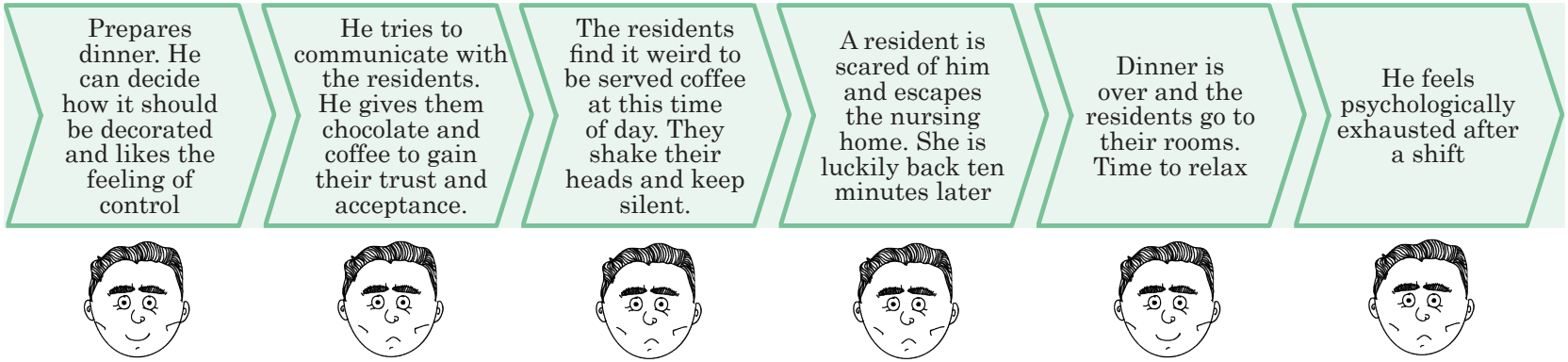
Personality and behaviour:
Ali is a SOSU assistant and primarily works evening and night shifts. He experiences many challenges during a shift and currently considers working in home care instead of nursing homes. The biggest challenge is communication, and many residents have troubles understanding him due to a thick accent. The language barrier makes it difficult to socialize and talk with residents, which sometimes leads to misunderstandings and frustration among residents, who will eventually shout at him. The residents do not feel calm in his presence, and many therefore keep to themself during his shift. He doesn't always have the capabilities to cope with more requiring residents and provide the care needed according to individual needs.

Motivation:
No specific motivation

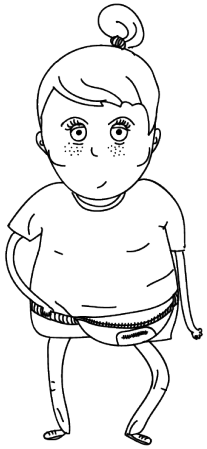
Needs:
- Better communication with residents
- Gain control and trust

Key Quote:
"DO YOU WANT MILK ON YOUR COFFEE?" RESIDENT: "DO YOU SPEAK RUSSIAN?"

Highlight and lowlight of the working day:



THE UNEDUCATED

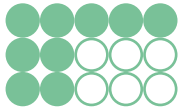


Name: Karina
NHe: 28 years old
Years at NH: 2 months

Nationality: Danish

Position: SOSU assistant trainee, day shifts

Danish skills
Knowledge about residents
Stress level (time)

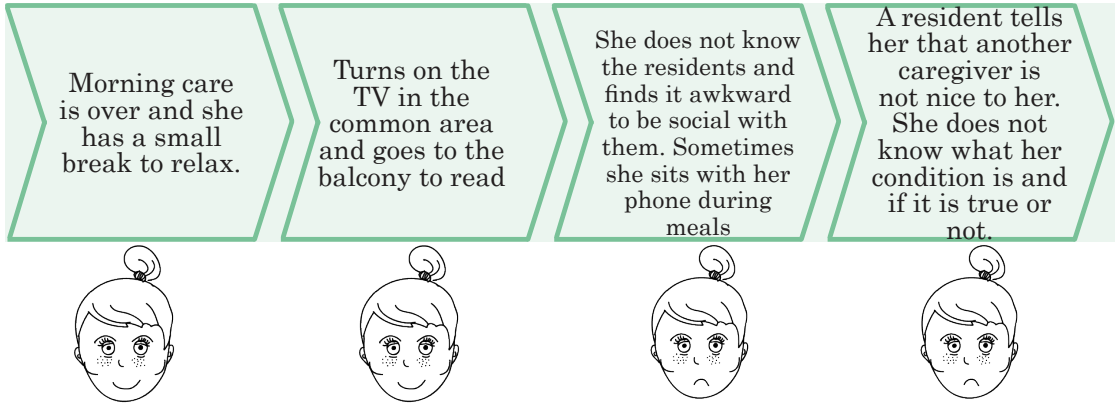


Personality and behaviour:
Karina is currently studying to become a SOSU assistant and she works as a student as part of her studies. She has only been at NH for 2 months, and until now she has mostly watched and helped the fulltime-workers in order to get to know the residents and the processes. She is anxious to do something wrong, and is very careful in all that she does. She is comfortable when being among the other caregivers, but is a little unsure about what to do with herself when she is alone with the residents. In her small breaks, she cares for the residents as for instance putting on nail polish or sits on the balcony and reads study related literature. When she started, she read some of the resident's life stories written by relatives, however, many were not fully filled in and she learned about them along the way.

Motivation:
She dropped out of her previous studies as hairdresser, and wanted to try something different. She is not sure yet whether this is the right job for her.

Needs:
- Knowledge about residents
- Education and experience

Highlight and lowlight of the working day:



Key Quote:
"I LEARN ALONG THE WAY"

EXAMINATION OF EXISTING SERVICES

After having defined what area the concept should evolve, the next step was about investigating existing services within the area in order to find out what services are already on the market and thus how a new service can differentiate from similar services.

The model below represents the findings of existing similar services and products. The services and products are placed according to different values:

- Unsocial vs. social communication.
- Concentrating on the past or present time.

It seems that these factors are the primary aspects that distinguish them from each other.

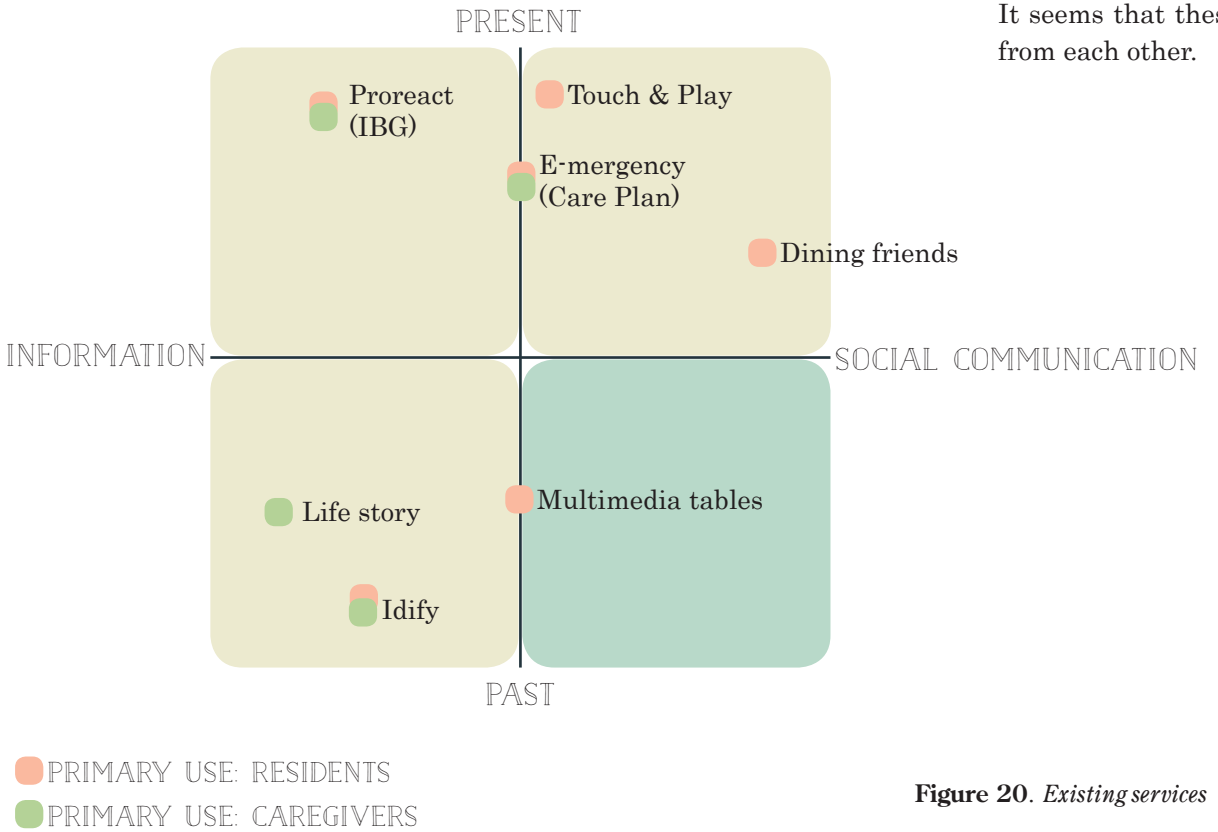


Figure 20. *Existing services*

Pro React (IBG)

IBG is an interactive citizen guide on big touch screens placed in the nursing homes. The caregivers, the residents and guests can get information about news in the nursing home, daily structure, menu, way directions, activities etc. IBG provides information about the nursing homes in present time (Proreact, n.d.).

Touch & play

Touch & Play is a giant touch screen on the wall that you can interact with. The service has various activities and games that the residents can use themselves or together with caregivers, other residents or relatives. The aim of the service is in particular to entertain residents and increase communication between residents and staff (Personaleweb, n.d).

Emergency (Care Plan)

The Care Plan is an information and communication platform designed to make elderly people and people with cognitive disabilities more independent. Each resident has access through a private profile where they among others can preview a calendar with private and public events, select what they want to eat and have video conversation with their relatives.
The Care Plan is also focusing on optimizing the caregivers' work flows by providing the caregivers with checklists of all the chores they have do perform during a shift (Careplan, n.d).

Dining friends

Dining Friends is a dinner club where volunteer students from health educations visit the elderly with a meal from one of the city's restaurants. Normally once a week.

Life story

When a resident moves into a nursing home he or she fills out a questionnaire concerning their life story. The life stories contain information about personal needs for care, food, habits, relations, traditions, religions and death. The lives story should be used be the caregivers with the aim of providing an understanding of the resident and his/her individual needs.

Multimedia tables

The multimedia table make it possible to play digital clips from a large database. The clips might be songs, sounds, images and movies from the 1920s to the 1980s. The aim is to create conversations around the table. The table should increase the quality and enjoyment of life in nursing homes and decreased social isolation. The multimedia tables are not on the market any more (Waag society, n.d).

Idify

Idify is a webpage where the resident can create his or her life story in a timeline with text, pictures, video and music. The purpose of Idify is knowledge sharing between the caregivers and relatives (Idify, n.d).

Opportunities

From investigating already existing services, it can be concluded that many service cover the area but there might be a new market focusing on social communication and the past.

IDEATION

Figure 21. *Ideation*

After analyzing "what is" and framing opportunities, the next phase will explore more concretely what "can be" in terms of envisioning new service design concepts for creating meaningful mealtime experiences at NH.

Co-creating future scenarios

Mealtimes can be seen as a complex system including residents (disabilities, communication capacity, gender, ethnicity) staff (practices, level of training, model of care) home (physical environment, menu planning, food delivery), and government (food budget allocation, policies) (Keller, 2014). According to Snowden (2007) managing complex contexts requires creativity and novel thinking, since no immediate cause-and-effect relationship is evident between problem and solution. This also means that not one single but multiple right answers exist (Snowden, 2007). Therefore, the strategy for starting the ideation process was a focus on creative thinking and idea quantity.

"Co-creation" was chosen as framework for ideation and is broadly defined as "the creativity of designers and people not trained in design working together in the design development process" (Sanders & Stappers, 2008). First of all, this framework was chosen in line with the principle of empathic design suggesting that users should be involved as partners for new product development (Postma et al. 2012). Also, several other empirical studies emphasize that successful innovation is more likely to happen when multiple viewpoints are applied. Co-creation has the advantages of: challenging the views of all parties, combining professional and local expertise, reducing knowledge asymmetry in both directions, improving mutual learning and understanding, enhancing communication and cooperation between different people and making the involved users feel that they have a permission to change things (Hansen et al. 2013; Holmlid, 2009; Steen et al. 2011).

On this background, involving users from NH was a deliberate choice to create a sense of ownership and to recognize that they are experts too - experts of their experiences, their social circumstances, habits and behavior, attitudes to risk, values and preferences enabling co-creation of value (Steen et al. 2011, p. 54).

When co-creating, the researcher/designer role changes from being translator to facilitator, which means that the role of the project group now is to invite and involve future users into the design development process by leading, guiding and providing scaffolds that support and serve peoples' need for creative expression, along with offering a clean slate for creating. (Steen et al. 2011, p. 11). These aspects were considered in the facilitation a co-creation workshop at NH.

Execution

LEGO Serious Play (LSP) co-creation workshop

The method for co-creating was LEGO Serious Play (LSP), which was carried out as 1,5 hour workshop with 8 participants: 6 caregivers (1 assistant + 2 assistant trainees, 1 helper + 1 helper trainee), 1 kitchen employee, and 1 health and nutrition intern. The participants have been working at NH between 1 month and 3 years. The project group had requested the number of participants and positional titles, but the final selection was made by NH based on who had the time and desire to participate on the day.
No residents participated in the workshop since NH evaluated that they would not have the required cognitive capabilities to participate, and moreover, the project group estimated the caregivers to be of the highest importance for involvement in this part of the project, since they most likely would be the facilitators of a new service.

As the name indicates, LSP builds on the premise of 'play' defined as "a psychological state that encourages curiosity and willingness to see and understand settings in different ways", which is suitable when dealing with complex problems (Hansen et al. 2013, p. 4). Furthermore, rather than talking, making something prompts the brain to work in a different way, which can unlock new perspectives (LEGO, 2010). LSP has three basic elements, which will be elaborated in the following section (LEGO, 2010):

- The challenge
- Building
- Sharing

A previously held LSP workshop at Aalborg University facilitated by a certified facilitator from Business Learning served as inspiration for organizing the workshop at NH. The agenda for the session at NH was as follows (Appendix 13):

1. The participants are introduced to the game method
2. The participants each build individual models for improving mealtime experiences
3. The participants build collective models for improving mealtime experiences

1. Introduction to the game method

First of all, it might be relevant to note that the participants were first introduced to the project team and the context for this workshop. Some of the participants had been involved in interviews earlier on in the process, but also new employees participated who had not been part of the process before this point.

First, a short 'icebreaker' exercise was introduced, where the eight participants divided into two groups had two minutes to build the highest tower using 40 LEGO bricks. This created an informal atmosphere and generated attention towards this workshop. Next, a short exercise was posed where each person would build an object from free imagination using 10 LEGO bricks. They were afterwards forced to choose what the object represented based on one of the following: A night in town, a chicken, a good friend or a lawyer and then tell a short story about the model to the person sitting next to him/her. This exercise forced the brain to think metaphorically and required imaginary skills, which – same as in the storytelling aspect - prepared the participants for the main challenge of the workshop.

Picture 10. *Co-creation workshop*

2. Individual models for mealtime experiences

The next activity on the agenda was centered on the main challenge towards finding solutions that improve the mealtime experience at NH. The participants were presented with the following challenge:

"IMAGINE THAT YOU HAVE ALL POSSIBILITIES AND TIME AVAILABLE FOR CREATING THE BEST MEALTIME EXPERIENCE FOR NH NURSING HOME 2016. HOW WOULD IT LOOK LIKE?"

The narrower problem statement used in the project group was intentionally compressed here. Highlighting 'communication' and 'socialization' was omitted, as the project group would like to get the thoughts and reflections without influencing ideas too much in order to " offer a clean slate for creating" (Steen et al. 2011, p. 11). Moreover, explicitly expressing intentions of improving communication and socialization might be perceived assaulting to some caregivers indicating that they are not doing their job well, which might create a negative atmosphere.
All participants understood the task right away and built for 20 minutes followed by 10 minutes of presentation of ideas in plenum. Choosing an individual model in favor of a collective model was decided on the background that it "gives more 'junior' or less vocal members of a team the chance to have a say, and perhaps more importantly offers the 'senior' or dominant members the opportunity to listen to insights and challenges which they may not have otherwise heard" (LEGO, 2010, p. 5).

Outcome

The individual exercise generated the following eight ideas.

IDEA 1: PREPARATION OF FOOD BY RESIDENTS
Each floor has its own kitchen, and the residents assist in preparing the food

IDEA 2: SENSORY GARDEN
Residents take a walk in the outdoors garden stimulating their senses

IDEA 3: STIMULATION OF SENSES

The residents are able to smell, see and hear the sound of food being prepared, and the meal is presented in a way that is visually attractive to them

IDEA 4: BEAUTIFUL SETTING OF THE TABLE

The meal is based on the premise of "hygge" and the table is set with tablecloth, candles, flowers and nice (non-plastic) trays.

IDEA 5: HOMELIKE CIRCUMSTANCES

The residents are provided with a setting like before they moved to NH matching to whether they prefer to sit alone or with others, appreciate conversations or not, etc.

IDEA 6: SMALLER EATING ISLES

The residents are seated in small round-table arrangements based on whom they would like to sit with, and those who are able to ladle food themselves are allowed to be self-served.

IDEA 7: FLEXIBLE DINNER HOURS

Opposed to fixed mealtimes today, residents can eat it suits them.

IDEA 8: MEALTIME HOST

One employee is assigned to hosting mealtimes and do not have other responsibilities.

Picture 11. *8 individual ideas*

3. Collective models for mealtime experiences

In the last exercise, the participants were divided into two groups of four people with the aim of building collective models. The challenge itself was the same as the previous challenge, but now with more guidance provided. Each group would have to randomly pick three cards each one covering a theme from the concept requirements, which had to be considered in the model:

MORE TIME WITH THE RESIDENTS (CR 2)
COMMUNICATION (CR 3)
LIFE STORIES (CR 4)
TOGETHERNESS (CR 5)
ACTIVATE/STIMULATE RESIDENTS (CR 6)

Incorporating all CR's in one model was considered to too constraining and difficult due to limited time.

For additional guidance, cue cards describing unique factors of the new nursing home were provided to each group, and placed on the table for inspiration while building inspiration. These were:

- Wi-Fi
- Café
- Hot meals for dinner
- Cold meals for lunch
- The nursing home prepares all the food
- 19 residents on each floor
- 4 caregivers on each floor during the day shifts
- 2 caregivers on each floor during the evening shifts

After 20 minutes of building with the bricks each group presented their idea to the other group.

Outcome

Picture 11. *Collective ideas*

The collective exercise generated the following 2 ideas:

IDEA 9: ONE ASSIGNED CAREGIVER

Each resident is assigned one caregiver, who follows him/her in all events during the day. In this way, the caregiver knows the resident better and the resident experiences a more natural flow of activities, when he/she is not 'thrown around' between different caregivers.

CR THEMES PICKED:
More time with the residents, Communication, Togetherness

IDEA 10: KITCHEN HOUSEWIFE

A 'kitchen housewife' is always present in the common dining area, and responsible for activities related to mealtimes without any additional responsibilities. She has the role of acting a host, welcomes residents at mealtimes, and prioritizes the social aspect of sitting at the table.

CR THEMES PICKED::
More time with the residents, Communication, Life stories

Evaluation

The use of LSP resulted in inspirational ideas and reflections, and the participants seemed to have fun while being focused on the task. Everyone understood the tasks straight away and quickly started building models after the challenge was presented. This supports the argument that most people feel comfortable building with LEGO bricks opposed to drawing (Hansen et al. 2013, p. 10). From the beginning the project, the project group encouraged the participants to consider the perspective of residents besides their own perspectives as caregivers, which they followed very well and many ideas focused on the well-being of residents.

One of the challenging aspects of the LSP method was to foster more spectacular and wild ideas. A high number of the ideas generated were closely related to governmental recommendations such as involving residents in the preparation of food, creating a homelike environment with candle lights and tablecloth, appointing hosts that are in charge of creating a good mealtime experience and stimulating different senses, such as smell and eye-sight (Kofod; Servicestyrelsen 2011). All relevant and good ideas, but at the same time it was clear that ideation could be taken even further and more ideas were waiting to be discovered.

Internal ideation

The co-creation session was followed up with an internal ideation session carried out by the project group. The objective was using other ideation methods that might take the ideation in new directions.

Analogous inspiration

The first method used to inspire more ideas was “Analogous inspiration” (IDEO, 2015). Analogy is the process of association between situations from one domain (source) to another (target) and hereby shift focus to a new context and get a fresh perspectives (Moreno et al 2014; IDEO 2014). The first task involved isolating elements from the mealtime situation at NH and linking these to other contexts that were related in some way (appendix 14).

Picture 12.
Co-creation workshop 2

Figure 22. *Overview of analogous inspiration*

Outcome

This resulted in a visual brainstorm of analogous inspiration where inspirational cues (highlighted in green in the model) made 10 new ideas appeared:

Cue: Hostess gift

IDEA 11: HOSTESS GIFT

Residents bring a personal item to the mealtimes that has a story connected to it

Cue: Presentation

IDEA 12: PRESENTATION OF NEW AND EXISTING RESIDENTS

When new residents move in a presentation is prepared of him/her and existing residents using pictures and objects.

Cue: Topics for conversation

IDEA 13: TOPICS CARDS FOR CONVERSATION

At mealtimes, caregivers and residents can use pre-made cards with different topics to spark a conversation.

Cue: General themes (work, weather)

IDEA 14: ICEBREAKER SCREEN

An interactive screen with general information, such as weather forecasts, date and time, and information about caregivers and residents serving as communication starters.

Cue: Competition

IDEA 15: GAME

A game that can be played while waiting for the meal or during mealtimes to trigger conversation and stimulation.

IDEA 16: FIND THE "ALMOND"

Like the Danish Christmas tradition of finding an almond in the dessert to win a gift, small treats could be hidden in the residents' food servings to make mealtimes fun.

Cue: Cheerleader

IDEA 17: VOLUNTEER ENTERTAINER

A volunteer from outside the nursing home (e.g. student or unemployed) comes for a visit around mealtimes to entertain and train professional skills in a win-win situation.

Cue: Tinder

IDEA 18: FOOD TINDER

A way for residents to communicate what food they like in a visual way. Two meals are shown at the time (on a tablet or touch screen) where the resident can click on the meal he/she likes the best.

Cue: Personal things

IDEA 19: PERSONAL NAMETAG

Replacing traditional nametags (currently used) with a personal object that the residents can tell a story about.

Cue: Plan for tomorrow

IDEA 20: INFORMATION SCREEN

Digital information screen with information about upcoming meals and next shifts.

Visual Technique

In contrast to ideating by analogous inspiration, "Visual technique" was used to foster ideas (target) that did not necessarily have any relation to the domain (source) (Striim, 2003). Pictures were selected that were not apparently related to the project theme. The pictures used for this project originated from a previously held session that one of the project group members participated in. The ideation started by talking loosely about the picture in terms of main elements, activities, feelings, colors, shapes to trigger associations and ideas (Striim, 2003). Associations can be directly related to the picture, but since the technique stimulates imaginary and creative thinking also indirect associations can arise not directly attributing to the picture (Striim, 2003, p. 24). Below is a short description of the four ideas triggered by the visual technique.

Picture 13. *For visual technique*
Source: Stokholm, M.(2010), PP, Integreted Product Development

Association: Animal

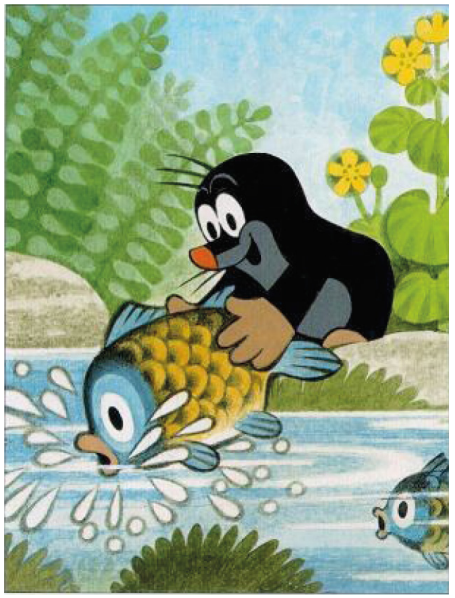
IDEA 21: ANIMAL CARE

The nursing home offers temporary care for animals of owners who are away (working, on vacation, etc.)

Association: Animal documentaries and live footage

IDEA 22: FOOD LIVE JOURNEY

Residents can see live footage from the kitchen and see how the food is prepared



Picture 14. *Visual technique*
Source: Stokholm, M.(2010), PP, Integrated Product Development

Association: No ears

IDEA 23: FOOD BELL

A bell rings when food is served and in the end of the meal

Association: Snapping for oxygen

IDEA 24: RELATIVE SNAP-CHAT

Relatives can send photos of their daily life that will pop up at a screen at the nursing home

Concretizing ideas

Figure 23. *Concept development*

In total 24 ideas were generated from the co-creation session at NH and the subsequent internal ideation session. The emphasis has until now primarily been on idea quantity meaning that all ideas are still in their early stages and not yet concretized. The next section describes the process of turning the many ideas into more elaborated concepts ensuring idea quality.

Osborn's checklist (SCAMPER)

The ideas were further developed using "Osborn's checklist" also known as "SCAMPER", which letters refer to the actions Substitute, Combine, Adapt, Magnify, Put to other use, Eliminate and Rearrange. Osborn's checklist aims to generate variants or improvements for suggested or existing solutions, and was developed by Eberle (1996) extending Osborn's (1953) brainstorming recommendations; the value of "copious ideation", the need for incubation, influence of emotions and effort in ideation, guidelines for brainstorming and ways to promote ideation) (Moreno et al. 2014 (b) p. 2). Osborn's checklist has many similarities to other concept development methods, such as for instance "Six thinking hats" or "Design compass" as they all seek to improve ideas through different thinking modes and design contexts (De Bono, 1986; Stokholm, 2005). However, "Combine" in Osborn's checklist enabled the project group to combine different ideas, which proved useful as many ideas were related in purpose and content.

A template for executing was created to ensure an overview and keep track of revisions. It was visualized as circles; one circle in the center to insert the idea, and seven surrounding circles for entering adjustments and elaborations.

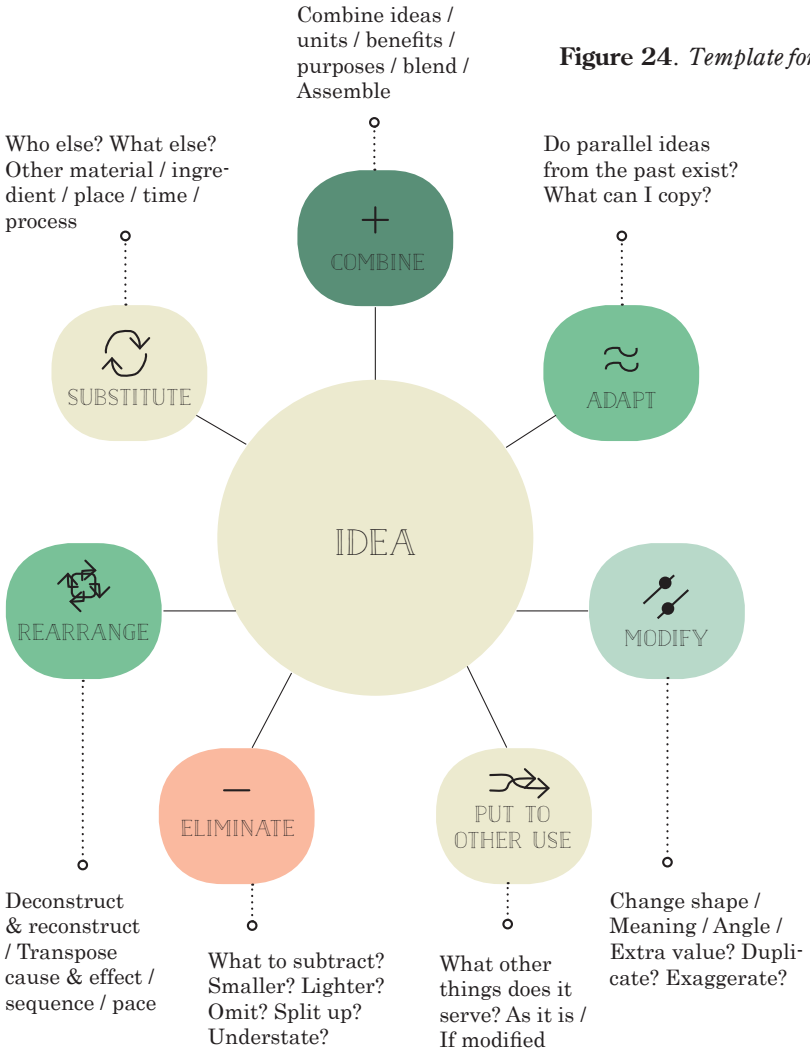
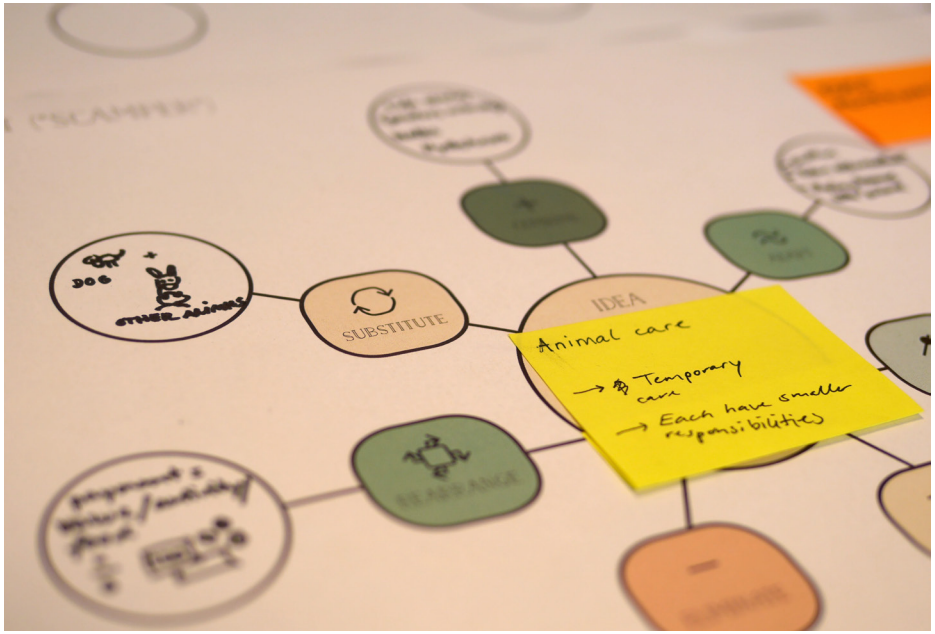


Figure 24. *Template for SCAMPER*

As it would be very time consuming to do the exercise for each one of the 24 ideas, it was decided to use the ideas that differed the most from each other as the centralized idea, and then merge the ideas that had similar goals in the "combine" mode in the SCAMPER model. In this way, the ideas with similar purposes or elements were considered together resulting in a more elaborated idea. For instance, the ideas 'food live journey' (internal ideation) and 'stimulation of senses' (co-creation) were combined into one concept that seeks to stimulate appetite by involving different senses.

The part "Substitute" was also very useful and it forced the project group to make changes to initial ideas by replacing one element with another, and hence not get stuck too fast on ideas still in their early stages. For instance, the immediate idea of 'dogs' in 'Animal Care' was substituted with other animals as well such as rabbits, which created new opportunities for responsibilities residents could have, such as picking grass.



Picture 15. *Applied SCAMPER*

Outcome

By following the seven actions in the checklist, the initial 24 ideas were reduced to an eight more elaborate ideas as a result of combining ideas, and eliminating ideas that did not seem to have potential to be developed further (Appendix 15). Main changes or modifications of the ideas are clarified below. Though a bit more elaborated than before, the original titles of the ideas are kept for the sake of clarity:

ANIMAL CARE

Development:

- Animals can be all types of animals
- Residents get responsibilities for the animals, such as walking with them or brushing their hair based on whether they have previously had past experience with animals (life stories).

FOOD TINDER

Development:

- Information about preferred food is sent to the kitchen
- The "tinder" format could include not only food, but also preferred activities

FOOD LIVE JOURNEY

Development:

- Combined with the idea "stimulation of senses" to serve as main purpose
- A static view of the meals of the day
- Live streaming from the nursing home is sent to relatives
- Not only food, but also live streaming of activities or other external happenings

PRESENTATION OF RESIDENTS

Development:

- Based on life stories and combined with the idea “hostess gift” (physical items)
- Written life story is made visual

RELATIVE SNAP-CHAT

Development:

- Combined with the ideas “Information screen” and “Icebreaker screen”.
- General information (meals, activities and so) is made available to relatives

RESIDENTS PREPARE FOOD

Development:

- Combined with the idea “Food Tinder” in the sense that the kitchen would send out available spots for participating in the preparation of food and residents could click ‘yes’ or ‘no’ according to if they would like to participate.

TOPIC CARDS

Development:

- Topics could be based on life stories
- Topics could include “special days”, such as public holidays and famous people’s birthdays

VOLUNTEER ENTERTAINER

Development:

- It should be a win-win situation, where both residents and the ‘ entertainer’ gain something

~~GAME~~

- This idea was difficult to develop further, and was therefore excluded.

First validation of ideas

As a manageable catalogue of ideas is specified the next process was to qualify which ideas to test at NH. The ideas were qualified according to an estimation of fit with concepts requirements and idea originality.

Concept requirements

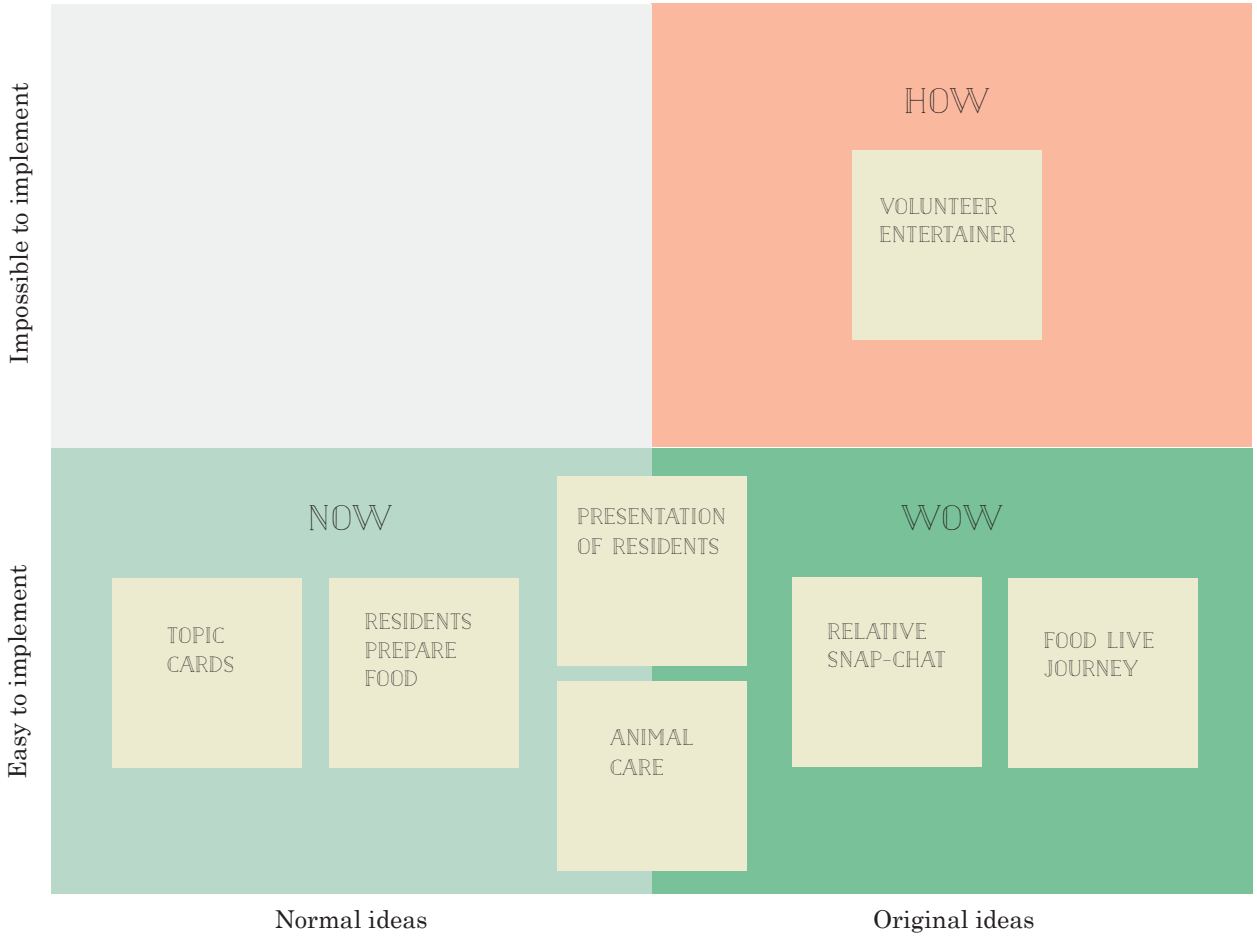
By assessing the ideas on the basis of each concept requirement, it was clear that “Food Tinder” did not match the framework for the project and was therefore eliminated. The remaining ideas were passed on to the assessment of ‘originality’.

	Animal Care	*Food Tinder*	*Food live journey*	*Presentation of residents*	*Relative Snap-chat*	*Residents prepare food*	*Topic cards*	*Volunteer entertainer*
CR 1	Animals eat with residents	Get the food they like	Stimulates appetite	Supports conversation	For those with relatives	Empower, stimulates appetite	Supports conversation	Entertains
CR 2	Delegated	NO	Automated	Objects as helping tools	Delegated	NO	Objects as helping tools	Delegated
CR3	NO	NO	Supports com-munication	Supports com-muni-cation	Supports com-munication	Supports com-munication	Supports com munication	NO
CR 4	Responsibili-ties based on life story	NO	Evokes memories	Life story as basis	Channel for past and new stories	Evokes memories	Topics related to life stories	Depends on activity
CR 5	Shared between residents	NO	NO	Getting to know other residents	NO	Doing something together	Interaction	NO
CR 6	Empower	Empower	Stimulate	Stimulate	Stimulate	Empower	Stimulate	Stimulate
	5/6	2/6	5/6	6/6	4,5/6	5/6	6/6	3,5/6

Figure 25. *Assessing ideas in relation to concept requirements*

Idea originality

As the project group's goal was to design something that was original, the ideas were qualified in according to "The CODC box" (also known as "How-Now-Wow" matrix) (Appendix 16). When selecting ideas two basic criteria are considered; on the one hand, degree of innovativeness – is the idea an old hat or new? On the other hand, feasibility: is the idea easy or difficult to bring to reality (Stortelder, 2011, p. 42).



How:
Ideas that are innovative, but not feasible. This area is a good for setting future goals

Now:
Ideas that are familiar and known to work well

Wow:
Creative ideas that can be executed

Figure 26. *The CODC*

Outcome

The idea “Volunteer entertainer” was eliminated, as it was difficult to imagine whom the entertainers would be, who would gain something from this and was different from the volunteers that participated in activities today. “Topic cards” and “Residents prepare food” was considered as normal ideas ready to be implemented, whereas the ideas “Food live journey”, “Relative snap chat”, “Animal care” and “Presentation of residents” all entailed original elements with no immediate apparent constraints. These four ideas were all passed on to mock up development (titles have now been slightly changed according to the development in Osborn’s checklist that altered the titles of two of the initial ideas):

PRESENTATION OF RESIDENTS

DIGITAL MESSAGE BOARD

(former called “Resident snapchat”)

NURSING HOME LIVE

(former called “Food live journey”)

ANIMAL CARE

The mock-ups will be explained in greater detail in the next chapter.

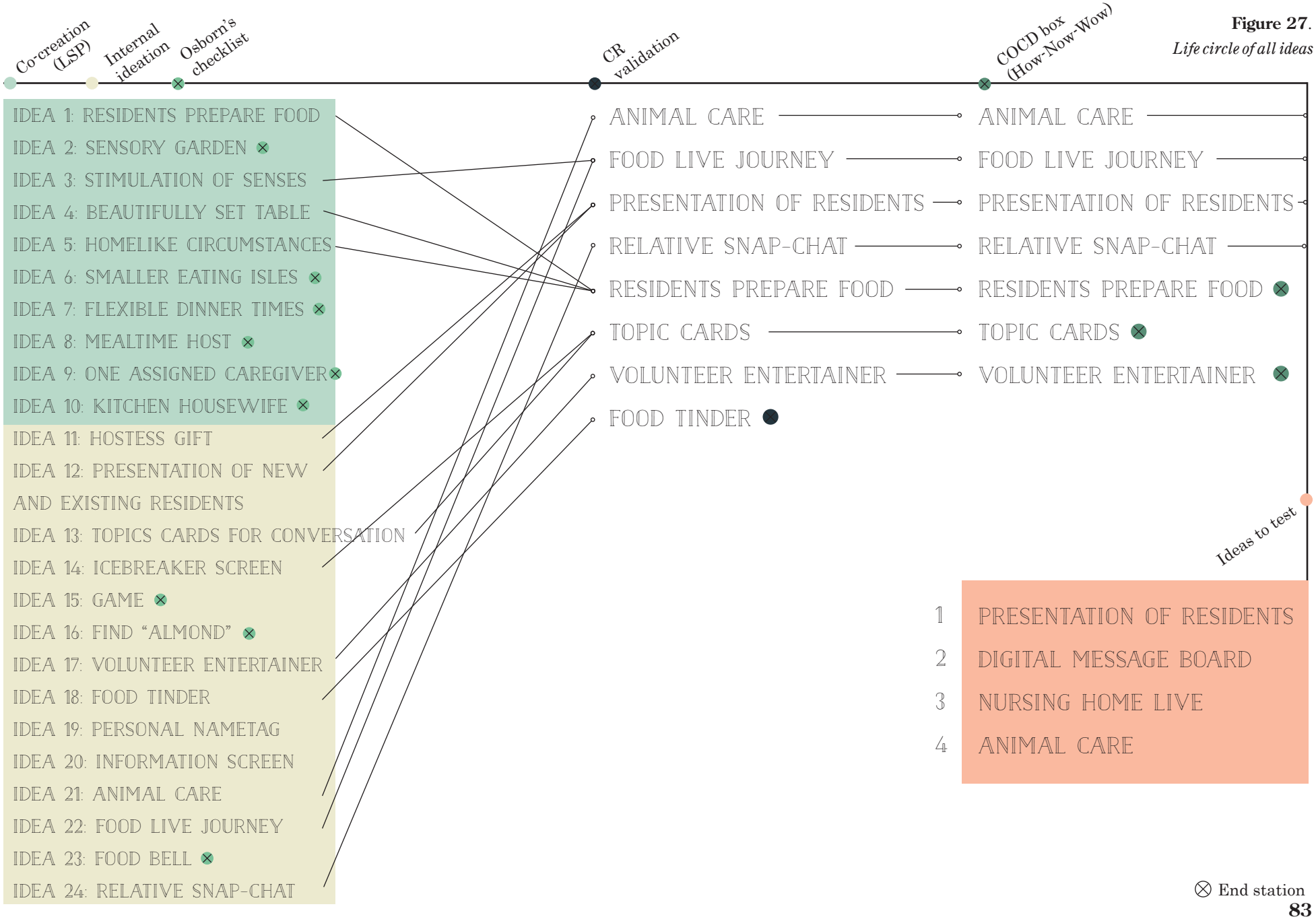


Figure 27.
Life circle of all ideas

⊗ End station

Picture 16. *Early prototypes*

EARLY PROTOTYPING

By extracting elements from different qualified ideas, four concepts with different features were conceptualized.

CONCEPT 1: Presentation of residents

Brief: Takes its outset in the life stories of the residents and present them in a more visual way than today where they (if they exist) are written and stored in binders.

Objective: Encourage conversations, strengthen social coherence, and provide information about the residents.

Collage

A physical collage with photos of significant events in the residents' lives created with the help from relatives. It is placed in the dining area serving the purpose to trigger conversations. Further, residents can study it closer during the day and learn more about other residents living on the same floor.

Screen

The life stories could also be available on a digital screen where a greater collection of photos is stored, also with photos of past activities at NH. All caregivers can access a secured entrance, where more private and care-related information is stored (what they like, how much they eat, if they need help with eating etc.).

PRESENTATION OF RESIDENTS

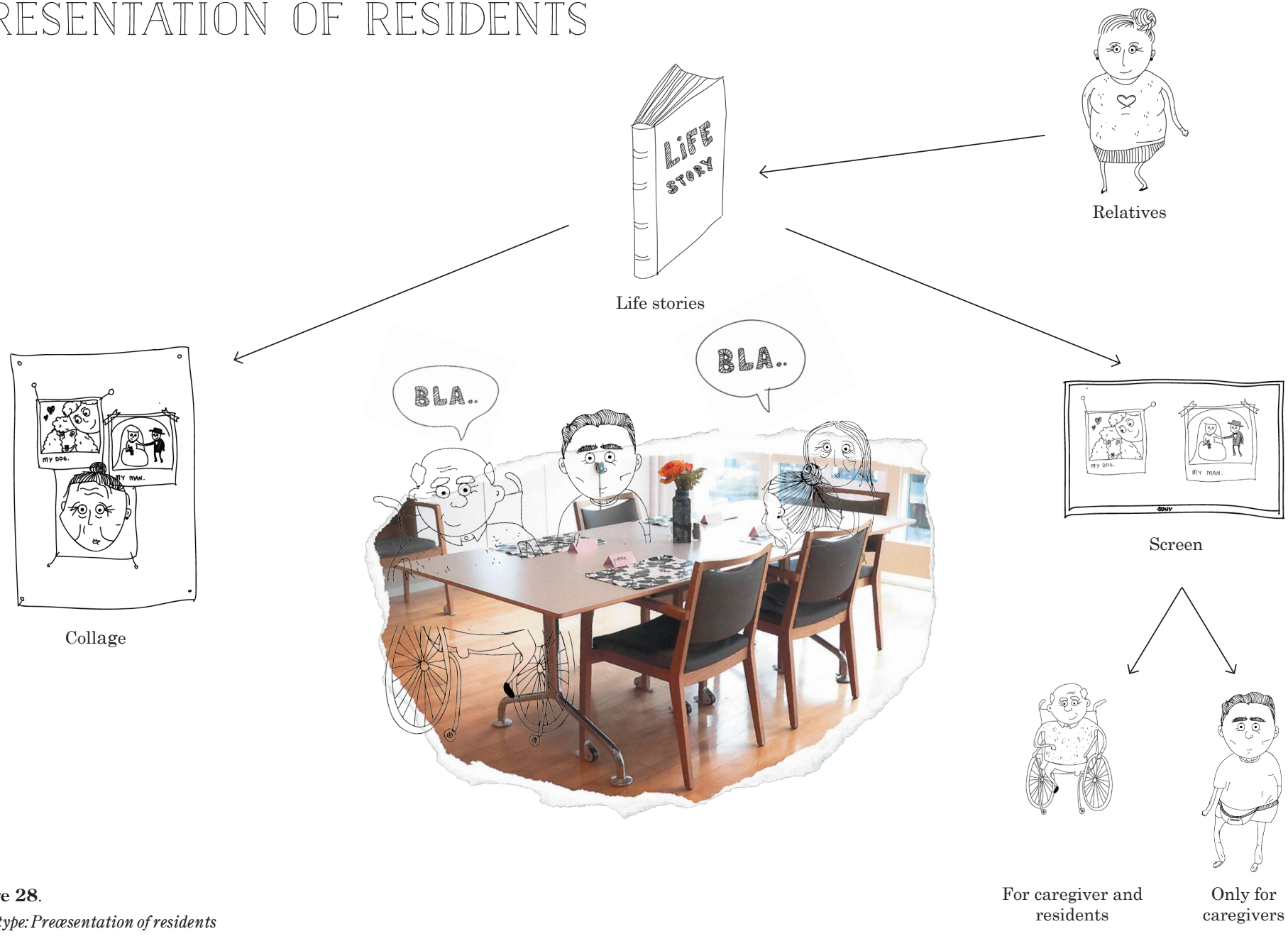


Figure 28.
Prototype: Preæsentation of residents

CONCEPT 2: Digital message board

Brief: Makes relevant information visible to residents on a digital screen placed in the commend area.

Objective: Encourage conversations, stimulate appetite, inform residents.

Icebreaker

As the name indicates, this feature visualizes general conversations triggers, such as the weather, day and date or birthdays. Moreover, it seeks to generate conversations from photos of the residents' lives and general historical events. The screen can be seen in the dining area and photos are presented on the screen on shift serving to "break the ice" during and between mealtimes.

Snap-chat with relatives

This feature enables relatives to send photos from their lives to the screen, where they will be available for a day. With help from the caregivers, the residents can send photos back. This feature serves the purpose of preventing loneliness and makes the days less alike.

Internal information

The last feature presents relevant internal information about what is happening and will soon happen at NH presented in a slideshow on the screen. Information includes the next meal, activities today/following day, current and next shifts (caregivers) - all presented with big photos and a short title. Most of the information (besides caregivers on shift) is available today in a monthly printed newsletter that the residents receive. However, many of them do not read the content from day to day. Photos of the food serve the purposes of conversation triggers and means to stimulate the appetite of the residents. Caregivers can control, which of the three categories should be displayed on the screen.

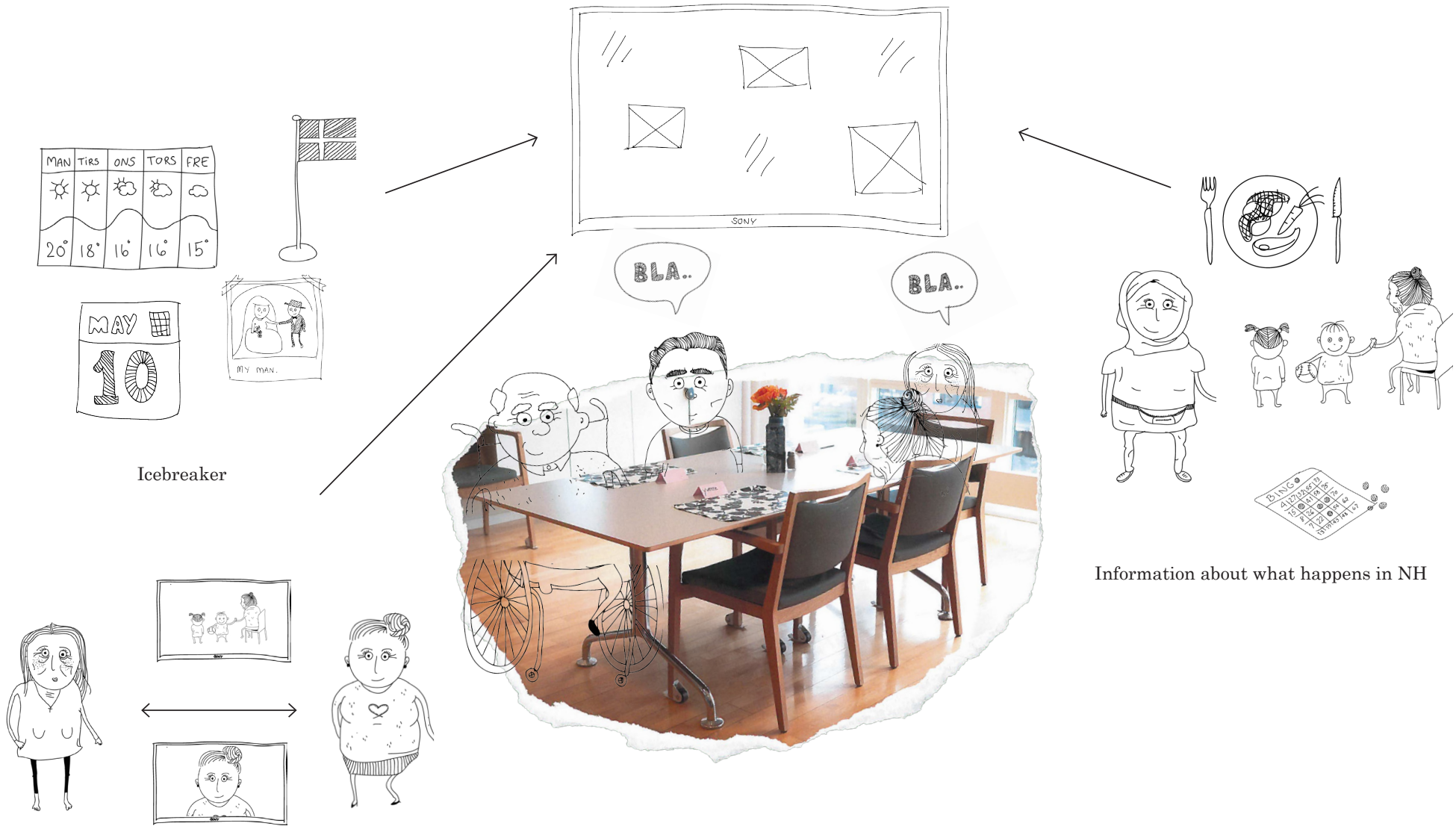


Figure 29. *Prototype: Digital messNHe board*

CONCEPT 3: Nursing home Live

Brief: Takes outset in making the kitchen and the preparation of food visible on a digital screen.

Objective: Encourage conversations and stimulate appetite.

Meal countdown

The first feature shows a countdown of when the next meal is served and what it is.

Live transmission from the kitchen

Residents can follow the journey of the food from preparation to serving from live transmissions from the main kitchen on a screen in the common areas on each floor. Based on the background that you are more likely to enjoy the food when you know how it has been prepared, residents can see what they are going to be served. This might also trigger conversations among the residents and possibly evoke memories from family mealtimes.

Live transmission from activities

Similar to live transmissions from the kitchen, live transmissions from activities are also showed on the screen as they are happening. This seeks to motivate residents to go and join and/or compensate for residents who might not be able to be physically present. Some activities are recorded and can be sent to relatives.

Recordings to relatives

Recordings from activities can be sent to relatives.

NURSING HOME LIVE

Figure 30.
Prototype: Nursing home live

CONCEPT 4: Animal care

Brief: The last idea differs from the previous ideas, as this is an analogue service that takes outset in creating social cohesion and empowering the residents.

Objective: Empower residents, strengthen social coherence and make residents sit longer at the table

Owner brings animal and belongings

People from the community can bring their animal for temporary care at the nursing home, while they are on work, on vacation or similar. Many existing nursing homes in Denmark have pets that live permanently at the nursing home, which is shown to evoke lost abilities in residents (Kofod 2011). Moreover, by having only one animal at the nursing home at the time, the residents have something that is shared between them, which strengthens the social cohesion.

Life story

In written life stories caregivers can see which animals the residents have had in their home in the past, what animals they like, and if they have allergies.

Activities/responsibilities

Based on the life stories and wishes of the residents, different residents get minor responsibilities for the different animals. Activities could include brushing, walking or feeding. This empowers the residents and makes them feel that someone needs them bringing forward the empathic sides of residents.

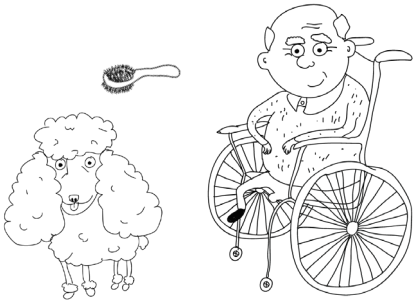
Eating with animals

The animal will eat approximately at the same time as the residents next to them in the dining area. This serves the purpose of making residents sit longer at the table, thus possibly increase food intake.

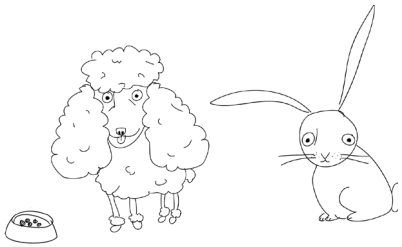
ANIMAL CARE

Owner brings animal and belongings

Life story



The residents have responsibilities for taking care of the animals



The animals eat together with the residens

The residents and the caregivers do activities with the anmals

Figure 31.
Prototype: Animal care

Picture 17. *Early prototype test*

TEST AND VALIDATION

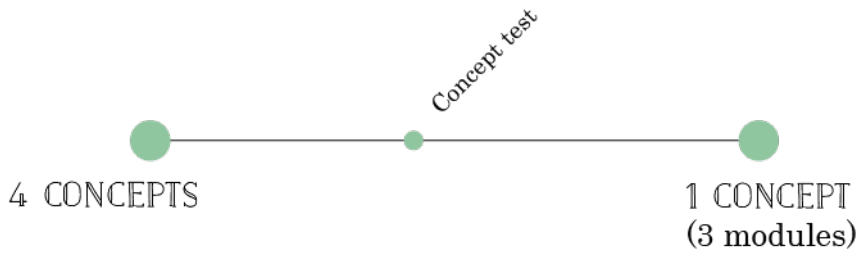


Figure 32. *Process of finding 1 concept*

After having developed and selected four concepts from the various ideas, this section will present the feedback received on the ideas from different perspectives in order to narrow the four concepts down to one.

Execution

Early concept test

The tests were carried out with; five caregivers individually, an expert who has a PHD in welfare technology focusing on quality of life for people with dementia, and one resident together with her relative. The tests lasted between 30-60 minutes.

The concepts were explained using the low-fidelity prototypes of cardboard with drawings presenting different features related to the concept as presented on the previous pages. It was chosen to apply low-fidelity prototypes, as prototypes only should command as much time, effort, and investment that are needed to generate useful feedback and evolve an idea (Brown, 2008). Moreover, the focus should be on the idea and not on the format/media, which could occur if a digital mock-up or other hi-fidelity prototype was applied for the tests. The more abstract drawings served to make it easy for the caregivers, the residents and the relatives to understand the ideas and comment on the relevance of the ideas only (not functionalities).

The tests were conducted firstly by explaining each idea using the drawing as support and secondly asking the participants the following questions:

- WHAT ARE YOUR IMMEDIATE THOUGHTS ABOUT THE CONCEPT?
- WHAT IS GOOD AND WHY?
- WHAT IS NOT SO GOOD AND WHY?
- PROPOSAL FOR AMENDMENT OR FURTHER DEVELOPMENT?

Finally, the participants were asked to prioritize the ideas from 1-4 according to which concept they preferred.

Outcome

Below is the prioritization shown, where number one is preferred.

	IDEA 1	IDEA 2	IDEA 3	IDEA 4
Caregiver	2	1	4	3
Caregiver	2	1	3	4
Caregiver	2	1	3	4
Caregiver	2	1	4	3
Caregiver	3	1	2	4
Expert	3	1	4	1
Relative	1	1	3	4
Resident	2	1	3	4
TOTAL	17	8	26	27
Final ranking	2	1	3	4

Figure 33. *Prioritization of the four ideas*

The tests participants' all preferred idea 2: "Digital message board".

Idea 2: "Digital message board" will form the basis of the final selected idea. However, during the tests, pros and cons including ideas for possible further development on the features of the four ideas arose (Appendix 17) and it was found that some of the features from the other ideas also were valuable and could be added to "The interactive message board".
Therefore, the project group has evaluated each features based on the pros and con and found those that will be added to the basis idea "Digital message board").

In the following the features of each of the four ideas will be reviewed with selected pros and cons and then evaluated.

Picture 18. *Test with a resident and her daughter*

IDEA 1: PRESENTATION OF RESIDENTS

Feature A: Collages of resident's life stories

PROS:

Caregiver: *"Good idea, then we have something to talk to the residents about."*

Relative: *"It is a good conversation starter between residents - The other day when we talked to Grethe (another resident) we found out that she had been living close to where you had a shop - but I was acting as the intermediary - There needs to be someone to facilitate conversations and take initiatives, because it can be difficult for the residents".*

Feature deselected

Feature selected

CONS: **Expert:** *It would be too much stimulation if the residents can see all the life stories at one time.*

Deselected
Comment: Visual life stories were found useful but not in the form of collage.

Feature B: Life stories on screen: Access for all / access only for caregivers

PROS: **Caregivers:** *"Good idea, maybe a family tree could be included*
Caregiver: *"Nice to have information about residents outside of the office".*

CONS: **Expert:** *"Be careful with the screen, because it might have the opposite effect in the way people would sit and look at that and not interact with each other".*

Selected
Comment: The test participants could see the advantages of that the life stories are presented on a screen instead of a collage, as it makes it easy for the relatives to upload new pictures and the caregivers can easily choose when and where the life stories should be displayed. The part with only access for the caregivers do not fit with the focus area and the problem statement and is therefore deselected.

IDEA 2: DIGITAL MESSAGE BOARD

Feature A: Icebreaker

PROS: **Caregiver:** *"Then we all have something to talk about - We can look together and talk."*
Relative: *"It is a good idea. Maybe it could help the caregivers take initiative to sit down and talk with residents, because they don't do that much to a high extent today".*

CON: **Caregiver:** *"Just remember some of the residents prefer silence during dinner"*

Selected
Comment: All of the test participants agreed that the icebreaker could be a starting point for conversations between caregivers and residents.

Feature B: Internal information

PROS: **Caregivers:** *"Could be used before they eat, to tell about what is going to happen that day, the resident have something to look forward to".*
Relative: *"Like that you make the things visual, and much information is spread out papers hanging different places today".*

Selected
Comment: According to the test participants the internal information would provide useful visual information and a feeling of belonging. The focus was especially on the menu.

Feature C: Snap-chat with relatives

PRO: **Caregiver:** "*For the healthy resident it could be a good idea"*

CON: **Caregivers:** *"What about those residents who do not have relatives, maybe it could be on a private screen".*

Deselected
Comment: Only very few were positive regarding this function and the relative did not want to use it.

IDEA 3: NURSING HOME LIVE

Feature A: Meal countdown

CON: **Expert:** *"Residents with dementia get stressed".*

Deselected
Comment: Many negative comments.

Feature B: Live transmission from the kitchen

CON: **Caregiver:** *"The residents will miss other senses like smell".*

Deselected
Comment: Many negative comments.

Feature C: Live transmissions from activities

PROS: **Caregivers:** *"Good, the resident can maybe relate to what is happening and maybe they will want to participate next time there is the same activity".*

CON: **Expert:** *"Residents with dementia does not understand the live aspect. Time loses its meaning for people with dementia".*

Deselected
Comment: A few of caregivers saw an opportunity in that residents might want to participate in an activity if they understood what it was all about. At the same time, it could appear that no one would participate because it was easier to be stay on their floor and follow through TV.

Feature D: Recordings to relatives

PRO: **Caregiver:** *"Good idea, right now we primarily communicate via. Facebook and I think it has only 40 likes."*

CON: **Relatives:** *"There might be privacy issues, if you send recordings of the residents to various relatives."*

Deselected
Comment: The aspect of involving the relatives and enabling them to see what happens in NH was found useful but not by recordings. The feature could occur by a relative logging on and thereby being able to see the same information as the residents.

IDEA 4: ANIMAL CARE

Feature A: Owner brings animal for temporary care

CON: **Caregiver:** *"Pills on the floor is a problem if the dog eats them"*
Expert: *"Instead of real animals it could also be special 'sensory rooms' with stuffed with animals and different textures".*

Deselected
Comment: Several of the test participant could see the advantages in having animals at the nursing home however they did not like the idea of temporary animals and they would prefer if it was animals that live in cages.

Feature B: Life story responsibilities

CON: **Caregiver:** *"Good idea if people are used to animals and likes them".*

Deselected
Comment: It was found useful that the types of animals were based on the residents life story on if they were used to have an animal and what kind. However many of the respondents were that it could only be animals in cages.

Feature C: Doing activities with animals

PROS: **Caregivers:** *Maybe it could be Fish instead, each resident could have there own fish and feed them*
Expert: *"Animals are easy to talk to and don't require much of you"*

Deselected
Comment: Some positive feedback was provided but mainly the participants were not interested in the idea about animals.

Feature D: Easting with animals

CON: **Caregiver:** *"Some residents and caregivers are afraid of some animals and some have problem with allergies"*

Deselected
Comment: None of the participant answered positive

The combined concept: "FORGET-ME-NOT"

The outcome of the tests is one concept called "Forget-me-not", which is based on the idea of "The digital message board" including its two features, icebreaker and internal information and with the extra feature "life stories". Each of the features have been somewhat further developed based on input from the test.

FORGET-ME-NOT

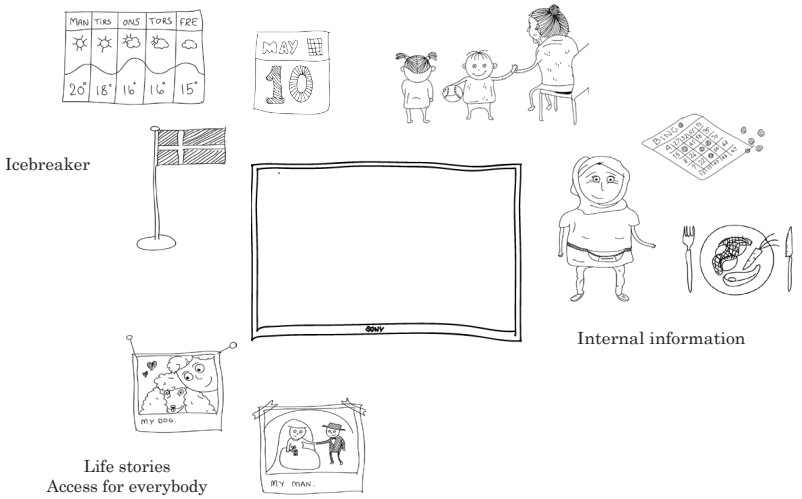


Figure 34. *"Forget-me-not"*

Why the name forget-me-not?

The service deals with the fact that the residents at the nursing home should not be neglected or have the feeling of being objectified through a high focus on practical care and efficient processes. Instead they should feel valued by supporting personal conversations and social togetherness.

The concept

"Forget-me-not" consists of three modules.

ICEBREAKER

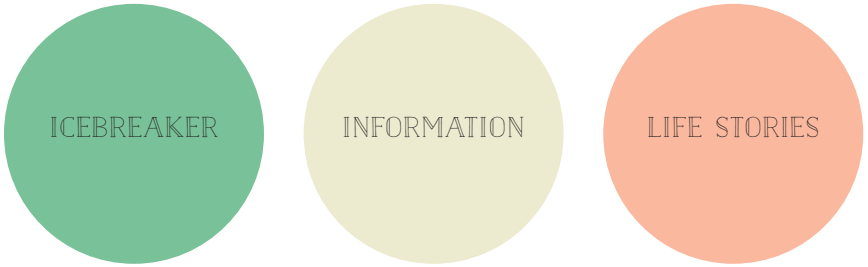
The icebreaker part visualizes general conversation starters such as the weather forecast for a week and a calendar with important events such as residents' birthdays, holidays and special dates.

INTERNAL INFORMATION

This part presents relevant internal information about what is happening and upcoming events at NH. Information includes menus for the week, current and next shifts (caregivers) - all presented with big photos and a short title and finally today and tomorrows activities.

LIFE STORIES

This part includes three categories. Category one is a life story of each resident on the floor through pictures and a small text. Each life story could contain family information, events, previous work, interests, favourite food, travel and others.
The second category is a picture from past activities in NH and the final category is pictures of historical elements and events. again the caregivers can control, which of the three categories should be displayed on the screen.



Evaluation

The method low-fidelity prototyping was found very useful, as it is a fast and easy method that provided the feedback that was intended. Throughout the tests the focus was on the idea and not on the format/media.

Testing with caregivers

The caregivers who have been a part of the earlier process were very interested in hearing about the "final" four ideas and they were eager to provide their feedback. Some of the caregivers found it easier to be more creative and think outside the box when they had a concrete idea to relate to.

Testing with an expert

It was also a beneficial experience to test with an expert. She could refer to several examples of how things are done in other nursing homes and explain her experience on the problem statement and the ideas.

Testing on a resident and her relative

Before testing the ideas on the resident and her relative, the project group had the opportunity to talk with them and ask them questions related to the project theme (Appendix 18). They explained how the residents are feeling about staying at NH, and confirmed that there is not much conversation during mealtimes. Earlier on the same day of the test, the relative had asked the caregivers why there are no conversations during the mealtime and the caregivers reply was that residents also have to take initiative themselves. This meeting made it easier to get answers from the resident, as the relative "translated" some of the questions to the residents and elaborated on her replies.

It can be argued that testing on more people would be preferable especially with more residents and relatives. It would have provided more value and possibly a different result. Unfortunately it was not possible this time since NH was not able to provide connections to more relatives.

Picture 19. *Prototype at NH*

PROTOTYPING FORGET-ME-NOT IN USE

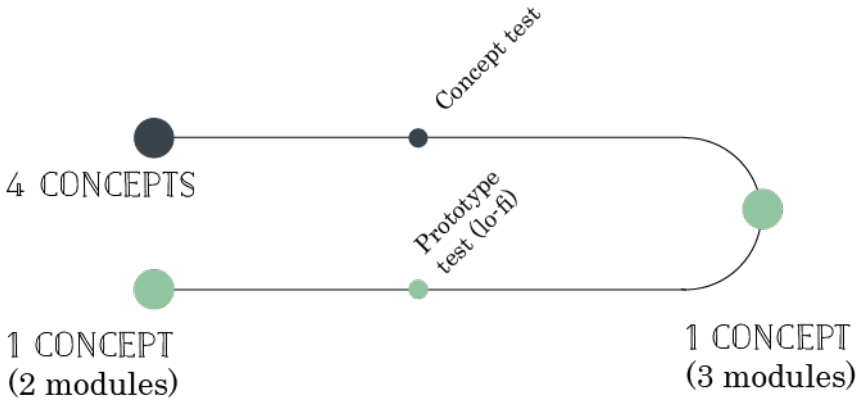


Figure 35. *Process of testing "Forge-me-not"*

- INFORMATION (NH)
  Meal menu and future activities
- ICEBREAKER
  Weather forecast
- HISTORY
  Past activities and historical events

When one concept was chosen and further developed, it was time to test the concept in the context of use. The aim of the test was that it should provide an indication of which effect the concept has on caregivers and residents when they applied it and hereby investigating, if it solved the problem statement of improving the mealtime experience by enhancing communication between residents and caregivers, and social cohesion among residents.

Execution

In order to perform the tests a low-fidelity paper based prototype were developed (Appendix 19). The prototype consisted of an A3 folder containing printed images see figure 36. The prototype was divided in three categories according to the three modules:

Each category started with a written example of how to use it followed by imNHes.

It would have been preferable if the aspect of life stories could have been included in the test, however it was not possible to get in contact with the resident and get pictures from their past. It was planned that the Life story aspect should somewhat be tested through the historical event as it would provide an indication of whether the residents remembered events from the past and wanted to talk about it.
The prototype was placed on the 5th floor in the dining area for five days. It would have been preferable to test on several floors, but unfortunately, NH could not meet this request. Also, it might have been relevant to perform the test on more days to get more answers, but due to limited time only five days could be set aside.
The caregivers at work were introduced to how they should use it, and were asked to fill out a questionnaire, containing questions asking what part of the prototype (response options) they had used, what time they had used it, what it had contributed to (response options) and finally they should provide an overall evaluation. It was possible for them to provide extra comments as well (Appendix 20).
The project group did not witness the prototype in use since it might be disturbing to the caregiver and residents, if conversations were witnessed.

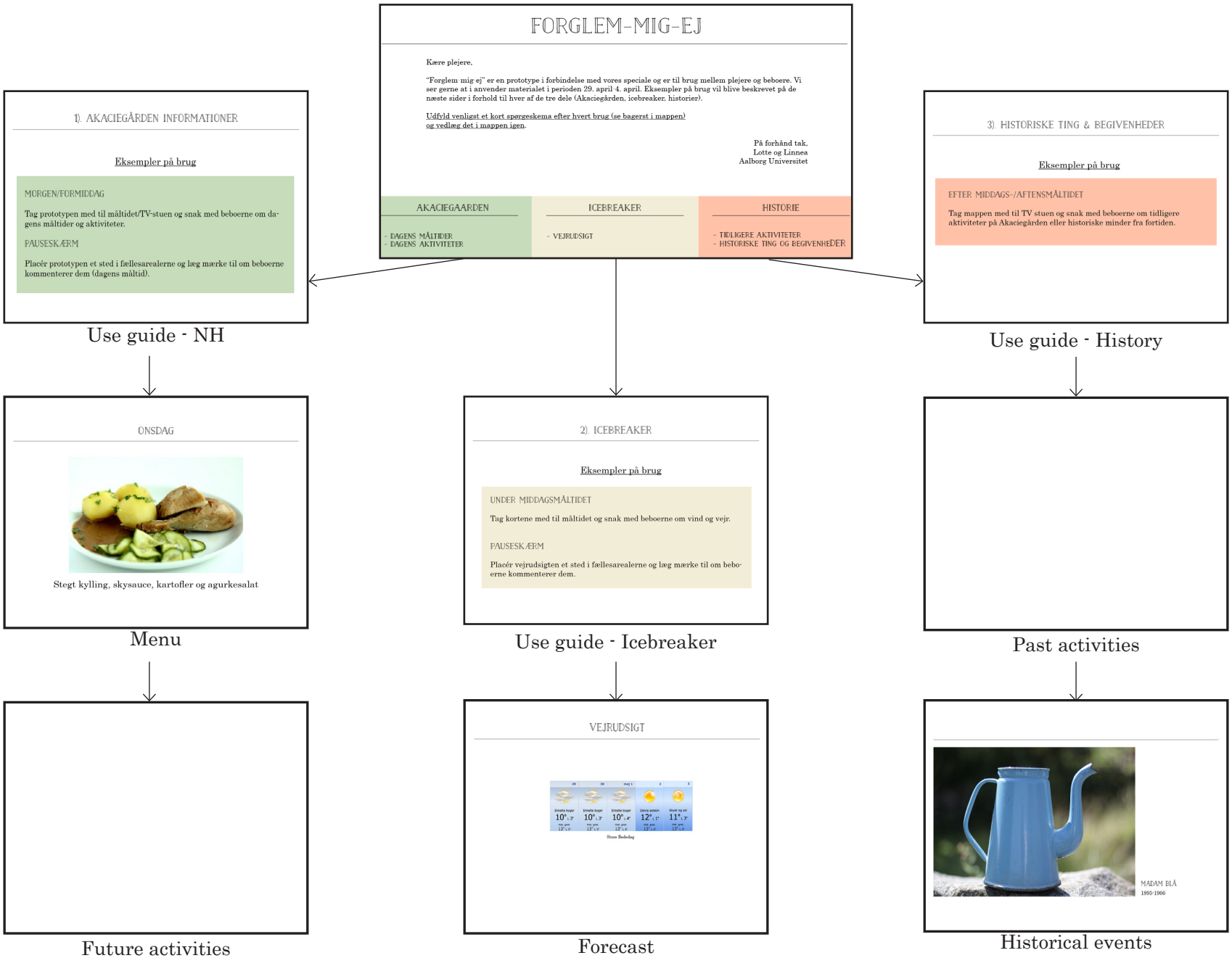


Figure 36. *Prototype of "Forget-me-not"*

Picture 20. *Introduction to caregivers*

Outcome

In total, five caregivers answered the questionnaire (Appendix 21).
The caregivers had used the prototypes for menu, weather forecast, today's activities and historical events.

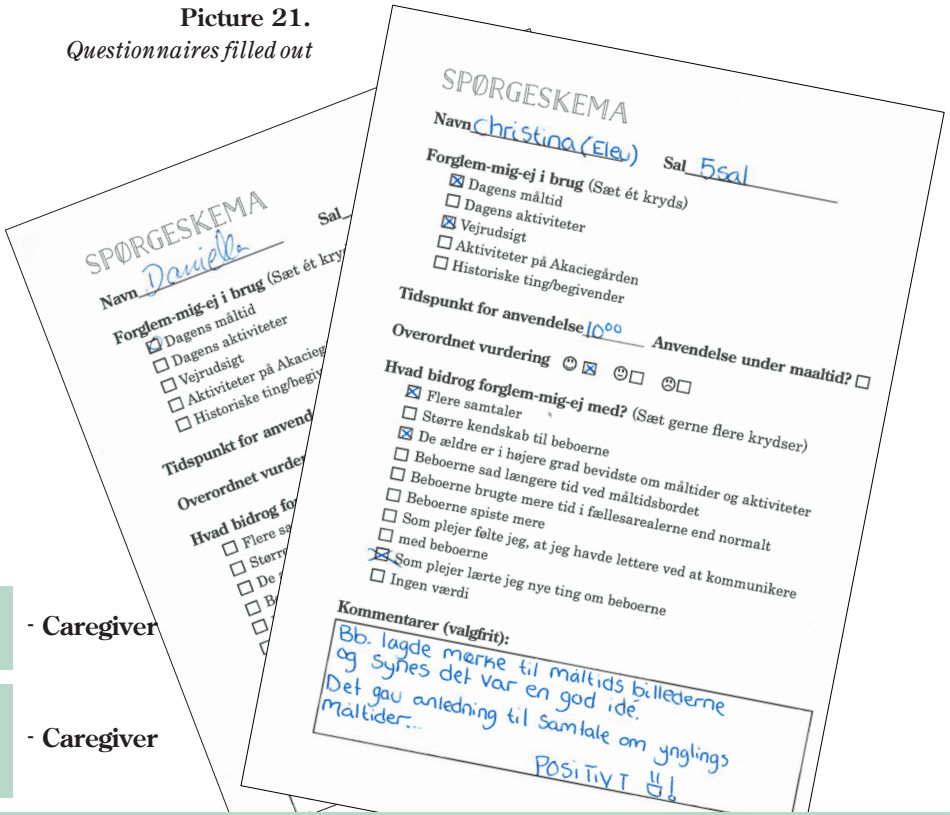
The overall evaluation was that some of the aspect was found very valuable while others was not. The menu was found useful. The future activities was rated badly and got the feedback that it did not encourage any of the resident to participate.
When the project group retrieved the questionnaires that were filled out at NH an informal conversation with two caregivers occurred. They caregivers provided positively feedback as that the residents had pointed at the pictures of today's menu and had started a conversation and that the prototype generally had created conversations.

Even though it is difficult to make any conclusions when only five have answered the questionnaire, the concept was incorporated to the test results and modified based on the problem statement.

First of all, it was decided to **eliminate the future activities** since the test showed it was not valuable. It did not serve the purpose of triggering conversations, as the caregivers felt that they had to convince the residents to participate, which might not be the best way to support communication.

Second of all, **the part of visualizing caregivers at work was eliminated,** as the focus in the service should be on conversation and not about information. The primary focus in the service should be on the past since people with dementia often have great memories about their childhood and early adulthood and often find it easier to relate to these periods of their life (Socialstyrelsen)

Picture 21.
Questionnaires filled out



"RESIDENTS FIND IT EASIER TO COMMUNICATE" - **Caregiver**

"AS A CAREGIVER, I FIND IT EASIER TO COMMUNICATE (WITH RESIDENTS)" - **Caregiver**

Caregiver (Trainee): "THE RESIDENTS NOTICED THE MEAL PHOTOS, AND FOUND IT WAS A GOOD IDEA. IT TRIGGERED CONVERSATIONS ABOUT FAVORITE MEALS"

"THE RESIDENTS ARE MORE CONSCIOUS OF MEALS" - **Caregiver** (Permanent)

Caregiver (Permanent):
Caregiver (Trainee): "AS A CAREGIVER, I LEARNED NEW THINGS ABOUT THE RESIDENTS"

"USING THE SERVICE CONTRIBUTED TO MORE CONVERSATIONS" - **Caregiver** (Trainee)

The final concept "FORGET-ME-NOT"

After two prototype tests, the final concept now consists of two modules with the following content:

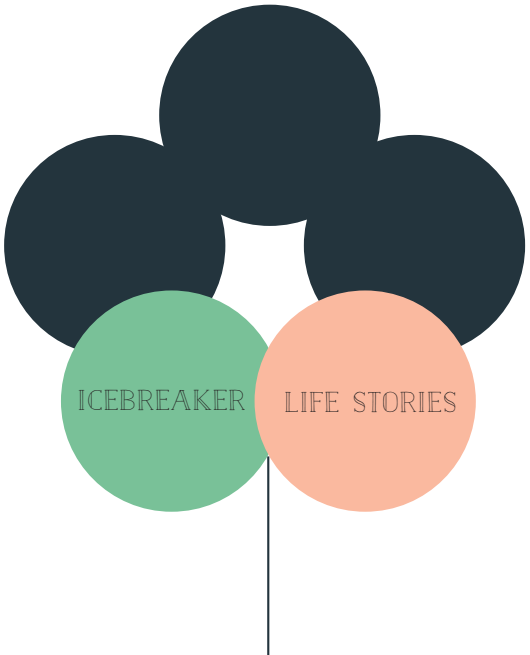
- ICEBREAKER

  Weather forecast for today / week
  Meals for today / a week
  Calendar with public holidays, birthdays of residents and other special days

- LIFE STORIES

  Resident life stories
  Past activities (NH)
  Historical objects and events

Details in the concept will be further developed and described in the next section.



Evaluation

The method of the low-fidelity paper based prototype served the overall purpose of the test, however, in hindsight it might have been necessary to clarify to the caregivers that iterative use was intended and maybe setting an approximate number for tests needed, so the caregivers would have used it more and thus provided more feedback. In order to get an impression of the real effect it would have been preferable to witness the conversations or film it but the caregivers did not feel comfortable in the situation to keep the conversation natural.

Since the part of live stories, was not tested it is necessary to test the service again with a prototype containing all the elements.

MEETING WITH SERVICE PROVIDER

After the prototype test, the project group were invited for a meeting with the tech company. They have an ongoing contact with NH, which means that they will most likely manage the development of technical aspects and final design of a new service concept, when it is defined in clear terms. The purpose of the meeting was for the service provider to hear about main insights from fieldwork and our preliminary ideas, as they will not make any primary research themselves, but focus on the final development.

Present at the meeting was the client, who would also be introduced to our final concept, where we until now have had more informal and brief discussions about our findings and ideas. Besides our project group, two other groups of students from Aalborg University were present, as they contemporarily worked on the same project proposal from NH. These student groups were master thesis students from the "Information Science" study program and bachelor students from the "IT, Communication and New media". The latter group only just started on the project, but we have been in contact with the other master thesis group in the early phase of the process, and then been going in different directions since quickly hereafter.

The meeting was very informal, and each group presented their main idea(s) and the research behind the idea justifying the relevance. It was interesting to see the different directions of each group. The bachelor students knew in advance they would want to develop an app and has implement features, such as food documentation; practical care documentation and other areas directly related to the initial proposal. The other master thesis group also focused on information management and documentation in relation to documenting food intake of all meals for each resident for more precise screening of food intake. Their solution was a documentation service where the caregivers after each meal would mark if the residents have been eating as usual, eaten less, or eaten much. In this way they were seeking to improve knowledge sharing between shifts, and provide more information back to the kitchen.

No decisions were made during the meeting regarding what the final concept would be, but it was agreed to create contact again after we had handed in our projects, as the company would also like to read these to get more information about our work.

Picture 23. *Sketching tool*

CONCEPT DETAILING

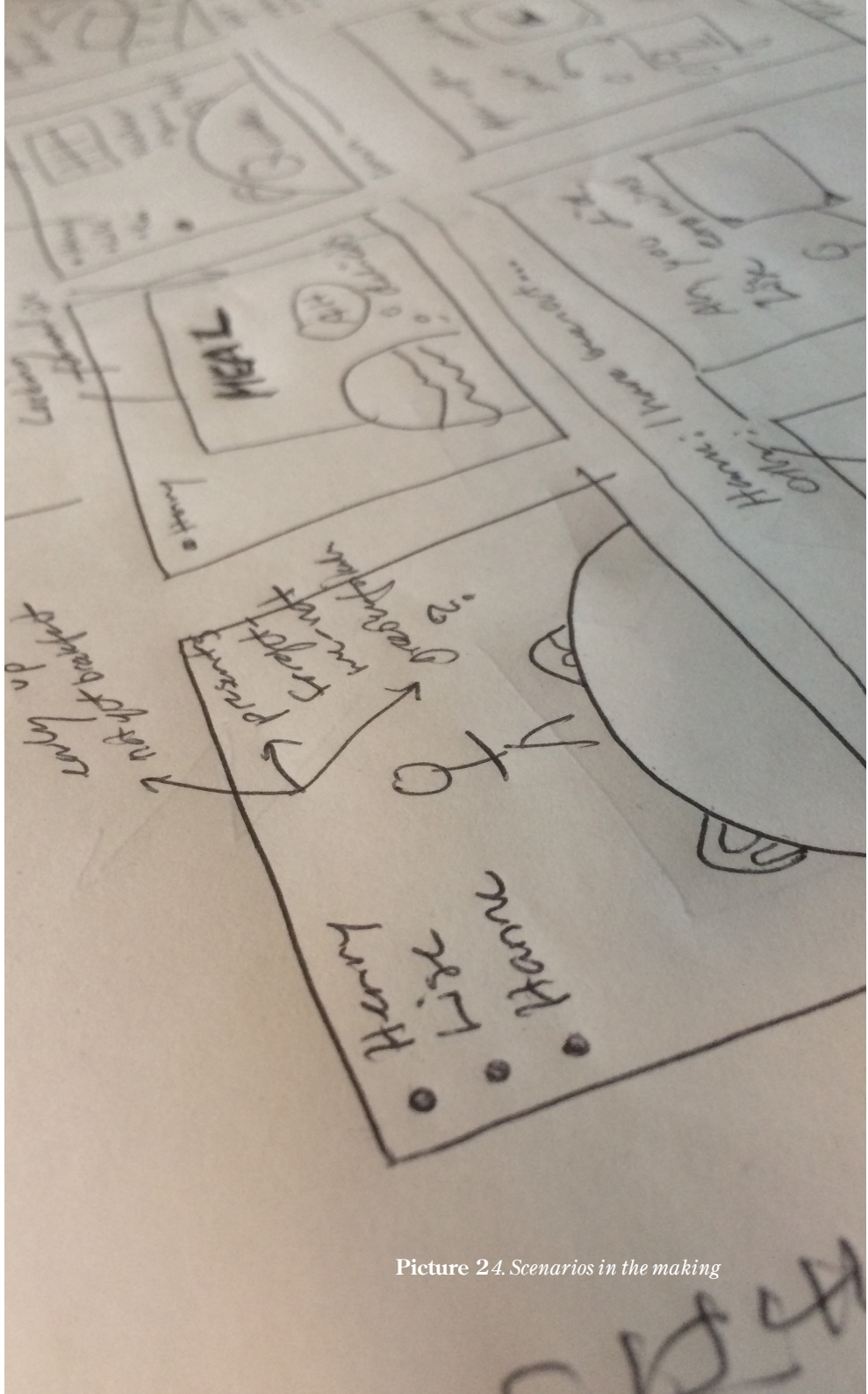
After the main aspects of the concept were defined, it was time to reflect on how the service would be used in the context of NH, the target group, and in relation to the framework of mealtimes. Our concept needed to fit into the daily activities and processes of caregivers and residents, and therefore the goal was to clarify the context of use according to daily routines. For this purpose, scenarios were created defined as, *"A story with a setting, agents, or actors who have goals or objectives, and a plot or sequence of actions and events"* (Pruitt & Grudin, 2003, p. 12).

Scenarios

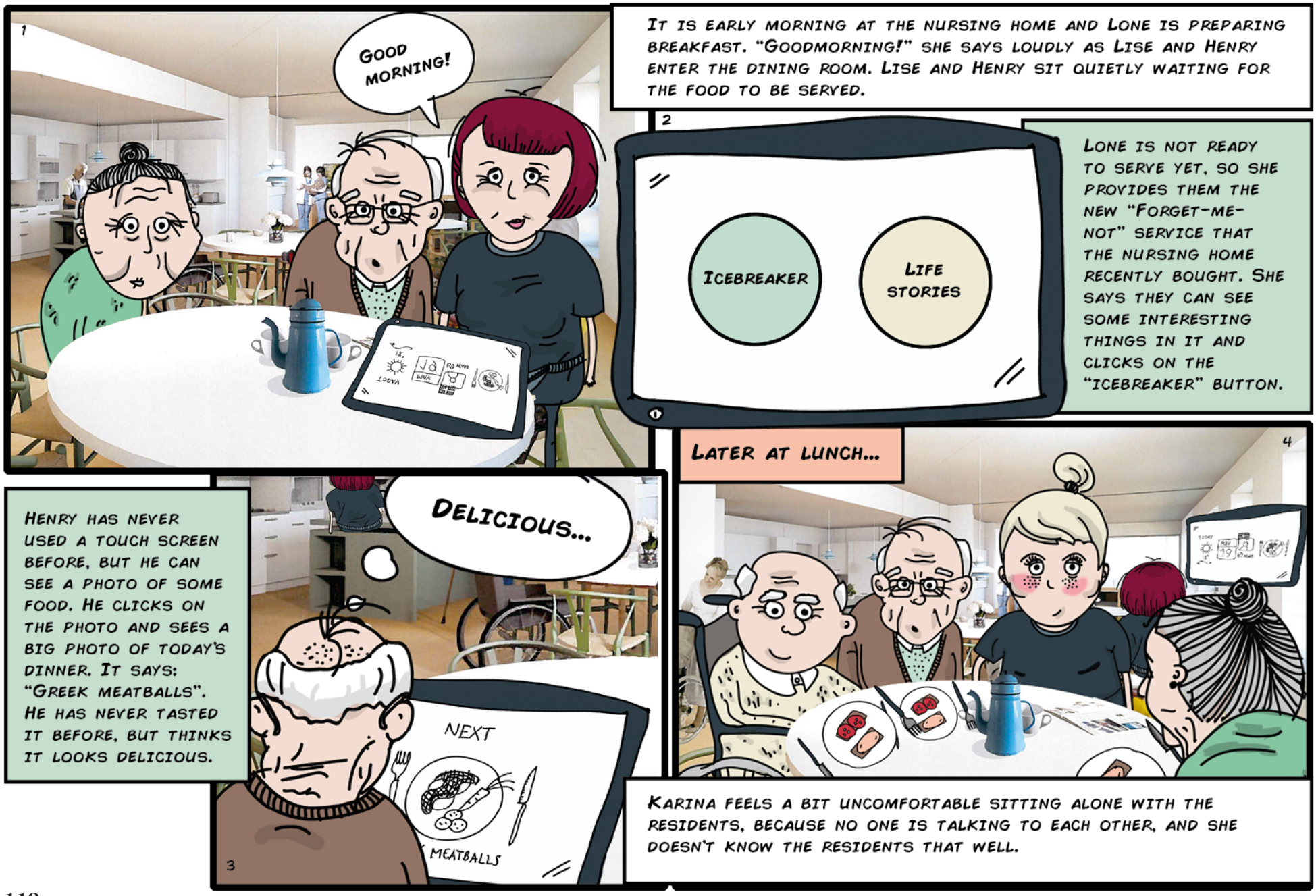
While much of the research has focus on the current activities in NH nursing home, the scenarios created visions of future use in the new NH 2016, where new possibilities exist. For instance, there will be four caregivers during day shifts opposed to two or three today, two caregivers during night shifts opposed to one today, which might reduce some of the stress and pressure they all feel. Second, the hot meal will be served at dinner opposed to lunch today, which is assumed to make the residents less tired after lunch creating possibilities for activities.

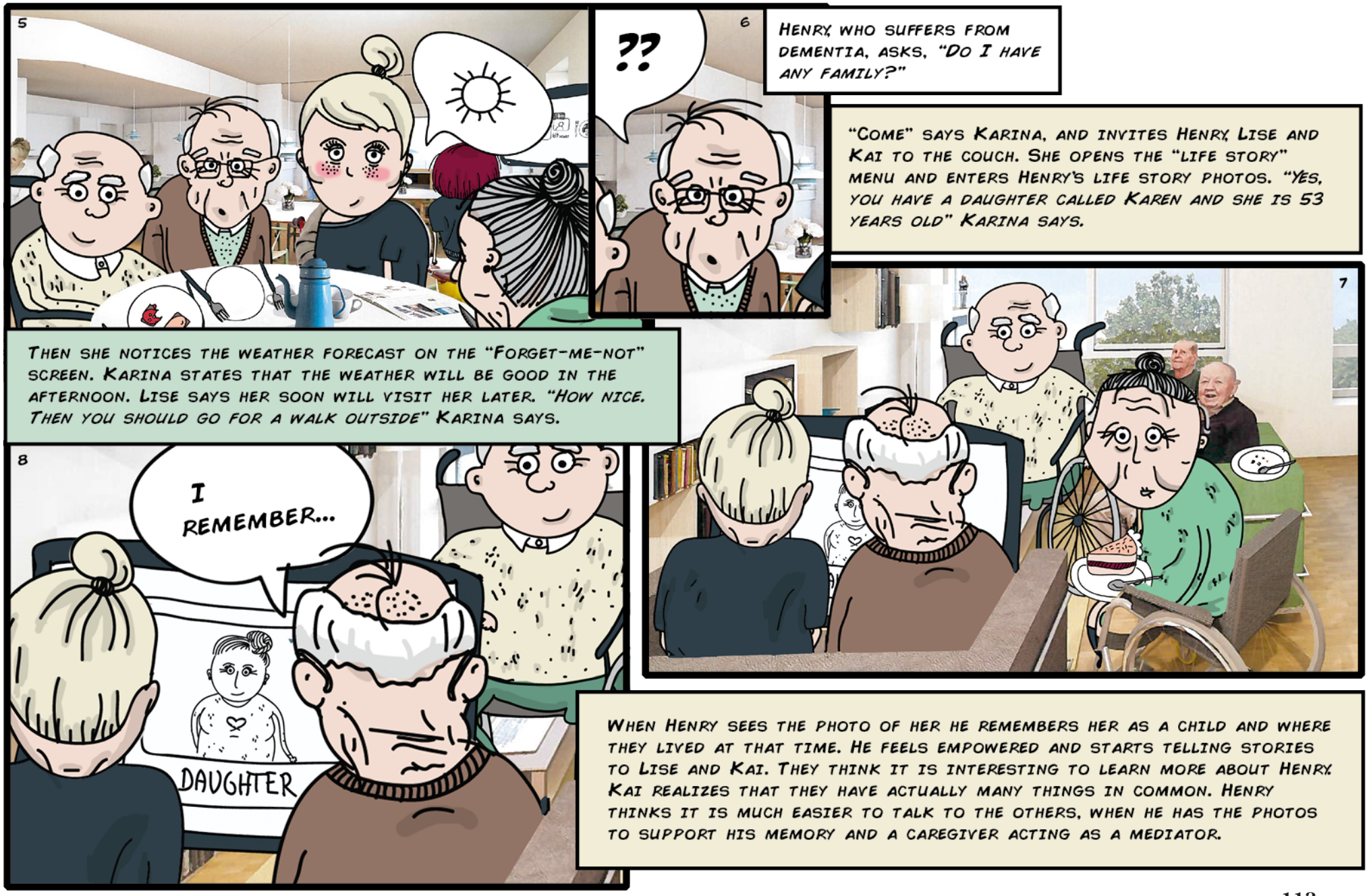
The scenarios are visualized as a storyboard to depict the use of the service in one coherent journey according to the time of day and highlight different use cases for the "Forget-me-not". The storyboard was first sketched in hand and later redrawn on computer.

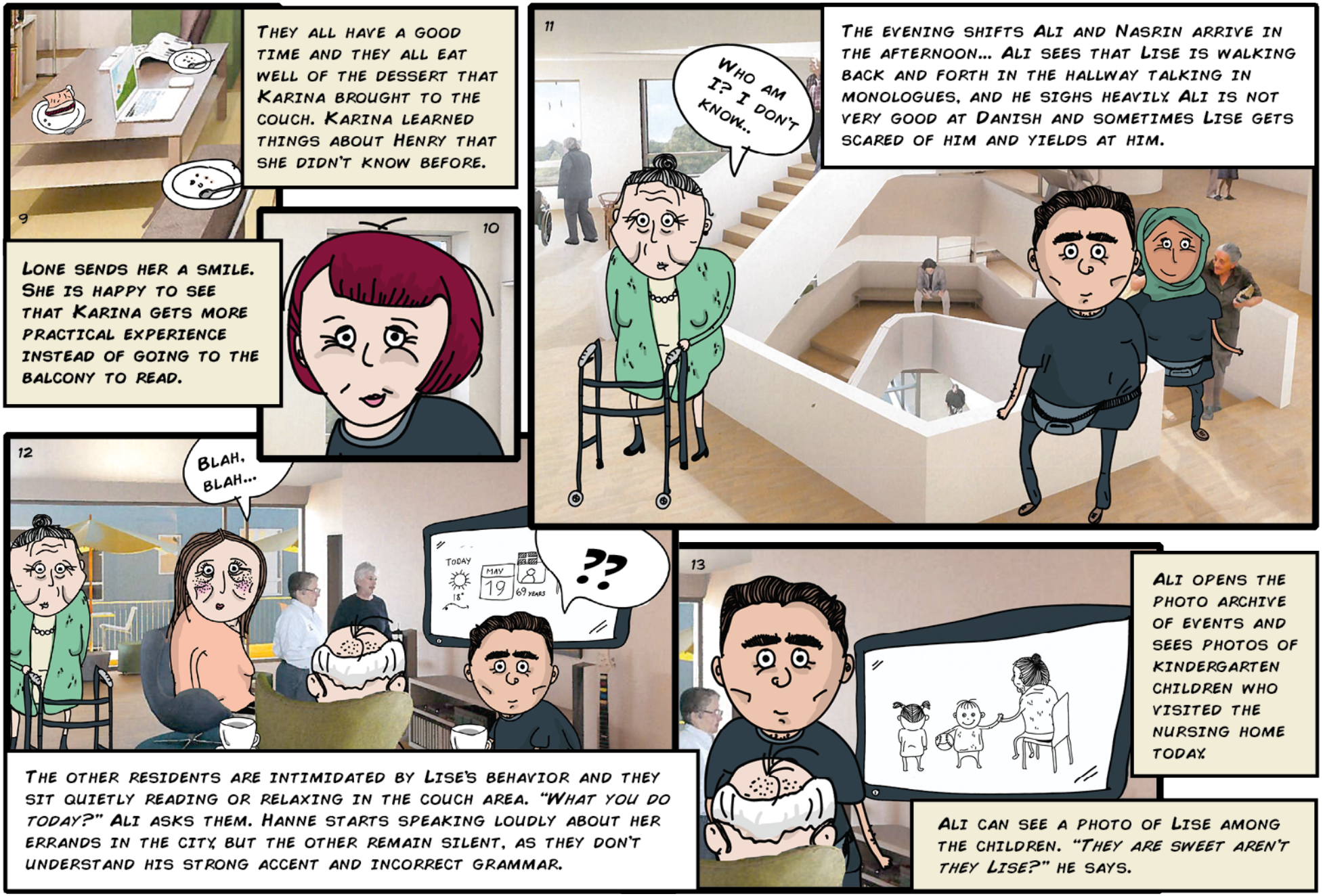
The color of the text boxes highlights the use of the respective features in the system: "Icebreaker" (green) and "Life stories" (beige).

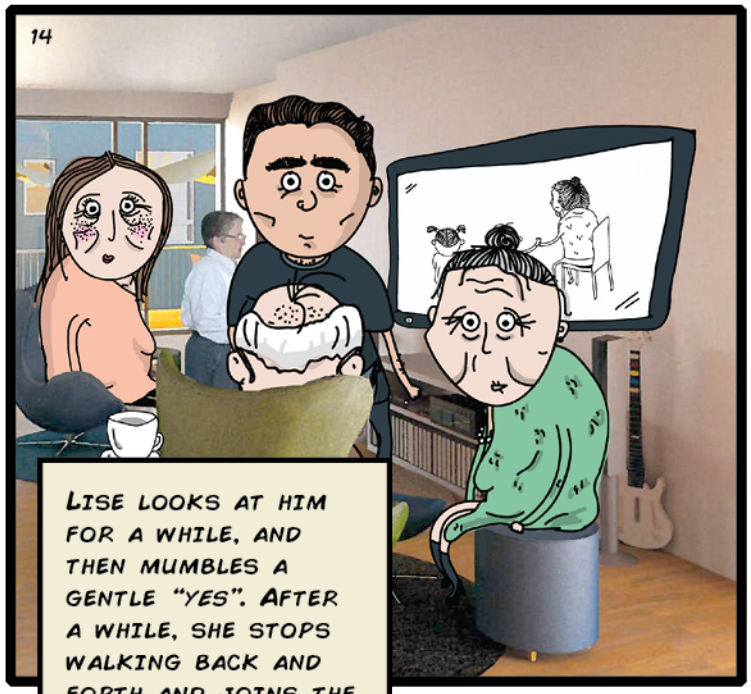


Picture 24. *Scenarios in the making*

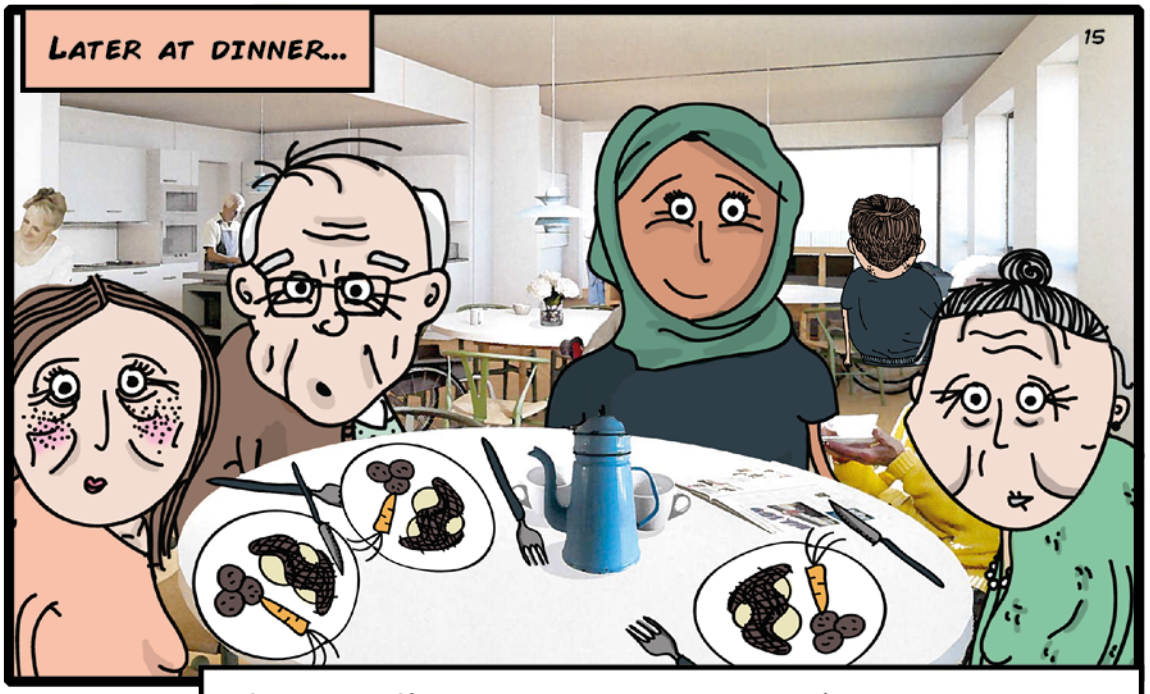

1
GOOD MORNING!
It is early morning at the nursing home and Lone is preparing breakfast. "Goodmorning!" she says loudly as Lise and Henry enter the dining room. Lise and Henry sit quietly waiting for the food to be served.
2
ICEBREAKER
LIFE STORIES
Lone is not ready to serve yet, so she provides them the new "Forget-me-not" service that the nursing home recently bought. She says they can see some interesting things in it and clicks on the "icebreaker" button.
Later at lunch...
4
Henry has never used a touch screen before, but he can see a photo of some food. He clicks on the photo and sees a big photo of today's dinner. It says: "Greek meatballs". He has never tasted it before, but thinks it looks delicious.
DELICIOUS...
NEXT
MEATBALLS
3
Karina feels a bit uncomfortable sitting alone with the residents, because no one is talking to each other, and she doesn't know the residents that well.


5
??
6
HENRY, WHO SUFFERS FROM DEMENTIA, ASKS, "DO I HAVE ANY FAMILY?"
"COME" SAYS KARINA, AND INVITES HENRY, LISE AND KAI TO THE COUCH. SHE OPENS THE "LIFE STORY" MENU AND ENTERS HENRY'S LIFE STORY PHOTOS. "YES, YOU HAVE A DAUGHTER CALLED KAREN AND SHE IS 53 YEARS OLD" KARINA SAYS.
7
THEN SHE NOTICES THE WEATHER FORECAST ON THE "FORGET-ME-NOT" SCREEN. KARINA STATES THAT THE WEATHER WILL BE GOOD IN THE AFTERNOON. LISE SAYS HER SOON WILL VISIT HER LATER. "HOW NICE. THEN YOU SHOULD GO FOR A WALK OUTSIDE" KARINA SAYS.
8
I REMEMBER...
DAUGHTER
WHEN HENRY SEES THE PHOTO OF HER HE REMEMBERS HER AS A CHILD AND WHERE THEY LIVED AT THAT TIME. HE FEELS EMPOWERED AND STARTS TELLING STORIES TO LISE AND KAI. THEY THINK IT IS INTERESTING TO LEARN MORE ABOUT HENRY. KAI REALIZES THAT THEY HAVE ACTUALLY MANY THINGS IN COMMON. HENRY THINKS IT IS MUCH EASIER TO TALK TO THE OTHERS, WHEN HE HAS THE PHOTOS TO SUPPORT HIS MEMORY AND A CAREGIVER ACTING AS A MEDIATOR.

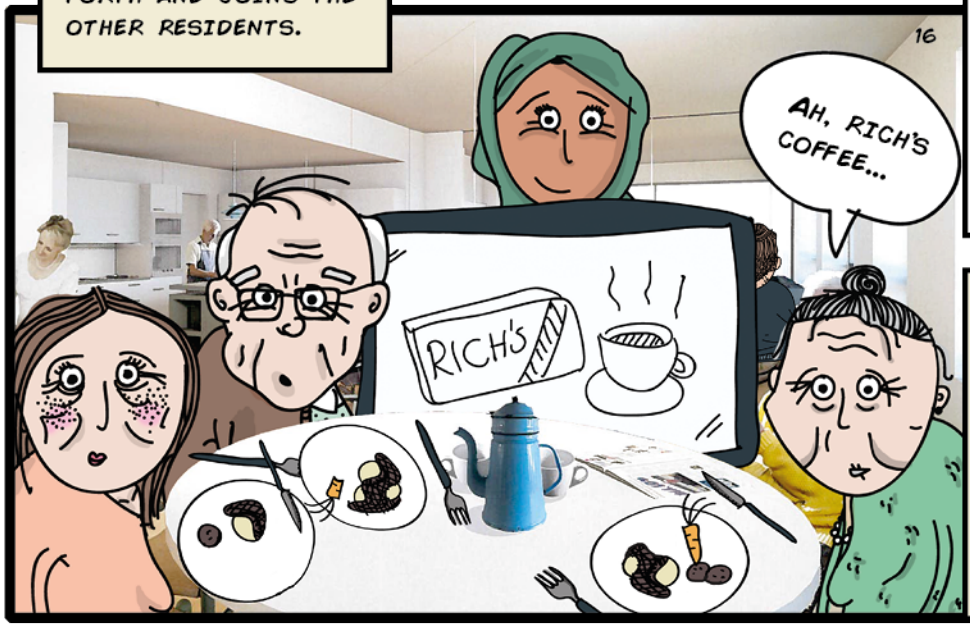

9
They all have a good time and they all eat well of the dessert that Karina brought to the couch. Karina learned things about Henry that she didn't know before.
10
Lone sends her a smile. She is happy to see that Karina gets more practical experience instead of going to the balcony to read.
11
Who am I? I don't know..
The evening shifts Ali and Nasrin arrive in the afternoon... Ali sees that Lise is walking back and forth in the hallway talking in monologues, and he sighs heavily. Ali is not very good at Danish and sometimes Lise gets scared of him and yields at him.
12
Blah, blah...
Today
May
19
69 years
??
The other residents are intimidated by Lise's behavior and they sit quietly reading or relaxing in the couch area. "What you do today?" Ali asks them. Hanne starts speaking loudly about her errands in the city, but the other remain silent, as they don't understand his strong accent and incorrect grammar.
13
Ali opens the photo archive of events and sees photos of kindergarten children who visited the nursing home today.
Ali can see a photo of Lise among the children. "They are sweet aren't they Lise?" he says.



Lise looks at him for a while, and then mumbles a gentle "yes". After a while, she stops walking back and forth and joins the other residents.



At dinner Nasrin is happy to see that Lise is in a good mood. Just as Nasrin is about to leave the table to clean up in the kitchen, she can see that Henry looks intensely at the "Madam blå" pot that they have got for the new nursing home. Nasrin doesn't remember the name of the pot and doesn't know much about Danish history in general, as she is not brought up in Denmark.



Nasrin recalls that the "Forget-me-not" service has photos of historical objects and events and she brings the screen to the table. While the residents eat she browses through the photos and they all have a memory associated to at least one of the photos. "The food tastes good today" Henry says and takes another bite of his Greek meatballs.

THE END

Using scenarios helped depicting the context of use from the perspective of the users, which was possible from utilizing the personas.

From the scenarios, the concepts relating to mealtimes were considered. It was found that "Icebreaker" would support communication during mealtimes, e.g. on a screen hanging on the wall in the dining area, since no direct interaction with the service is required. On the other hand, the module "Life stories" consists of a photo archive that requires direct interaction with the service in order to browse the photos. This makes the use most ideal just before mealtimes to initiate conversations that can be continued during mealtimes, and after mealtimes, when there is more time and one-on-one sessions can be executed as well seeking to make the residents value the time spent in common areas.

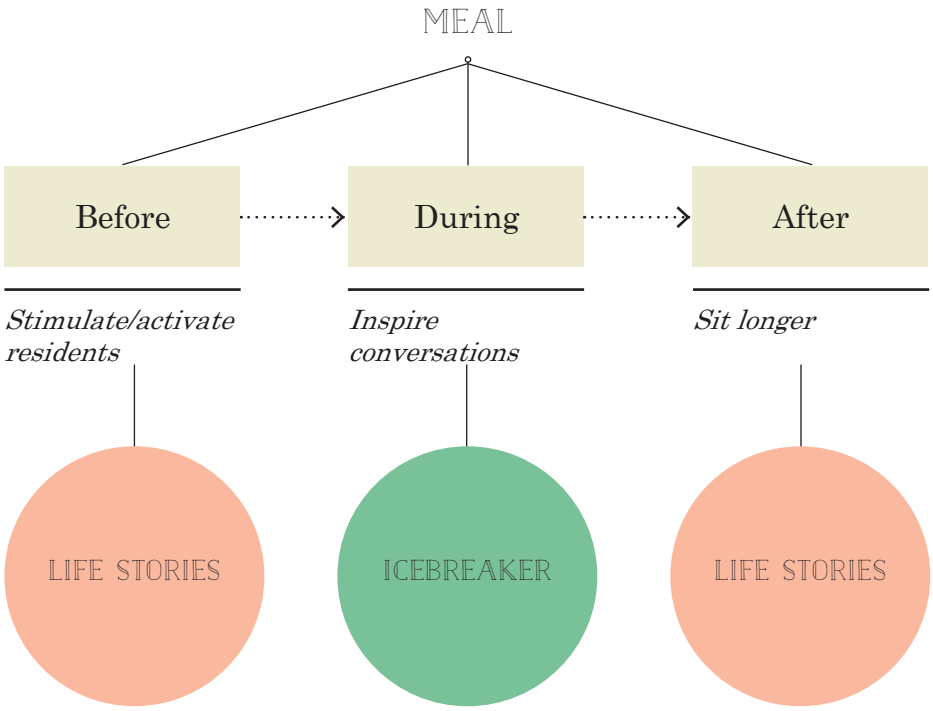


Figure 38. *"Forget-me-not" in relation to mealtimes*

Process-Chain-Network

As the context of the service was defined, emotional journeys of the caregivers and residents were examined in order to assist their interaction with the service.
For this purpose a process-chain-network (PCN) was applied as it illustrates a balanced perspective of the "provider - customer" relationship and describe the interaction between them (Kazemzadeh, 2015). In this case, the caregivers are the providers and the residents are the costumers of the service, since the caregivers are the actors that put the service to use.

Whereas the scenarios provided a general picture of service use in terms of storytelling, the PCN outlines the service operations in a more systematic way. Also, adding emotions by having the caregivers and the resident emotional "experiences" in mind, this reflects on the "experience" part of the problem statement as being main thing to achieve (improving experiences).

The journeys take outset in the needs of the users, which triggers use. The emotions are based on the feedback provided in the tests, here especially the latest prototype test's feedback from the questionnaire filled in by caregivers that specifically provided information about the 'effects' of the service.

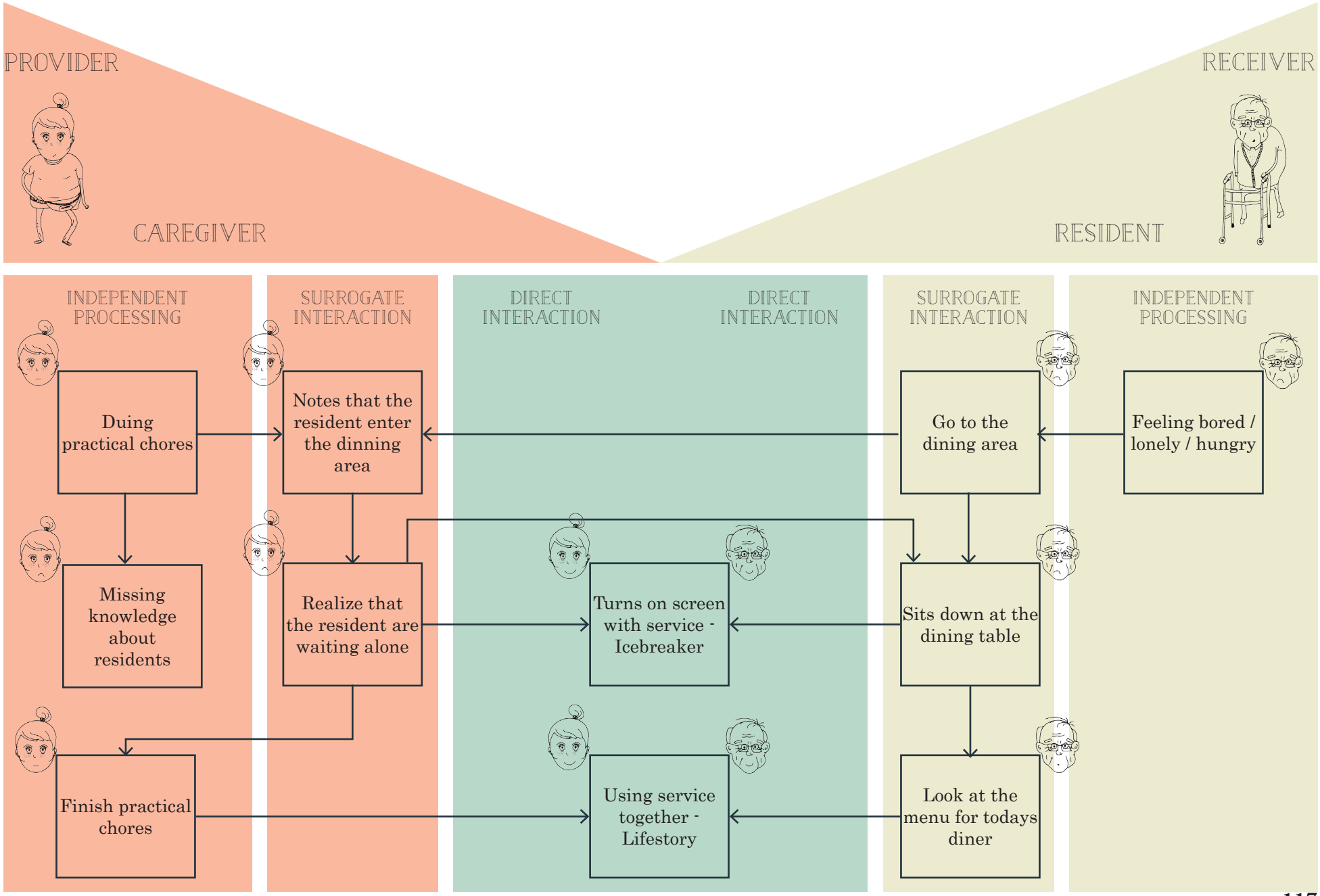


Figure 39. *PCN*

Actors map

Besides the end users (caregivers and residents) other actors contribute to the service in order to develop and sustain it. The actors in the "Forget-me-not" service are presented to the right which shows the type of contact between them, whereas their more defined roles and responsibilities will be clarified later during the technical development.

Motivation matrix

To ensure that the service will work properly, it is necessary to clarify that the actors are motivated to participate, as the cooperation between the actors is essential for the success of any initiative (Morelli, 2007). Therefore a motivation matrix is developed see figure 38. The matrix is based on the findings in the field research, interviews and observations. The motivation matrix shows the motivations for the five actors that are required for sustaining the service system: the residents, the caregivers, the relatives, kitchen staff, activity staff, administration, NH as organization and the service provider company. From creating the matrix, it was ensured that all actors were motivated to participate and contribute to sustaining the service.

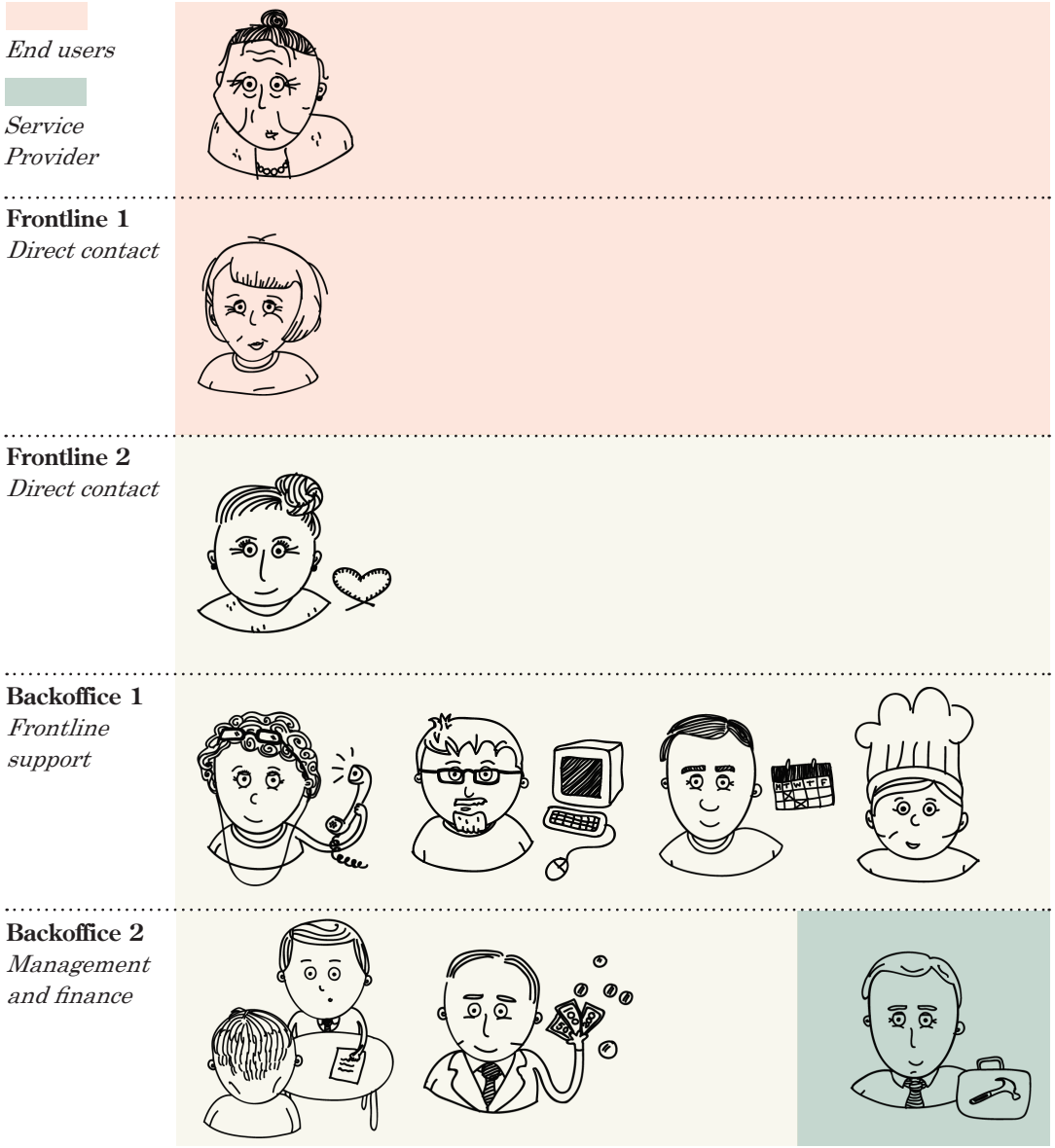


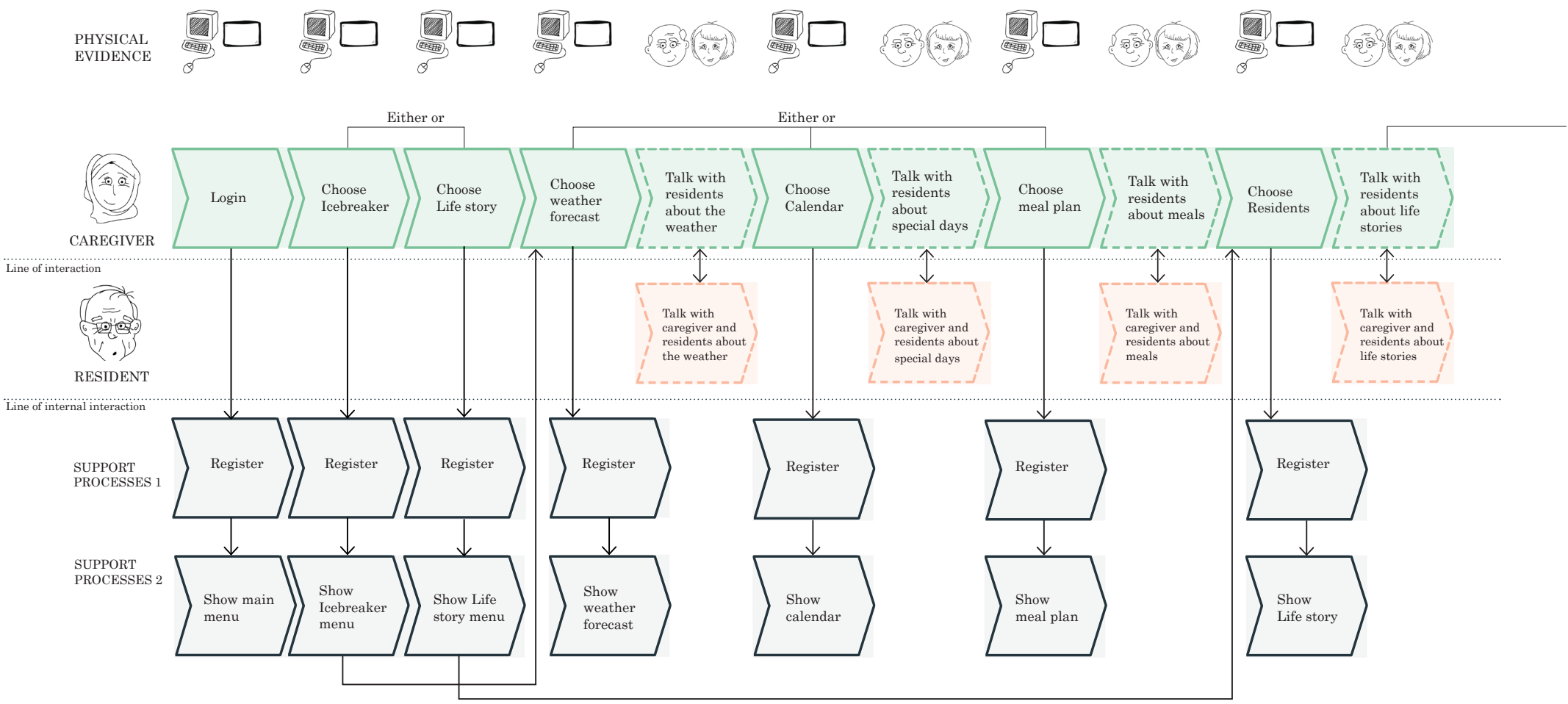
Figure 40. *Actors map*

Gives to →	Residents	Caregivers	Relatives	Kitchen staff	Activity staff	Administration	Nursing home	Service Provider
Residents	Improved communication. Social cohesion Life quality	Conversation. The feeling of doing a job that matters.	Conversations. Approval on photos to share.	Inspiration to menu plans from photos of favourite meals.	Recognition by remembering activities and good times.			Feedback for improvement and promotion of the service.
Caregivers	Facilitate and support communication. Empower / stimulate residents. Fulfil social needs.	Improved communication. Knowledge about residents as persons. Social cohesion.	The social needs of their loved ones are cared for.	Share residents' comments to the meal aspects in the service.	Share residents' feedback on activities.		Feedback on service / product. Good reputation.	Promotion of the service.
Relatives	Support finding photos and provide information to life-stories.	Information about the individual resident´s life stories.	Security that their relatives (residents) are treated decent.				Good reputation.	Promotion of the service.
Kitchen staff	Visualization of the meal menu plan.	Topics for conversation (meal plan).	Information about meals that will be served.	Inspiration to menu plan.				
Activity staff	Photos of past activities.	Topics for conversation (photos of past activities).			More visibility.			
Administration	Birthdays in calendar.	Topics for conversation (birthdays).				Assurance that birthdays are celebrated.		
Nursing home		A tool to facilitate communication. Better working day.	Practical as well as social care for their loved ones.	A tool to push information about meals.	A tool to get more recognition / attention.		Happy residents.	Buys service. Feedback on service use.
Service provider	Communication tool.	Communication tool.	A platform for easy sharing of photos and information about residents.	Integrated catalogue with photos of meals.	Integrated catalogue with photos of meals.		Access. Guidance. Maintenance and support.	Get recognition that could lead to more jobs. Profit in the long run.

Figure 41. *Motivation matrix*

Service blueprint

In order to provide a holistic picture of the service system and provide a macro picture including also back office processes, a service blueprint was created.



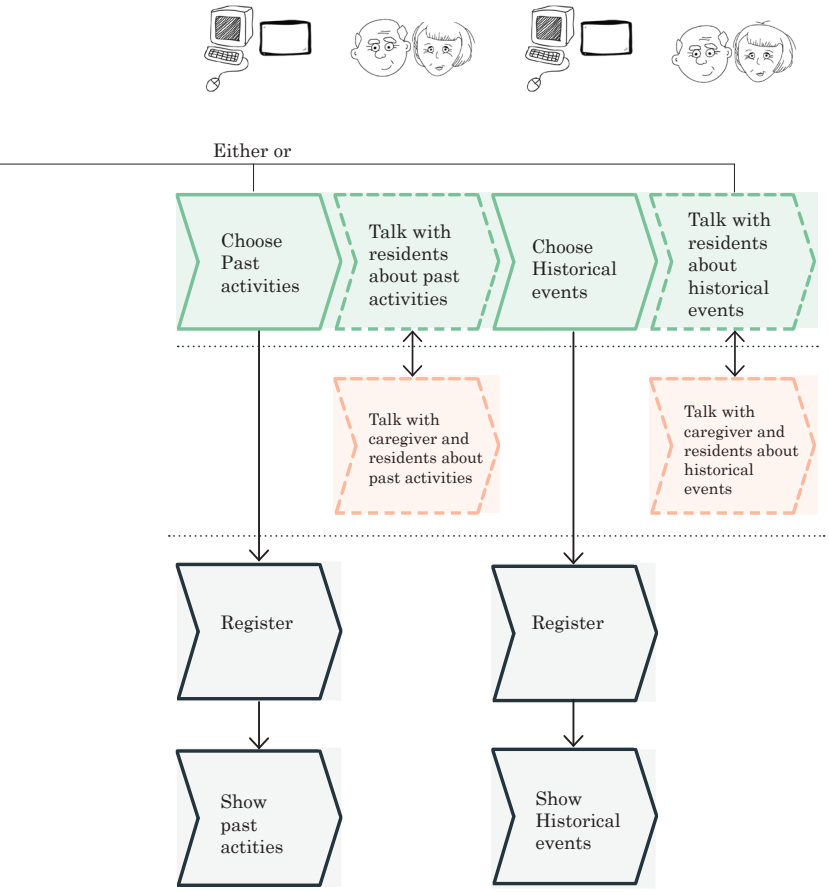


Figure 42. *Service Blueprint*

The service blueprint provides a detailed overview of what happens in the front office and in back office every time the user is in contact with the service (Bitner, 2007).
The blueprint is created around the journey of a caregiver with arrows pointing to the processes that are activated when the user action is exe¬cuted. The sub-processes are divided in front office (line of interaction), back office (line of visibility) and support processes (line of in¬ternal support). In the front office is a journey of a resident since they also are users of the service. The steps with dashed line are not required for the service to work.

The exact time aspect of service steps is not included since it cannot be predicted how long the conversations between the caregivers and the resident will last. It is also possible that the icebreaker module will run as a screen saver.

In this process report, only a general blueprint is included. In the project report more in-depth and detailed blueprints are presented.

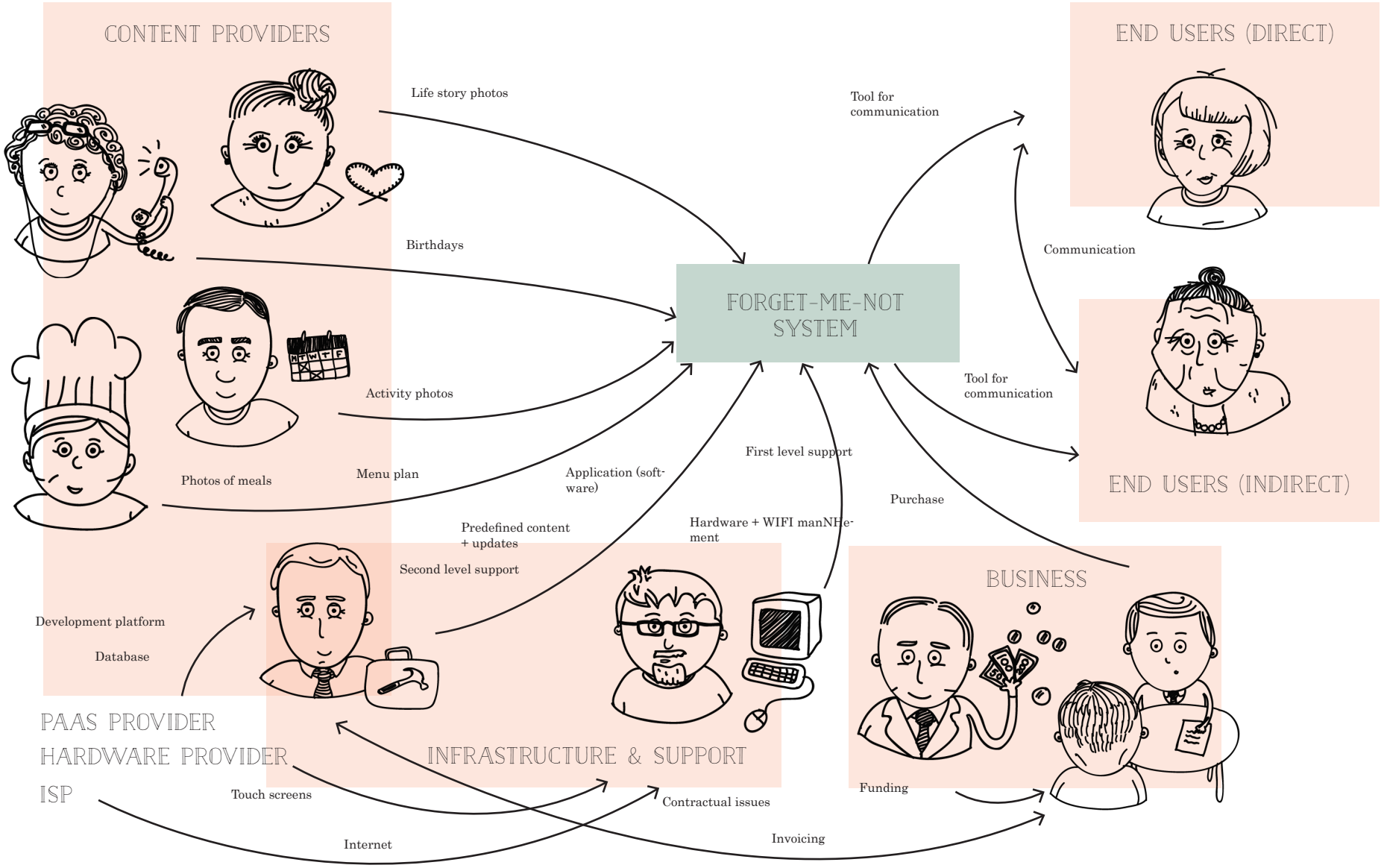


Figure 43. *System interaction*

DESIGNING THE BACKOFFICE

The following section will provide a technical review of the service “Forget-me-not”. The focus in the process has so far been on the primary users and their front-end interaction with the service. However, in order to provide the best possible service to the nursing homes is it also necessary to design the system behind the service and make sure that it fits all the actors needs and wants.

System interactions

To provide an overview and understanding of the system a System interaction model has been created, see figure 40. The model has stressed the discussion of who are the actors involved in the service, both internal and external, what do they each provide to the system and what connections do they have around the service.

Access to the system

The service is heavily dependent on the actors involved and their contribution to the system. So in order to make sure that the actors have the ability to contribute to the service it is necessary to clarify what their roles are, how they access the system (which touch points), and what their relationship to the data are. The focus in the table is on the internal actors in the nursing home.

Actor	Role	Touch point	Access
 **Caregivers**	End-users (Direct)	Access the system through the app or webpage depending on the type of hardware the nursing homes decide to buy. It is recommended that they buy a big touch screen for each department.	There is one login to every department in the nursing home, which the caregivers should use. They can see all the data except for life stories where they only can see the ones related to that department.
 **Residents**	End-user (Indirect)	Access the system together with the caregivers on their department. Beside they can access the system through a private computer or smart device.	Have private login. Can see all data but only life stories related to the department and edit (input and delete) personal life story.
 **Relatives**	Responsible for providing life story in cooperation with the resident.	Access the system through a private computer or smart device.	Uses the resident login (possible together) Can see the data but only life stories related to the residents department and edit (input and delete) his/her life story.

Actor	Role	Touch point	Access
 **Administration**	Works for the nursing home. Responsible for providing the residents' birthdays to the system.	Access the system through a computer or smart device.	Private login. Can see all data of the nursing home inclusive all life stories. Can create and delete profiles. Can edit (input and delete) in the provided calendar.
 **Kitchen staff**	Works for the nursing home. Responsible for providing the menu to the system.	Access the system through a computer or smart device.	Private login. Can see all data of the nursing home inclusive all life stories. Can edit (input and delete) the menu.
 **Activity staff**	Works for the nursing home. Responsible for providing information of past activities to the system.	Access the system through a computer or smart device.	Private login. Can see all data of the nursing home inclusive all life stories. Can edit (input and delete) activities.

Table 1. *Roles, touch points, and access*

System map

In order to understand how the service is organized as a system, a system map was developed.The system map illustrates the different actors involved, their mutual links and the flows in the system (Morelli, 2007).

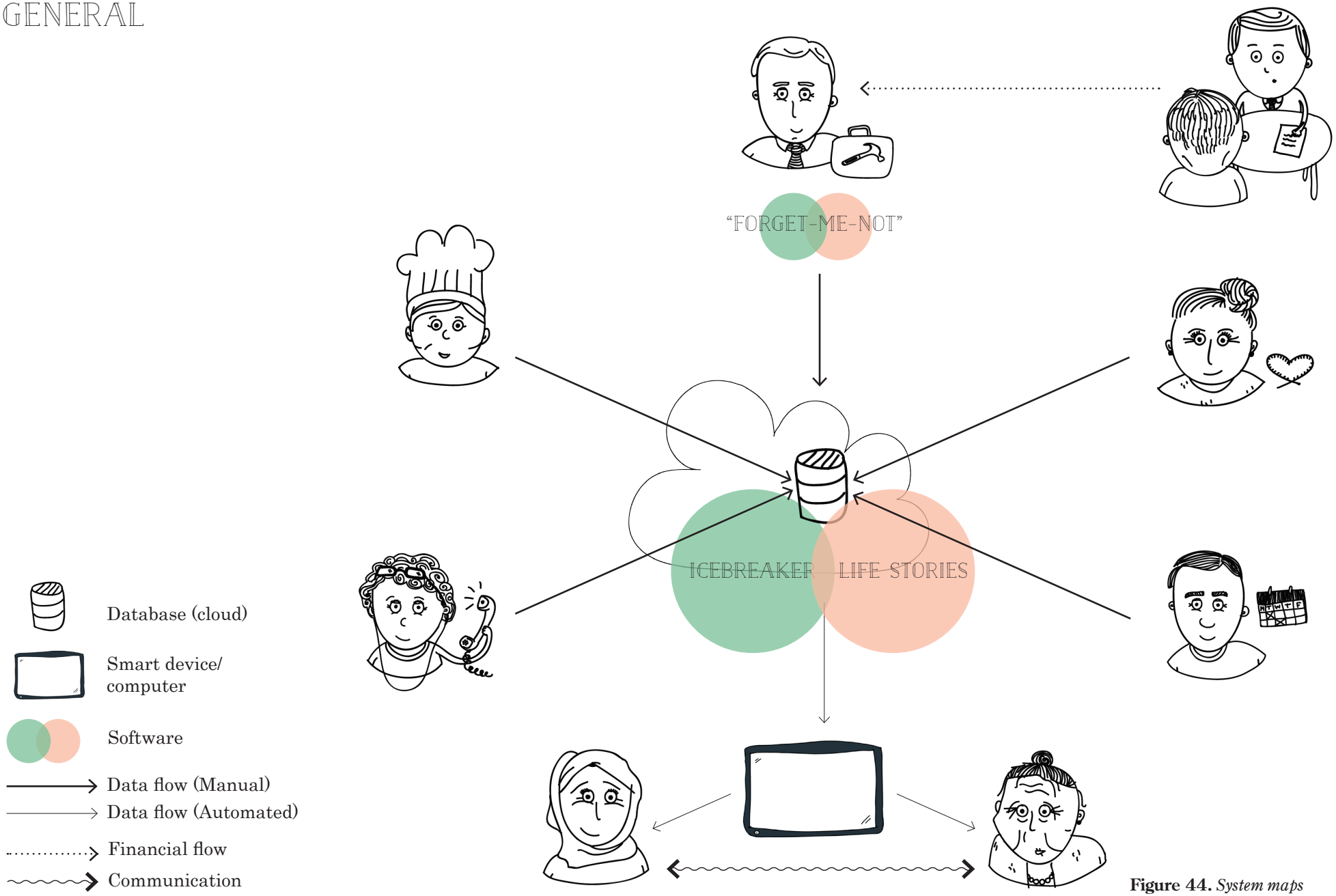
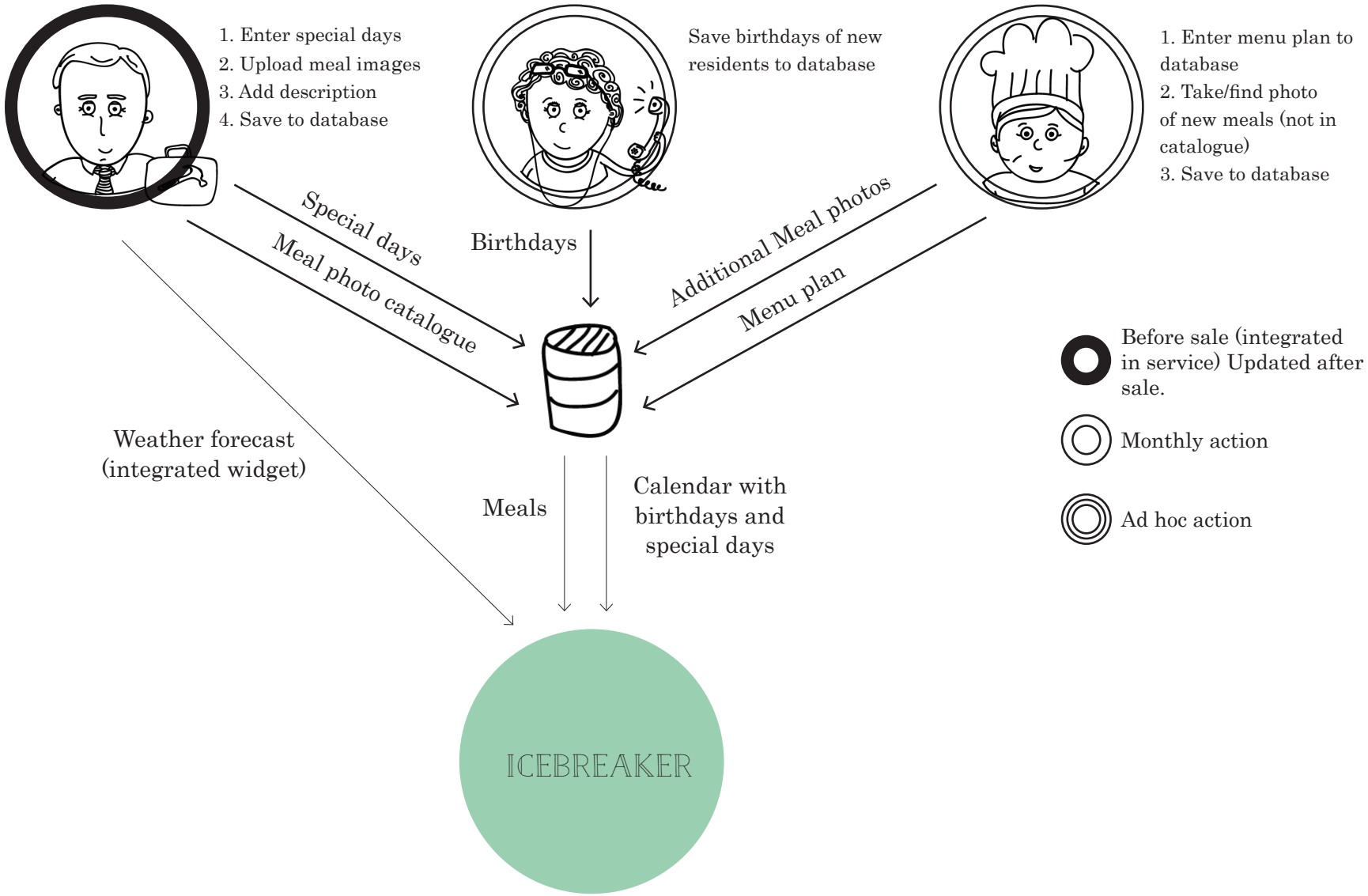
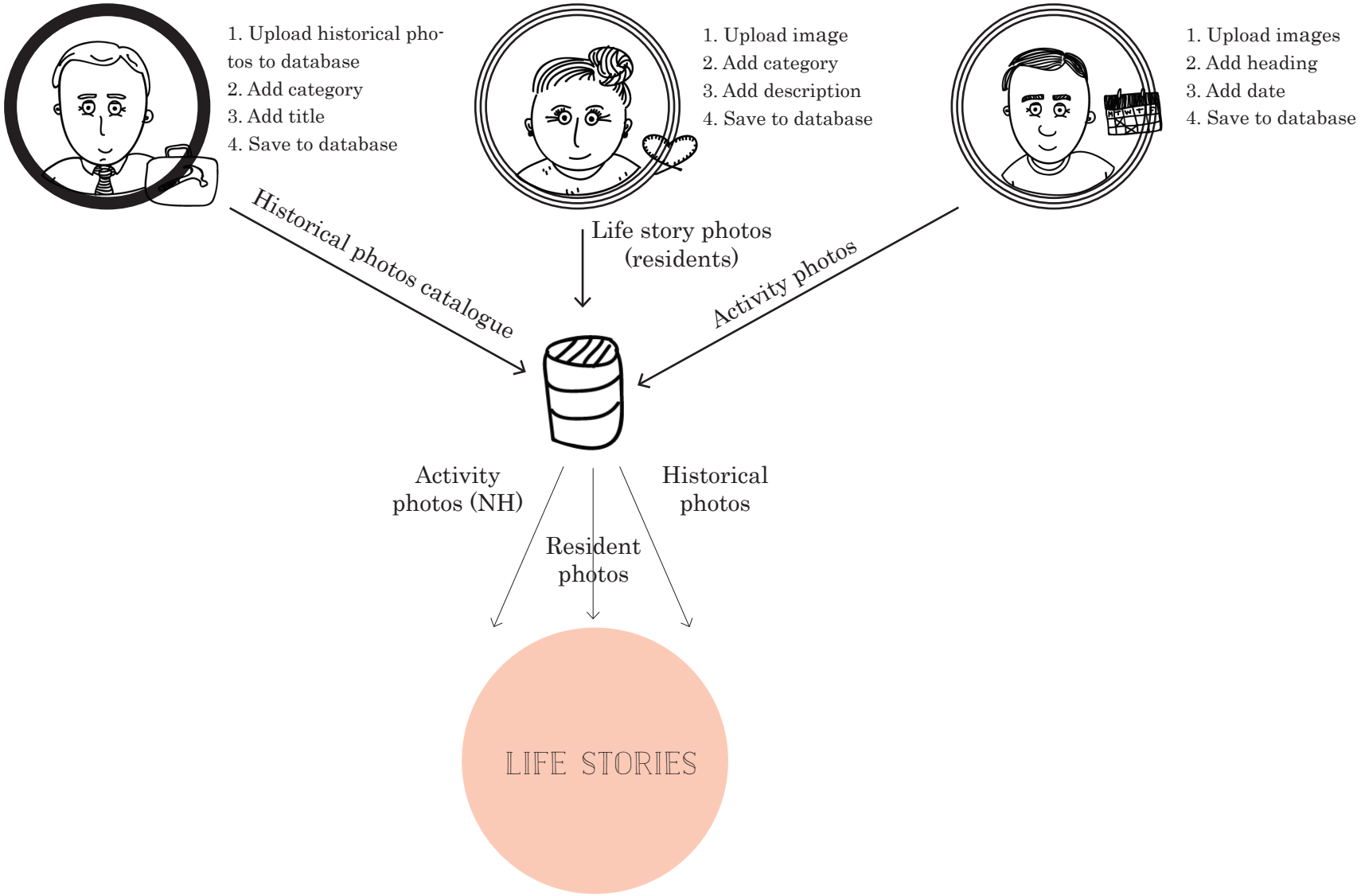


Figure 44. *System maps*


1. Enter special days
2. Upload meal images
3. Add description
4. Save to database
Save birthdays of new residents to database
1. Enter menu plan to database
2. Take/find photo of new meals (not in catalogue)
3. Save to database
Special days
Meal photo catalogue
Birthdays
Additional Meal photos
Menu plan
Weather forecast (integrated widget)
Meals
Calendar with birthdays and special days
Before sale (integrated in service) Updated after sale.
Monthly action
Ad hoc action
ICEBREAKER

LIFE STORIES



Representation of the functionalities

To specify the requirements to how the system will work when the various actors are using it, five use cases have been developed. The use cases visualize the actions in the service step-by-step and allows a deeper understanding of the system in its details (Morelli, 2007).

In the scenarios it was explained how the caregiver together with the residents use the service. The following use cases focuses on the others internal actors and their interaction with the service. Each use case represents one of the actors' interactions with the service.

Use Case 1	**Relative updates life story**
Actor	Relative
Trigger	The aim of the service and her responsibility toward the service were explained in a welcome meeting yesterday when her mother moved into NH.
Precondition 1	Has access to a computer or smart device with internet.
Precondition 2	Have the resident login
Precondition 3	Has picture from her mothers past
Description	The relative opens her internet browser on her computer and enters the web address for the service. She access the service webpage and is asked to login. She enters username and password and has now access to the main menu. Here she chooses the "edit" button on the right and afterward she picks "Life story" and gets an overview over the residents at her mother's department. She selects her mother and presses edit. The relative uploads images, tags them in categories and make a small describtion. When she is finich she presses save.

Table 2. *Use cases*

Use Case 2	Administration creates new profile
Actor	Administration
Trigger	A new resident is scheduled to move into NH tomorrow and the administration must create a profile for the resident so she can get the login at the welcome meeting.
Precondition 1	Has access to a computer or smart device with internet.
Precondition 2	Have a login.
Description	The administration enters the web address in her computers web browser, she access the main menu where she is already logged on. In the main menu she presses a button in the right corner saying “Update Profile”. Here she chooses “Delete profiles” and find the profile of the old resident who lived in the apartment as the new resident will be staying in. She presses delete. Now she presses the button “Create New profile” where she creates a new profile by entering user name and passwords. Besides she declare the role of the profile and what access the new profile should have. Finally she presses save.

Use Case 3	Administration insert a new residents birthday in the calender
Actor	Administration
Trigger	A new resident are scheduled to move into NH.
Precondition 1	Has access to a computer or smart device with internet.
Precondition 2	Have a login.
Precondition 3	Know the birthday date of the new resident.
Description	The administration enters the web address in her computers web browser, she access the main menu where she is already logged in. She chooses edit and afterwards calendar where she gets an overview of the calendar for this month. She turns the calendar to the October using the arrow buttons and presses on the 2nd. Here she enters the new resident name. Finally she presses save.

Use Case 4	Kitchen staff updates the menu
Actor	Kitchen staff
Trigger	Once a month the kitchen staffs create the menu for the next month.
Precondition 1	Has access to a computer or smart device with internet.
Precondition 2	Have a login
Description	The kitchen staffs have just finished creating the menu for the next month. The responsible kitchen staff enters the web address her computers web browser and access the service webpage where she types username and password. She enters the main menu where she chooses edit and then menu. Now she places the menu for the following month day by day by choosing the date, enters the name on the dish and choose a picture from the food library (She find the pictures via a search box to the library of food photos). On Thursday they are going to eat eels. She cannot find eels in the food library. She finds an available photo online and uploads it to the meal catalogue. On Thursday when the eels dish is prepared she will take a photo of it and upload it to the library of food. When she is finich editing the menu for the entire month she save the changes.

Use Case 5	Activity staff updates past activity
Actor	Activity staff
Trigger	There has just been held Easter party at NH.
Precondition 1	Has access to a computer or smart device with internet.
Precondition 2	Have a login
Precondition 3	Has taken pictures to an activity.
Description	The activity staff enters the service application on her tablet, where she can see the main men. She presses on the edit button and afterward past activity. In the “Past activity” she presses on the button “New activity”. She enters the heading “Easter party 2015”, set the date to 03.04.2015 and the place to NH. Finally she uploads the pictures she has on her tablet from the Easter party to the application. Now she can see the activity created and she presses save.

The structure of the IT System

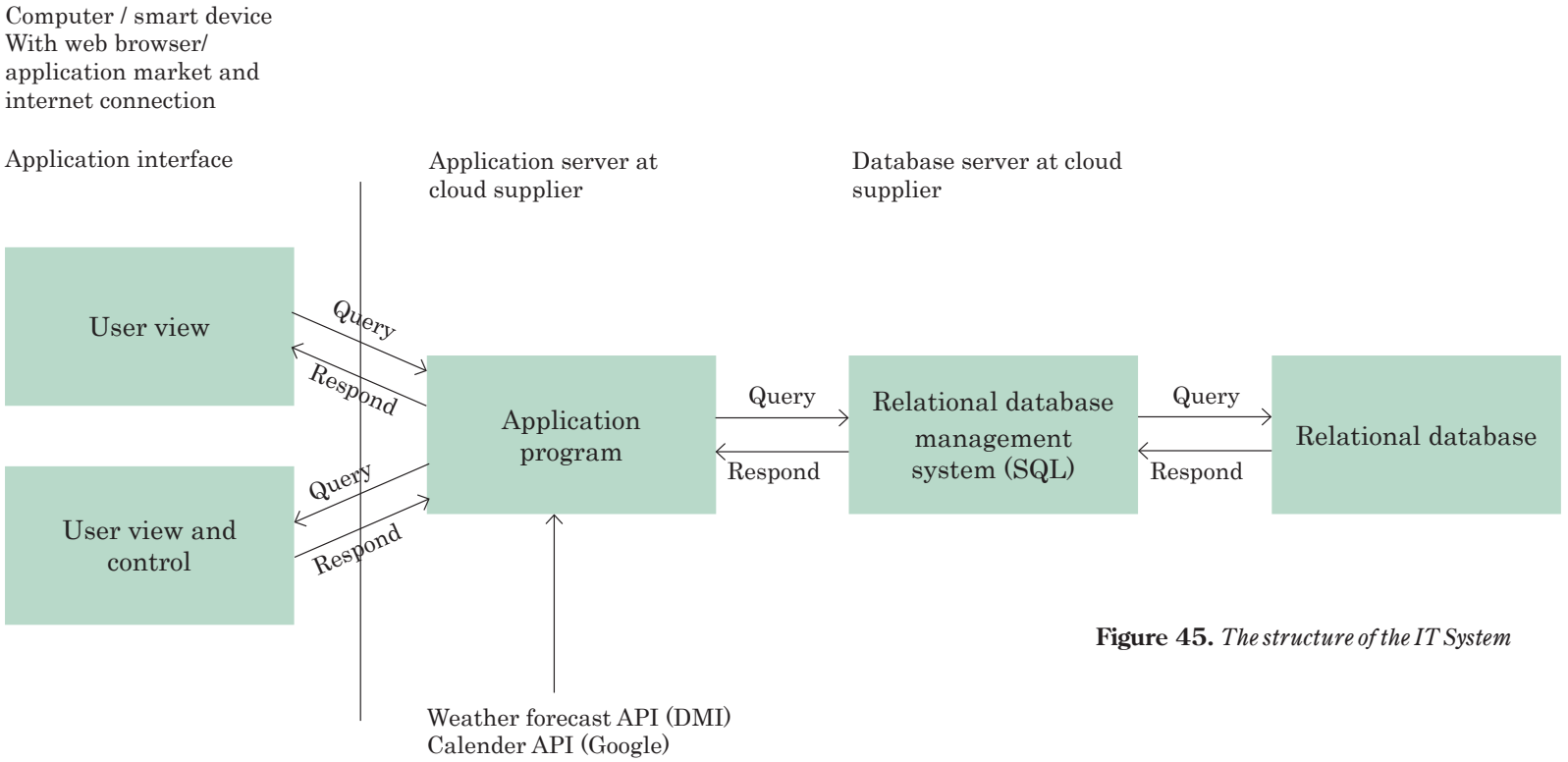


Figure 45. *The structure of the IT System*

The model above illustrates how the system is structured, its components, and the relationships between them.

The system can be divided into four parts:

1. **User view / Application interface**
   Flowcharts and main interfaces are reviewed in the next section.

2. **Application server**
   The code of the application server will not be discussed, since it lies beyond the scope of this project.

3. **Relational database management system**

4. **Relational database**

Delivery model

"Forget-me-not" is built on a cloud computing model, which allows remote computing power via the Internet, provided by a supplier (Laudon & Laudon, 2010 p. 196) The cloud computing model is needed since the service provider not does own the underlying infrastructure and have to rent access to servers from a cloud service supplier. One of the advantages of not owning the infrastructure is that it is impossible to predict how many users the system will have to allocate resources for and by using the cloud model solution it provides flexibility and scalability which means that the service provider easily can expand the service (Mell & Grance, 2009; p. 6).

In order to run the application the delivery model for the cloud service is evaluated to be Platform as a Service (PaaS), where the service provider will not control or manage the infrastructure, such as the servers, but will have control over the application and the database (Mell & Grance, 2009 p. 6).

The service system needs to support collection and relation of data from the various actors that are involved in the service like the Administration, kitchen staff etc. To accomplish this, a relational database is selected as it collects data from distributed clients and supports relations between the data.

The application will be running on the application server where queries from the users will be received, and send to the Database management system that will act as an interface between the application program and the physical data files (Laudon & Laudon, 2010; p. 240).

The relational database must contain information about the following:

- User
- Role
- Access
- Life stories
- Meal menu
- Activities
- Historical events

DESIGNING THE USER INTERFACE

After developing the backend system that establish the rules for writing content, the next step in the process was the frontend development in relation to reading the content, i.e. the design of the graphical user interfaces for the website/app development.

Activity diagrams

Before designing the actual interface, the functionalities were developed from designing activity diagrams in the Unified Modeling Language (UML). Most often, activity diagrams specify organizational workflows, but are also intended as computational processes and was adapted to the framework by Lieberman (2004) for detailing user interfaces navigation. Activity diagrams were developed to visualize the dynamic aspects of the interface relevant to the software developers who are to design the website/app, as it depicts not only what the users can do (as for example static interface screenshots), but also how (Lieberman, 2004). Activity diagrams were preferred over flowcharts, as activity diagrams are able to show concurrent flows and therefore well suited to capture a series of actions taken on behalf of a user via a GUI.

The diagrams will not be presented in this report, since they are mainly aimed at developers.

Please find activity diagrams in the "Project report" on page 44.

Interfaces

In order to envision how the application and website could look like have a proposal for the interface been prepared as a final prototype. The interfaces must show how the content of the service can be provided very simple and manageable, since a target group, who often are not familiar with technology and smart devices, should apply it. Therefore it important that the interfaces are easy to use as the caregivers otherwise might abandons using the service. In addition it the interface are clear enough it is possible that some of the most mentally fresh residents could be trained to tap the screen.

The interfaces contain 28 frames, but more pages can apply according to how many life story photos are uploaded (Appendix 22). Photos of residents and past NH activities are photos from NH that are publicly available at their Facebook page. Photos of meals and historical events and objects are iStock photos.
The sitemap on the following page gives an overview of the website contents. Interfaces are presented in a bigger size in the project report.

SITEMAP

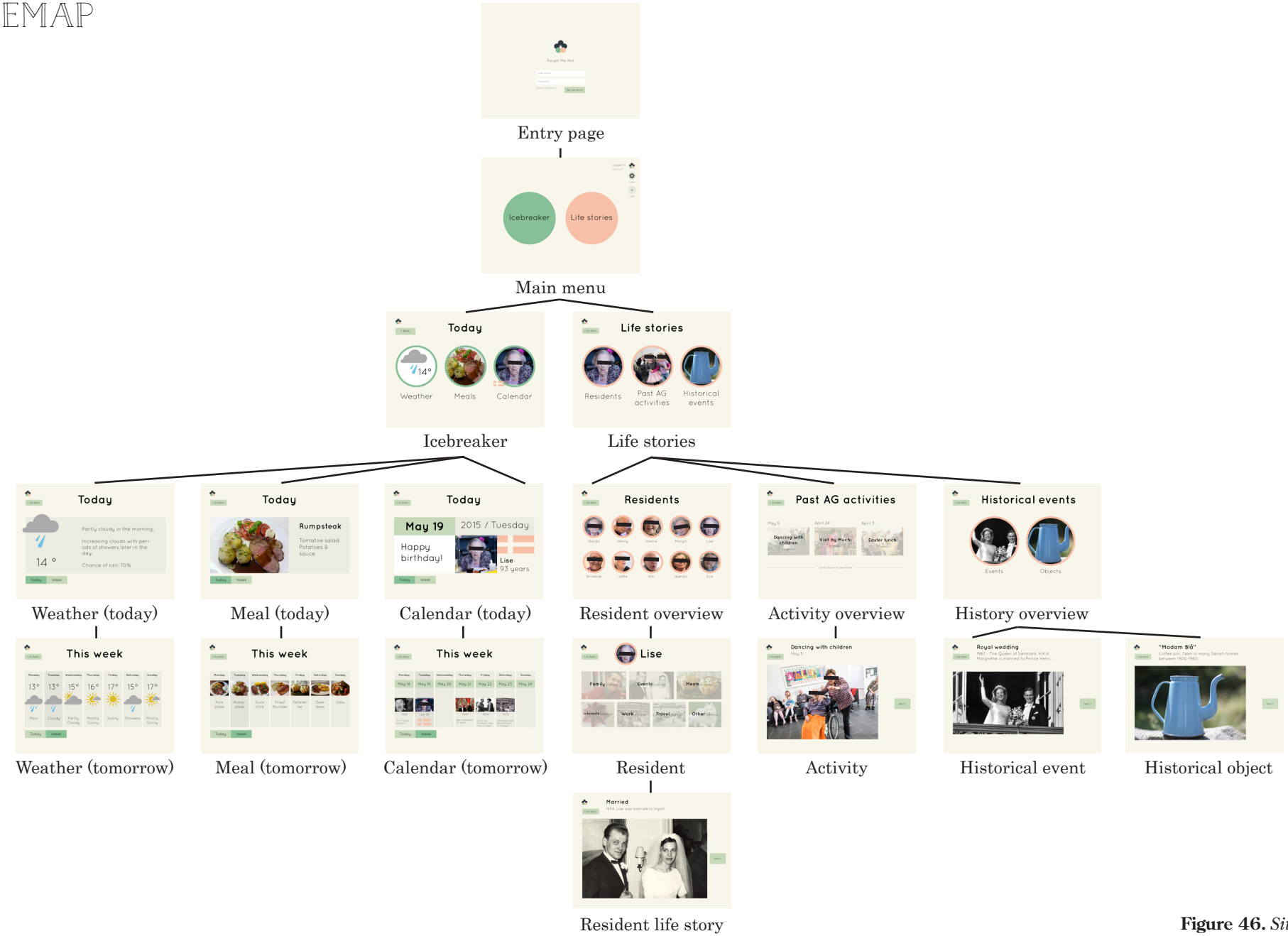
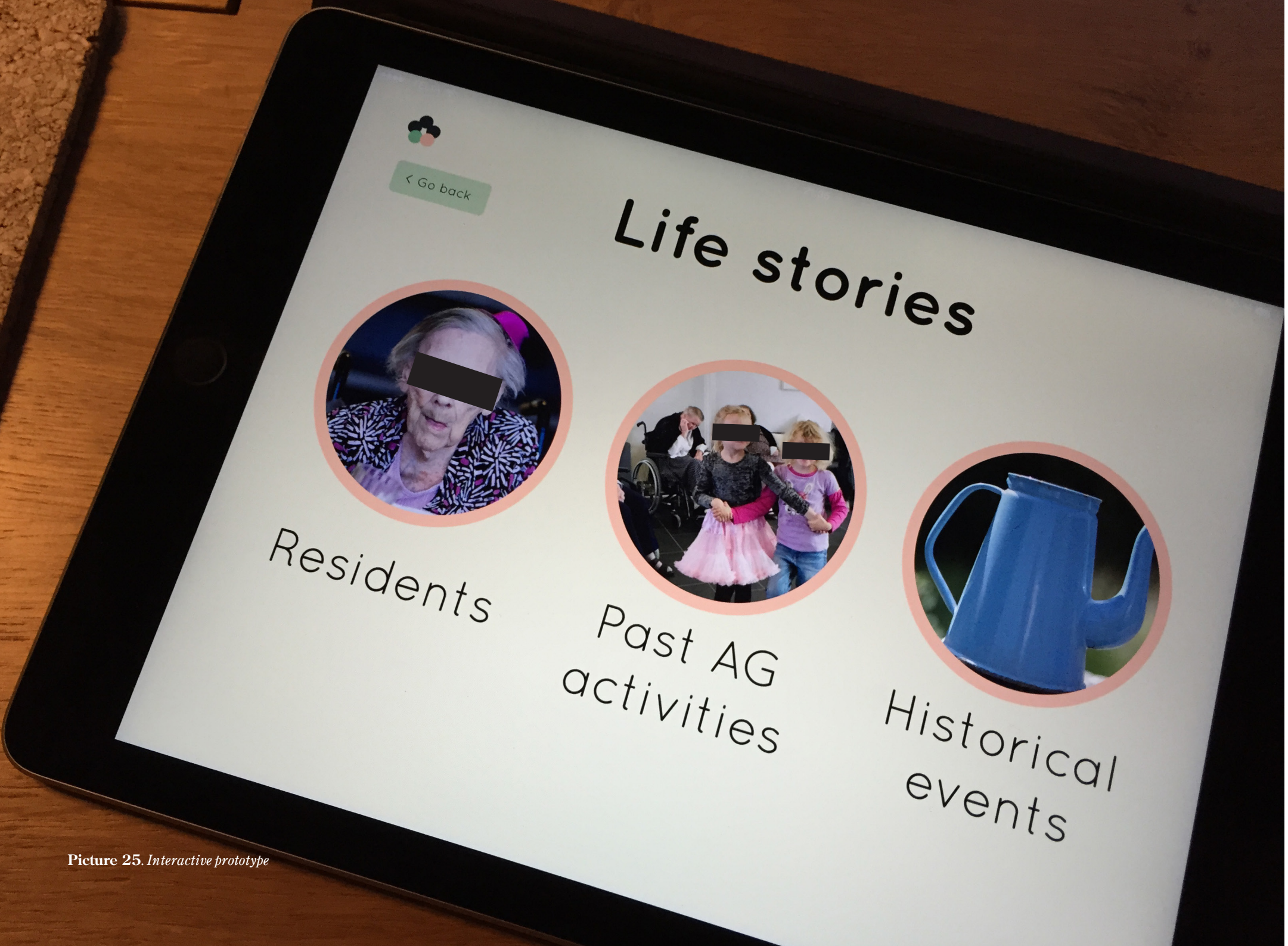


Figure 46. *Site map*



Picture 25. *Interactive prototype*

TESTING THE INTERFACE

After creating the interfaces they were tested at NH to see if they were as simple and manageable for the caregivers as they were presumed to be.

Execution

In order to test the interfaces was the prototyping tool Invision was used. Invision transformed the static screens created in InDesign into clickable, interactive prototypes, which made it the test more reliable as a prototype. The prototype was downloaded to an iPad and worked like a real application.

The tests were carried out at NH where three caregivers participated. One at the time the caregivers were asked to go through the application and provide reactions on what they saw and understood.

Outcome

Two of the test participants knew what the service was about since they have participated earlier in the process and found the prototype very easy to use. The test participant who did not have any knowledge about the service asked a lot of questions about the service and what she was suppose to do before and doing the test. However, after the test she reflected that even though she was not use to apply touch screen she would have tried pressing the various buttons if nobody was to ask for help and would have found out how to use it. It is therefore considered important that each caregiver receive a small introduction before use.
All three caregivers reflected that most of the residents will not be apple to use it on their own, and will need assistance from the caregivers. If the caregivers find the pictures the resident can look at them on their own and maybe slide between the pictures.

The developed interfaces can be used as a starting point for further development.

Evaluation

The form of the prototype worked well as the caregivers found it very reliable. The test provided the feedback that was hoped for. It would have been valuable to test the prototype on more caregivers and also on some of the residents. However the project group were not able to get in contact with the mentally fresh residents.

Picture 26. *Testing the interface*

KEY PARTNERSHIPS

Nursing home
Key partner as co-developer of the service.

Funding company
Fundings to finance some of the development of the service.

Provider of PaaS
The provider of the platform.

KEY ACTIVITIES

Software ready to implement

Installation

Maintenance

Support

KEY RESOURCES

Reliable IT system
- Infrastructure
- Database structure
- Software program

Employees

VALUE PROPOSITIONS

Residents + Caregivers
- Improved communication.
- Closeness.
- "People" focus instead of "process" focus.

Residents
- Feeling of togetherness between residents

Caregivers
- Improved working day
- Improved balance between practical chores and social interaction.

CUSTOMER RELATIONSHIPS

Personal
- By purchase
- Service provider install the service
- Support

CHANNELS

Website

Personal contact at sale

Recommendations

Cases

CUSTOMER SEGMENTS

Primary
Nursing homes

Secondary
Other types of nusing homes

In the future, this customer segment can be expanded to include other types of nursing homes as for younger people with disabilities.

COST STRUCTURE

Fixed costs
- Wages for the staff working for the service provider

Variable costs
- PaaS- depending on how many users
- Maintenance of the system
- Testing the system regularly
- Updating the system

REVENUE STREAMS

One amount + subscription fee

The nursing homes must pay one amount for the service when they buy the software. Beside they will pay a subscription fee according to how many profiles they have.

Figure 47. *Business Model Canvas*

THE BUSINESS CASE

So far, several perspectives of the service have been discussed and designed in the process.

Adding to these perspectives is it important to review and organize the business part of the service. Even through "Forget-me-not" has been developed based on social needs, it is essential to make sure that the service is profitable for the service provider who is intended to drive the development process forward. In order to outline the business perspective this section will contain a business model canvas.

Designing Business model

The purpose of this part is to define and visualize the business model of the service. The business model should serve as a strategy for the company who will develop and implement "Forget-me-not" (The service provider).
It is possible that this company will sell the concept to another company when the development is finalized but the starting point of this business model is that the service provider owns and sells the service themselves. They can subsequently use the business model to convince a potential buyer and/or clients of the concept.

Execution

To define the business model of the service, the Business model canvas is applied, as it provides "a shared language for describing, visualizing, assessing, and changing business models" (Osterwalder & Pigneur, 2010; p. 18).

The BMC will shows how the service provider, based on the design, can create, deliver and capture value in order to make the service desirable and profitable (Osterwalder & Pigneur, 2010).
Reflection

Going through the nine building blocks which form the business canvas model, it helped to reflect upon the design decisions taken so far in the process and identify new aspects that until now had not been thought through.

PLAN OF ACTION

When the service provider adopts the designed service concept, there are a few tasks they have to carry out before they can launch the service. These tasks include testing and developing. As the service has been released and the sale has started, the service provider must expand the service concept with new modules in order to extend the s-curve and ensure that "Forget-me-not" is an attractive service for the nursing homes in the future.

The chronological order of the primary actions are described below.

1. PROOF OF CONCEPT
   Test the concept on several people from NH. Initial tests have been carried out but it is important to test on more actors and afterwards modify the functions.
   When: Fall 2015

2. SEEK FUNDING
   Find a way to finance the development costs.
   When: Fall 2015

3. DEVELOP AND TEST A BETA-VERSION
   Develop and test of digital prototype (beta version) on the entire Nursing home and afterwards adjust the functions.
   Measuring the service success.
   When: Fall 2015

4. DEVELOP THE SYSTEM
   The service provider has already hired IT people to develop and test the application and database. The service provider must choose a cloud service supplier.
   When: Fall 2015

5. LAUNCH OF "FORGET-ME-NOT"
   Official launch of service.
   Start by installing the final service at NH and additionally sale to other nursing homes.
   When: Spring 2016

Implementation plan

Table 3. *Implementation plan*

Step	Nursing home	Service Provider
1	Showing interest in the service via webpage, mail or phone.	Receive lead on possible purchase - arrange meeting with the nursing homes.
2	Presentation meeting with the service provider where the nursing home signify needs etc.	Presentation meeting with nursing homes – make customized offer.
3	Buy touch screens + service	Provide help in choosing the touch screens.
4		Install the service at the nursing home.
5		Create profiles and access to the nursing home
6	Receive introduction - either the IT person there, and he/she afterwards introduce the service to all relevant employees.	Instruction of use.
7		Support + maintenance.

(continued)

6. EXPANSION OF SERVICE

Testing and implementation of new features / modules.
When: Autumn 2016

7. EXTENSION TO SECONDARY SEGMENT

The company overtaking the development should look at the possibility of selling the service to other segments which could include other types of nursing homes as for example younger people with disabilities.

FUTURE CONSIDERATIONS

During the design process, relevant possible features in the service concept were left out due to limited time and a wish of concept simplicity. Some of these will be briefly be outlined her to reflect on how the concept might be developed and "added on" in the future.

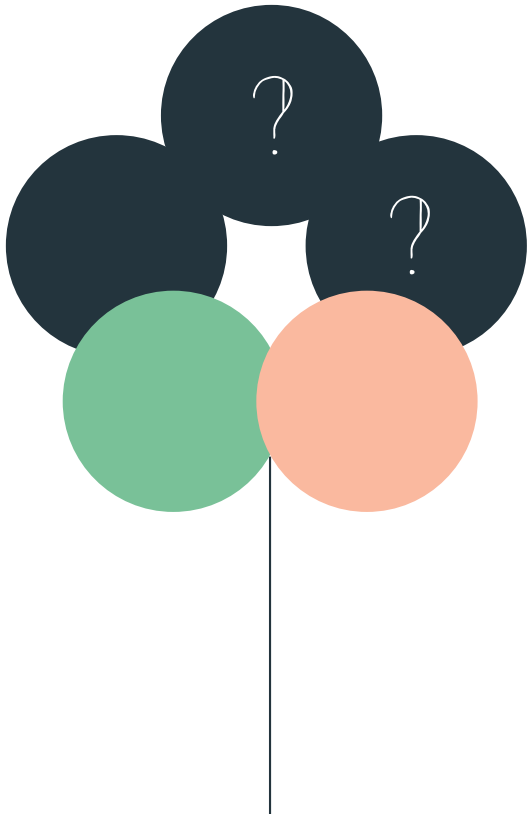
Possible add-ons

Care-related information for caregivers

The life story aspect in the Forget-me-not service has the purpose of communication and entails photos from the residents' lives (public information). Besides, aspects of more private character such as eating habits, health statement, medicine prescriptions, care description, which are all important for the caregivers' work were also included in the first prototype test.
Here it was stated that this would be very useful to have all this information stored in one digital touch point, as much of this information today was written on paper notes located various places. Therefore, it would be relevant to have a public entry to the system for communication purposes and a private entry for the caregivers to access direct care-related information.

General information

The second prototype included an aspect of digitalizing more information about what is happening in the nursing home, such as activities and caregivers on shift according to date and time. All which today are distributed to residents in paper format and managed by caregivers on LEAN boards, but which might be useful to digitalize for more efficient information management and simple overview. Information about daily meals was included in the final service solution, since test results showed that meal information contributed to improved conversations, where other information such as activities made caregivers feel that they should convince residents to join activities, thus not suited for general social interaction. General information might be relevant to integrate in the future as a secondary module serving other purposes.



REFLECTION

The process - what did we learn?

The overall processes was carried out from the framework of empathizing with possible users, synthesize general insights and needs of the users, ideate, prototype and test new service concepts, and deliver one final prototype. Moving back and forth between these mindsets and working modes provided valuable experience in project management and application of methods and tools according to project goals and the actors involved.

When actors cannot talk freely

Involving caregivers and residents in the design process demanded very cautious deliberations in relation to which methods and tools to apply for involvement, since they could not participate on the same level.
Only few residents were able to - or open towards - speaking about their situation and feelings about living at the nursing home. Moreover, with the goal of improving the residents' quality of life poses many questions that cannot be asked about directly, as for example loneliness and happiness, which are difficult or even taboo to talk about.

This provided some constraints to the design process according to how we could involve the residents, as regular interviews were proved difficult to carry out and did not provide the answers needed. It was investigated if photos could support the interview by showing images of different aspects that might be important for good mealtimes experiences, which would not be intimidating to talk about and which would support communication for people with dementia. It helped getting more answers, as residents could now provide "yes" and "no" answers according to if the aspect shown on the photo was important to them. However, it was still difficult to get elaborate answers due to the factors outlined above. When starting the project, it was planned to involve residents in co-creation ideation sessions, but it was soon realized that this was not possible and methods needed to be appropriated to the abilities of the residents to obtain the best results.

Appropriating methods

Instead of asking residents directly, participant observation made us able to, to some extent, to put ourselves in their shoes and experience for instance a mealtime from the perspective of the residents. Observations also provided indications of the residents' feelings and attitudes observed from tone of voice, facial expressions and actions provided indications about if the residents were happy or not. Still, this also constituted a complex situation, as some psychological states were triggered by the illness of the resident, e.g. dementia leading to aggressive behavior. This made it difficult for us as non-experts to evaluate the underlying causes of their feelings.

Utilizing the knowledge of secondary informants

Secondary sources of information were proved useful to involved to support own observations. The caregivers at NH possessed knowledge about the impairments and daily routines of the residents, which helped navigating. To get insights on more 'difficult' matters, it was found useful to involve relatives along with the residents as a bond of trust exist between them making it easier to "open up" in conversations. This was realized as we visited a resident along with her daughter to discuss ideas and get insights about her experience at NH.

As an example, we asked the resident how she experienced life at NH, and further how her relationship to the caregivers and the other residents was. She replied that she liked being at NH, but didn't elaborate further.

Then her daughter supplemented by saying that her mother previously had expressed that the social cohesion could be better, and the resident confirmed, “Yes that is true”.

Secondary research as for instance studies on loneliness and well-being in Danish nursing homes was examined to support findings and to see the bigger picture, and indicate implications on a bigger scale.

When actors can talk freely

The staff at NH was able to speak freely and was highly involved throughout the design process. The caregivers participated as key informants, as the project benefited from utilizing their knowledge as experts in the daily practices and in providing care. However, also management, physiotherapy and kitchen staff was involved to provide inputs from other perspectives. The staff was informing the process from the early stages (interview with manager, guided tour, focus group interview, in-situ interviews), in the ideation phase (co-creation workshop) as well as in the concept test and prototype test to maintain a user-centered focus. In contrast to challenges of involving the residents, the constraints of involving staff contained sorting all the many inputs from the various actors and realizing which problem to focus on.

Different objectives

From the early phase of the process, it was realized that the different actors involved have different objectives of participating and due to their different positions and personal believes, they focus on aspects relevant for their area.

Our main contact (client), who was the one creating the client proposal is a kitchen manager and nutrition specialist and responsible for drive processes related to food, emphasized aspects within this area. Therefore, she was looking for a solution that would support the documentation of residents’ food intake supporting decision making for her as kitchen manager.

To the caregivers, a focus on documentation would imply more tasks for them to carry out in order to monitor and document each of the residents during mealtimes. To them, the most important thing would be to be relieved them from the stress and pressure in their daily practices leaving less time to spend quality time with residents.
And last but not least there are the residents, who do not care worry about how things are documented or how many tasks the caregivers have (only to a certain degree, as it of course also affects them in the end), but the primary goal for them is to feel quality of life, which includes both delicious food, and being surrounded by friendly staff among other things.

Managing complexity by probing

Having an open approach to collecting data resulted in many different viewpoints and problem areas, not only determined by the different professions, but also within each profession, where different problems areas were found according to the persona asked.
For instance, answers would differ according to if you interviewed experienced caregivers who knew the residents well, substitutes who were not experiences and didn’t know the residents that well, or non-Danish caregivers who experienced barriers to communication. This created a high level of complexity in sorting the various data and in determining the main focus area, as there were many different problems to take into account.
In the same way, under such circumstances there is not one right solution, and the management style therefore entailed an experimental mode of probing and the focus area. Further, solutions were based on deliberate choices made by the project group based on informed intuition (i.e. answers from test and choices made by the project group).

Challenges

Besides challenges related to the above aspects, limited time and access to informants provided some challenges to the project, as already touched upon in the introduction chapter discussing validity.

Access to informants

NH was acting as the intermediate between the project group and all informants from the nursing home, so every time someone from NH were to be involved in the design process, we would request the desired the number of participants we wanted to include, the positional titles of the participants, and time to set aside for the task. In the end, NH would confirm what was possible, since they of course needed to coordinate the people in a framework where there were still the personnel available on shift. It was a great help that NH managed the final recruitment, as it would most likely not have been possible to involve as many participants if not, however, it also constituted some uncertainties during the project, as we did not have control over the final framework for involving staff. The final framework deviated slightly from the initial request, as for the test of the second paper prototype. The optimal scenario would be to test the prototype on all five floors; however only 5th floor could meet the request resulting in only five test results.

Also, it was experienced to be difficult to establish contact to relatives, which was due to the fact that NH did not have much contact with many relatives, and could only provide us with contact information of two relatives. As relatives in the case of this project seemed to provide a better way to talk to residents, it would have been a great advantage to include more relatives to provide a better ground for empathizing with the residents.

Time constraints

It could sometimes take weeks to organize a meeting due to the coordination that had to be done NH in advance, and especially for activities requiring more than just a few participants. This often let to that activities were postponed according to the initial project planning, and we learned that a fixed project execution plan could not be fulfilled, but would have to be adjusted during the process. From this, we also learned that buffer time for all planned activities was needed.

Besides the constraint of not knowing what activities could be carried out and when, the aspect of not keeping to a fixed project schedule also provided many advantages. For instance, this provided opportunities for improvisation and by adjusting activities along the way; a better fit between emerging findings and appropriate applications of methods was discovered.

As a result of activities filling out many time buffers due to waiting for a response from NH, the project framework of four months left no time for buffers in the end. This meant there was no time for a forth prototype test (interactive prototype in use in real setting) within the scheduled time. Moreover, in order to test the "life story" aspect this would require a prototype based on photos of residents' past lives, which would require much more time to complete in order to get rich catalogues for all the residents on the floors than what was possible in this framework. However, the aspect of "Historical objects and events" were estimated to provide almost the same experiences and effects, and it would be relevant to test this module more thoroughly next.

The product - Did we solve the problem?

The problem statement explored during this project was:

"HOW CAN A SERVICE SYSTEM IMPROVE THE MEALTIME EXPERIENCE AT NURSING HOMES BY ENHANCING COMMUNICATION BETWEEN RESIDENTS AND CAREGIVERS, AND SOCIAL COHESION AMONG RESIDENTS?"

The digital "Forget-me-not" service was designed to solve to the three inherent goals:

1. Communication between residents and caregivers (the primary goal)

The icebreaker module can encourages and supports communication through visualizing "easy topics". The life story module visualizes resident life stories and provides more personalized information than what is provided in life stories at NH today. This advances the caregivers' knowledge about the residents and evokes memories of residents through reminiscence leading to enhanced communication for both parties.

2. Social cohesion among residents (the secondary goal)

The service were designed to be used in common areas of the nursing home, making it possible to use the service more people at the time supporting social cohesion. Features for this purpose includes the facilitation of storytelling of resident life stories. As many residents cannot initiate such activities or conversations themselves, this aspect requires that the caregivers take time to sit down and use the service.

3. Improved mealtime experiences (the ultimate goal)

The icebreaker module can stimulate the residents' appetite before meals and triggers social interaction during mealtimes, which are important aspects of good mealtimes experiences (Keller, 2014). The service can stimulate residents before mealtimes through photos of upcoming meals, and initiate conversations that can be continued during mealtimes. The life story module can further be used during or right after mealtimes seeking to make residents sit longer in common areas.

Ultimately, the service also touches upon problems of malnutrition, since the stimulation before, social interaction during, and sitting longer at the table after meals increases food intake. Sitting with people you know and like makes you sit longer at the table, and sitting longer at the tables usually makes you eat more (Kofod, 2008).

Feedback from NH

The caregivers state that the residents' were to a higher degree aware about meals they were to be served. Visualizing upcoming meals in the dining room contributed to conversations about food, and triggered conversations about residents' favourite meals (Appendix 21).

The caregivers further state that the service makes it easier for both them and for residents to communicate in general. From using the service the caregivers increased their knowledge about residents and they learned things about them they didn't know before (Appendix 21).

What is the relevance of our service?

The value of the Forget-me-not service is that it targets the majority of residents living at nursing homes today.

Many of the innovations in the industry focus on technological developments; such as for instance Internet-of-things based services that enable residents to control heat, curtains, light and other things through a smart device (Fremtidens Plejehjem).
However, when talking to a designer, who had been involved in such developments (e.g. Fremtidens Plejehjem in Aalborg), she affirmed that these type of innovations target only the minority of the elderly living at nursing homes today, as the residents have either not adapted to technology or they don't have the physical or mental abilities to use it (Carrie Peterson, personal communication, April 8, 2015).

Future relevance

The lack of technical abilities among the residents was also observed at NH, where only a very small percentage had a mobile phone or a computer. Therefore, the service Forget-me-not is primarily to be used by caregivers, so all residents, who currently live in nursing homes can benefit.
However, in the future we anticipate that the service can be adapted to the generation of nursing home residents, who have used technology and social media most of their lives. In the future, the service might provide value for residents from accessing the service from private devices and possible communicate and send photos to each other in addition to use in common areas currently targeted.

Service design as a field
- What can we contribute with?

In academic terms

After completing the master program in "Service Systems Design", the project group has obtained the qualifications to (Curriculum):

I. MASTER DESIGN AND DEVELOPMENT WORK IN SITUATIONS THAT ARE COMPLEX, UNPREDICTABLE AND REQUIRE NEW SOLUTIONS.

II. INDEPENDENTLY INITIATE AND IMPLEMENT DISCIPLINE-SPECIFIC AND INTERDISCIPLINARY COOPERATION AND ASSUME PROFESSIONAL RESPONSIBILITY.

III. HAVE THE CAPABILITY TO INDEPENDENTLY TAKE RESPONSIBILITY FOR OWN PROFESSIONAL DEVELOPMENT AND SPECIALIZATION.

The design work of this master thesis meant dealing with many complex situations. The company itself is a complex system of infrastructures, actors, processes and not at least different levels of physical and cognitive impairments of residents that needed to be explored. Understanding the current system was important, as the relationships within the current system establish the basis for developing relationships for a new service system. By challenging the initial client proposal, the complexity increased in terms of exploring latent needs of users and proposes possible solutions to these constituting many unknowns. Moving away from the initial client proposal was a decision taken in agreement with the client, and enabled us to work independently and control project direction by applying discipline-specific methods and tools, while still being in close cooperation with the client and the actors designed for.

Personal remarks

After this work and completing the master program, we can refer to us self as "Service Designers". So why is service design relevant? And what can we bring to society?

Services are key to survival

In the introductory chapter, it was presented that **a shift from a product-based industry to service-based industries** is seen, as a result of e.g. technological development and globalization and increased access to information, which poses new **complex demands** (Evenson et al. 2010; Morelli, 2002). Complex demands include providing value through experiences, since everyone can make a good cup of coffee, but not everyone can provide unique and **meaningful experiences** around it. Thus, the ability to create experiences for customers is the key today for companies to differentiate from each other (Wisler-Poulsen, 2015, p. 11). However, this is not to say that service design is the same as customer experience, because sometimes a service user might also be a service provider (Polaine, p. 7). Moreover, all service actors (user, client, service provider and more) should all receive value from the service in order to sustain a service over time (Wisler-Poulsen, 2015, p. 67). Therefore, a holistic approach is needed.

Holistic approaches provide better experiences

Service design is explorative, generative and evaluative and spans the entire design process from discovery to release (Evenson, et al. 2010, p. 4). In other words, service designers do not focus on one single touch point of a service only, but analyze and **design the service experience as activities happening over time through multiple touch points**. As service experience

is the outcome of all touch points in a customer journey combined, service design provides means to analyze where 'pain points' exist in a journey and provides tools to design for better experiences. In order to find these pain points a user-centered approach is required.

Taking users' perspective triggers innovation

Service design assumes the client is the starting point or lens for a specific service, through the use of creative, human-centered and user-participatory methods (Evenson et al. 2010, p. 4). This is related to the fact that services exist and provide value only when they in use (Polaine et al. 2014, p. 23).

By designing, not only for, but also with users, latent needs can be discovered that might not evident from the beginning. It is not about finding the solution immediately, but about finding the problem first. This approach differs from conventional business approaches, where strategy is defined prior to investigation (Evenson et al. n.d., p. 4). According to Polaine et al. (2013), the division of silos makes sense to the business units, but makes no sense to the customer, who sees the entire offering as one experience (p. 22).

Therefore, as tools used by service designers are not domain-specific, i.e. relating to a specific industry, this makes service designers valuable to external companies in terms of innovating from a bottom-up-approach, whether this is in the industry of hospitality, banking, travel or other.

Having a holistic approach and taking users' perspectives cannot realize a service alone. Instead, collaboration with many other actors is key to accomplish implementing new service design, which is why negotiation tools and the mastering of these are essential.

Visualization is a mean for negotiation and collaboration

Services are immaterial in nature, thus service designers frequently need to make the invisible visible by showing customers what has gone on behind the scenes, showing staff what is happening in the lives of customers, and showing everyone the resource usage that is hidden away (Polaine et al. 2014, p. 31). During the nursing home project, the use of narratives in terms of sketches were used to communicate early service concepts, and later in the process interactive prototypes were used to visualize the service to actors, when they already had an understanding of the concept. In this way, an important value of service designers is the ability to communicate with people with different levels of knowledge and skills in order to collaborate and pool know-how from different areas of expertise.

Concluding remarks on learning outcomes

During the master program in Service Systems Design, we have obtained knowledge about essential service design methods and tools. This includes negotiation and representation tools for exploratory, communicative, business-related and technical purposes, which enables us to design and develop services, and communicate aspects of it to stakeholders with various backgrounds. Through semester projects and internships, we have gained experience in practical aspects of service design, i.e. knowledge about how and when to use the different tools according to the problem at hand. In the end, this has provided us with the qualifications in innovating for efficient and effective processes, improved service delivery and more desirable (service) products.

Designing services differs from the traditional perceptions of design, as it is more than aesthetic constructions of shapes, materials or colors. Service design is design with a purpose.

"Most people make the mistake of thinking design is what it looks like. People think it's this veneer – that the designers are handed this box and told, 'Make it look good!' That's not what we think design is. It's not just what it looks like and feels like. Design is how it works."

- Steve Jobs

(Published in New York Times, 2003).

CONCLUSION

Many challenges are seen in society today requiring new solutions.
The number of elderly people over 65 years is exponentially increasing, which compels innovation in the area of care and nursing home services. Today, problems of loneliness and malnutrition of nursing home residents are well known phenomena in Danish nursing homes and are further recognized by the caregivers, who do not feel that they fulfill the needs of the residents.
These problems were also the foundation for this master thesis project, and was initiated by a proposal from a nursing home recruiting students to help designing solutions to overcome problems of malnutrition and general neglect. The project group went through a design process from fieldwork studies to final (service) product, and was informed by many different actors involved in the process through interviews, observations, co-creation and test.

General insights from fieldwork exposed many problems providing barriers to communication between caregivers and residents, and among the residents living on each floor, especially during mealtimes. A barrier for residents related to high variety in disabilities, which provided a need for someone to initiate and support the process of social interactions. Barriers from the perspective of caregivers included lack of knowledge about residents, and limited Danish language skills among a high number foreign caregivers. All while working in a busy environment, with limited time set aside for social interaction. These aspects resulted in residents' needs for social stimulation not being met, residents isolating themselves and feeling objectified. Therefore, the problem statement guiding the project was,

How can a service system improve the mealtime experience at nursing homes by enhancing communication between residents and caregivers, and social cohesion among residents?

The final service concept is a digital service called "Forget-me-not" delivered on a touch screen device and used in the common areas of a nursing home just before, during, or right after mealtimes in order to provide better experiences.
The service entails the two modules "Icebreaker" and "Life stories", which both seeks to encourage and support communication through the means of visualization, but targeting different kinds of use.
The module "Icebreaker" is targeted use during mealtimes and visualizes 'easy subjects related to the specific day or week, such as meals, as weather forecasts and a calendar with special days to respectively seeking to stimulate appetite and trigger general conversations.
"Life stories" is targeted use just before mealtimes in order to stimulate/empower residents before meals and start conversations that can be continued after meals, as well as right after mealtimes to make residents value sitting longer in the common areas. The module is based on the idea of visualizing residents' life stories, in terms of personal photos, photos from past activities at the nursing home or photos relating to specific decades in Danish history. It seeks to evoke memories of the residents and empower them to tell stories about events in their lives, while caregivers and other residents possibly gain more knowledge about the specific resident.

The direct effect of the service is to encourage and support communication, the secondary effect is to strengthen the feeling of social cohesion, and the ultimate effect is to provide better mealtimes experiences. Mealtime experiences are improved by social interaction, which again is postulated to increase food intake, since the food is perceived to taste better and you are more likely to sit longer at the table when you are sitting with people you know and like.

GLOSSARY

CLOUD COMPUTING: Web-based applications that are stored on re mote servers and accessed via the “cloud” of the internet using a standard Web browser.

CO-CREATION: A term for collaborative creation. Through co-creation (thinking, designing, and building together in multidisciplinary teams), personalized and unique experiences arise. In this way, users become part of the design and development team.

COGNITIVE ABILITIES: Cognitive abilities are brain-based skills we need to carry out any task from the simplest to the most complex. They have to do with the mechanisms of how we learn, remember, problem-solve, and pay attention.

DEMENTIA: Dementia is a syndrome that affects intelligence, memory, personality and emotional life. Dementia progresses over several years during which the patient becomes increasingly forgetful, confused and changing personality. Even simple chores at home can be difficult to perform, and more and more care and support becomes necessary.

DESIGN THINKING: A deeply human process relying on the abilities to be intuitive, recognize patterns, and construct ideas that are emotionally meaningful as well as functional, and to express ourselves through means beyond words or symbols.

EMPATHIC DESIGN: Researchers and designers moving towards end-users, trying to get closer to their lives and work, trying to empathise with them, with their experience and emotions.

ETHNOGRAPHY: Field work done in natural settings, the study of the large picture to provide a more complete context of activity, an objective perspective with rich descriptions of people, environments and interactions, and a bias toward understanding activities from the informants' perspective.

LEGO SERIOUS PLAY: A workshop in which users are invited to play and build with various materials such as toy blocks. It brings out creativity and helps participants to express their insights actively.

LONELINESS: A subjective feeling and perception of unwanted lack of social relationships or poor quality in those that are present. People can live rather solitary lives and not feel lonely, or they can have many social relationships and nevertheless feel lonely. Consequently loneliness is more closely related to the perceived quality than the quantity of social relationship.

MALNUTRITION: The condition that develops when the body does not get the right amount of the vitamins, minerals, and other nutrients it needs to maintain healthy tissues and organ function.

MEALTIMES: Just before, during and after a meal is eaten. Mealtime is a complex process with multiple levels of influence including residents, staff, home and government.

MEALTIME EXPERIENCE: The physical and psychosocial mealtime environment and mealtime processes that can influence food intake. The mealtime experience is influced by social interactions, ambiance, meal pace, appetite and desire to eat.

NURSING HOME: A nursing home gives 24-hour care to people who are unable to manage daily activities because of debilitating health conditions or old NH.

PLATFORM AS A SERVICE (PAAS): The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the

application-hosting environment.

QUALITY OF LIFE: Individuals' perception on life in the context of the culture and value systems in which they live and in relation to goals, expectations, standards and concerns. It is a broad-ranging concept affected in a complex way by the person´s physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of their environment.

RAPID ETHNOGRAPHY: A collection of field methods intended to provide a reasonable understanding of users and their activities given significant time pressures and limited time in the field. The core elements include limiting or constraining the research focus and scope, using key informants, capturing rich field data by using multiple observers and interactive observation techniques, and collaborative qualitative data analysis.

SERVICE DESIGN: Service design is the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between service provider and customers. The purpose of service design methodologies is to design according to the needs of customers or participants, so that the service is user-friendly, competitive and relevant to the customers.

SOCIAL DEATH: A situation where we are prevented from joining other people in social communities, because our body physically gets in the way. This means that our social life dies and we lose our identity.

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APPENDIX

Appendix 1:	Project proposal
Appendix 2:	Interview with daily manager – Interview guide (In Danish)
Appendix 3:	Audio file: Interview with daily manager (In Danish)
Appendix 4:	Focus group interview - questions and hypotheses (In Danish)
Appendix 5A:	Audio file: Focus group interview part 1 (In Danish)
Appendix 5B:	Audio file: Focus group interview part 2 (In Danish)
Appendix 6:	Observation scheme for notes
Appendix 7:	Observation findings (In Danish)
Appendix 8:	Interviews with caregivers – Interview guide (In Danish)
Appendix 9:	Interviews with caregivers – Findings (In Danish)
Appendix 10:	Interview with residents – Answer pictures for question (In Danish)
Appendix 11:	Interviews with residents – findings (In Danish)
Appendix 12A:	Picture of empathy map of caregivers
Appendix 12B:	Picture of empathy map of residents
Appendix 13:	Co-creation workshop: Agenda
Appendix 14:	Picture of analogous inspiration – draft
Appendix 15:	Pictures of Osborn's Checklist – working models
Appendix 16:	Picture of OCDC box/How-Now-Wow: Draft
Appendix 17:	Test 1: Testing concepts - findings
Appendix 18:	Test 1: Interview with relatives and resident
Appendix 19:	Test 2: Prototype (In Danish)
Appendix 20:	Test 2: Questionnaire (In Danish)
Appendix 21:	Test 2: Completed questionnaires (In Danish)
Appendix 22:	Interfaces
Appendix 23:	Financial calculations