FORGET-ME-NOT

PROJECT REPORT

Linnea Forss
Lotte Skjødt Hansen

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 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.

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". The project was conducted between February and May 2015 in close cooperation with a 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.
This product report is aimed the nursing home and the external service provider. It presents the developed service concept, its business case, and provide a framework for future technical development.

The models and tools applied in the project report are presented in a descriptive way to ensure that the intended receivers of the report, who might not be familiar with service design, understand how tools are used.

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

Acknowledgements

We would like to thank the many people, who have been involved for their contribution to the project, showing interest and setting time aside to help us.

Especially, thank you all caregivers, residents, relatives and everyone else at the nursing home, who have been involved.

Also thank you to Carrie Peterson, Gerontologist at Copenhagen Living Lab, for helping us understand implications of dementia and provide feedback based on professional experiences.

Additionally we would like to thank our supervisors Nicola Morelli and Amalia De Goetzen for sparring and supervision.

Project group

Lotte Kirstine Skjødt Hansen
BA Product Development
University of Southern Denmark

Linnea Forss
BA Information Management
Copenhagen Business School

LEGEND

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

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BACKGROUND FOR THE SOLUTION

Project proposal

The starting point for the project is based on a proposal published online by a nursing home (NH). The project proposal states that NH wants to solve problems of malnutrition for the elderly in nursing homes. NH experiences that many elderly people today are malnourished and neglected in general. The solution is prepared for a future nursing home, which is currently under construction .

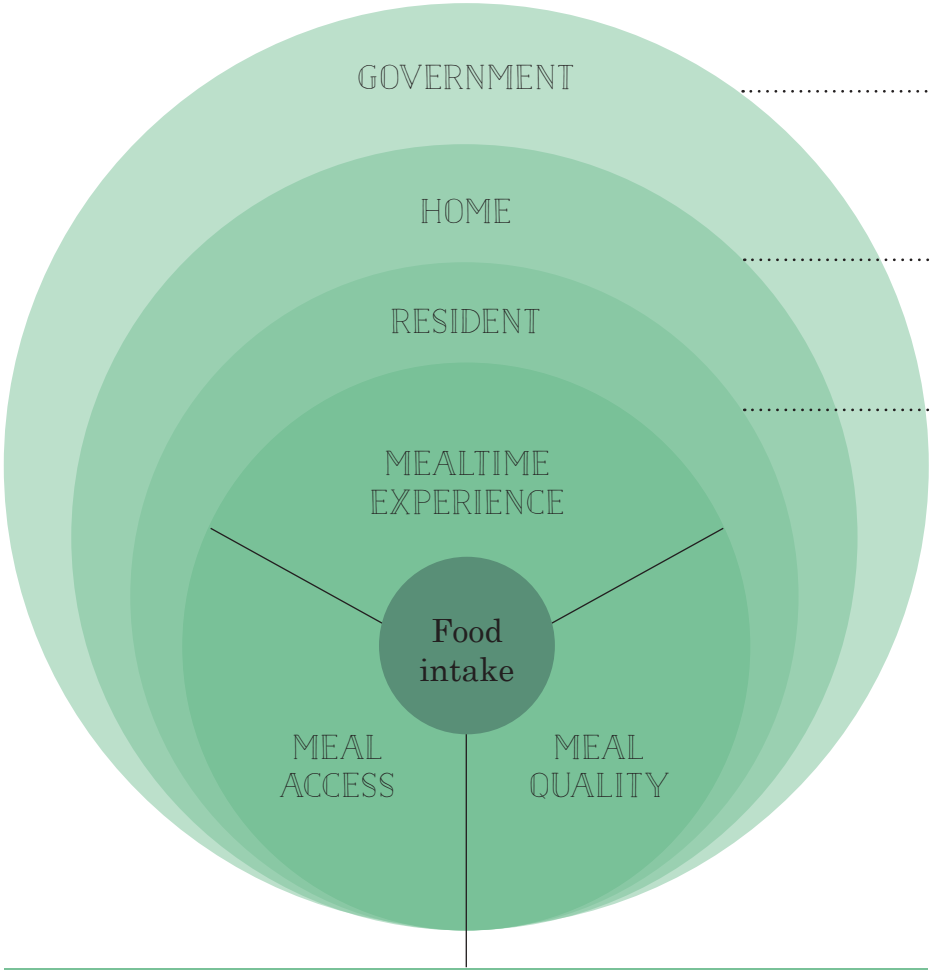
Current issues in society

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 (www.dst.dk).
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 theses 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 (Ældrekommissionen, 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). SFI's study shows that social interaction is highly important for the residents' quality of life and another study reveals that one out of four residents in nursing homes feel lonely (Wahl-Brink, 2012).
The study from SFI also points out that the framework for the meal in terms of shaping an environment of togetherness is important (Rostgaard, 2012 p. 30). In order to provide the elderly people with the best meal experience possible several aspects must be fulfilled. Keller (2014) has developed a conceptual model of "Making the Most of Mealtimes" (M3) for elderly people in nursing homes that highlights these (Keller et al. 2014). The model links malnutrition, loneliness and quality of life, and provides a conceptual framework for concept of mealtimes applied for this project.

Mealtimes - A conceptual framework

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. With the M3 framework it can be confirmed that mealtimes are complex, and 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 claims to be linked to the mealtime experience (p. 2).



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

M3 =

Meal Quality +	Meal Access +	Mealtime Experience
- Sensory appeal	- Support to eat	- Social interactions
- Nutrient density	- Chewing, swallowing	- Ambiance
- Variety, preference	- Taste, smell	- Meal pace
- Presentation	- Food availability	- Appetite
- Food safety	- Texture meets needs	- Desire to eat

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

PROJECT FOCUS

For this project, the "Mealtime experience" is the main focus.

Insights from the nursing home

In order to develop the best possible solution for the nursing home fieldwork has been carried out. In total, 32 people have been directly involved in the design process through interviews, focus group, co-creation workshop, and tests. These include caregivers, residents, kitchen personnel, physiotherapists, nurses, a manager, a relative, and an external expert. In addition to this, 20 hours of observations of caregivers and residents have been conducted. Based on the findings in the fieldwork are insights and subsequently concept requirement for the service created.

The five main insights are listed in below accompanied with the argumentation behind it and the source.

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

Observations:

- *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 have health conditions that make it difficult"*
- *Resident: "I only leave my apartment to eat and then I go back again. 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."*
- *Caregiver: "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 ("I don't have time to talk to you, I am working").*
- *When a caregiver was pouring 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.*

Concept requirements (CR)

The concept requirements are developed based on the insights and represents the success criteria for the service system to be designed.

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

CR2: Helping caregivers facilitate experiences while balancing time pressure

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

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

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

CR6: Empower/stimulate the residents

THE SOLUTION "FORGET-ME-NOT"

After an iterative design process where field- and desk research, ideation, concept development, prototyping and test were carried out, a service system named "Forget-me-not" was designed.
The overall objective of "Forget-me-not" is to enhance communication between residents and caregivers, and create social cohesion among the residents with the ultimate goal of improving mealtime experiences.

The service "Forget-me-not" is delivered through an application and a webpage and is to be applied in nursing homes. The main target group are residents and caregivers in nursing homes, which primary will access the service through a touch screen placed in the common rooms.

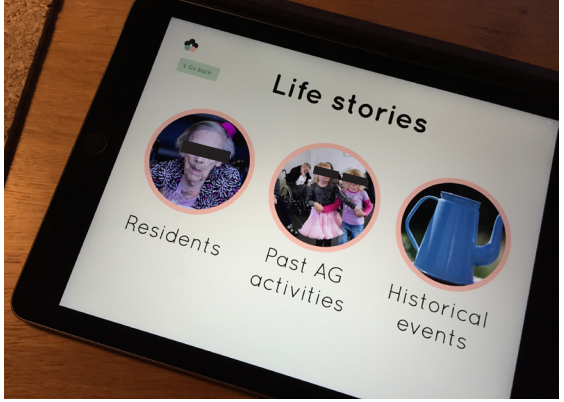
The service is based on two main modules: "Icebreaker" and "Life story".

ICEBREAKER

The "Icebreaker" module includes three categories:

- A weather forecast for today and for the week.
- Photos of the meal plan for today and for the week.
- A calendar with public holidays, birthdays of residents and relevant well-known people.

The "Icebreaker" module provides value to both the residents and caregivers by providing "easy" topics for communication and by making relevant information visual. At the same time, the photos of today's menu seek to stimulate the residents' appetite.



Picture 1. *"Forget-me-not" prototype.*

LIFE STORIES

The "Life story" module also includes three categories:

- Life story of each resident in pictures and small text. Each life stories could contain family, events, previous work, interests, favourite food, travel and others.
- Photos and small description of past activities held in NH.
- Photos and small description of historical elements and events.

The "Life story" module provides value for residents, as it helps residents to remember past memories through photos, which may trigger storytelling. To caregivers, this module helps them to get to know the residents better, as life stories at NH today (if they exist) are seldom used and focuses more on how to provide practical care than on who the residents are/were as persons. It can help them recognize, if the stories the residents tell are true or not and which things and people they value in their lives. Further, it supports non-Danish caregivers in their communication with the residents through supporting words with photos and by providing descriptions of historical events that they might not know, but means something to the residents. Using the service in common areas seeks to stimulate social cohesion, as other residents might want to know the other residents better and find things they have in common.

The use of "Forget-me-not" are often required that the caregivers take the initiative, and help the residents evoke memories by describing the content of the photo, as many residents are not familiar with using computers.

WHY THE NAME "FORGET-ME-NOT?

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

The service will be described in further detail in throughout the rest of the report.

Service Ecology Map

The service ecology map provides an overview of the overall concept, the individual actors and their interaction with the service (Wisler-Poulsen, 2015).

The model describes six directions for the service:

WHO?
Who are the actors involved? In the centre of the model the service "Forget-me-not" is placed. In the first circle, those who have the closest relationship with the service, the primary users are placed, and so on. The caregivers and the residents are placed in the same circle, as they will primarily use the service together.

WHEN?
When will the various actors use the service?

WHERE?
Where will the various actors use the service?

WHAT?
What parts of the service are the various actors primary in contact with?

WHY?
Why are the actors motivated to use the service? What do they gain when using the service?

HOW?
How do the actors use the service?

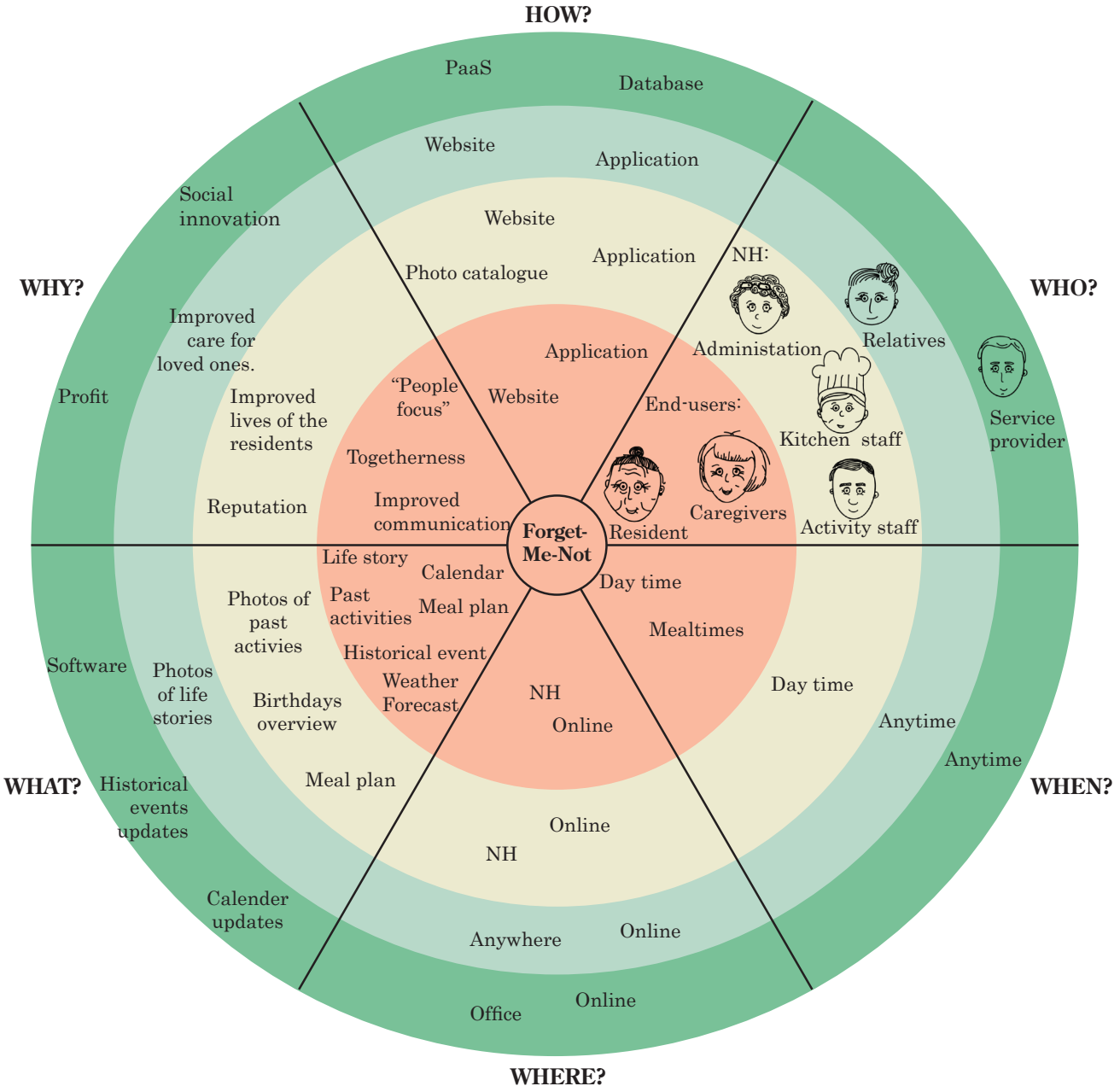


Figure 2. *Service Ecology map*

THE SERVICE IN USE

In order to gain an understanding of how “Forget-me-not” works when it is used in the nursing homes, this section will provide a description of what characterizing the target group of the service and introduce scenarios visualizing the use in context.

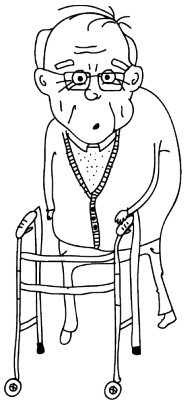
Personas

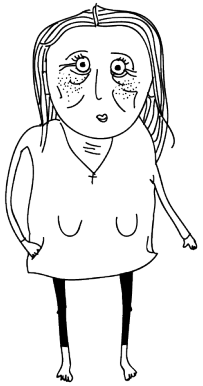
Four personas are created for each target group of the service, respectively for the nursing home residents and caregivers. The personas are archetypes and are differentiated by characteristics found important that differentiate them from each other. The personas are created based on information and impressions gained during the fieldwork, mainly observations and interviews.
The aim of using personas is to provide an understanding of who the target groups are and what aspects that characterize various residents and caregivers, as well as what their needs are.

The personas will act as main characters in the following scenarios.

RESIDENTS

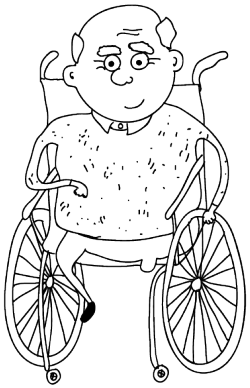
Social

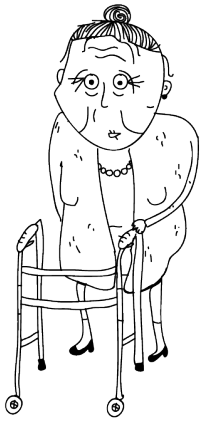




Mentally healthy

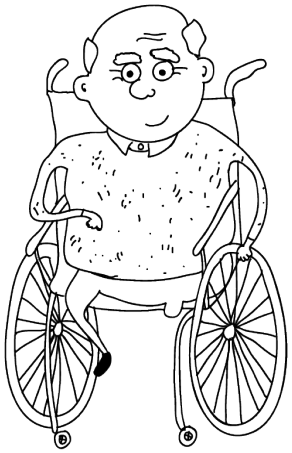
Physically healthy





Unsocial

THE FRESH



Name: Kai
Age: 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

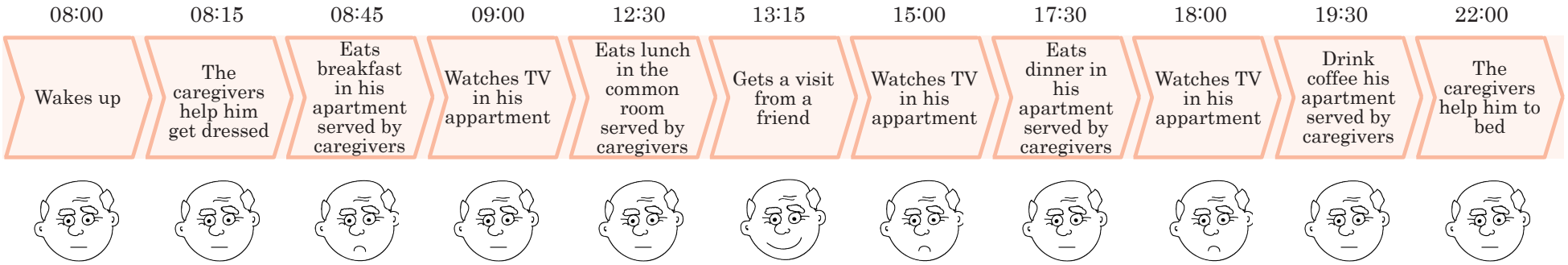
Participate in activities: No

Characteristics:
Kai is suffering from severe diabetes, which led to, that he got his leg amputated 2 years ago. 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.

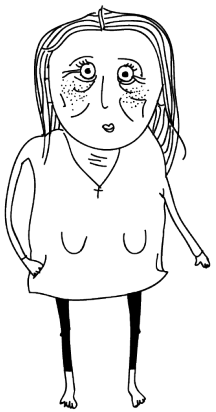
Needs:
- Kai often feels lonely in the nursing home; he misses having a friend.
- He would like to have something in common with the other residents.

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

Journey of a typical day with emotions:



THE DISTURBED



Name: Hanne
Age: 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

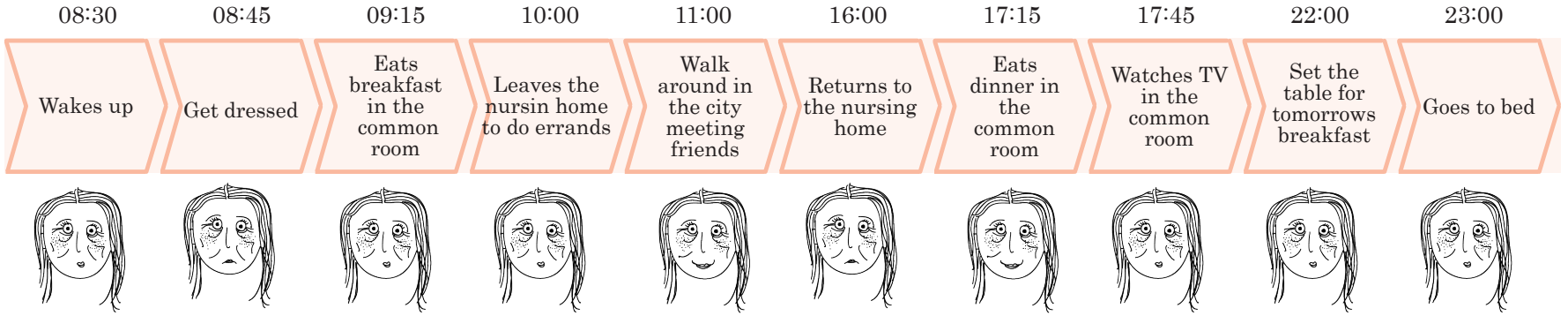
Characteristics :
Hanne is suffering from manic depression. She is mentally very fragile and is former alcoholic. Hanne is happy to live at the nursing home and is often in a very good mood. She talks a lot with the caregivers and with the other residents however she can be very vocal which can be intimidating 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

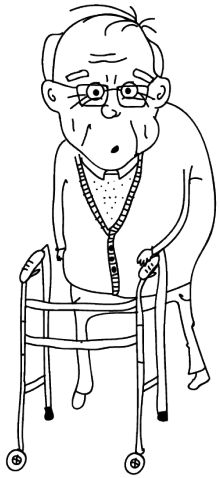
- Hanne misses more action in everyday life

Key Quote:
"WE NEED TO HAVE SOME FUN"

Journey of a typical day with emotions:



THE CONFUSED



Name: Henry
Age: 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.

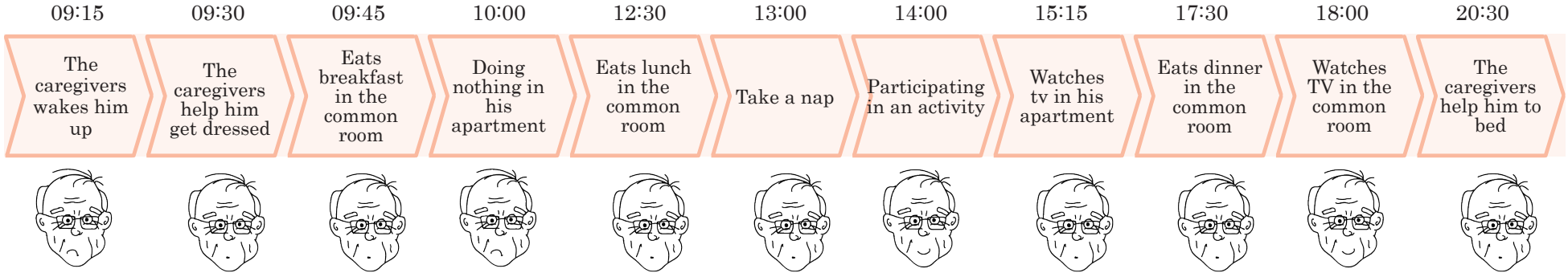
Needs

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

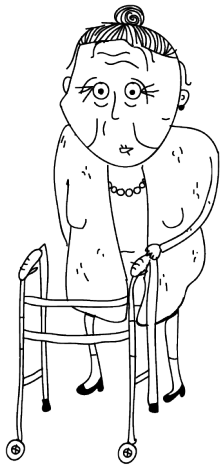
Key Quote:

"I WOULD PREFER TO TAKE CARE OF MYSELF"

Journey of a typical day with emotions:



THE AGGRESSIVE



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

Mental healthy
Physically healthy
Social

Relatives: A son

Eats in the common room: Yes

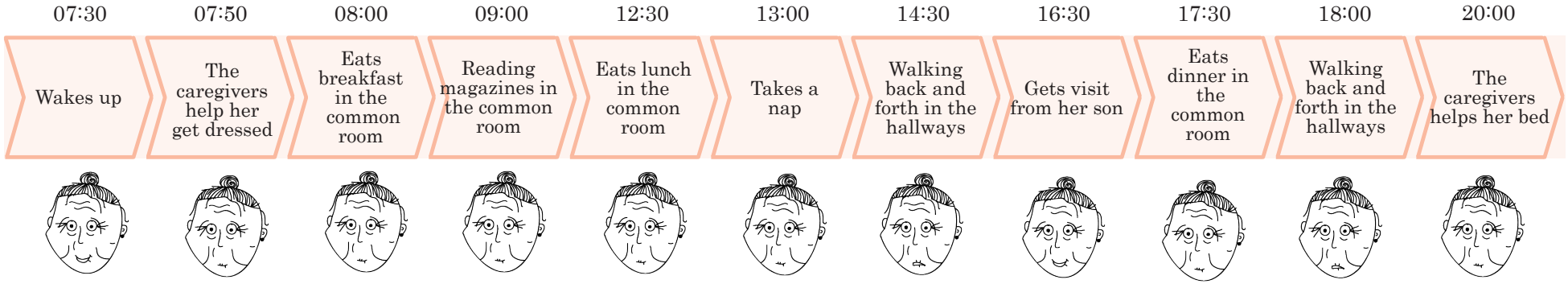
Participate in activities: No

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 and do not return. 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.

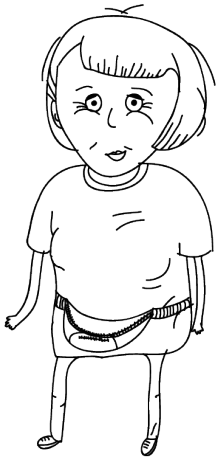
Key Quote:
"THE CAREGIVER WANTS TO HURT ME!"

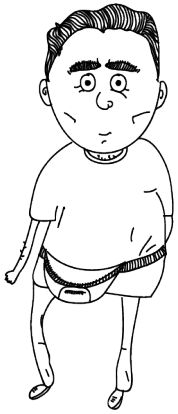
Journey of a typical day with emotions:



CAREGIVERS

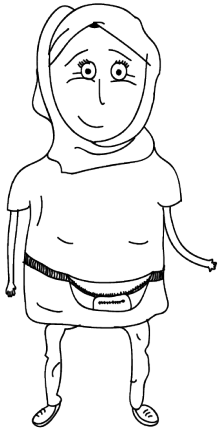
Stress (psychological)

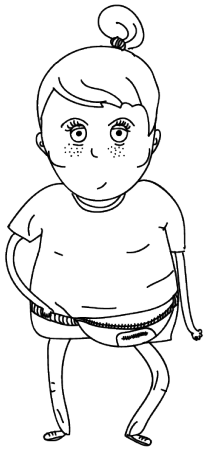




Communication with residents difficult/not valued

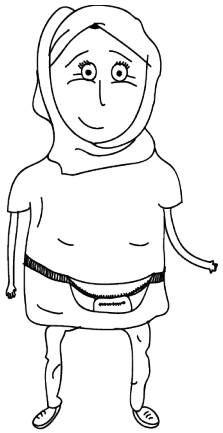
Communication with residents valued





Stress (time related)

THE STRESSED

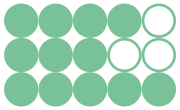


Name: Nasrin
Age: 42 years old
Years at NH: 1 year.

Nationality: Iranian

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

Danish skills
Knowledge about residents
Stress level (time)



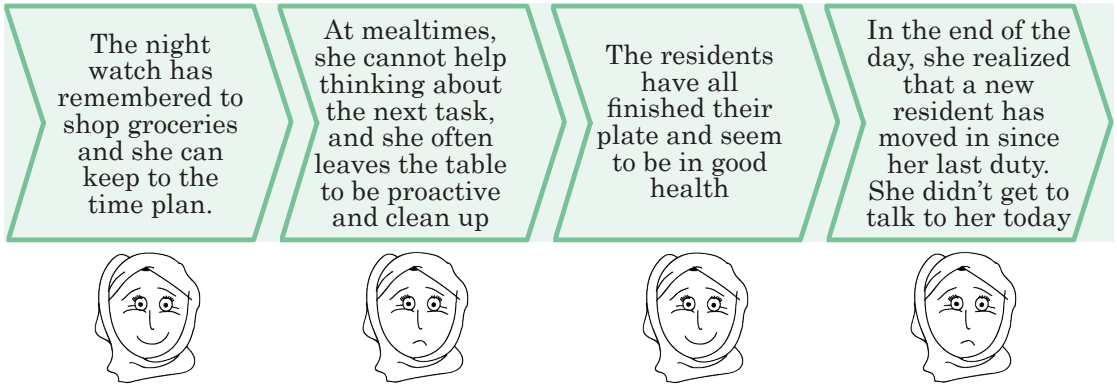
Personality and behaviour
Nasrin is a substitute SOSU helper and is originally from Iran, but speaks Danish well. She is very keen on doing a good job and providing the best care for the residents, however, many tasks, unforeseen events and residents who need extra monitoring during the day stresses 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.

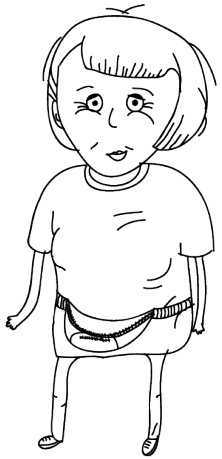
Needs
- Surplus time and energy
- Knowledge about residents

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

Highlight and lowlight of the working day:



THE EMPATHIC

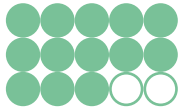


Name: Lone
Age: 38 years old
Years at NH: 4 year.

Nationality: Danish

Position: SOSU assistant, day shifts

Danish skills
Knowledge about residents
Stress level (time)



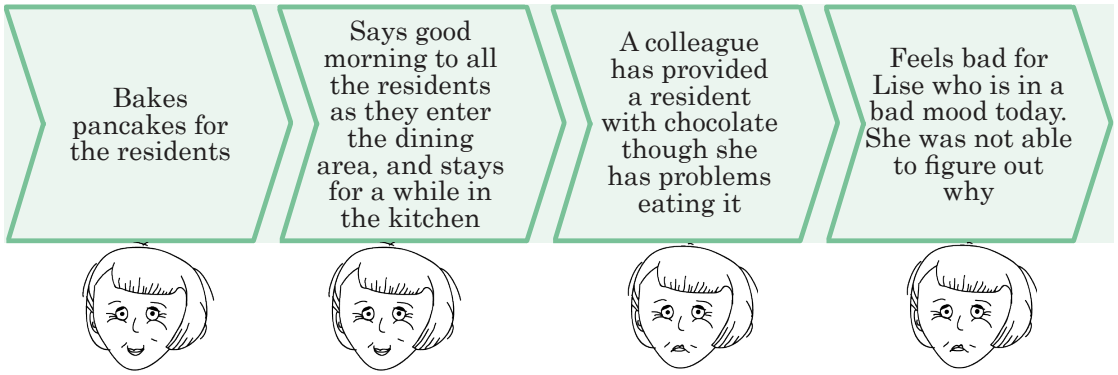
Personality and behaviour:
Lone is one of the caregivers who have been employed for the longest time. It is important to her to treat the residents with respect and she says good morning to everyone accompanied with a nice compliment. She knows processes and residents very well, and gets irritated if 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.

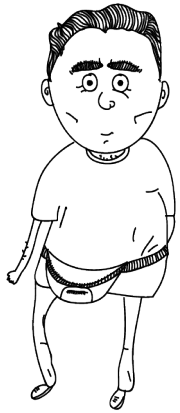
Needs
- T:rust in colleagues
- More time with residents
- Relieve pressure of own expectations

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

Highlight and lowlight of the working day:



THE LINGUISTIC CHALLENGED

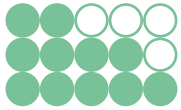


Name: Ali
Age: 42 years old
Years at NH: 8 months

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

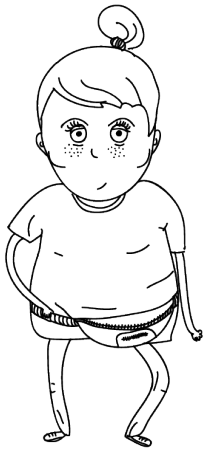
Needs:
- Better communication with residents
- Gain control and trust

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

Highlight and lowlight of the working day:

Prepares dinner. He can decide how it should be decorated and likes the feeling of control	He tries to communicate with the residents. He gives them chocolate and coffee to gain their trust and acceptance.	The residents find it weird to be served coffee at this time of day. They shake their heads and keep silent.	A resident is scared of him and escapes the nursing home. She is luckily back ten minutes later	Dinner is over and the residents go to their rooms. Time to relax	He feels psychologically exhausted after a shift
					

THE UNEDUCATED

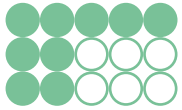


Name: Karina
Age: 28 years old
Years at NH: 2 months

Nationality: Danish

Position: SOSU assistant trainee, day shifts

Danish skills
Knowledge about residents
Stress level (time)

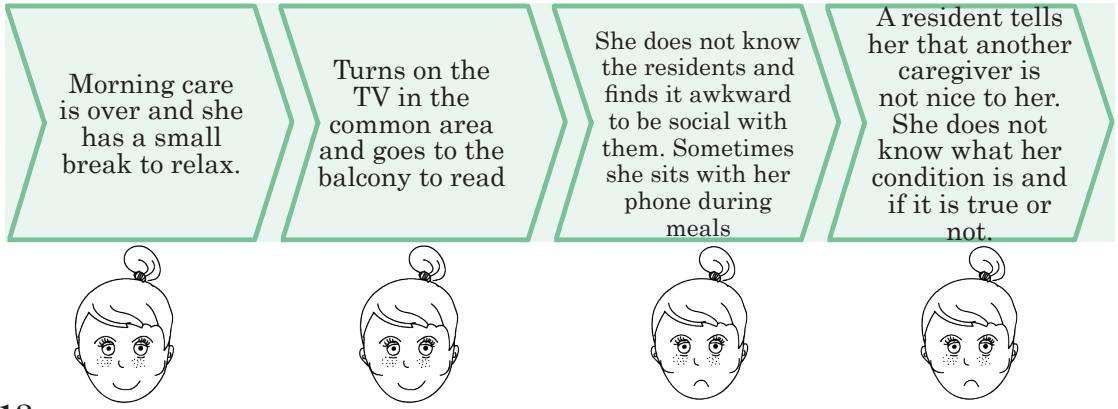


Personality and behaviour:
Karina is currently studying to become a SOSU assistant and she works as a student at the nursing home as part of her studies. She has only been at nursing home for 2 months, and until now she has mostly watched and helped the fulltime-workers in order to get to know the residents 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"

Scenarios

Different scenarios are made to show how the service is expected to work in the 'real' context at the nursing home. Scenarios are sequenced activities and can be 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). To illustrate service use on a typical day, where different 'settings' exist according to time of day (e.g. number of caregivers and type of meal), the scenarios are presented in a storyboard.

As the ultimate goal of the service is to improve mealtime experiences, examples on use are provided that seek to stimulate appetite before mealtimes, encourage communication during mealtimes, and improve social interaction after mealtimes.

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

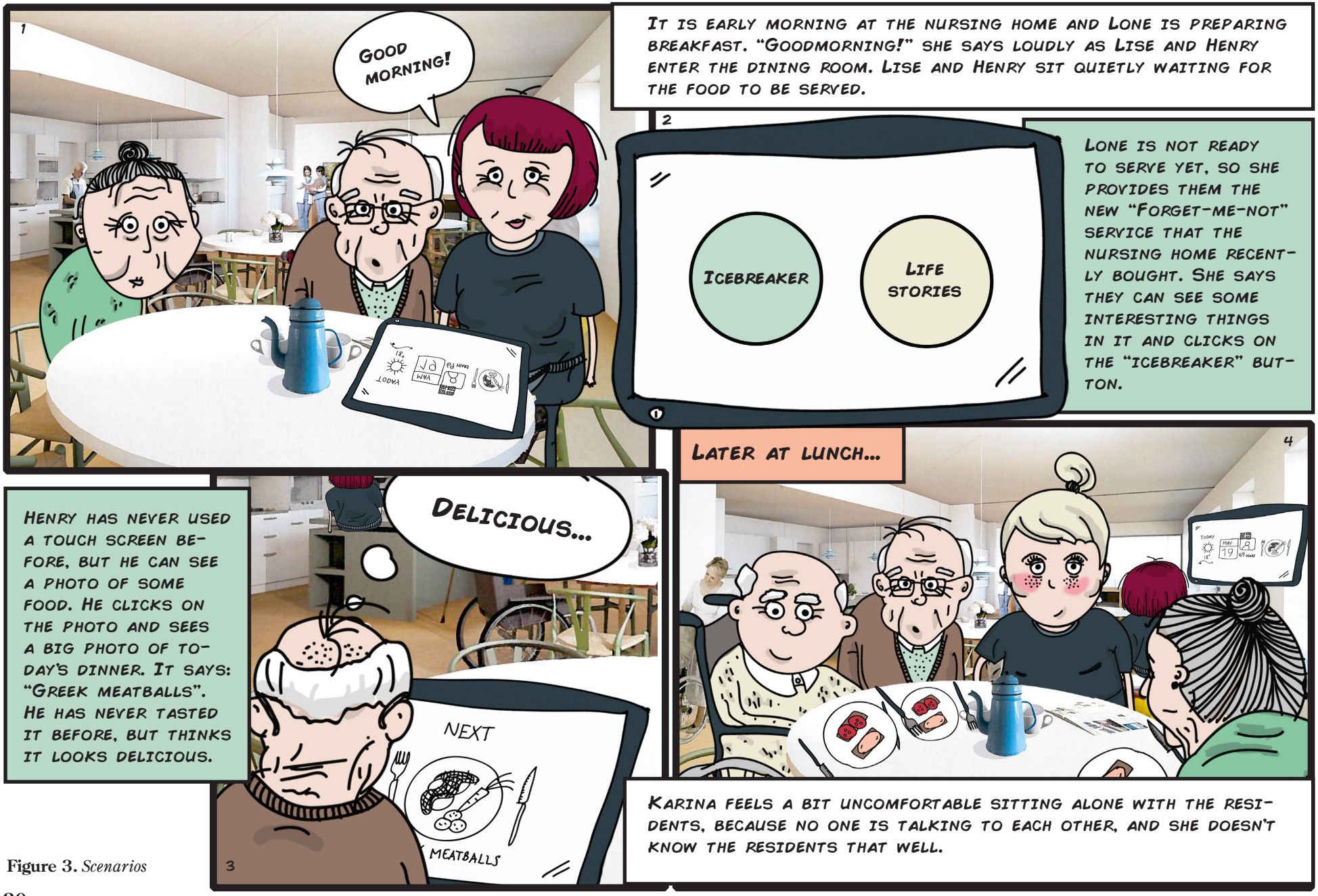
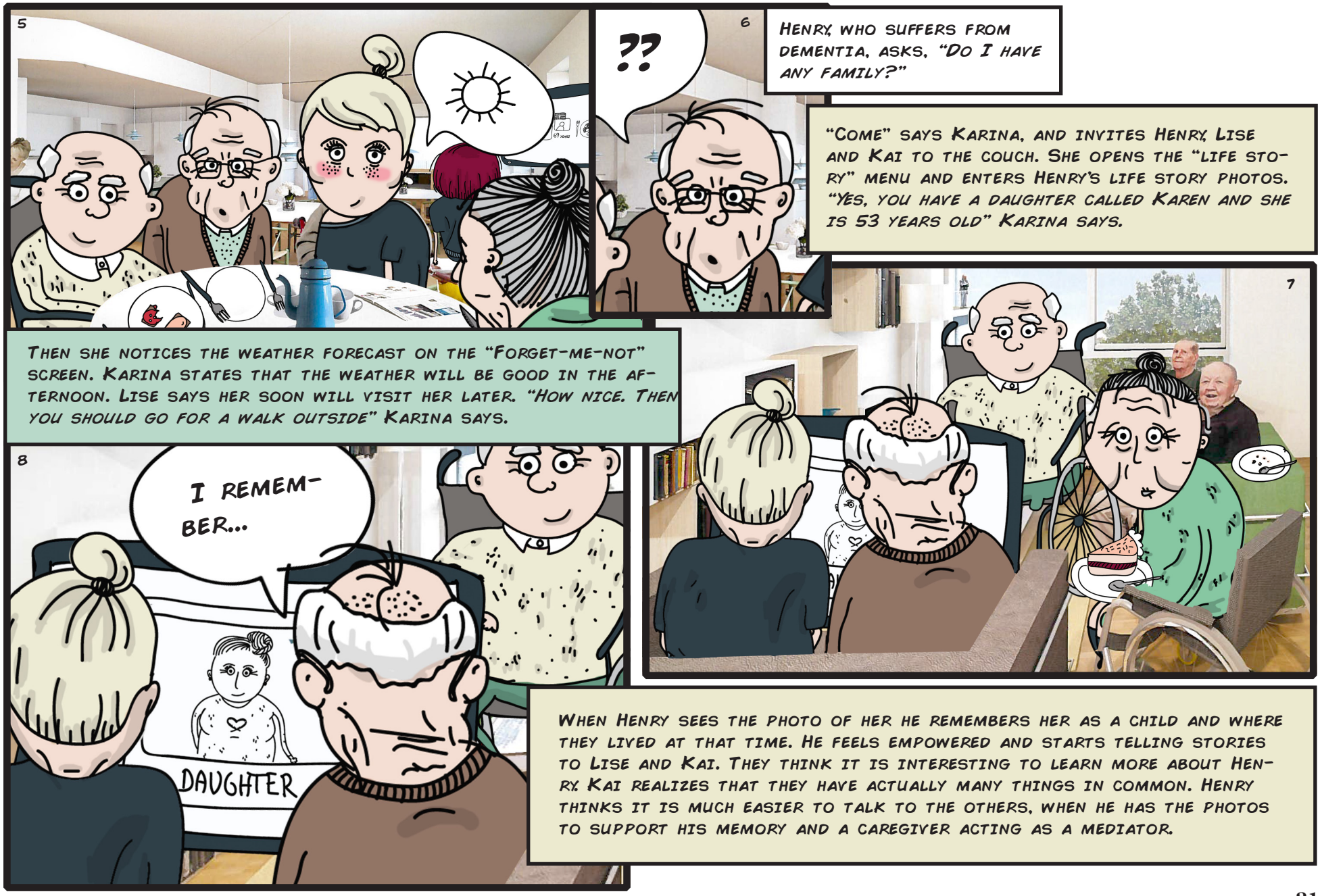
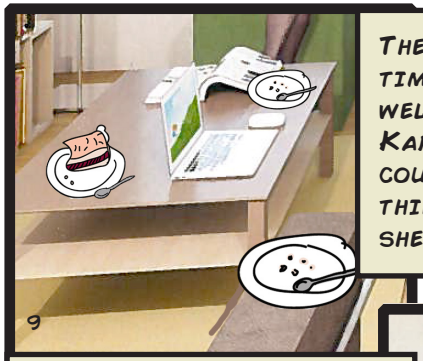
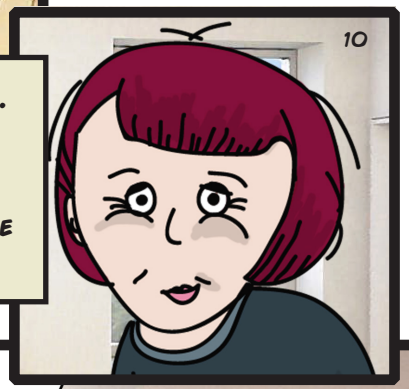


Figure 3. *Scenarios*

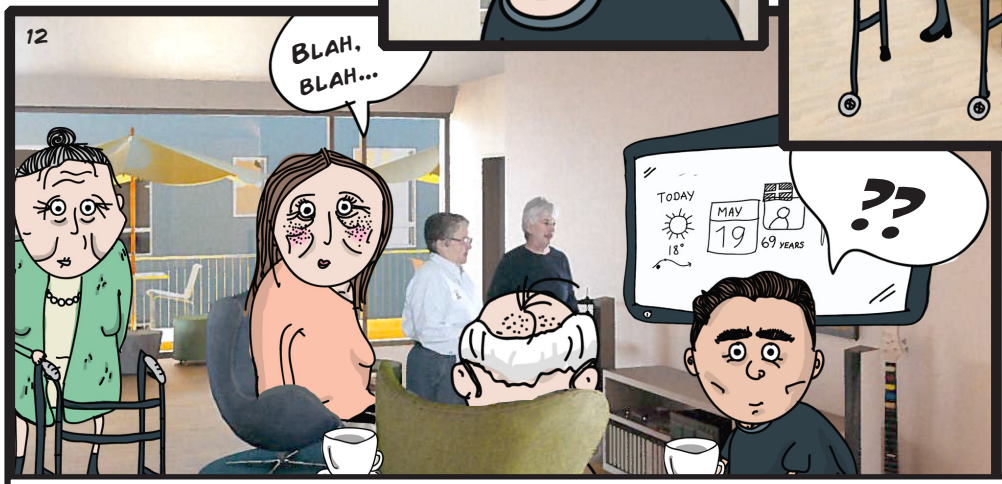

5
??
6
HENRY, WHO SUFFERS FROM DEMENTIA, ASKS, "DO I HAVE ANY FAMILY?"
"COME" SAYS KARINA, AND INVITES HENRY, LISE AND KAI TO THE COUCH. SHE OPENS THE "LIFE STORY" MENU AND ENTERS HENRY'S LIFE STORY PHOTOS. "YES, YOU HAVE A DAUGHTER CALLED KAREN AND SHE IS 53 YEARS OLD" KARINA SAYS.
7
THEN SHE NOTICES 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.



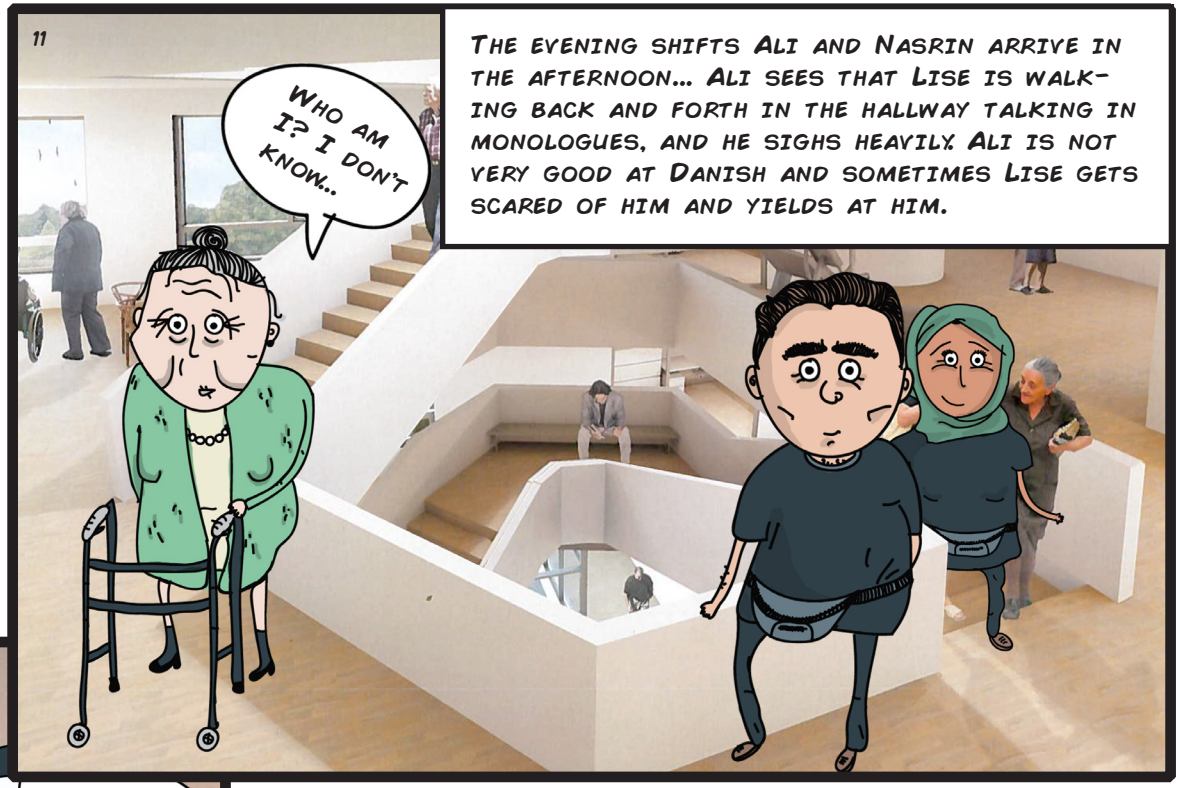
They all have a good time and they all eat well of the dessert that Karina brought to the couch. Karina learned things about Henry that she didn't know before.



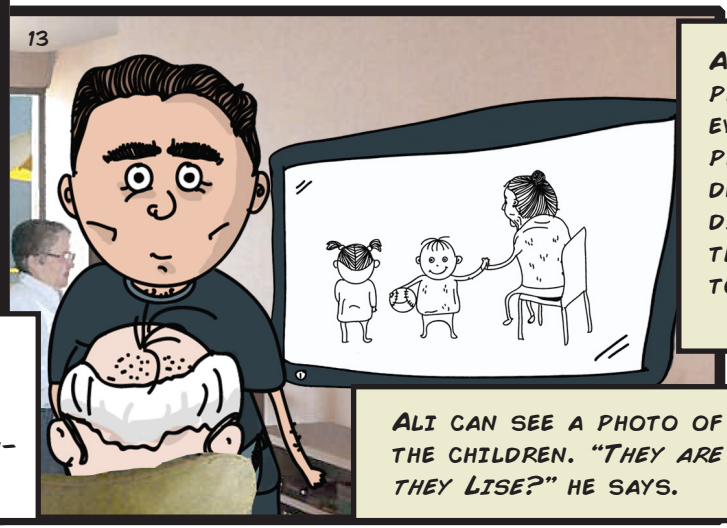
Lone sends her a smile. She is happy to see that Karina gets more practical experience instead of going to the balcony to read.



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.

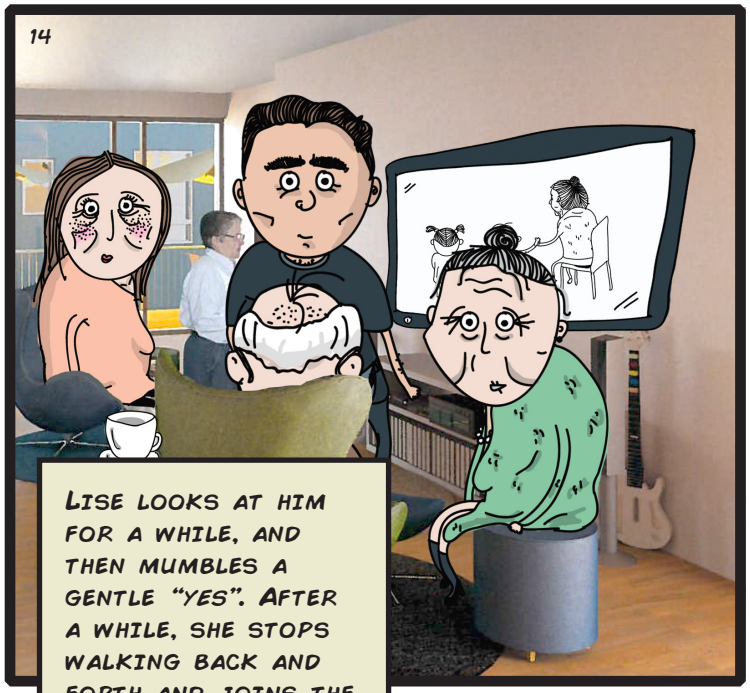


The evening shifts Ali and Nasrin arrive in the afternoon... Ali sees that Lise is walking back and forth in the hallway talking in monologues, and he sighs heavily. Ali is not very good at Danish and sometimes Lise gets scared of him and yields at him.



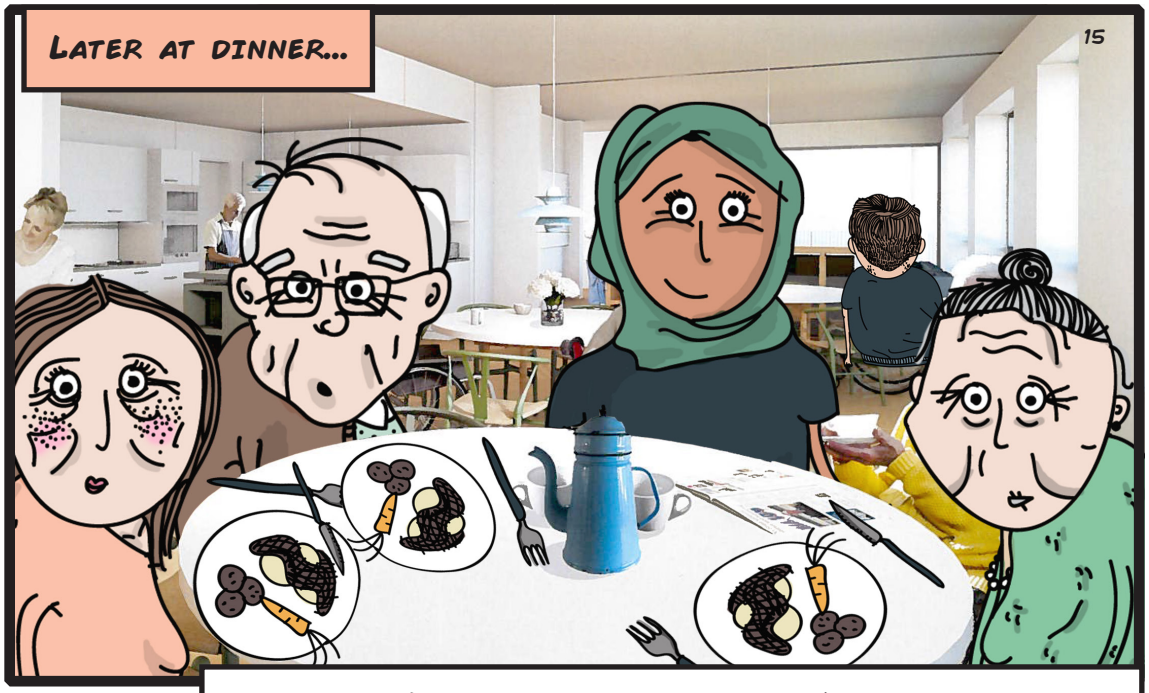
Ali opens the photo archive of events and sees photos of kindergarten children who visited the nursing home today.

Ali can see a photo of Lise among the children. "They are sweet aren't they Lise?" he says.

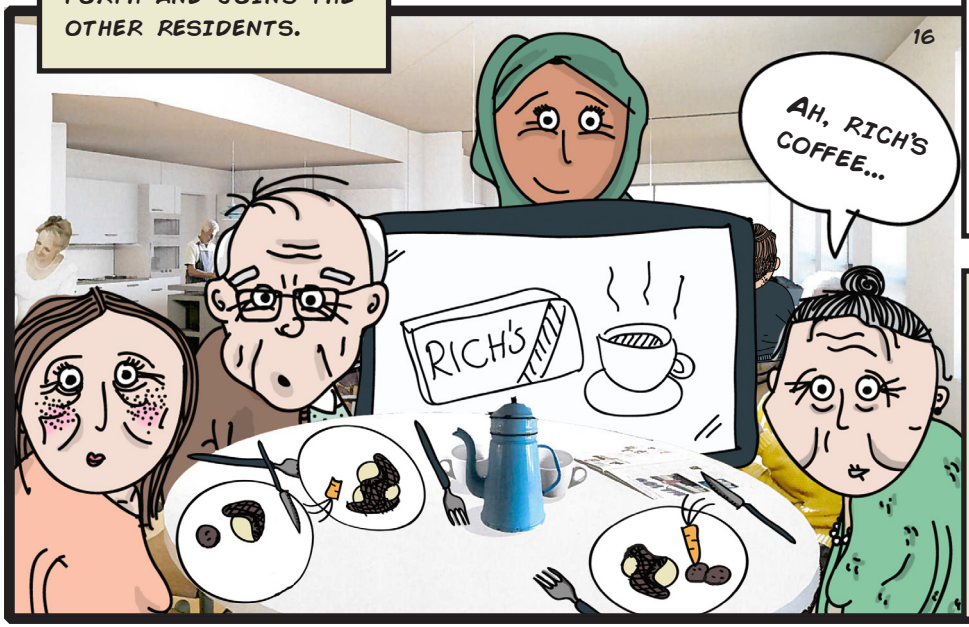


Lise looks at him for a while, and then mumbles a gentle "yes". After a while, she stops walking back and forth and joins the other residents.

Later at dinner...



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

THE ACTORS

This section will provide an overview of "who" are engaging with the service, "why", i.e. what their motivations are for contributing to / using the service.

Actors map

Where the storyboard focus on the end users (caregivers and resident), this actors map presents all other actors, who contribute to sustaining the service. In the model, the actors are presented according to their internal relationships.

Motivation matrix

The motivation matrix visualizes the functional relation between all the actors participating (Morelli, 2007). In other words, it provides an overview of what the actors provide to each other, and what their main motivations are for being part of the “Forget-me-not service (the diagonal highlighted in green). It is important to establish motivations for actors involved in the service, since they are necessary for sustaining it. The actors required for making the service work are the residents, the caregivers, the relatives, kitchen staff, activity staff, administration, NH as organization and the service provider.

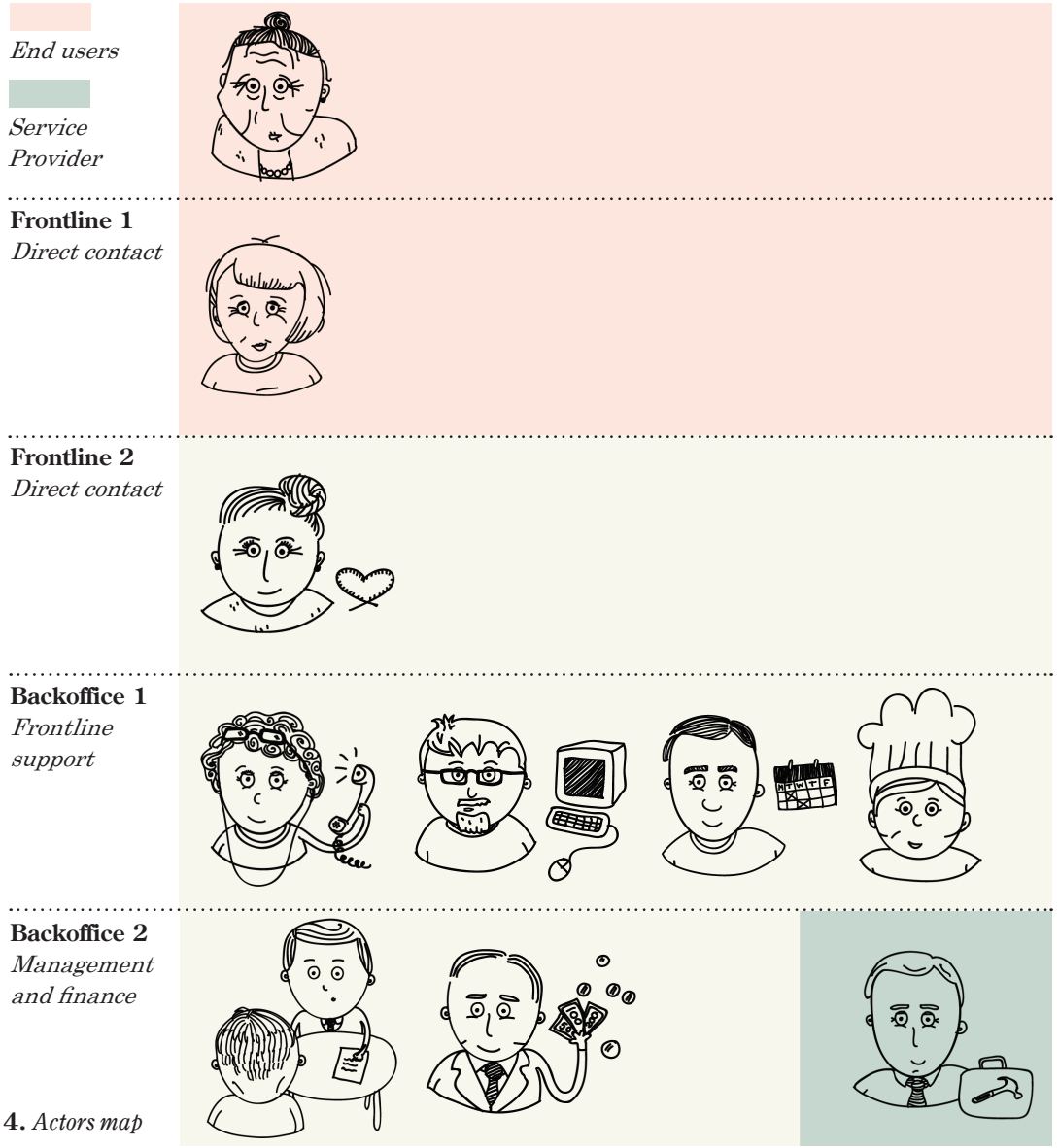


Figure 4. *Actors map*

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 5. *Motivation matrix*

THE SYSTEM

This section will link the previous sections by defining the interactions and relations between the actors and the service system. This serves to clarify responsibilities of each actor in greater detail, and further, to provide a gradual transition to the mere technical aspects in terms of a general overview of interactions between the front office and back office processes.

System map

The system map illustrates the different actors involved, their mutual links and the flows in the system (Morelli, 2007). Flows include manual and automated data flows and financial flows. It provides and overview of who does what, and further adds "when" by defining the timely occurrence of the given actions. This can give the nursing home an indication of how much time is required to maintain the service.

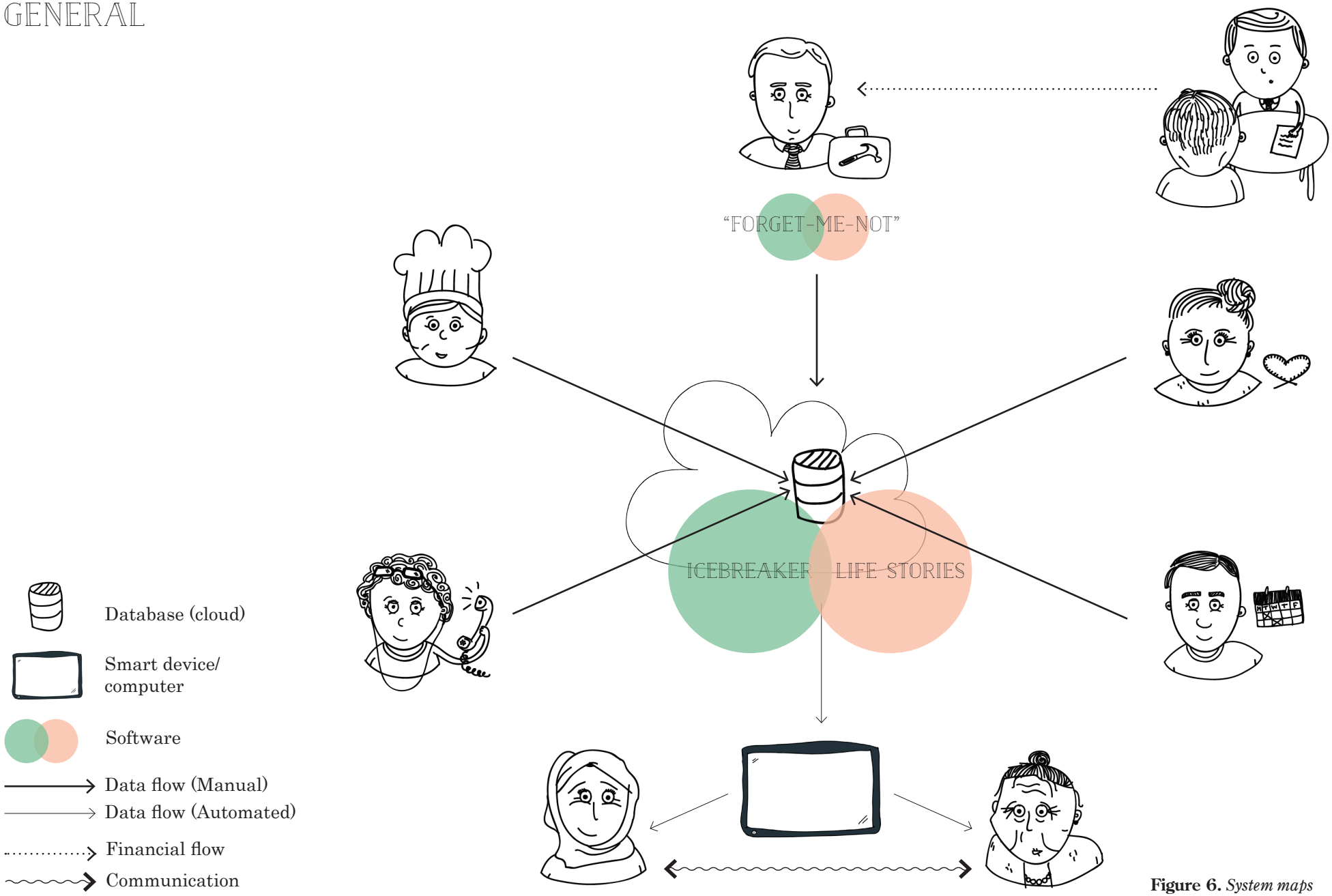
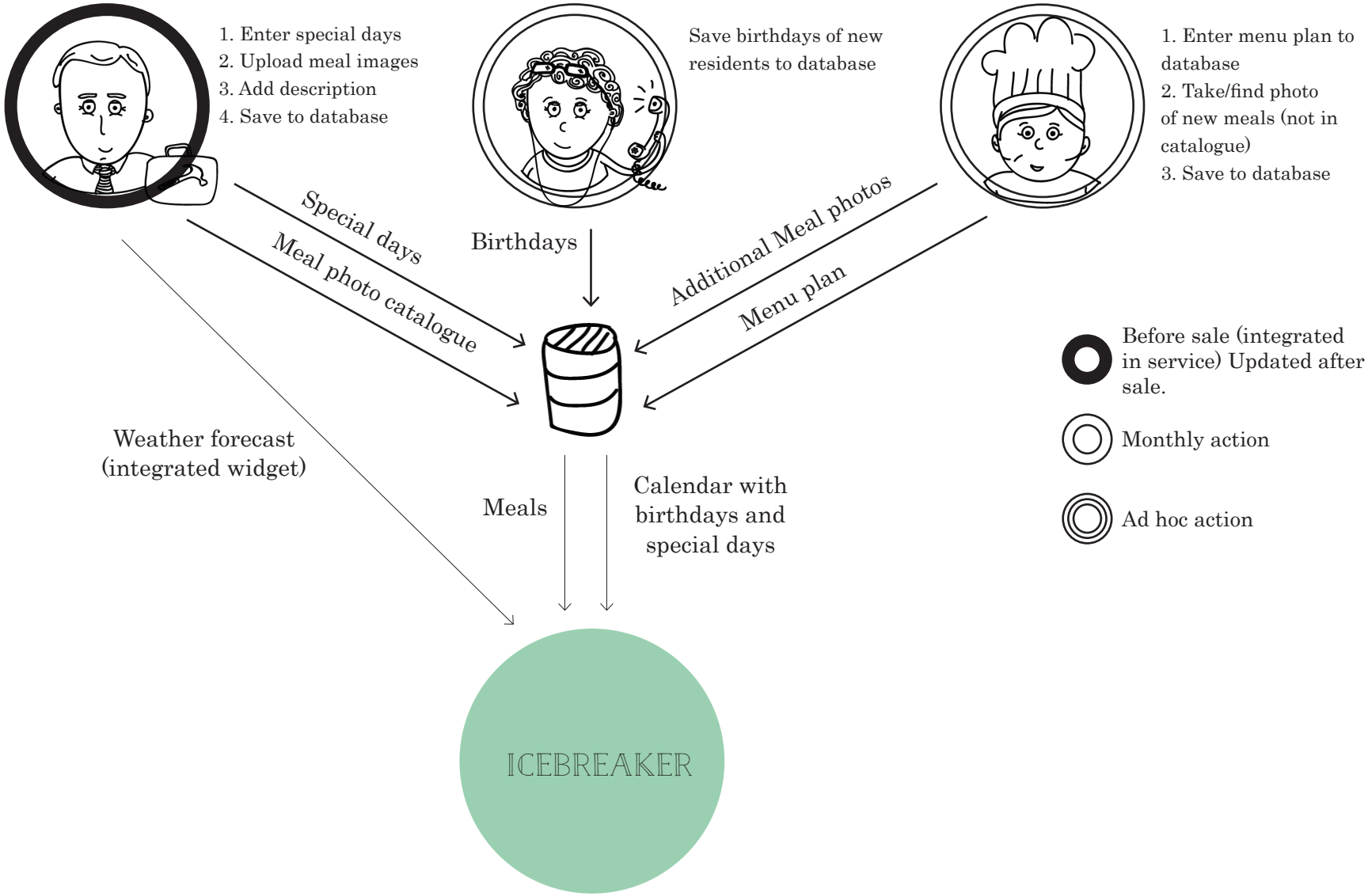
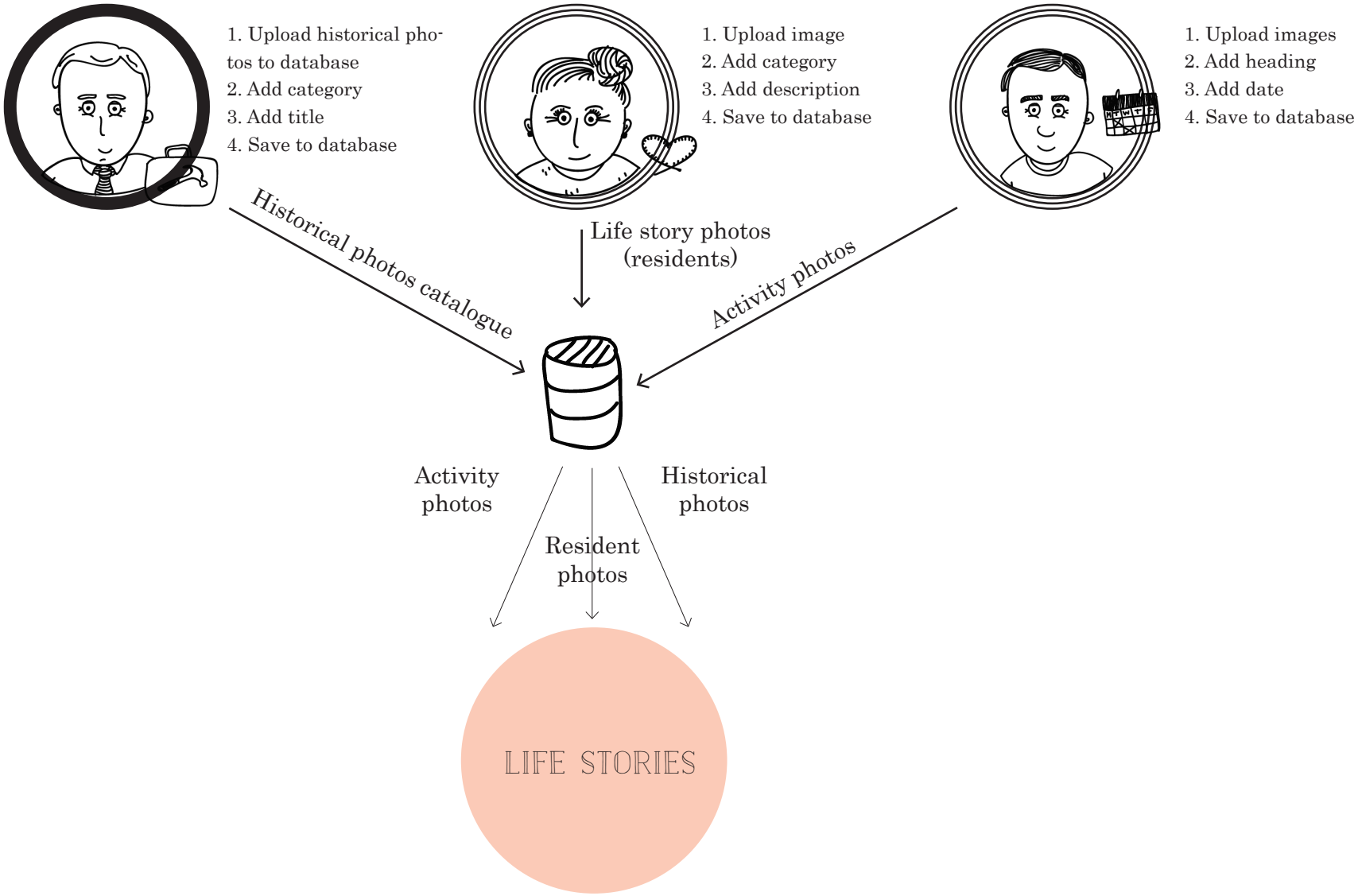


Figure 6. *System maps*


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



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 the 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) and support processes (line of in¬ternal support).

The blueprint has been divided intro three parts:

- PRE-SERVICE
- ICEBREAKER MODULE
- LIFE STORY MODULE

PRE-SERVICE BLUEPRINT

The pre-service blueprint visualizes the steps that the caregivers go through before using the core service. Besides, it shows other actors involved in the service and what they deliver to the service system as co-creators.

The caregivers can access the service through both an application and website, however, only one blueprint has been prepared since the journeys are the same.

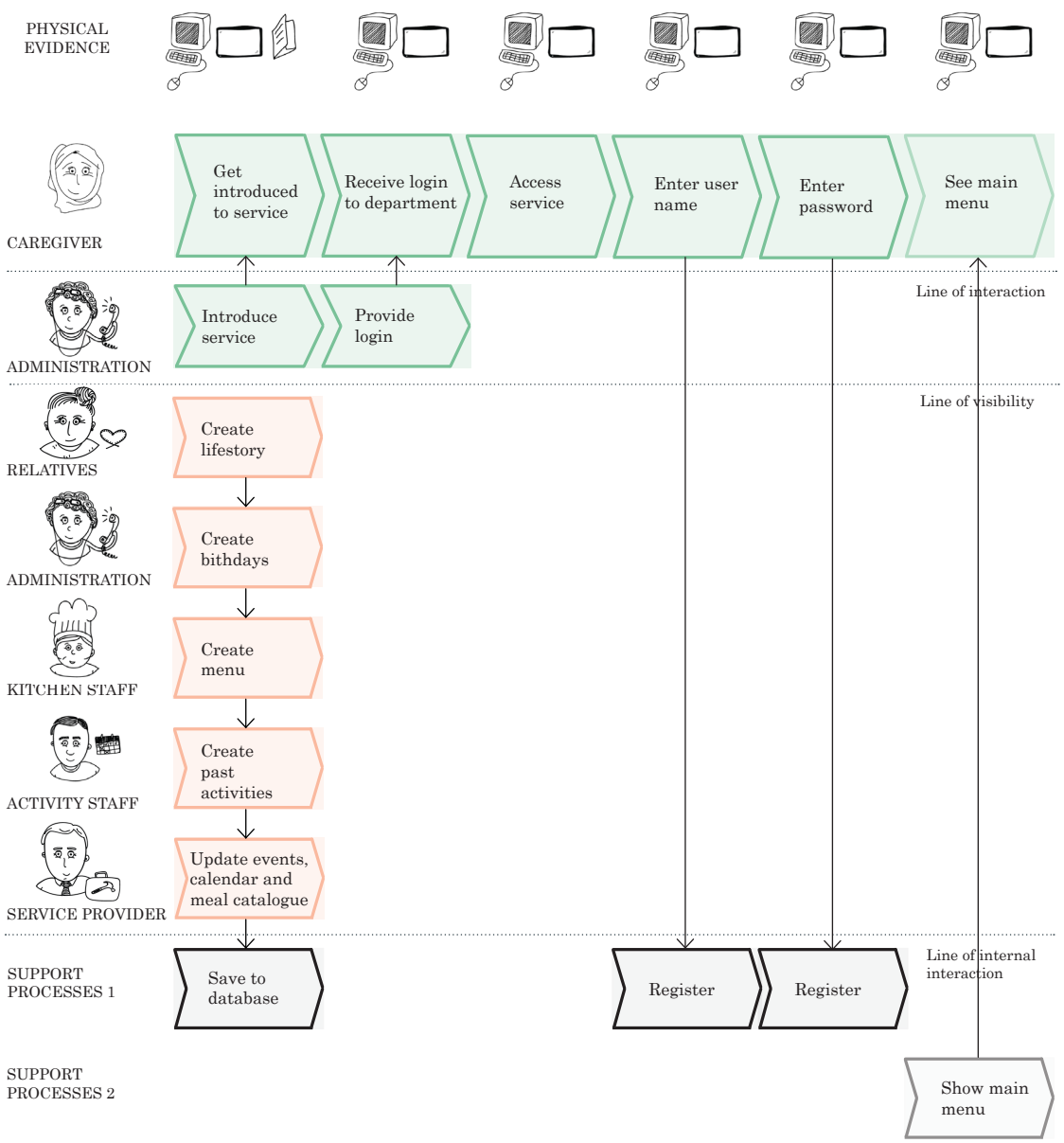


Figure 7. *Pre-service blueprint*

ICEBREAKER BLUEPRINT

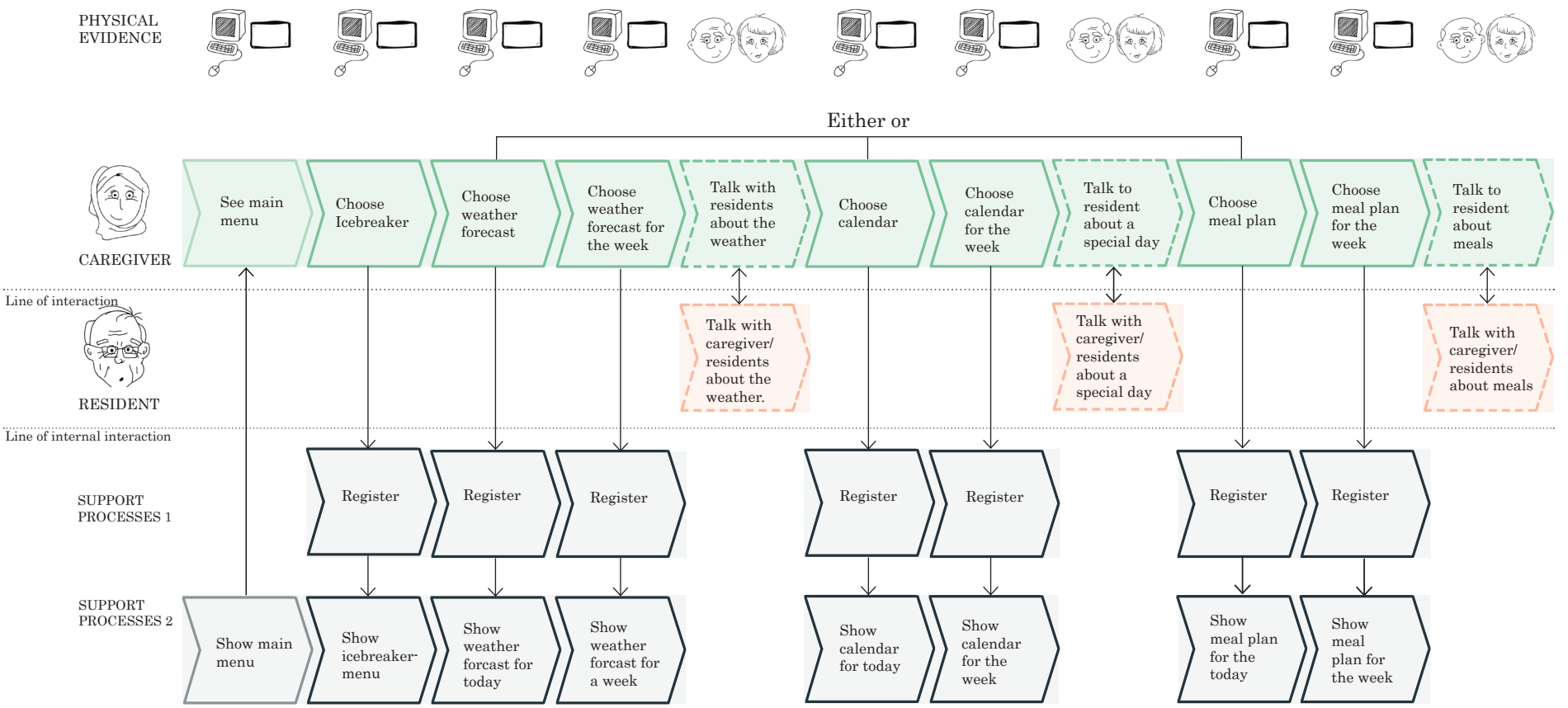


Figure 8. *Icebreaker Blueprint*

LIFE STORIES BLUEPRINT

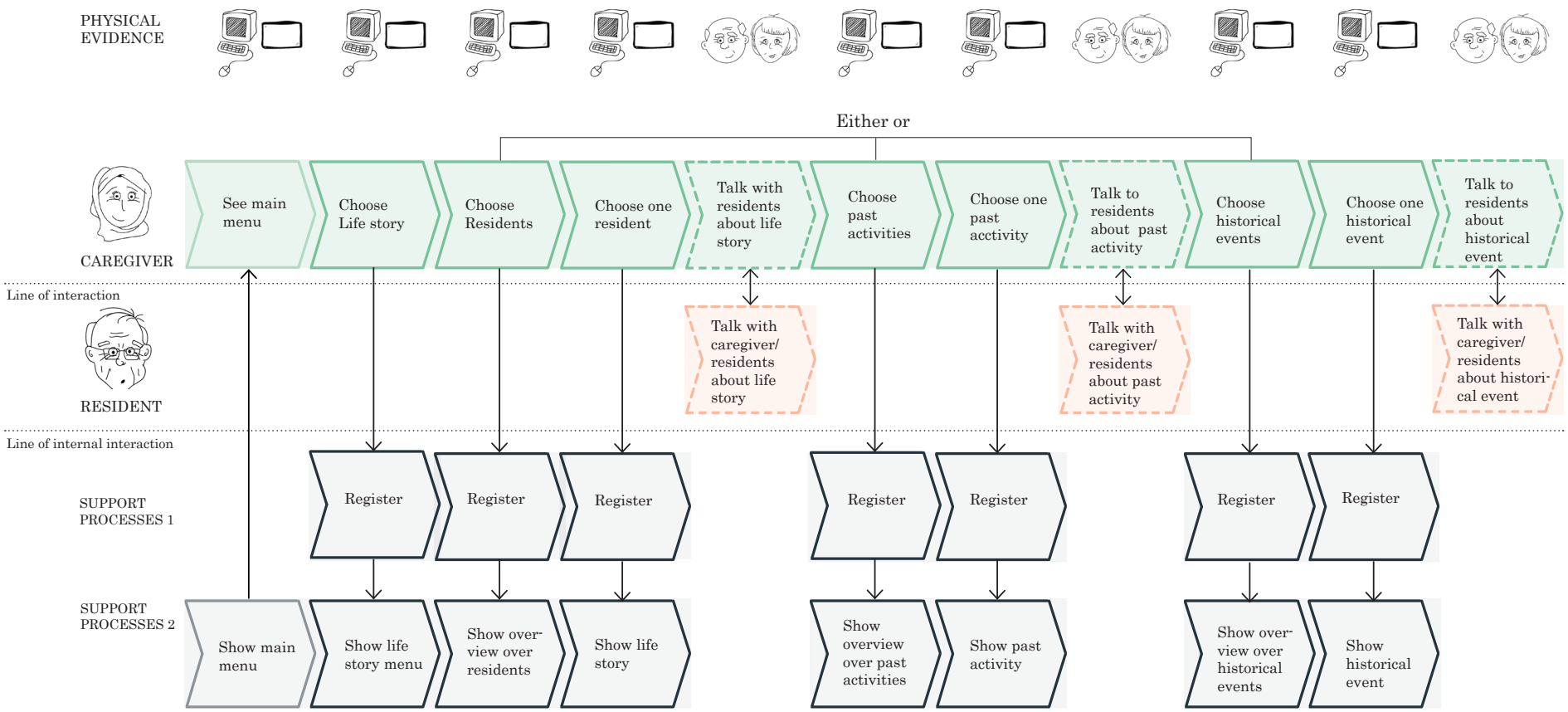


Figure 9. *Life stories Blueprint*

THE BACKOFFICE

The following section will provide a technical review of the back end of the service. The section is primary aimed the service provider, who will apply the knowledge about the back end when developing the software.

System interactions

To provide an overview and understanding of the system, the model below shows what each involved actor provides to the system and what interactions there are between the actors around the service.

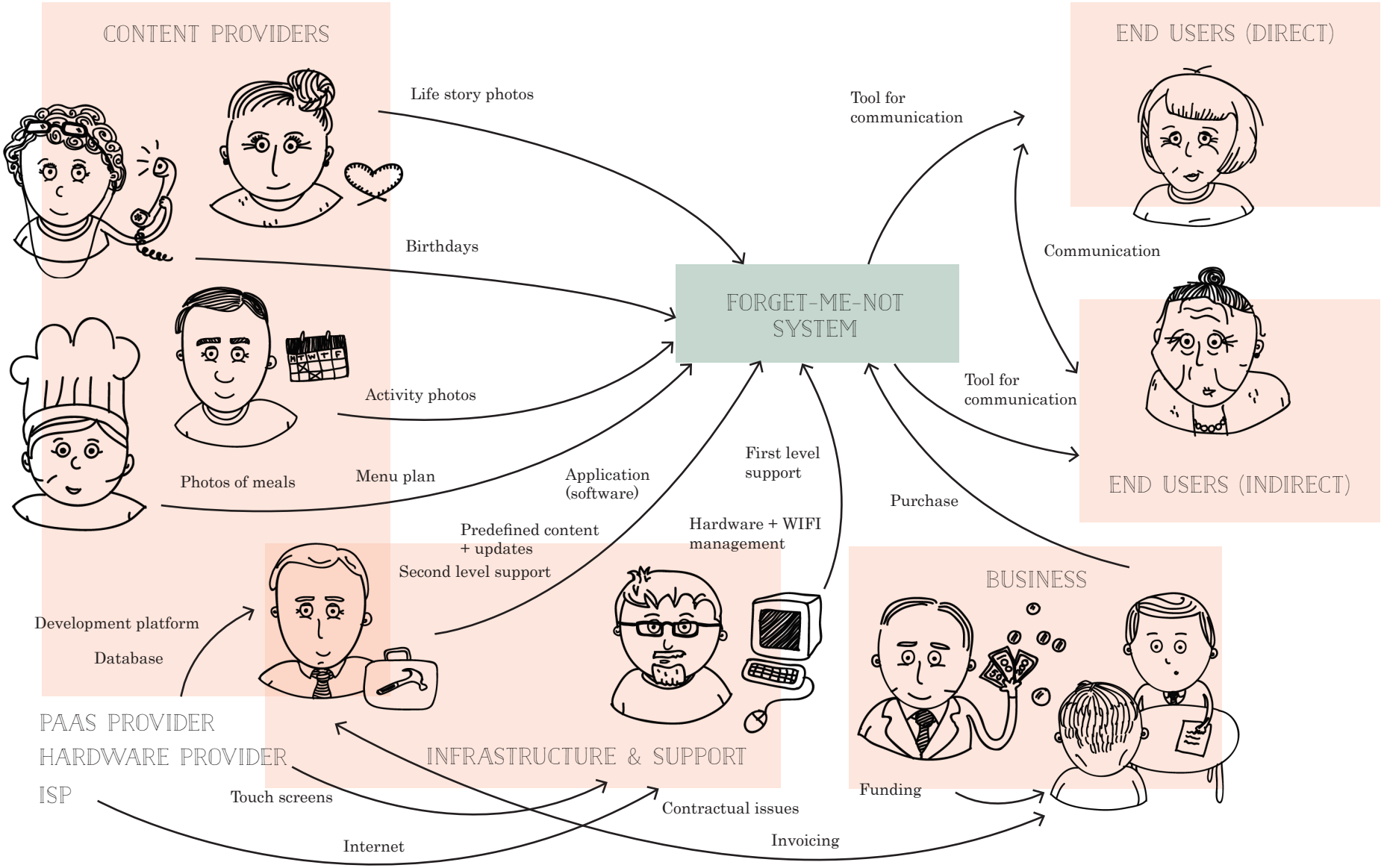


Figure 10. *System interaction*

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 clarified what their roles are, how they access the system (which touch points), and what their relationship to the data are (access).

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.

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

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.

Representation of the functionalities

The following use cases specify the functionalities of the service, when the various actors are using it. The use cases visualize the actions in the service step-by-step and allow a deeper understanding of the system in its details (Morelli, 2007).
In the scenario presented earlier it was explained how the caregiver together with the residents use the service (front office). The following use cases focuses on how actors in the back office interact 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 the nursing home.
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

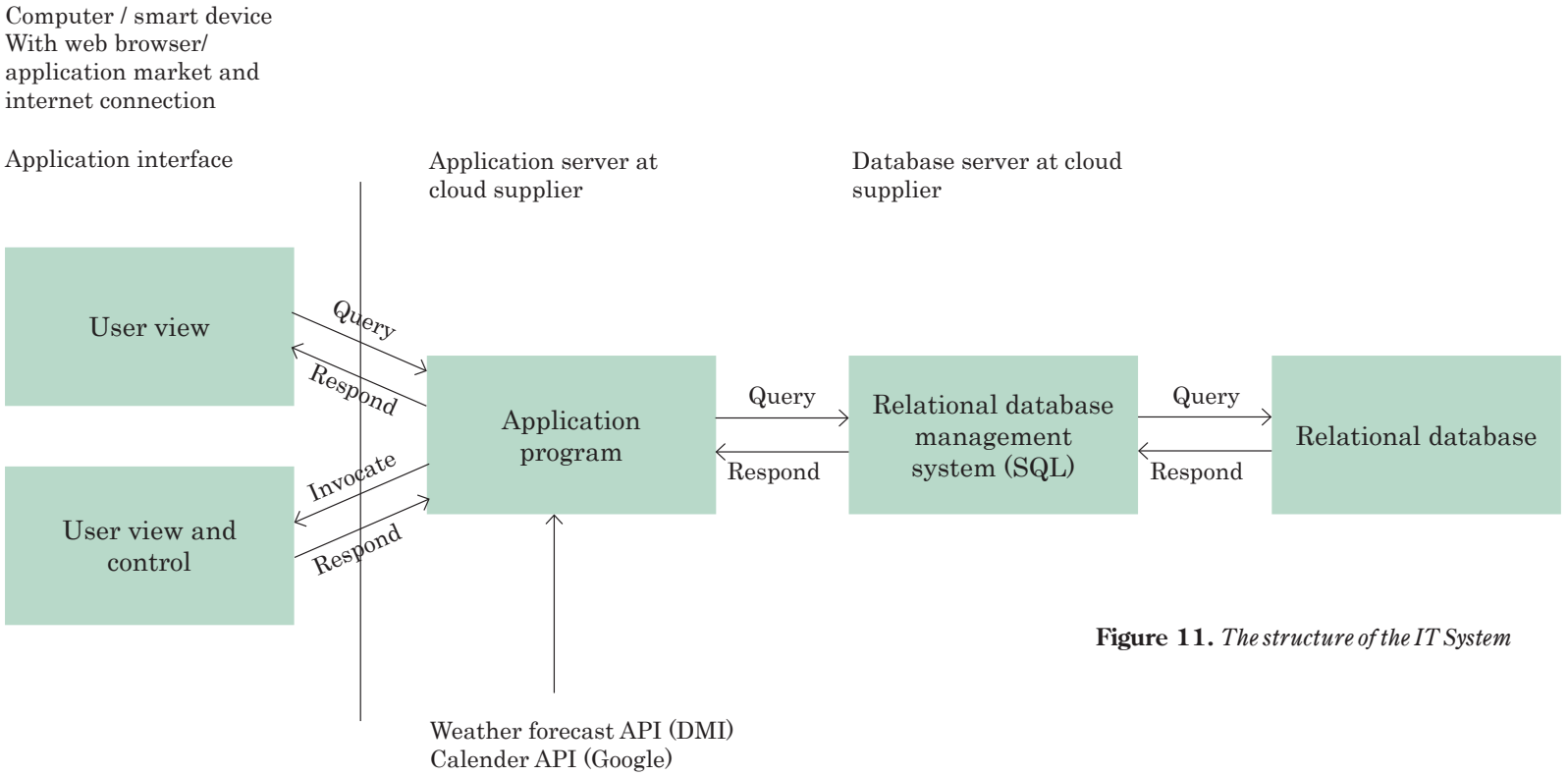


Figure 11. *The structure of the IT System*

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

It is suggested the service system is built on a cloud-computing model, which allows remote computing power via the Internet provided by a supplier (Laudon & Laudon, 2010 p. 196). This model is chosen since it is difficult 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 meaning 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 can be selected as it collects data from distributed clients and supports relations between the data. The application can run 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

THE DESIGNED TOUCH POINT

This next section will move from the backend to the frontend development, and present technical and design related aspect related to the graphical user face development.

When a user (and other actors for that matter) interacts with Forget-me-not he/she encounters the service across different touch points. A touch point is a contact point with one of the elements of a service offering - like for instance reading a brochure about the service (Mouritz, 2005, p. 44). This section will present the main touch point designed - the "Forget-me-not" application - in terms of functionality and design.

Activity diagrams

The activity diagrams communicate the functionality available to system users via a graphical user interface, and are therefore adapted to the context of websites and applications as presented by Lieberman (2004). The activity diagrams have the ability to show dynamic aspects of the interface, which is relevant for the developer in order to understand not only "what" the user can do, but also "how" (Lieberman, 2004).

Main elements of the activity diagrams are defined in the box to the right (Lieberman, 2004).

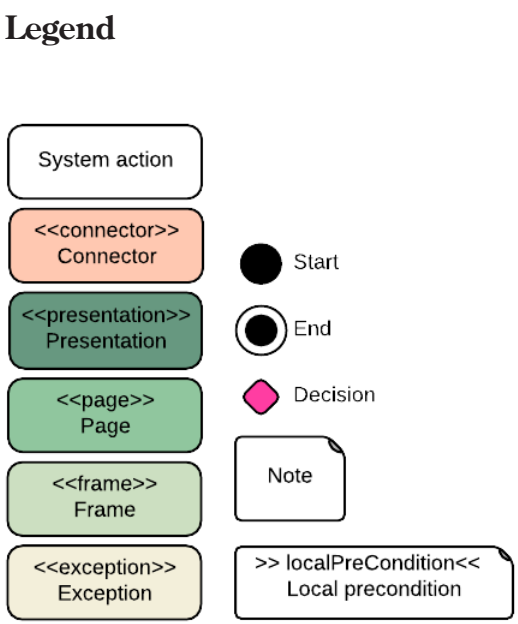
In addition to Lieberman's framework, "local preconditions" have been added to show action constraints related to certain actions (Sparx Systems, n. d.).

Action:	Represents activities performed by the system.
Presentation:	Indicates that there is a conversation between the use-case actor and the system. It represents a special category of Action activities and is used to abstract user interface details.
Connector:	Represents connections to flows diagrammed elsewhere or not included in the respective diagram.
Exception:	Represents an exceptional flow in the use case usually representing an error condition.
Frame:	The Frame and Page stereotypes are useful in describing both web pages and application displays. Frame is used to represent areas of the presentation that are logically or physically separated.
Page:	Page is used to indicate separate display pages.
Diamond:	The diamond shape represents a decision. The control of flows coming deferring from a decision node will have guard conditions, which will allow control to flow if the guard condition is met.

ENTRY

The first flow that can be initiated by the user is entering the website or app, which takes the user to the entry page. At the entry page, the system must identify if the user is already logged in (user credentials are saved for a day on a device until the user logs off). If not, login information will appear, where system needs the user to enter username and password before any further action takes place.If the credentials are incorrect, the user will have to re-enter login information. If the password has been forgotten, the user can request to receive an email with the password.

If the login information provided by the user is correct, the user is directed to the main menu. The main menu is represented as a "connector" as the functionalities of the main menu is represented in the next flow.



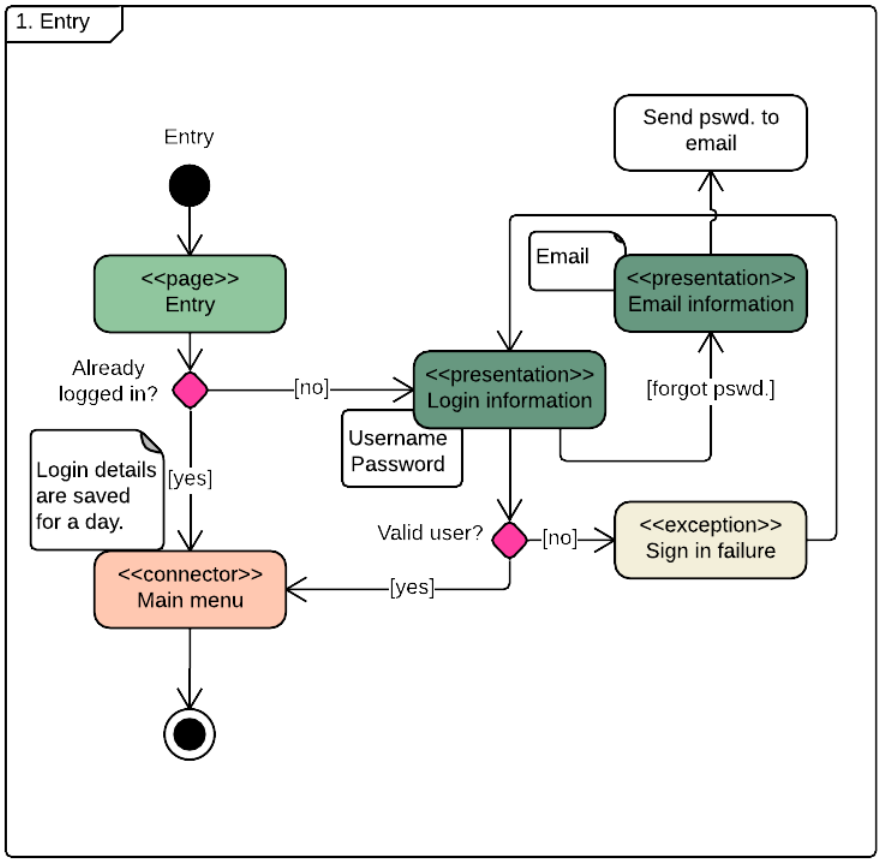


Figure 12. *Activity diagram: Entry*

MAIN MENU

The main menu shows different “frames”, i.e. areas in the display that are logically separated - in this case in terms of buttons. In the manage user frame, the user can delete or create new users. Because the user is already logged in during entry, there is no need for entering passwords again, and the system can immediately validate if the user has the rights to delete/create users (only administration role has these rights). If the access is denied, the user will get a failure message and return to the main menu. If access is provided, the user is directed to the user page, represented as a “connecter”, as the further flow will not be defined more in this diagram due to a focus on the ‘read’ functions. The same applies to the edit page, which must be included in the development, but is out of the scope of this representation, as backend processes have been clarified in the previous chapter.

If “icebreaker” or “life stories” were chosen from the main page, the user is will be directed to the connecting pages that will be elaborated in the next section.

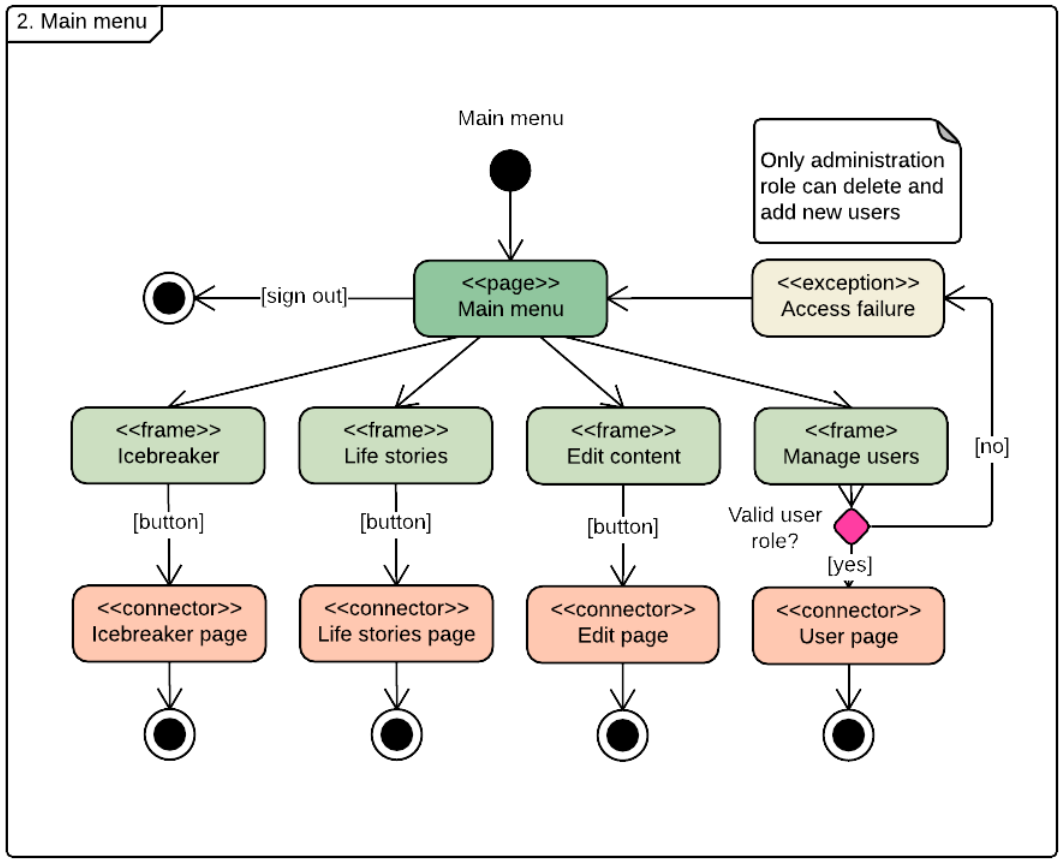


Figure 13. *Activity diagram: Main menu*

ICEBREAKER

The icebreaker page is one of the two main modules in the “Forget-me-not” service and is accessed from the main menu. The icebreaker page contains three frames representing separate areas that link to separate pages if a button is triggered (weather, meal or calendar). The weather page as default shows the weather forecast for the respective day, but if a weekly view is chosen it links to a weekly overview. The same flow applies for the meal page.
If the calendar is chosen from the icebreaker menu, it will show the calendar of the respective day including birthdays and special days. With no constraints, it would not be necessary to outline the actions ‘birthdays’ and ‘special days’. Due to the fact that these aspects only apply to certain days (local precondition) the action boxes are included to provide a more accurate description of the display, whereas linking the precondition to the calendar page would indicate that the regular calendar would not be shown if the precondition was not met. As with the other pages, the calendar as default shows the current day only, whereas a week button will display weekly view.

As stated in a note, all the steps allow for a transition to the previous step and all displays contain a “home” button that will direct the user to the main menu. This information is provided in the shape of a note in order to avoid the diagram getting to complex.

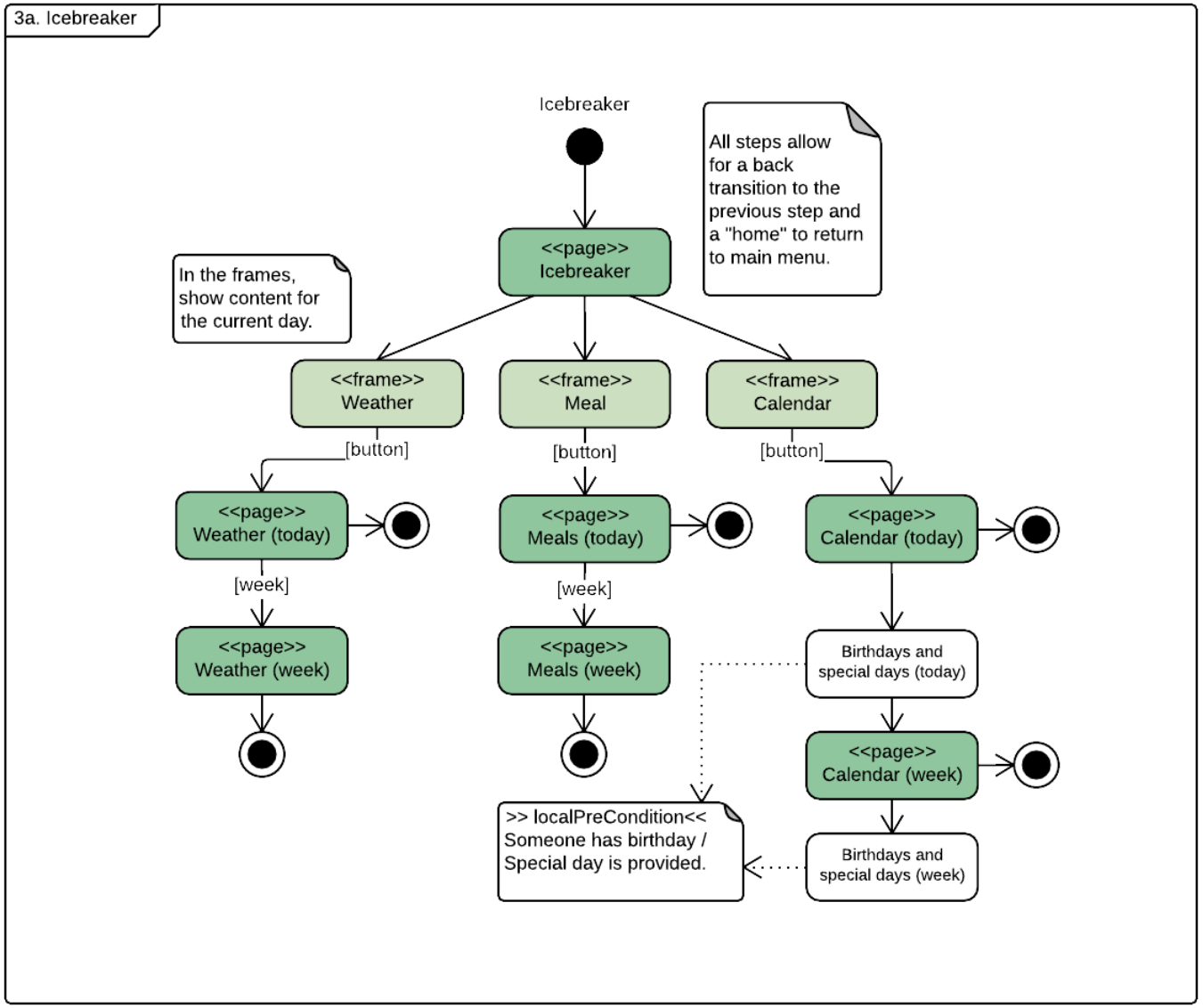


Figure 14. *Activity diagram: Icebreaker*

LIFE STORIES

The life stories page represents the other main module of the service and can be accessed from the main menu. This page has three frames linking to different pages (resident overview, activity overview and history overview). On the page resident's overview, the user can choose between the residents living on the floor and by clicking on one it directs the user to the resident's page with photos of the residents organized in categories. The categories could have been shown as frames but to keep the diagram simple and clear, they are included in a note.
When choosing a category, a photo from this category will be displayed if the precondition has been met that a photo under this category has been uploaded. The photo is represented as a presentation, since there is a conversation between the user and the system. The user requests the display of another photo, which triggers an action in the system, which is repeated until the user does not want to see any more photos or if there is no more photos in the archive. The logic for the flow of residents also applies to the pages for past activities and historical events.

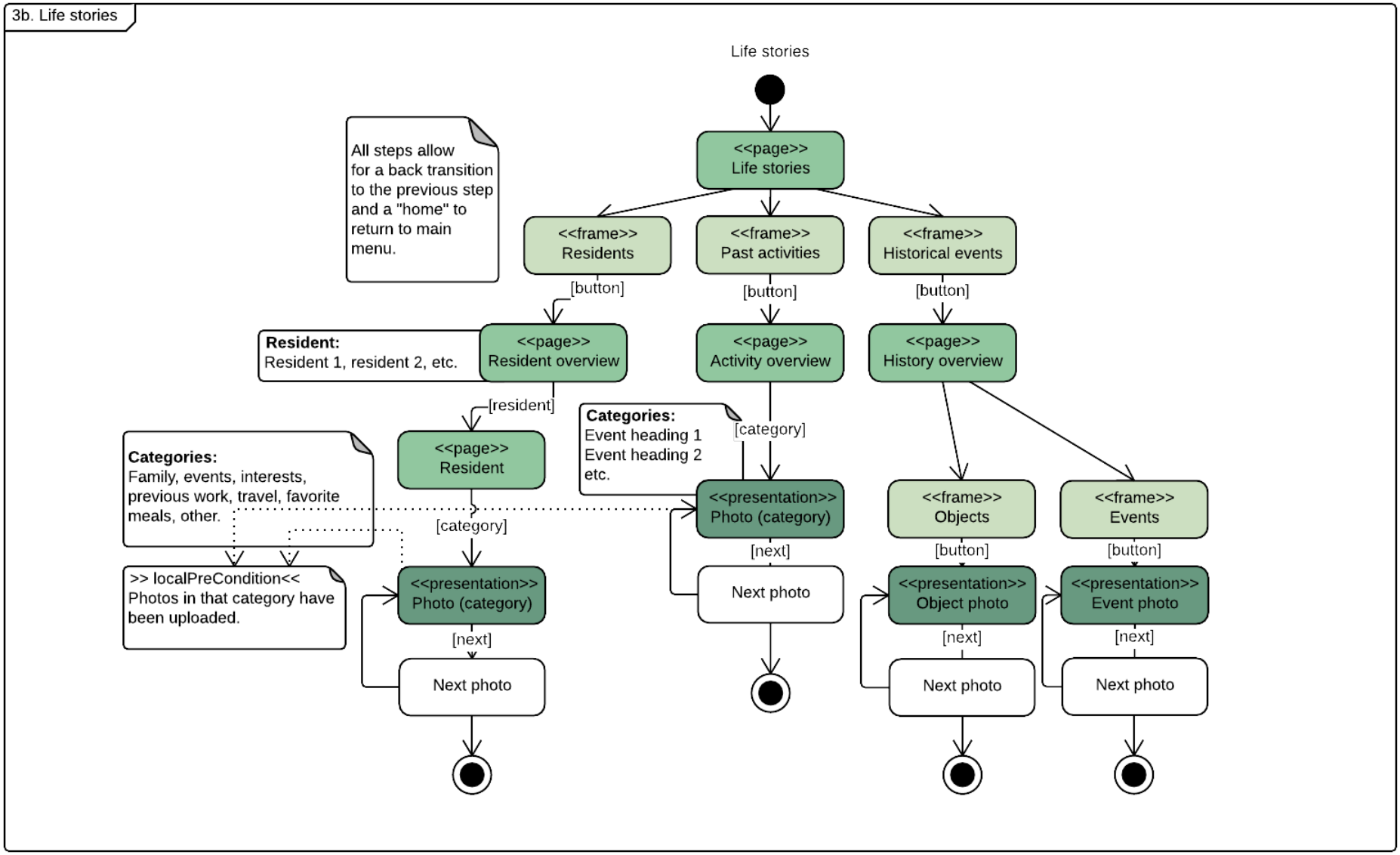


Figure 15. *Activity diagram: Life story*

Interfaces

The interface mock-ups provide an idea about what the final design of the user interface should look like, whereas the activity diagrams prescribes how these are linked to each other.

The interfaces are designed very simple and manageable, since the target group, who often are not familiar with technology and smart devices, should apply it. If the interfaces are easy to use, the caregivers might abandon using the service. In addition if the interface are clear enough it is possible that some of the most mentally fresh residents could be trained to tap the screen.

In the following some of the main interfaces are presented following the activity diagram.

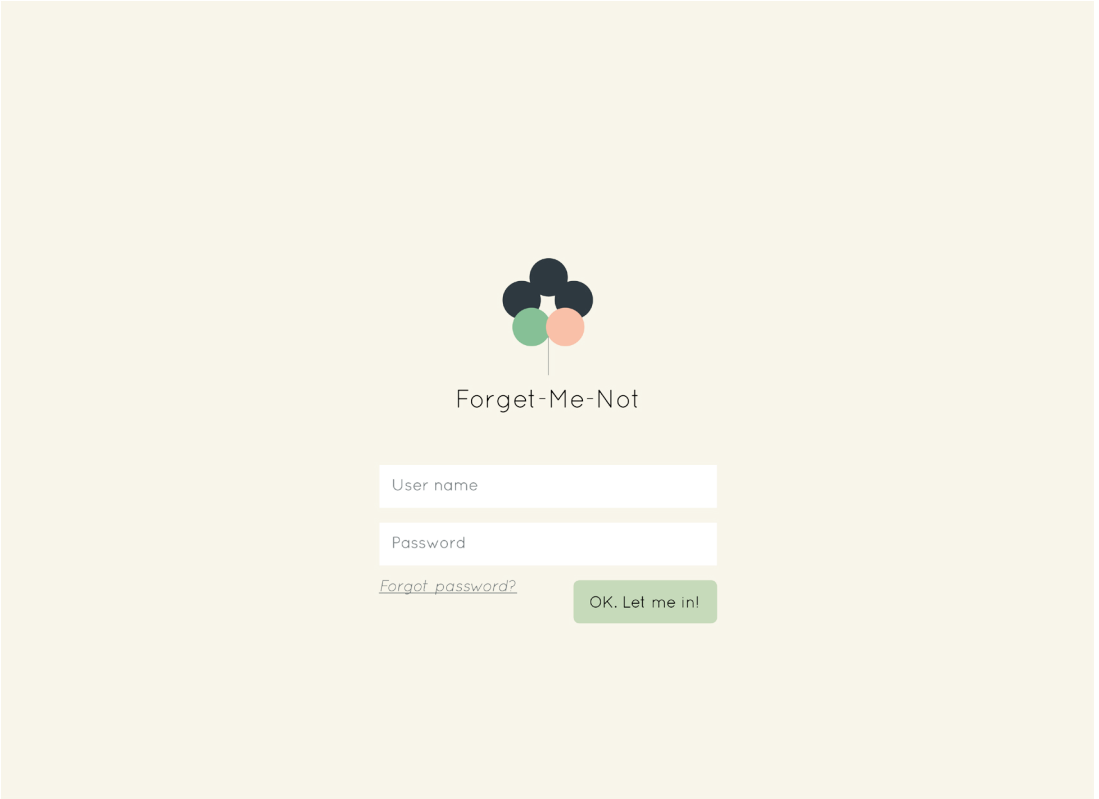


Figure 16. *Interface: Login*

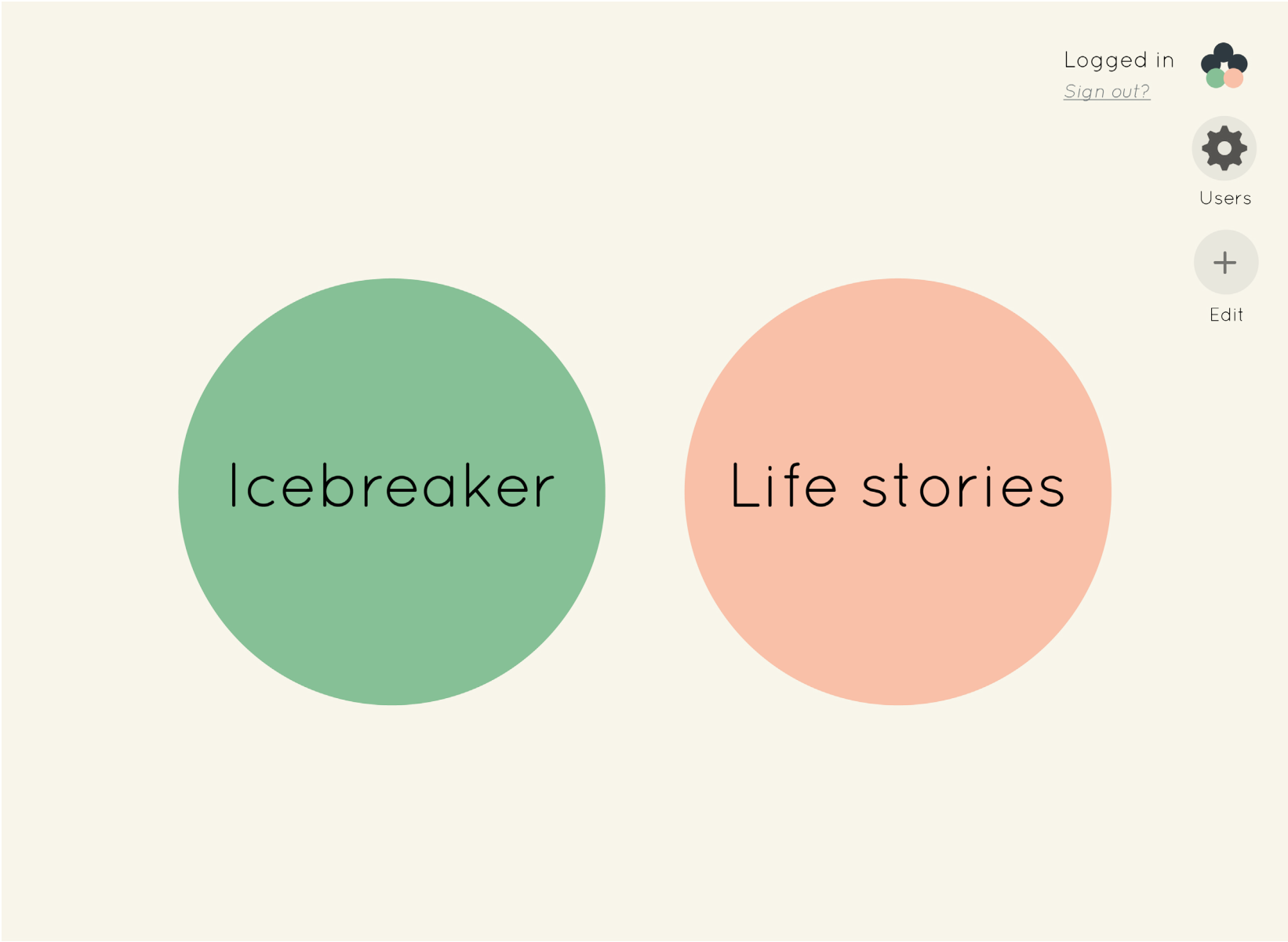


Figure 17. *Interface: Main menu*

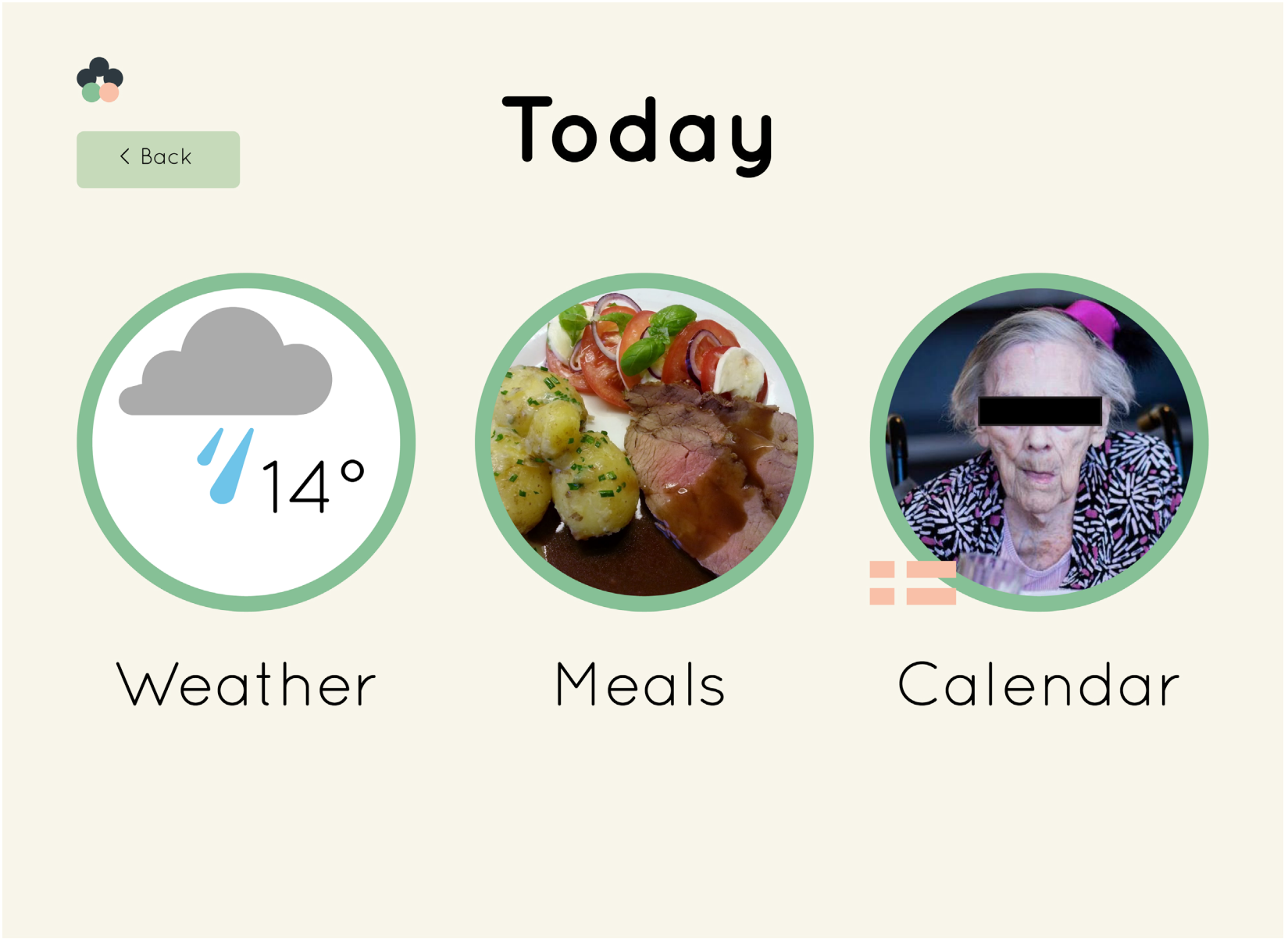


Figure 18. *Interface: Icebreaker*

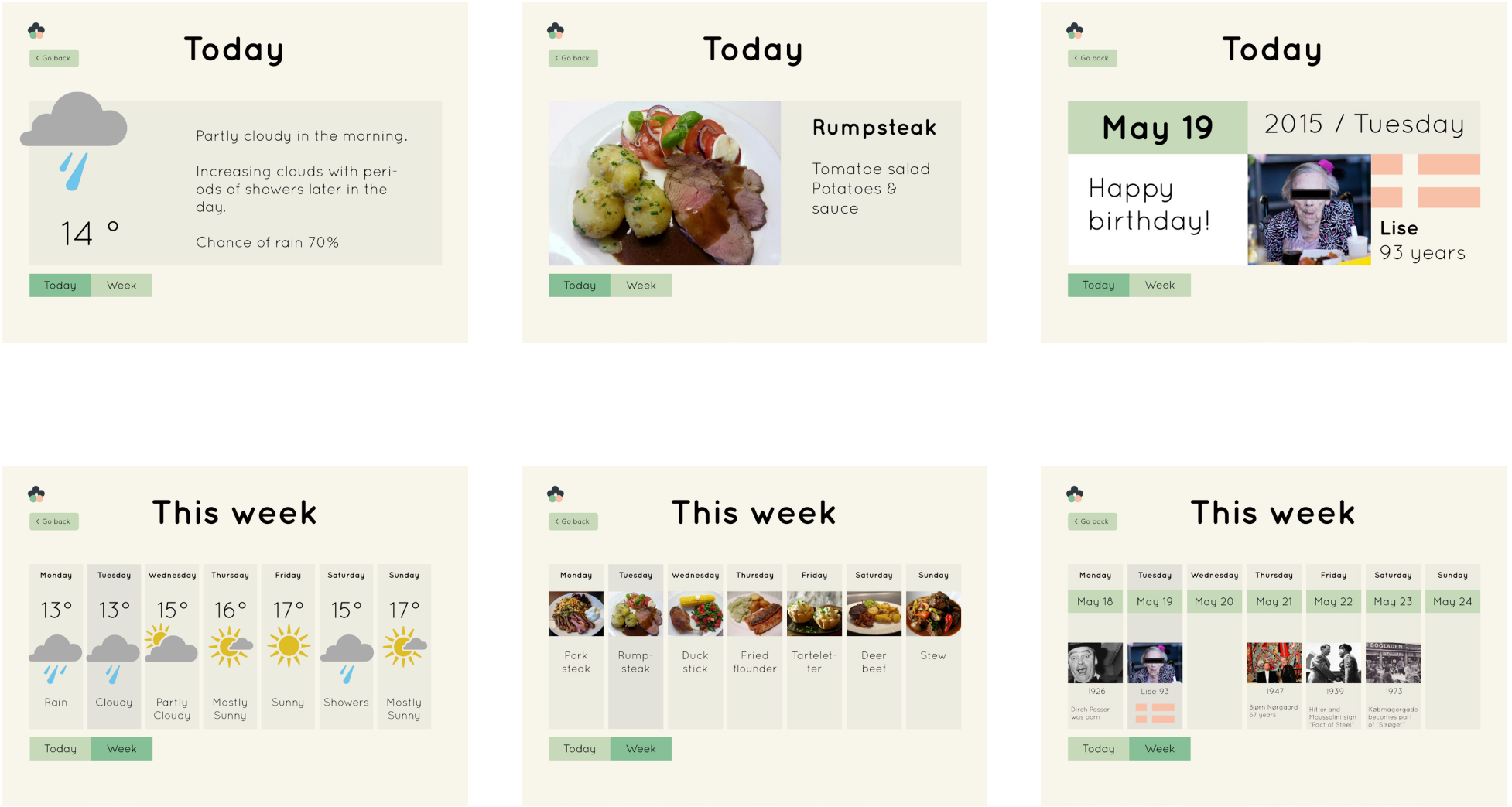


Figure 19. *Interface: Icebreaker content*

Figure 20. *Interface: Life story*

Figure 21. *Interface: Overview of residents*

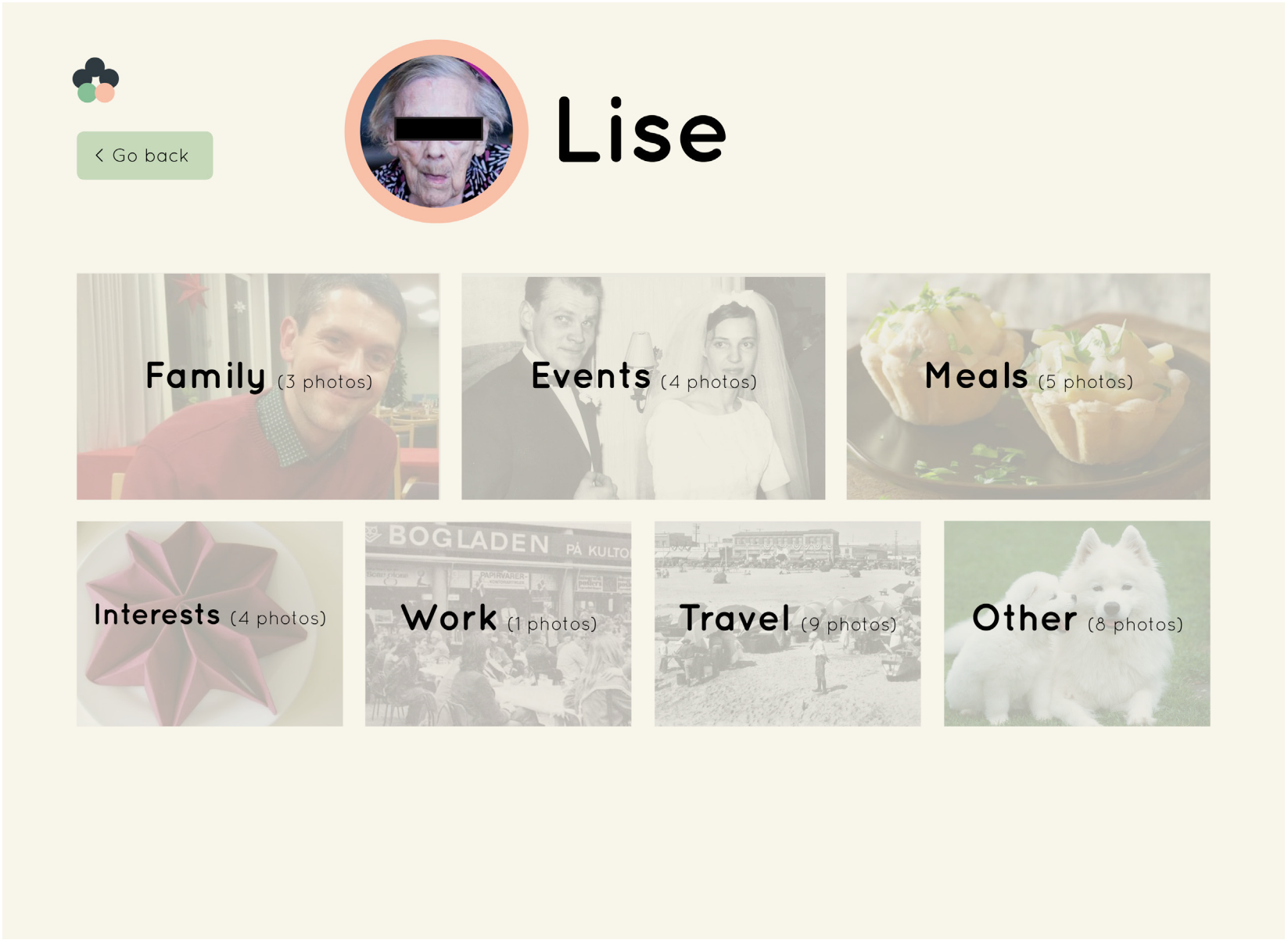


Figure 22. *Interface: Personal life story*

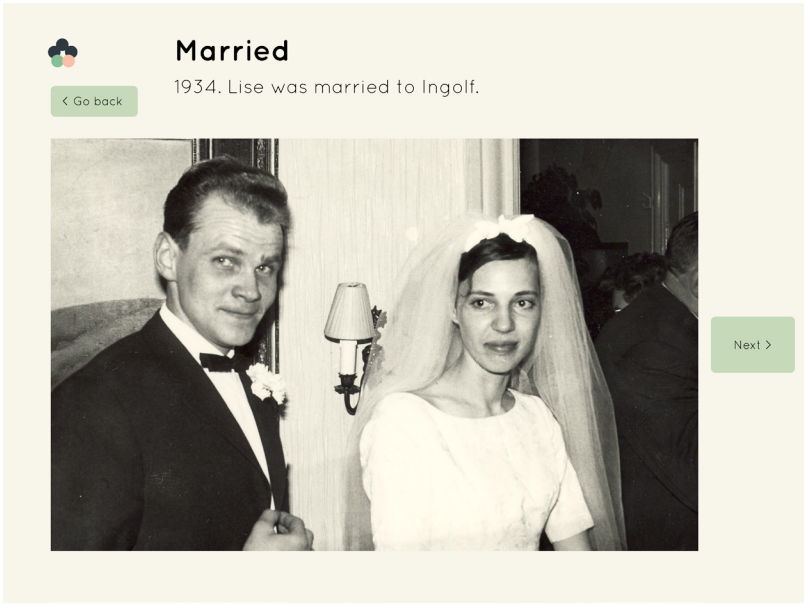


Figure 23. *Interface: Life story images*

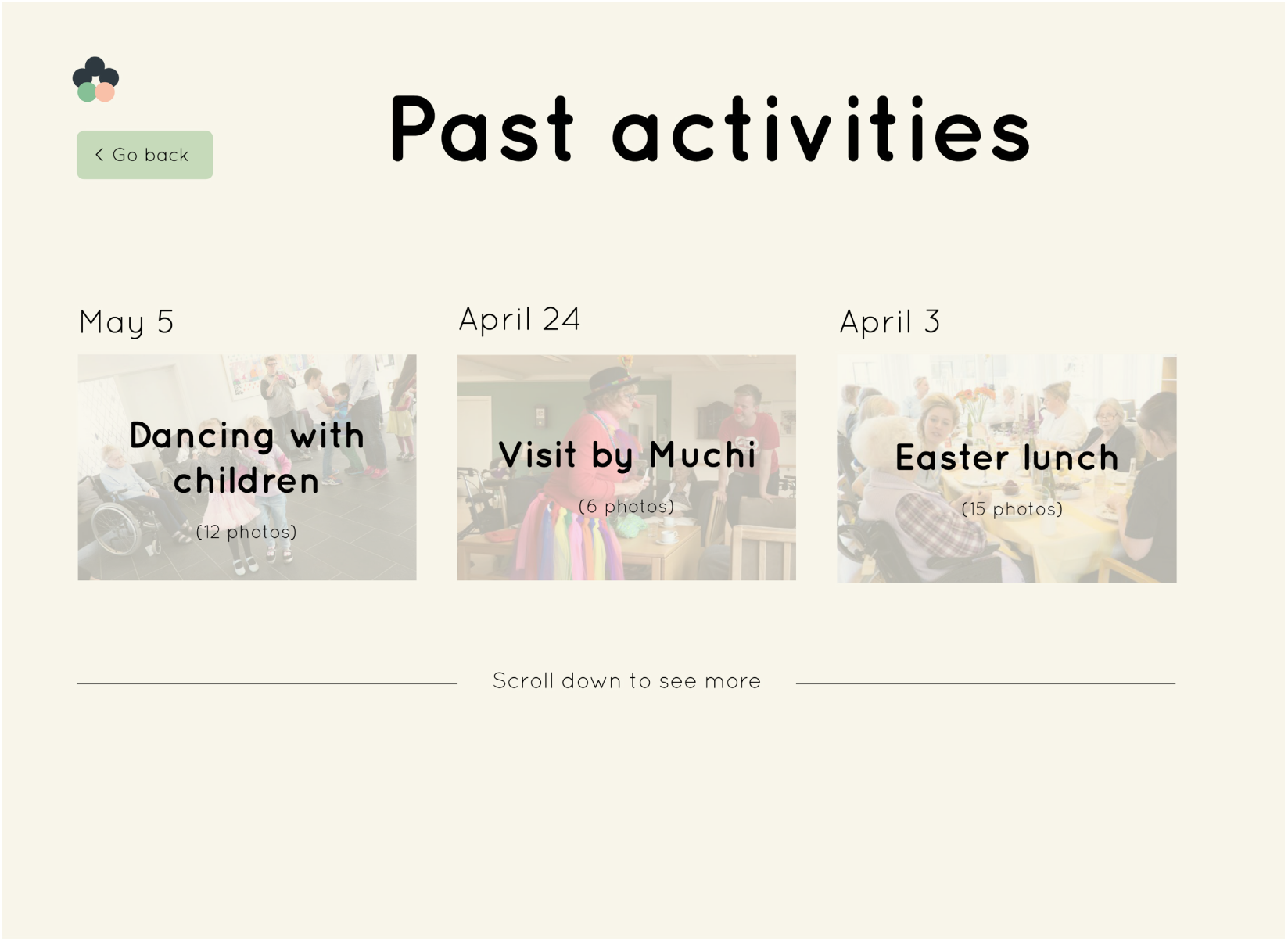


Figure 24. *Interface: Overview of activities*

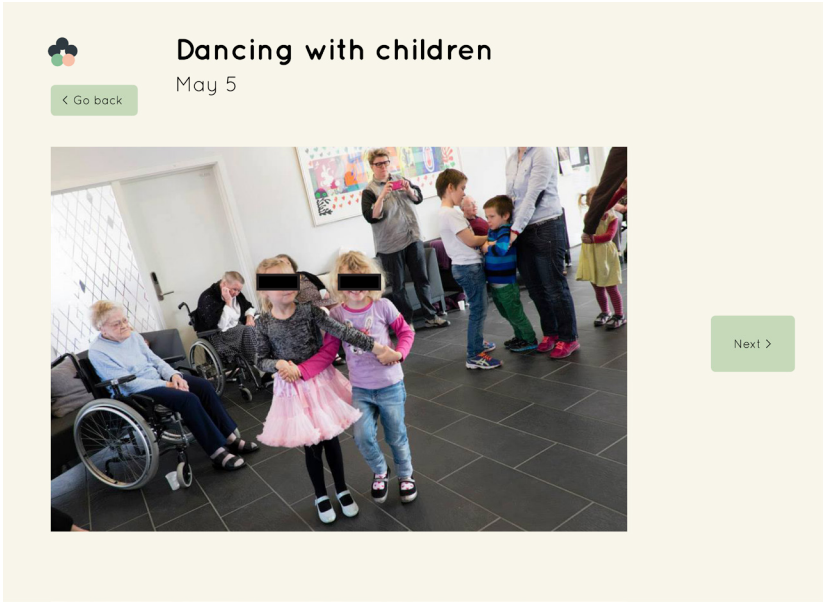


Figure 25. *Interface: Images from activities*

Figure 26. *Interface: Historical events*

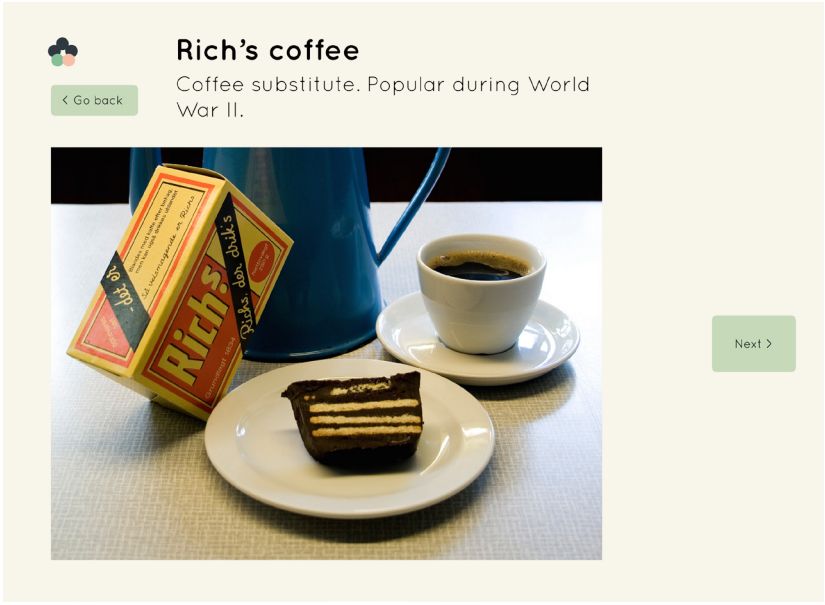


Figure 27. *Interface: Images of historical events*

THE BUSINESS ASPECTS

This section focuses on the strategic and economic part of “Forget-me-not” and contains business model and calculated economic indicators of the profit of the service product.

Business model canvas and People value canvas

The Business model canvas (BMC) below 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). It should serve as a strategy for the service provider who will develop and implement “Forget-me-not”.
Since this service are especially focusing on social needs, a People Value Canvas (PVC) has additionally been prepared, since the business model lack detailed knowledge and information about individual people (Wildevuur, 2013 p. 134). The understanding of people is the key in PVC and the overall output of PVC is a value proposition, which is only a starting point in BMC.

KEY PARTNERSHIPS

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

Funding company
Funding 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

"Elaborated in People Value Canvas"

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 nursing 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 28. *Business model canvas*

INSIGHTS INTO PEOPLE

SOLUTIONS AND EFFETS

CHARACTERISTICS

Residents
- Diverse diseases but cognitively still function well or suffer from mild dementia

Caregivers
- Foreign staff
- Temporary workers
- New employees

MOTIVATION

Residents
- Feeling of belonging.

Caregivers
- Improved working day
- Improved relationship with residents

NEEDS

Closeness between the caregivers and the residents.

Better communication between caregivers and residents.

The feeling of togetherness beween the residents.

"People focus" instead of "process focus".

PEOPLE

Residents

Caregivers

TECHNOLOGY

Software

Controlled by the caregivers

Easy to use

PROCESSES

Information

Interaction

EXPERIENCES

Residents
- Feeling valued by personal conversations
- Stimulation
- Being more mentally and socially active

Residents
- Better communication with the residents

CONTEXT

Nursing home

Mealtimes

EFFECT

Residents
- Increase quality of life.
- Prevent loneliness
- Empowermet / stimulation of residents.

Caregiveres
- Improved balance between practical chores and social interaction.

Figure 29. *People value canvas*

Economic indicators

In order to prove the profitability of "Forget-me-not" calculation of the financial ratios are sought conducted. The financial ratios provide an indication on that "Forget-me-not" is economically worthwhile to develop.

The overall questions that are answered are:

- WHEN WILL "FORGET-ME-NOT" GENERATE A PROFIT (BREAK EVEN)?
- HOW MUCH MONEY CAN THE SERVICE PROVIDER EARN ON "FORGET-ME-NOT" (PROFIT)?

In order to answer the questions some prerequisites for the later calculations is created.

It should be clarified that all the calculations are estimated and based on decision taken by the project group since at this point in the process there are still many uncertainties. The calculated data can therefore only be used as indicators.

The calculations are conducted in Danish Kroner (DKK).

All calculation inclusive notes can be seen in appendix 23.

Development budget

First, a development budget is created which covers the core expenses of the development. Fixed costs like rent are disregarded since the service provider also develop and own other service that contributes to paying these expenses. The profit from "Forget-me-not" will be used to cover the fixed cost.

Development costs	**Danish Krone (DKK)**	**Note**
Salary	550.000,00	Four fulltime employees for three months
Database test	20.000,00	
Prototype (Beta-version and paper based)	25.000,00	
Cloud service supplier	15.000,00	
User manuals and sales materials	100.000,00	
Buffer (15 %)	106.500,00	
Development costs in total	**816.500,00**	

Table 3. *Prerequistes for later calculations*

Sales price

The next necessary prerequisite is the sales price of the service, i.e. what must the nursing homes pay for the service?

The price is established by comparing prices of the similar services.

Example of prices:
E-mergency Careplan: Cost a fixed fee when the nursing home buys the service and a subscrip¬tion fee up on to 399,00 monthly per resident. Note: E-mergency Careplan contains more functions than "Forget-me-not".
ProReact: A fixed fee when buying the service and a subscrip¬tion fee.
Idify: Subscrip¬tion fee on 149 dkk monthly per resident.

It is very difficult to get a precise price on the similar services since the price of the services often depends on the individual nursing home's size and choice of options. Therefore, the prices of similar services are used for indicated and the project group has set the final price.

When a nursing home buy "Forget-me-not" they must pay a fixed fee on 13.200 for the establishment and a subscrip¬tion fee on 5,000 every month:

The calculation is based on that the nursing home has 50 resident since the size of the nursing home varies but most nursing home has 50 residents or more (dst. in kristeligt dagblad, n.d.)

Establishment expenses for the nursing home	**Danish Krone (DKK)**	**Note**
Database access	10.000,00	Four fulltime employees for three month
Customizing database	2.000,00	
Personnel training	1.200,00	2 hours off 600,00
Establishment expenses per. nursing home in total	**13.200,00**	

Operating expenses for the nursing home each month	**Danish Krone (DKK)**	**Note**
Database subscription	3.000,00	
Use of the database per day per resident	1.500,00	1,00 per day if 50 resident per nursing home
Technical support	500,00	
Operating expenses for nursing homes per. month in total	**5.000,00**	

The service provider's expenses

In order to calculate the service providers revenue every time they sell "Forget-me-not" and every month their *'Establishment expenses'* and *'Operating expenses'* have been calculated and subtracted from the sale price.

Service provider establishment expenses per. nursing home	**Danish Krone (DKK)**	**Note**
Sales expenses	1.200,00	3 hours of 400,00
Technical support	700,00	2 hours of 300,00
Personnel training	700,00	2 hours of 400,00
Materials	1.000,00	
The service provider establishment expenses per. nursing home in total	**3.600,00**	

The service provider operating expenses per nursing homes per. Month	**Danish Krone (DKK)**	**Note**
Database maintenance and update	1.000,00	3 hours of 400,00
Operating expenditure of cloud supplier	500,00	2 hours of 300,00
Technical support to nursing home	350,00	2 hours of 400,00
The service provider operating expenses per nursing homes per. Month in total	**1.850,00**	

Profits on the establishment	**9.600,00**

Profit on operating activities per institution every month	**3.150,00**

Numbers of nursing homes expected to buy “Forget-Me-Not”

Finally estimations are created over how many nursing homes are expected to buy “Forget-me-not”.

The estimations are based on the fact that there are 1036 nursing homes in Denmark (dst. in kristeligt dagblad, n.d.) The estimation is set low in order to ensure that it is realistic. The estimation is made over three years.

Expected sale	Month 1	Month 2	Month 36
Number of nursing homes	1	2	49
Number of citizens per. nursing home	50		
Number of resident in total	50	100	2450

After having created the prerequisites break even and the profit can be calculated.

Break-even and profit have been calculated based on two different methods of financing the development cost, since it is uncertain how the financing can occur in various ways but here are two methods calculated.

In both calculations it is expected that the nursing homes continue to pay the operating expenses in the calculated period of time, meaning they keep the service.

Method of financing 1

The first calculation is based on that the developments cost are made available (e.g. by a fund) which the service provider must not pay back.
A break even is found:

The calculation shows a **break-even** on **Month 15** and a **profit of 2,816,500** after **36 months.**

Even though this model prescribes that development costs are funded, a break even is calculated, since it must be proven to the fund that their investment will generate a profit, thus the cost development must therefore be deducted from the profit.

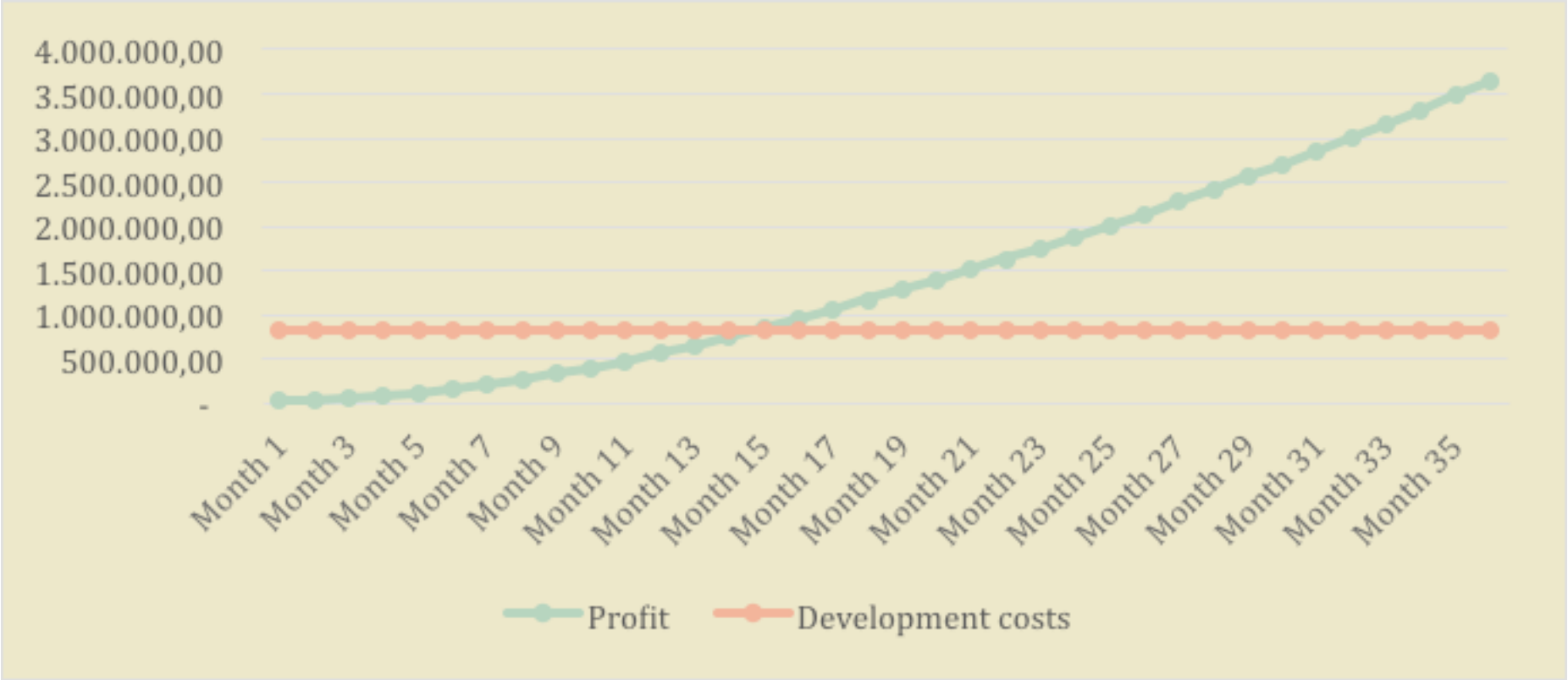


Table 4. *Breakeven + profit - Method 1*

Method of financing 2

The calculation is based on that the development cost is made available (e.g. by a fund or company) and expected a return of 0.833% per month corresponding to an effective rate at approximately 10% per annum.

The calculation shows a **break-even** on **Month 16** and a **profit of 2,715,948** after **36 Months,** since the return of the development costs stops in Month 16 as they at this time has been repaid.

The financial ratios that have been estimated and calculated provide an indication on that the service is economically sustainable under the premise that it can be sold to 49 nursing homes within the first three years.

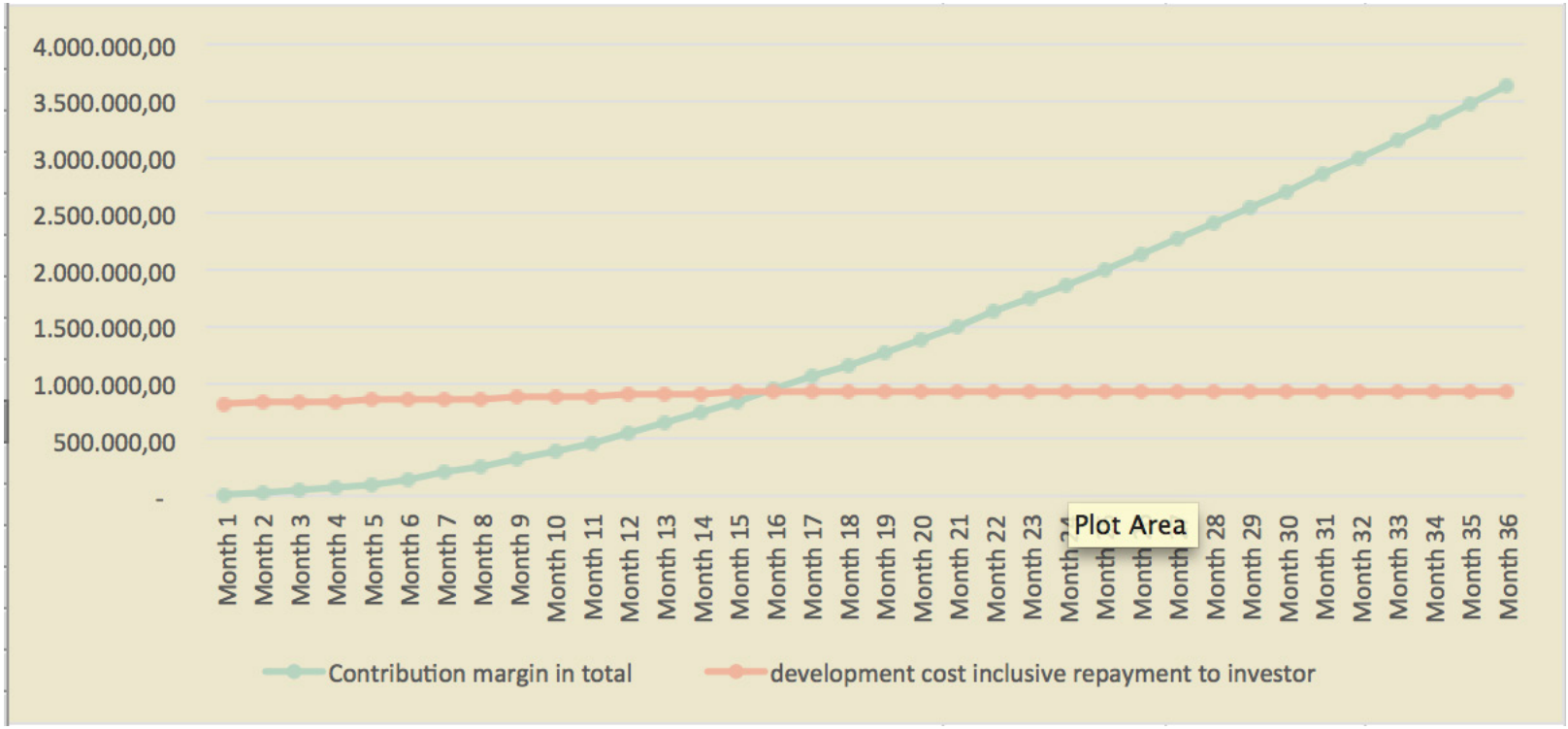


Table 5. *Breakeven + profit - Method 2*

PLAN OF ACTION

In order for this service to be implemented in nursing home a few tasks they have to be carried out. These tasks include testing and developing. After the service has been released and the sale has started, the service concept can be expanded with new modules in order to ensure that "Forget-me-not" is an attractive service for the nursing homes in the future.

The chronological orders of the primary actions are described below and can be used as guidelines to the further development.

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 NH 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

Step	Nursing home	The service provider
1	Showing interest in the service via website, 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 touchscreens + service	Provide help in choosing the touchscreens.
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.

Table 6. *Implementation plan*

(continued)

6. EXPANSION OF SERVICE

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

7. EXTENSION TO SECONDARY SEGMENT

The service provider 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.

FEEDBACK FROM USERS

The citations are feedback from users (caregivers) after testing a paper pased prototype (Appendix 21).

I found that...

"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)

CONCLUSION

A growing population of people over 65 years provides attention towards elderly care and nursing home services. New solutions are required to overcome current problems and prevent increase of problems in the future. Special attention needs to be provided to problems of malnutrition and loneliness, as well as providing better ways for caregivers to meet the needs of the residents.

The service "Forget-me-not" is a tool that encourages and supports communication between caregivers and residents, and provides means for evoking memories of crucial events in the residents' lives. The service empowers residents and increases the knowledge that caregivers have about the residents by rethinking life stories and include them daily care.

The service is based on insights found at the nursing home revealing that little time was spent on social interaction during day - especially observed during mealtimes - where residents entered the dining room just before a meal, little interaction occurred during, and residents went back to their apartment shortly after a meal. Barriers to communication were found both for residents and caregivers. The variety in disabilities among residents makes it difficult to start and uphold conversations, which provides a need for someone to facilitate and support communication. Barriers from the perspective of caregivers include lack of knowledge about residents (especially for substitute workers), lack of experience or knowledge of how to converse with the individual residents (especially trainees), and a high amount of foreign workers lacking Danish language skills. The Forget-me-not service seeks to improve the communication through visual means that supports verbalized communication and can help residents remember.

In the end, social interaction also relates to malnutrition and food intake (Keller, 2014). Although malnutrition is a complex phenomenon that can have many origins, a focus on social interaction is highly important when seeking to find solutions to the problem. "Meal Quality", "Meal Access" and "Mealtime Experience" all determine food intake, where the aspect of mealtime experiences are the main focus in our solution (Keller, 2014). Social interaction improves the quality of life of residents and is moreover claimed to affect the perception of taste, as food seems to taste better when you sit among people you know and like (Kofod, 2008). Further, by stimulating residents before meals, this can increase their appetite and trigger conversations that can be continued during meals (Kofod, 2008). Valuing and providing means for social interaction during and right after mealtimes as well may make residents sit longer at the table. And if you sit longer at the table, you most often eat more.

We would argue that a solution like "Forget-me-not" is highly relevant for nursing homes, as a tool to trigger and support meaningful conversations in an industry where practical chores take up much of the time. End the end communication and social interaction contribute to quality of life, good mealtime experiences and possibly increase in food intake.

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APPENDIX