A LOVED ONES SMILE
JUST A CLICK AWAY

Family Window

Final Bachelor Report

STUDENT Kyara Fasen
PROJECT Studio Silver
COACH dr. ir. R.G.A. Brankaert
ASSESSOR prof. dr. Matthias Rauterberg

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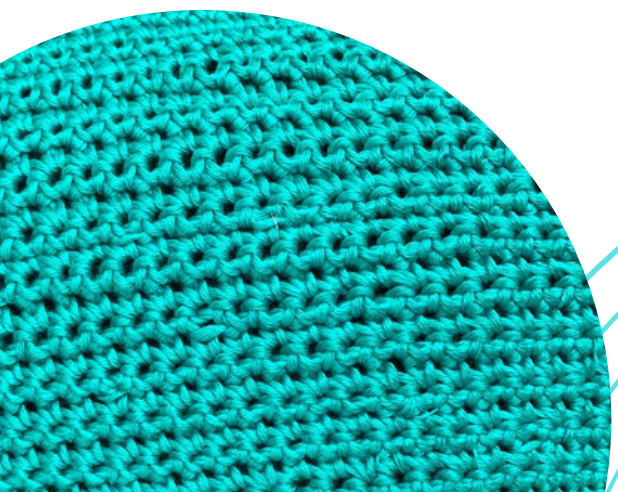

ABSTRACT

This report showcases the research and design process for the Final Bachelor Project ‘Family Window’.
In this project I worked on the following design challenge; how can we use technology to help people with dementia to longer maintain their social network?
A user-centered design approach has been taken, involving older adults with dementia and multiple other stakeholders. Used methods include: Focus groups sessions, interviews, and user tests.
Read with me as I gain more knowledge about dementia, graphical user interfaces, social contact, and video messaging. Resulting in my final design ‘Family Window’. A video message tool that allows loved ones of a person with dementia to send them personal video messages. The tool will guide its user with dementia to watch and respond to these video messages with a video message of their own.

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INTRODUCTION

In my vision I state that I find it important to design for **empowerment** of my users. Like Maslow illustrated in his famous pyramid, we all have a similar hierarchy of needs. But not every **individual** has the same opportunities to fulfill these needs. Whether it's through illness, disability or inability to express themselves. I believe everyone in our society deserves the same **opportunities** since we all have something unique to contribute to this world.

This makes that I find people with **dementia** a really interesting group to design for, as I feel like many things that empower them as individuals are being taken away from them. I find it a great challenge to work on a design concept that brings this empowerment back and will improve their **quality of life.**

The direction I wanted to focus on is social isolation. I took it upon me to work on a design solution that will make it easier for people with dementia to preserve their social network and keep having daily contact moments with important people in their lives.

DESIGN PROCESS SUMMARY

Keeping track of your design process is important to later reflect upon it. Using the reflective transformative design process framework (Hummels & Frens, 2009) I visualized my process.

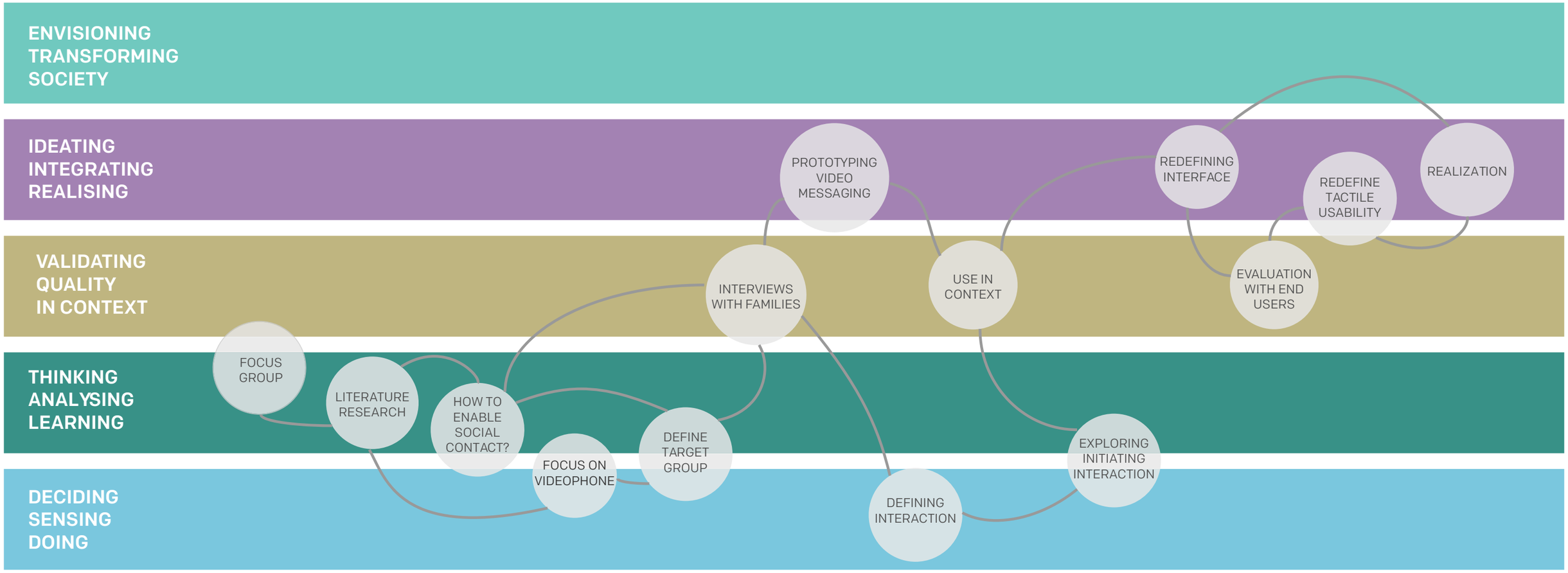


Image 1, Reflective transformative design process

DESIGN CYCLE #1

Where did I start

First ideation and insights

Where did I start

I started the process by learning more about this issue by doing secondary literature research into the topic, interviewing dementia caregivers and informally talking to family members of dementia patients.

Here I already gained many interesting insights. Innes, Archibald and Murphy (2004) explain the causes of social exclusion for people with dementia. They talk about disabling environments, ‘batching’ of people with similar needs, limited opportunities for enjoyment of arts, limited opportunities for artistic expression, limited opportunities for leisure activities, limited opportunities for meaningful occupation, limited choice and control over own lives, experience services as difficult to access, difficulty maintaining contact with faith community and thus limited opportunities for spiritual expression, and low self-esteem and loss of dignity (Innes, Archibald and Murphy, 2004).

I used the focus group qualitative research technique. Here I spoke with two groups (of two and three dementia caregivers) from the organizations Proteion and Zuyderland about social interaction of dementia patients and these causes of social exclusion. During these sessions I learned that there are very little actions that dementia patients are still allowed to do themselves (related exclusion cause: Limited choice and control over own lives). So said caregiver Simone Zeegers from Proteion as an answer to the question “what are some examples of things that the care house inhabitants still do themselves?” that the only thing they can do, if they are still capable, is help with getting themselves dressed.

Also when talking about the social contacts of the care home inhabitants the caregivers explained that most people from the living group they worked at only had contact with their family when they visited. Only one man in their living group had phone and Skype contact with his daughter. He owns his own tablet and phone and is able to use them correctly, only at night the caregivers turn off his smart devices.

I used the information I gathered as a basis for a broad ideation, but I quickly noticed a recurring theme from which I drew inspiration. Namely video contact.

By watching the film ‘Still Alice’ by Richard Glatzer and Wash West, and talking to the dementia caregivers from Proteion and Zuyderland it inspired me to see how using Skype, video contact, seems to still be a very natural way of communication even in further stages of dementia.
It made me wonder why the use of Skype or similar video contact appliances is not more common.

This is why I did more research into the topic of people with dementia and videophone communication. I also based my first product idea iteration on dementia and videophone communication. Videophone communication seems to related to multiple of the causes for social exclusion explained by Innes, Archibald and Murphy (2004). Namely limited opportunities for meaningful occupation, their experience of services as difficult to access and limited opportunities for leisure activities.

In 2009, Hori et al. already explain that they consider that a videophone communication is useful for cognitive rehabilitation and the feelings of the patient, and it is also good for a satisfaction of the family.

I believe videophone is an interesting area with many possibilities that I would love to explore.

Image 2, sketchbook first ideation

First Ideation and insights

After I discussed my findings and initial ideas with coaches and I reflected on my progress I came to several insights.

'The images behind the window can cause fear'

Unnatural proportions of faces, unfamiliar backgrounds, and the element of surprise when a video starts playing once someone with dementia opens the curtains can all be perceived as scary and possible cause panic. It is important for me to explore more implementation possibilities of video messaging

'Watch out with screens, tv is already very complicated to use'

Being able to use the tool intuitively is very important when designing for people with dementia. There should be no instruction needed.

'Video messages from loved ones seems to be a fairly unexplored topic'

During my focus group sessions caregivers explained they never show or watch videos with the dementia patients.

Image 3, Un continued ideas not based on video messaging

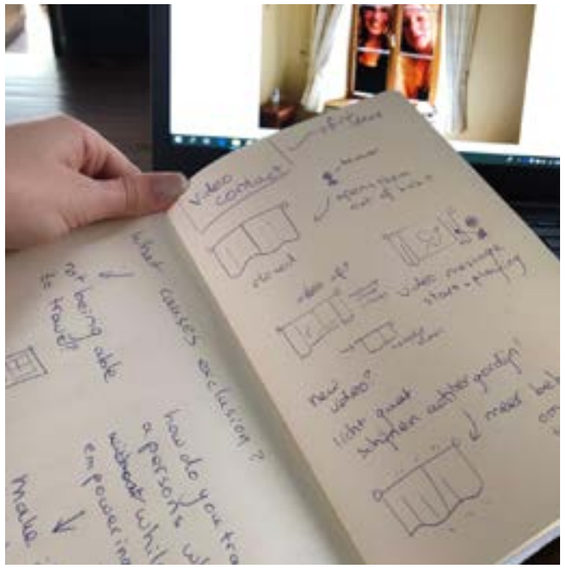


Image 4, Video message based idea

DESIGN CYCLE #2

Target Group

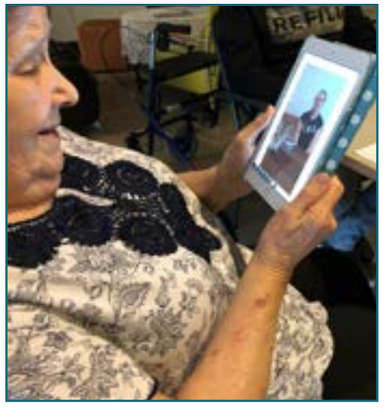
Insights from research

Importance of cognitive stimulation

Redefinition concept

Deepening

Realization



Evaluation

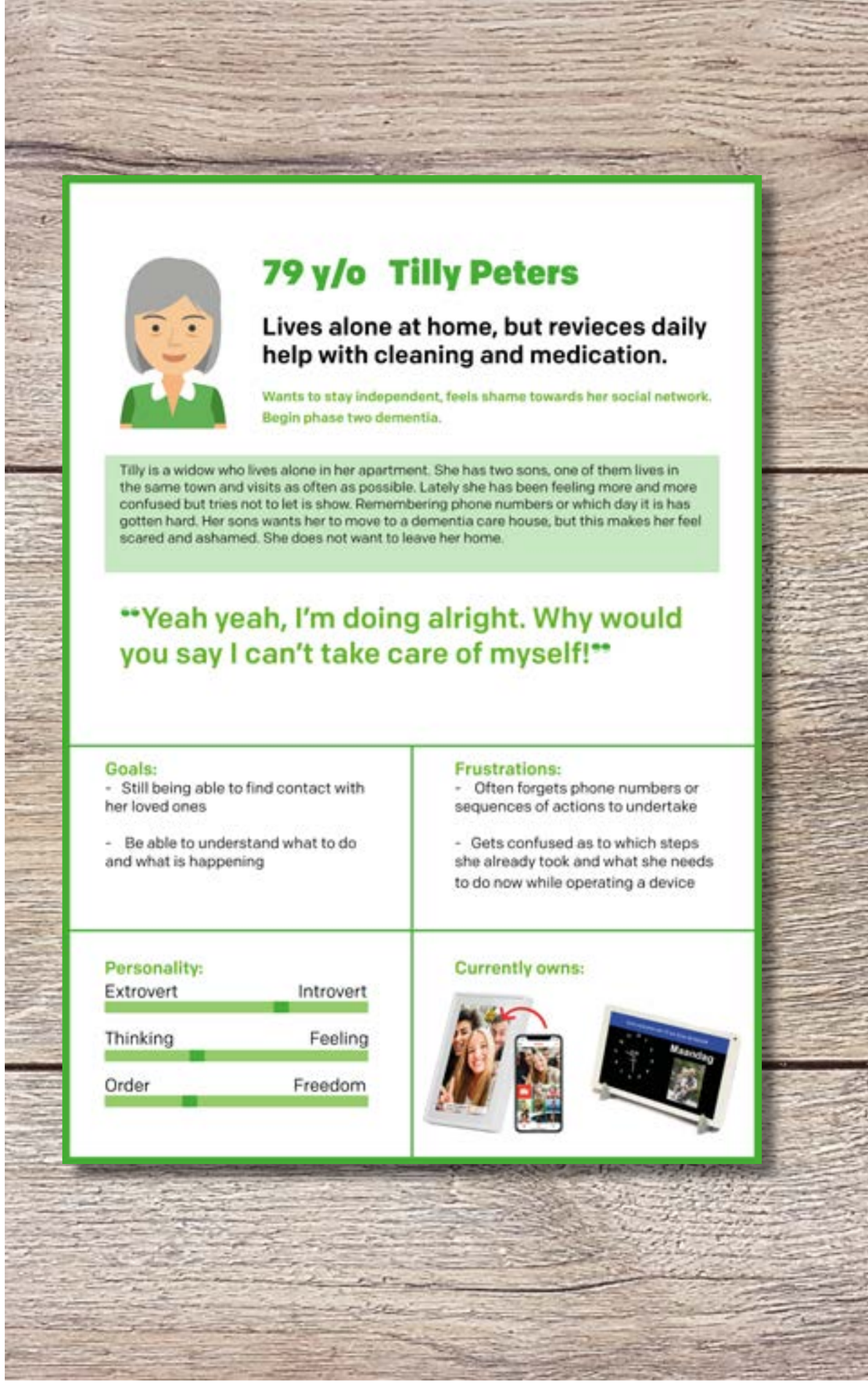
Iterate

This iteration is focused on communication through video messaging.

"Vroeger belde mam heel veel, maar nu eigenlijk niet meer. Initiatief [verliezen] is wel een ding. Ze belde ook altijd veel met al haar vriendinnen, maar dat lukt nu niet meer. Mam heeft nu een telefoon met vier knoppen met de in-geprogrammeerde nummers van mij en een paar andere familieleden, maar zelfs dat wordt wel eens vergeten." - Daughter of an older adult with dementia living in a Pleyade care house.

Target group

The target group I defined are people with dementia in the transition phase from home to a care house. As a side goal I want to make this transition phase easier with my tool by offering a stability in social contact. In 2013, Sury, Burns, and Brodaty found that the decision to move (a family member) to a care house and the subsequent adjustment period is a difficult time for people with dementia and their family caregivers. Admission has been linked to increased behavioral symptoms and in particular depression and agitation, decreasing cognition, frailty, and falls in people with dementia. For caregivers, guilt, depression, feelings of failure, and continuing burden but also improvement in quality of life have been variously reported during their study (Sury et al., 2013). Because this
Experience is so personal I have to take into account many different user experiences. After speaking to some families who have experienced this transition phase with their loved one I started to get a clearer image of the different types users I am designing for. I decided to create persona's to better understand my users' needs, behaviors, experiences and goals. It helped me to empathize with the users I'm designing for by stepping out of myself. (See appendix C for enlarged image)



Insights from research

Standing on the shoulders of giants (Newton, 1675)

How do people with dementia interact with touch screens? Why can video communication be a solution to returning empowerment and assisting in preventing social isolation? These are some of the many questions that arose from reflecting on my first iteration.
Boman, et al. (2013) found, by exploring the usability of a videophone mock-up for persons with dementia and their significant others, that people with dementia might have considerable **difficulties in using an ordinary telephone**. This while being able to use the telephone can be very important in order to maintain their social network, getting stimulation and for reaching help when needed. Therefore, **persons with dementia might need an easy-to-use videophone to prevent social isolation and to feel safe and independent** (Boman et al., 2013). This conclusion aligns with my personal expectations.

Astell, et al. (2010) found interesting results while doing research through their touch screen based design concept CIRCA (see image 5). The results suggest that **interacting with the touch screen system is engaging and enjoyable for people with dementia**. The direct sense of feedback and affordance the touch screens seem to provide make that the persons with dementia can use them independently or with encouragement (Astell, et al., 2010). I found this conclusion very interesting as it goes against my first instinct that says that many older adults don't fully understand how to use smart touch screen devices. However the possibility of being able to use touch screen in my design concept for users with dementia does provide me with more design freedom and possibilities.

Image 5, CIRCA, retrieved from http://garygowans.com/circa.html

Sposaro, Danielson, & Tyson (2010) did a study on their android application iWander for dementia patients. In their study they explain that the majority of interaction is done through simple prompts, voice commands, and text to speech. They also explain that **older adults often have difficulty with their haptic perception**. To avoid the need for the software keyboard on the device, input is provided through the use of easy to press buttons and auditory input when applicable. Next to that all color schemes have **high contrast ratios** to promote ease of readability (Sposaro et al., 2010). I found these insights rather interesting guidelines to use in this screen based design iteration.

In a recent study (Wintermans, Brankaert, & Lu, 2017) also present a related project, the radio 'Stay Tuned!'. I found the base of interaction with the 'Stay Tuned!' device very inspiring because of its simplicity and usability gained by co-designing. Their usage of reminiscence for the radio and the strong visual stimuli of the pictures of the family members seemed to work very well in this context. They describe that it is important to think of the simplicity (**keep the product both simple to use, logical and focusing on one function only**), perspective of the participants, and the usability when designing for this user group (Wintermans, Brankaert, & Lu, 2017).

Importance of cognitive stimulation

Many of the family members I spoke to admit to find frequent communication with their loved one with dementia difficult at times. Talking on the phone isn't always possible, as well as visiting multiple times a day just isn't realistic. Next to that a recurring theme in the interviews (discussed on page 24) has been the lack of initiative for interaction coming from the person living with dementia.
This makes one wonder, is the shrinking social network and lack of frequent communication also a relevant problem for the people with dementia themselves? Or is just something the relatives experience?

Woods, Aguirre, Prendergast, & Orrell (2012) answer this question by explaining that a clear, consistent benefit on cognitive function is associated with cognitive stimulation. This conclusion remained evident at follow-up one to three months after the end of their cognitive stimulation treatment. In secondary analyses, with smaller sample sizes, benefits were also noted on self-reported quality of life and well-being of dementia patients. The authors even conclude that there was consistent evidence from multiple trials that **cognitive stimulation programmes benefit cognition in people with mild to moderate dementia over and above any medication effects** (Woods, Aguirre, Prendergast, & Orrell, 2012).

Treiber, et al. (2010) also explain in their paper 'Cognitive stimulation and cognitive and functional decline in Alzheimer's disease: the cache country dementia progression study.' how important cognitive stimulation is for dementia patients. In their research they examined the association of engagement in cognitively stimulating activities with cognitive and functional decline in a population-based sample of incident Alzheimer's disease. They found that there was a statistical interaction between dementia duration and the number of activities in predicting the rate of cognitive decline and overall functional ability. Concluding that **active involvement in cognitively stimulating pursuits may be beneficial for persons with Alzheimer's disease** (Treiber, et al., 2010).

Redefined design for video messaging

These insights from research allowed me to redefine the design for a video messaging device. I now decided to continue with a device shaped like a television, allowing for association with watching video material. The device makes use of a touch screen for its interactions. Noticeable are the buttons with faces of loved ones of the user with dementia. If the user receives a video message the button with the face of this person will light up and when touched the video will play. With the pictures of loved ones I want to allow for curiosity and familiarity.

I also added a function for users with dementia to respond to the received message. I find the two way interaction really important as it can spark empowerment in the users with dementia. It feels empowering to be able to fulfill a task. It also feels empowering to feel like an equal to the person they have received a video message from. I did not want to make sending video messages a task only the family members of the user with dementia can do.

Have a look at page 23 for a story board of the redefined design.

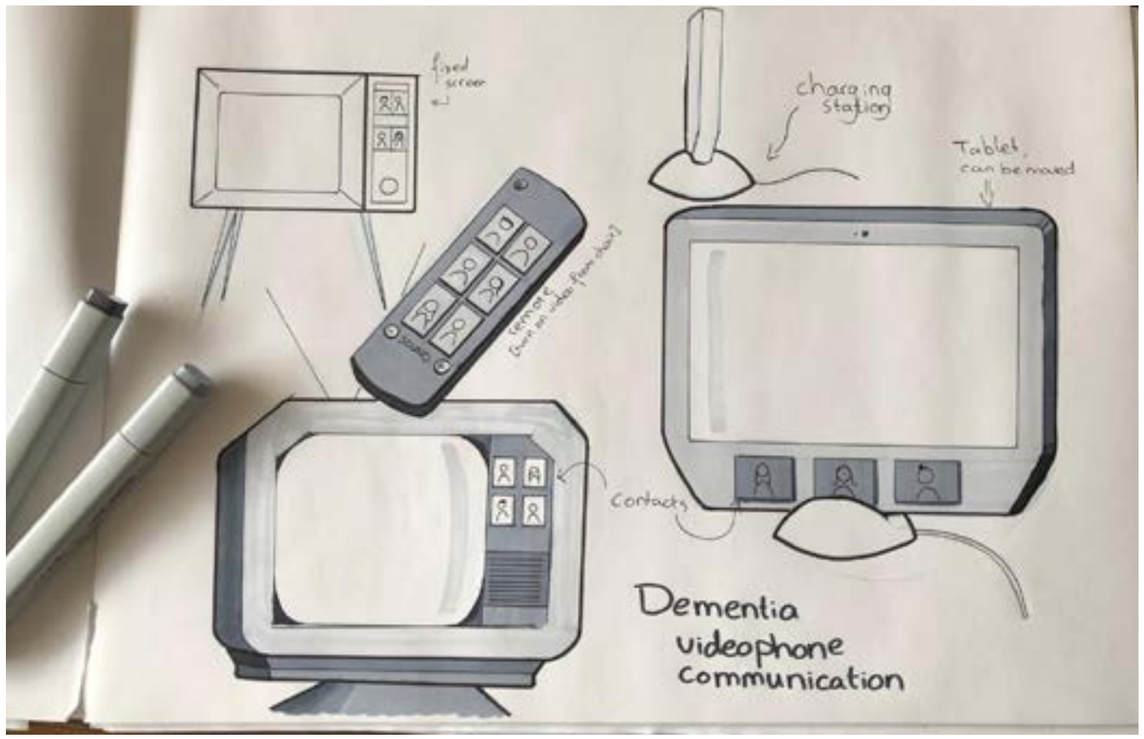


Image 6, Ideation sketches

Deepening

Because people with dementia are such a vulnerable group I found it very important to put a lot of effort in the preparation of the first test of this concept with target users. This to avoid making the participants feel unpleasant and upset.

Interviews

To best educate myself on the situation of the families, who were interested in participating in an evaluation session of my design progress, I first had a meeting with family members who are close the participating user with dementia. During these meetings I got to know the families that will be working with me and got the chance to conduct a semi-structured interview with both of them to learn more about the problems they face with communication with their loved one who has dementia.
Two different families were closely involved in the development of this project.
The member of the first family I spoke to is the son of an 85 year old woman who has been living in a dementia care house for almost three years.
The member of the second family I had a long conversation with is the daughter of an 88 year old woman who has been living in a dementia care house for only 3 months.
Both first sessions lasted an hour and focused on communication issues throughout the development of the disease as well as their opinion on video messaging and possibilities of the design.
Both sessions were audio-recorded and later transcribed. These transcripts were analyzed by doing a cluster analysis (See full transcription and analysis in appendix E).

Family #1

"zelf bellen zou ze nooit kunnen."

"Je zou het niet de mogelijkheid moeten geven om echt te bellen. Dan zou mam 10 keer op een dag bellen, terwijl ik op werk ben. Je moet in je eigen tijd de reactie kunnen bekijken."

"De kinderen zou dit erg aanspreken om in contact te blijven met hun oma. Ze hebben er namelijk wel veel moeite mee om echt op bezoek te gaan en het aftakelen te zien."

"Ik ga vaak langs maar met dit zou je contactmomenten makkelijk kunnen verdubbelen."

"Voor mam zelf maakt het niet uit of een video live is of al eerder opgenomen. Voor haar is dat nu. Op dit moment beleven."

Family #2

"Vroeger belde mam heel veel, maar nu eigenlijk niet meer. Initiatief [verliezen] is wel een ding."

"Als ik bel is ze er bijna nooit. Dan zit ze in de woonkamer. Dit zou dan heel handig voor mam zijn als ze weer terug komt kan ze zien dat ik een bericht hebt gestuurd om haar iets te vertellen! Want een antwoord apparaat bedienen lukt niet meer."

"Wil je met een scherm bellen dan moet het wel duidelijk zijn. Want hier staat gewoon een telefoon maar ze vergeet ook wel eens dat ze die heeft."

"Je moet opletten met symbolen, zo een driehoekje als play knop is voor ons heel duidelijk. Maar voor haar niet. Ze kan wel heel goed lezen, dan zou ik eerder 'afspelen' op een knop zetten."

Pilot test

Next to the semi-structed interview I organized a pilot test. This pilot test was conducted to filter out unnecessary mistakes and make sure I can offer the real target users a meaningful experience which will result in useful information for the continuation of this design process.
In the pilot test participated six family members and one older adult (without the dementia diagnosis), two of their children and 3 of their grandchildren.
Over the course of the week the participating family members were asked to record personal video messages for their (grand)mother. At the last day these messages were shown to the grandmother using the WhatsApp application. Allowing the grandmother to click on one of the persons in the list to see a video message they have recorded for them. Simulating my concept.

Afterwards all participants were interviewed using the semi-structered interview method and later transcribed as well as analyzed by doing a cluster analysis (see appendix E).

This pilot test allowed me to recognize some flaws that would have disturbed the test with actual target group users. An example of this is the changing position of the WhatsApp contacts once you responded to a message. As well as the inability to press the profile picture to open the chat, only the written name can be clicked on. This confused my participant and resulted in my decision to longer use the WhatApp application in my first user test.

[after sending a video message back to her daughter]
Participant: "Huh, iedereen is omgedraaid?"
Me: "Ohh de volgorde van mensen is inderdaad verandert! Sorry, maar dat maakt verder niks uit."
Participant: "Nu moet ik toch op [kleindochter] klikken hé?"
Me: "Ja, als je een video bericht van haar wil zien. Ohnee je hebt op [dochter] geklikt. die video heb je al gezien. [kleindochter] sta nu onderaan."
Participant: "Ohh wat verwarrend."

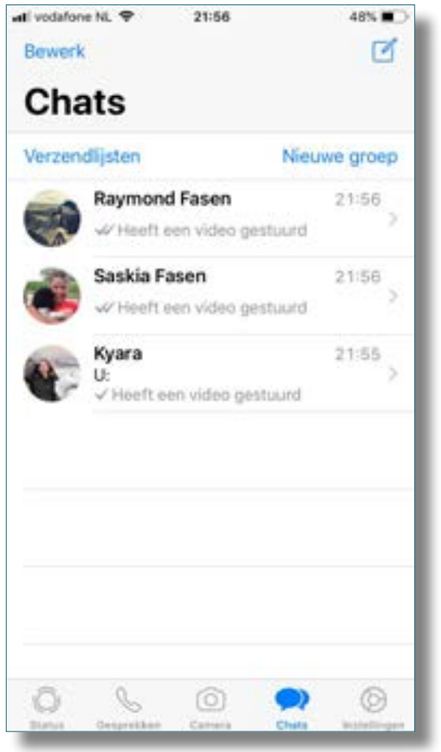


Image 7, Phone screen resembling the one used in the pilot test

Realization

For the development of the first 'Family Window' iteration I used an iPad surrounded by a cardboard case and a cotton layer. The shape of the device was inspired by an old television to use reminiscence and link this device with watching video footage.

The case

Image 8, Using low fidelity cardboard prototypes to try out different ideas

Image 9, Developing one of the designs further into a prototype of higher fidelity that can be used during the user test

The application

To try my ideas in a user test with end users I needed to build an application prototype.
The first program I worked with to build this application is InVision. InVision is a platform that allows users to quickly create and share interactive mockups for application designs. Working with this program was experienced as very pleasant. It was easily to learn and building working application mockups went quickly. However this program did not allow video material in the mockup apps, nor did it allow for communication with the camera function on the device the app was running. Because of these reasons I went to look for another program to build an application for my test.

The second program I worked with was Processing. Processing has many functions and possibilities. At first this is why I was drawn to use it, it would allow me to create an application with videos, camera function and communication with other devices. However the many functions are also the reason I stepped away from it. I had never worked with this program before, and after days of coding I had to decide to step over to another app building program. My progress in learning how to work with the program was slow, and I knew that at this rate I would not be able to do my important user test with a working prototype.

The third program I worked with was Marvel app builder. Marvel is again a program that allows users to create interactive app prototypes. It seemed to be more advanced than InVision as, instead of the first program, it did allow for communication with other apps (camera function) and platforms (play videos from e.g. YouTube). However sadly Marvel seemed incapable of processing large files. Resulting in malfunctions of the application and inabilities to continue working with the platform.

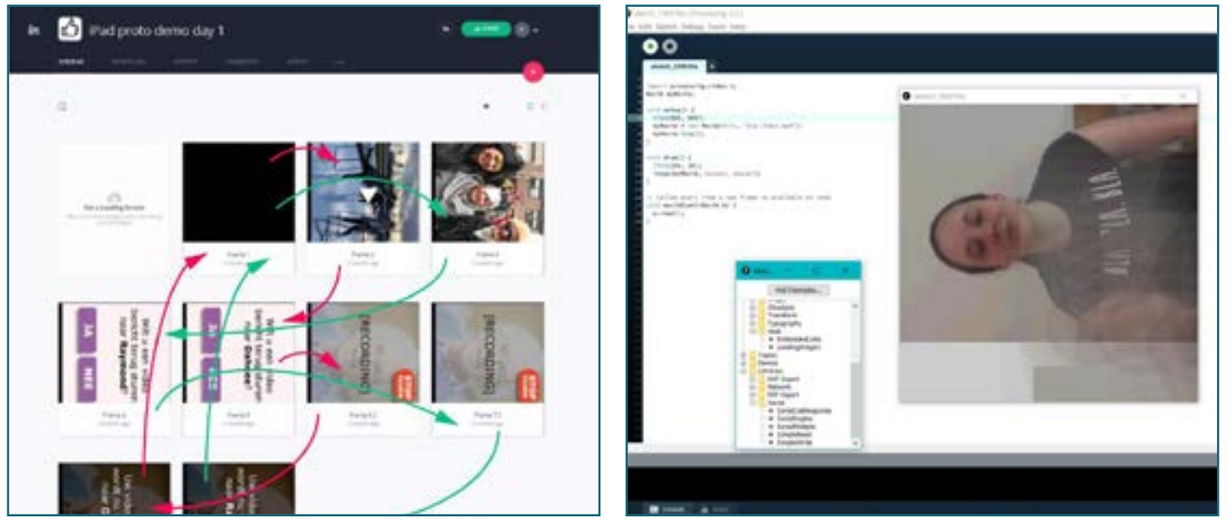


Image 10, Left to right: building an application prototype using InVision and Processing

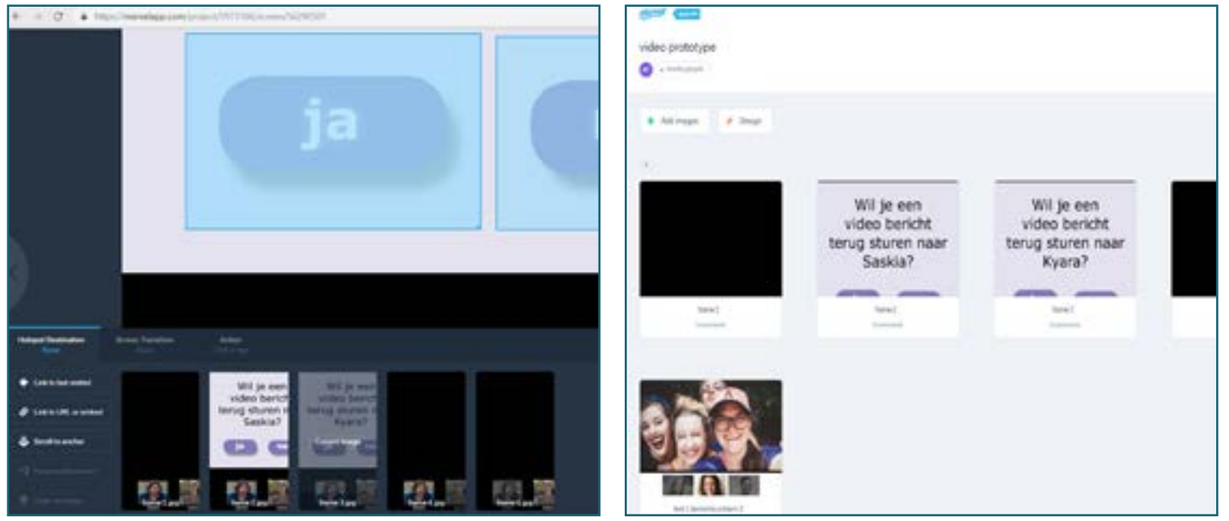


Image 11, Marvel prototype

Evaluation session

In order to gain more usability insights and test my assuption that Family Window could help people with dementia to watch and respond to video messages of their family and friends, an evaluation session was planned. In this session the older adult with dementia who has been living in a dementia care house for almost three years, her son and her granddaughter were involved.

I used paper prototyping to simulate the interaction of the device. During the test I paid attention to her facial expressions, verbal expressions, and physical movement. After the test I held an evaluating conversation with her son, who accompanied me on the test, to hear how he interpretated his mothers reactions to the device.

Image 12, Paper prototype user test

Main insights

Should have possibility to replay video

It takes the participant time to process what is happening once the video starts playing. The participant did not seem to catch the first seconds of the video. After the video has ended the participant showed initiative by asking herself if she could watch the video again. The participant does not mind watching the same video again, as she asked for multiple replays.

Good sound very important

The care house is a noisy environment with people talking, walking by, and watching television. The participant has bad hearing, and had to focus very hard to hear what her granddaughter was saying in the video. In the next iteration I will have to include better sound quality.

Subject of video did for the most part not matter

Subject of video did for the most part not matter
When asked what her favorite video was the participant was not able to choose. Also her facial expressions and level of concentration on the videos did not seem to change while watching the different videos about different subjects (telling a story of the past, telling a story of the present/future, doing a magic trick, showing something in the house). The participant loved every video because she was happy to see her granddaughter. The only video that got a bigger reaction of happiness was the video of the magic trick, as it made her laugh. The other videos got a smile as reaction and comments on how happy she was to see her granddaughter.

Buttons with pictures worked distracting

The participant did not seem to recognize a difference between the lit up picture (of granddaughter who recorded some videos) and darkened, black, and white pictures of other relatives who potentially could have send a video. The pictures mostly worked distracting as she would not answer a question but suddenly change the subject to talk about the pictures on multiple occasions.

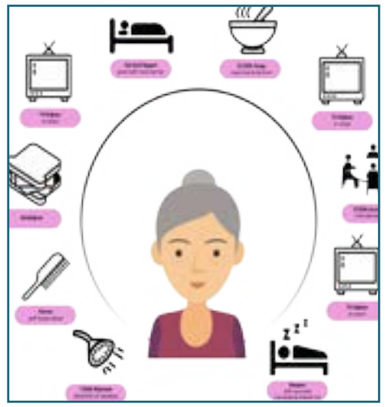
Did not like seeing herself on camera

When recording a reply she did not like to see herself on the screen and even wanted to stop filming. She also needed reminders during the recording of the response what she was doing and what she needed to talk about.

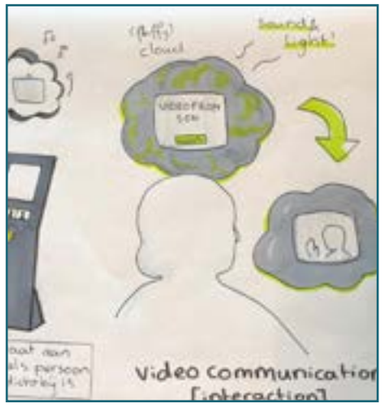
Image 13, Using cluster analysis

DESIGN CYCLE #3

Initiating interaction



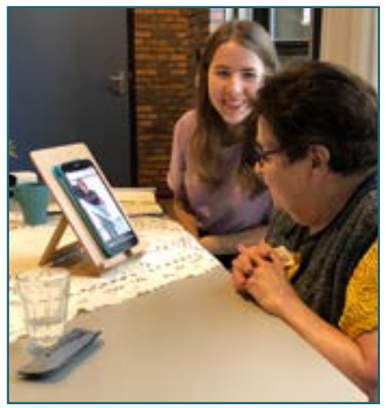
Daily routine



Ideation

Redefined interface

Realization



Evaluation

Insights

Iterate

This iteration is focused on initiating interaction.

The insights I gathered from the test with an older adult with dementia and the cluster analysis of the conducted interviews with family members caused me to rethink the design and put more focus on stimulating users with dementia to initiate interaction with the device.
Once the user test participant started interacting with the device I encountered only minor problems with the interactions, the main flaw I recognized in the first iteration of the design was how the device blended in with the rest of the interior too much, it did not spark curiosity. The family members I spoke to also all recognized that their loved one with dementia would probably need an extra stimuli to go to the device and interact with it.

"Als iets de hele tijd aanstaat valt het niet op, maar als opeens aan zou springen, wil je je kinderen bellen klik dan hier, dan valt dat wel op! Anders denkt ze waarschijnlijk dat het een schilderij is." – Daughter of an older adult with dementia living in carehouse Pleyade.

Initiating interaction

To change my design in a way that stronger initiates interaction, I first needed to learn more about this loss of engagement in people with dementia and if there are activities or qualities that seem to spark interest in interaction in people with dementia.

Vikström, Josephsson, Stigsdotter-Neely, & Nygård (2008) share in their paper that their findings indeed show that both spouses, in a relationship where one is diagnosed with dementia, perceived a loss of social engagement as a consequence of the dementia disease. What I found interesting was their description of how even though many of their participants with dementia described that they did not mind decreased socializing, as this causes stress, several also told of a longing to continue meeting with old friends (Vikström, Josephsson, Stigsdotter-Neely, & Nygård, 2008). So although meeting with friends can cause the person with dementia to feel overwhelmed, they still show interest in keeping contact with **people who are familiar to them**.

Werner, Cohen-Mansfield, Fischer, & Segal (2000) show similar results in their paper on characterization of family-generated videotapes for the management of verbally disruptive behaviors. They explain that their treatment of showing video **messages of family members expressing love** to reduce verbally disruptive behavior, proved to be an appropriate and rewarding avenue to involve family members in the care of their elderly relatives (Werner, Cohen-Mansfield, Fischer, & Segal, 2000). Again seeing familiar people seems to be the drive behind the behavior of the participants with dementia from this study.

But besides familiarly with a person also **prompts and praise** can help to increase the engagement of older adults with dementia. So explain Engelman, Altus, & Mathews (1999) who analyzed the effects of nursing assistants' use of prompts and praise to increase the engagement of older adults with dementia in daily activities (Engelman, Altus, & Mathews, 1999).

How to implement device in daily routine?

"Eigenlijk moet het video's kijken in haar ritueel gaan passen. Dat de verzorging gewoon elke keer voordat ze naar bed gaat tegen haar zegt dat ze eens op die knop moet drukken." - Daughter of an older adult with dementia living in a Pleyade care house.

"Eigenlijk zou gewoon elke dag om 12 uur het beeldscherm moeten aanspringen en dan komt er ook nog spraak uit. En als de persoon net in buurt is wordt ze getriggerd om te kijken, dan staat er: Druk hier! En dan staat er een foto van de zoon en de dochter. En dan begint dit verhaal [refereert naar sequence storyboard]. Kijk mam zal nooit zelf die eerste stap zetten. En mam is nog een van de beste daar in het tehuis. Je zult ze moeten uitdagen." – Son of an older adult with dementia living in a Zuyderland care house.

A good way to initiate interaction is to make it a habit and make sure a user will put interaction with the device in their daily routine. To find out more about the daily routines of a person living a dementia care house I asked a caregiver who works at a care house for people with dementia to explain me the daily routines on some of the inhabitants she works with.
Image 14 shows one of the daily routines visualized. The others can be found in appendix C.

Image 14, Daily routine

Ideation

Use scenario's product

The insights I gained, from learning about the different daily routines of people with dementia living in a care house, I used in during my brainstorm sessions and in a morphological analysis. I used the morphological analysis method to generate ideas for the tactile exterior of the video message device, so it would be able to fit with an activity in their daily routines.

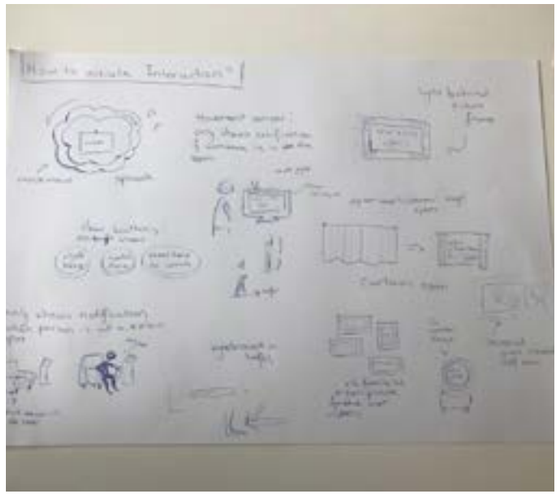
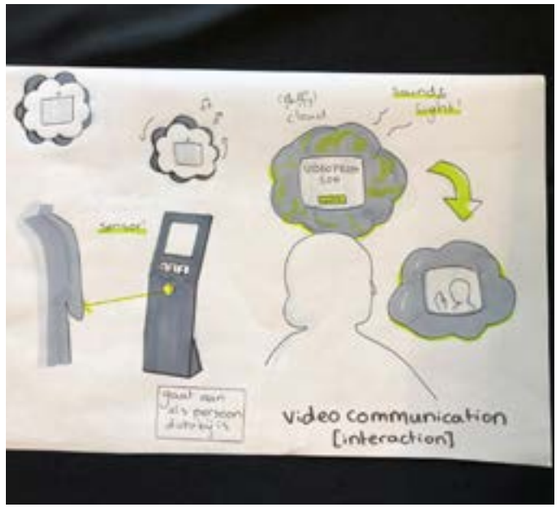
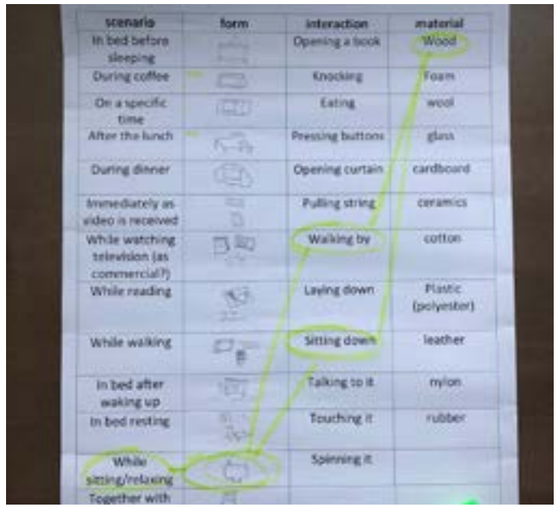


Image 15, Brainstorms





scenario	form	interaction	material
In bed before sleeping		Opening a book	Wood
During coffee		Knocking	Foam
On a specific time		Eating	wool
After the lunch		Pressing buttons	glass
During dinner		Opening curtain	cardboard
Immediately as video is received		Pulling string	ceramics
While watching television (as commercial?)		Walking by	cotton
While reading		Laying down	Plastic (polyester)
While walking		Sitting down	leather
In bed after waking up		Talking to it	nylon
In bed resting		Touching it	rubber
While sitting/relaxing		Spinning it	
Together with			

Image 16, Left: ideation sketches, Right: morphological analysis

Redefining interface

Based on the insights I gained from the previous test I decided to no longer include the buttons with the faces of the family members on the interface. This decision was made based on the insights I gained from the precious test and on the information I gathered during my interviews, where I learned that the users face so much lack of initiative that they will rare make the first move to find interaction.
No longer being limited to the buttons changes the amount of people the user with dementia can interact with via the device. It is no longer limited to the close family members who get a button on the device. Every person from their social network who has the accompanying app connected to the users 'Family Window' can send the user video messages. Possibly resulting in a larger quantity of video messages which in its turn results in more cognitive stimulation for the user with dementia during the day.

Realization

For the realization of this iteration I used a new app building platform. Namely MIT App Inventor. This blocks-based tool makes it possible to create complex, and high-impact fully functional apps for smartphones and tablets. I experienced working with it was very pleasant and easy to learn. The first application prototypes I build with it were fairly simple, but as the days went on I was able to create much more complex apps. Resulting in the final app I used in my evaluation with my end user. This final app was fully functioning and made use of voice prompts as well as written text to communicate with the user.

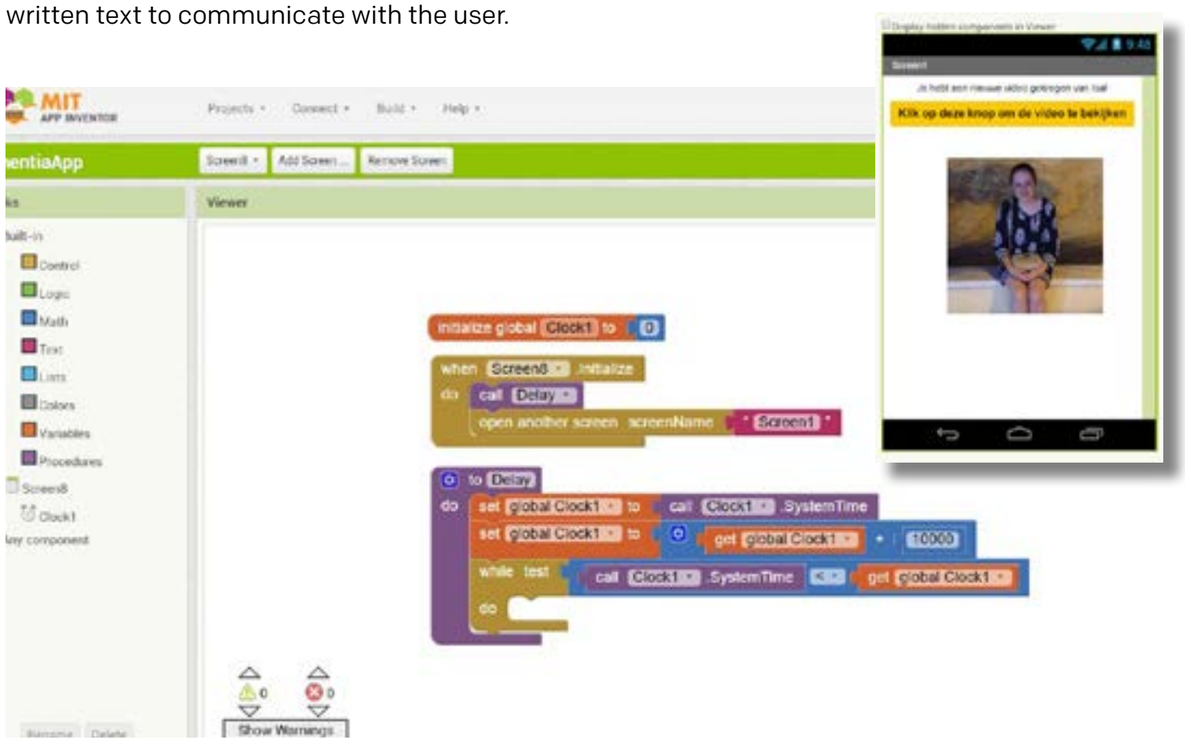


Image 17, Left: MIT App Inventor, Right: App screen

Evaluation

For this evaluation session I did nothing more than place the tablet with the running app on the table at which I was sitting with the participant with dementia.

The family had send me a new video message to show their (grand)mother which I placed in the app. For the test I also programmed the app in such a way that after the user went through the entire sequence of actions the screen turned black and looked "off". However after 2 minutes the screen would turn "on" again and show that the participant has received a new video message. This way I wanted to test two things. Firstly the ability of the user to go through the sequence without any assistance. Secondly to see of this style of notification was able to initiate interaction.

The sessions was audio-recorded and later transcribed. Next to audio-recording I took field notes about the behavior responses to watching the videos and interaction with the device. These transcripts and field notes were analyzed by doing a cluster analysis (See appendix E).

Image 18, User test

Participant: "Ik vind het wel moeilijk om te bedenken wat ik haar terug wil sturen. Ik wil wel iets goeds zeggen. Gewoon, bedankt voor de video, verwacht ze vast al."

[tijdens video kijken]
Participant: "Haha nou wat leuk dit, wat een leuke meid."

Son: "Is het moeilijk zo die filmpjes kijken en maken?"
Participant: "Ohh nee hoor, heel makkelijk maar hoef het ook weer niet continu te doen ofzo."

[in gesprek] [opeens gaat scherm aan] Device: "Hallo je hebt een nieuwe video, van Isa!" Participant: "Van Isa! Echt waar? Isa heeft ons weer een video gestuurd! Maar wij hadden haar niks terug gestuurd.."

Participant: "Wat zitten jullie me nu allemaal mee te kijken! Zie je wel, ik kan het helemaal zelf. Hoeft me niet op de vingers te kijken."

Son: "Ik denk wel dat ze de video's heel leuk vond, ze bleef goed gefocussed op het scherm. Als ze het niet leuk vond of niet snapte zou ze wel om zich heen gaan kijken."

Main insights

Interaction with device

Image 19, Recreation event during user test

Pressing too hard against the screen, fall-over risk

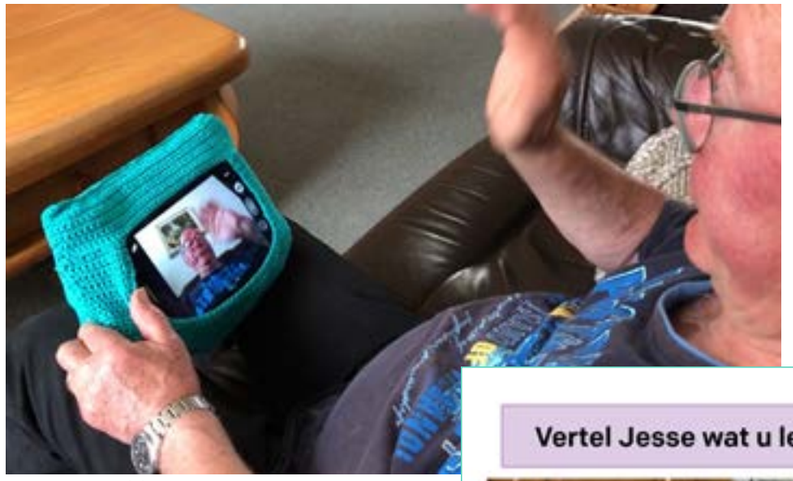


Image 20, Old camera screen

Participant feels very unsure once camera opens, seems like she no longer understands what is happening

Image 21, New screen design

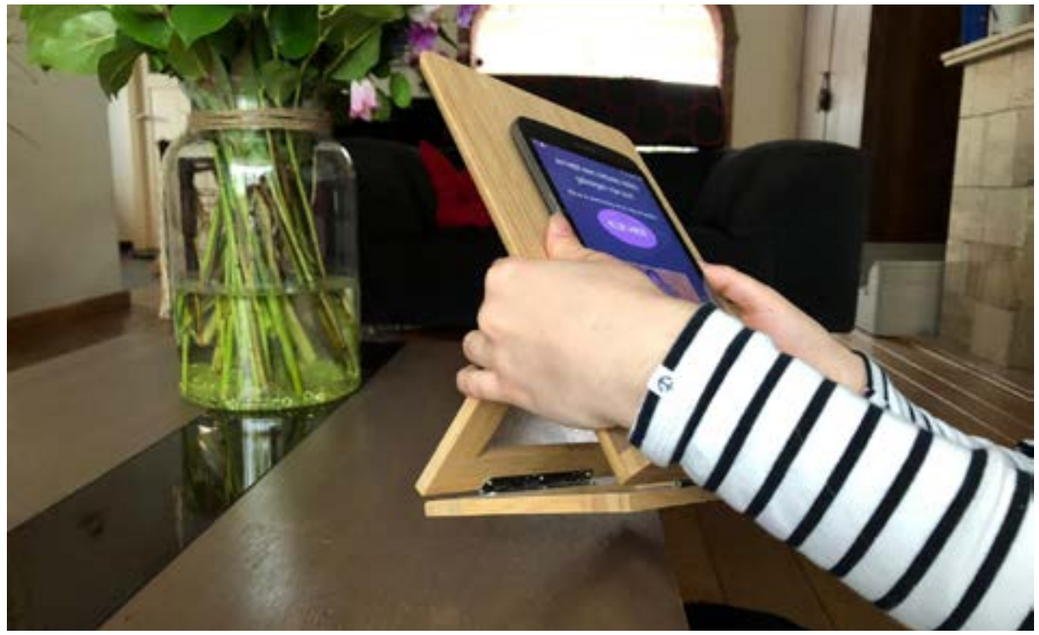
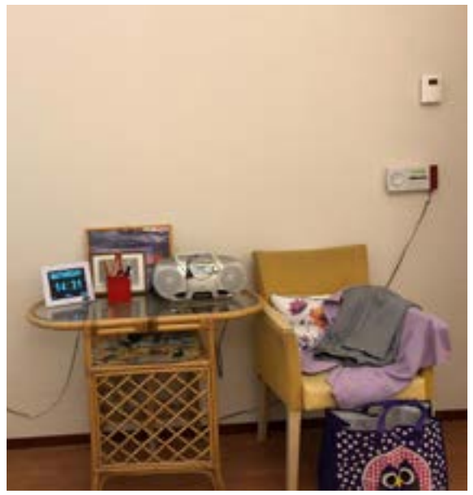


Image 22, Recreation event during user test

Desire to watch screen up close, participant took device off the table into their lab

DESIGN CYCLE #4

Ideation



Aesthetics

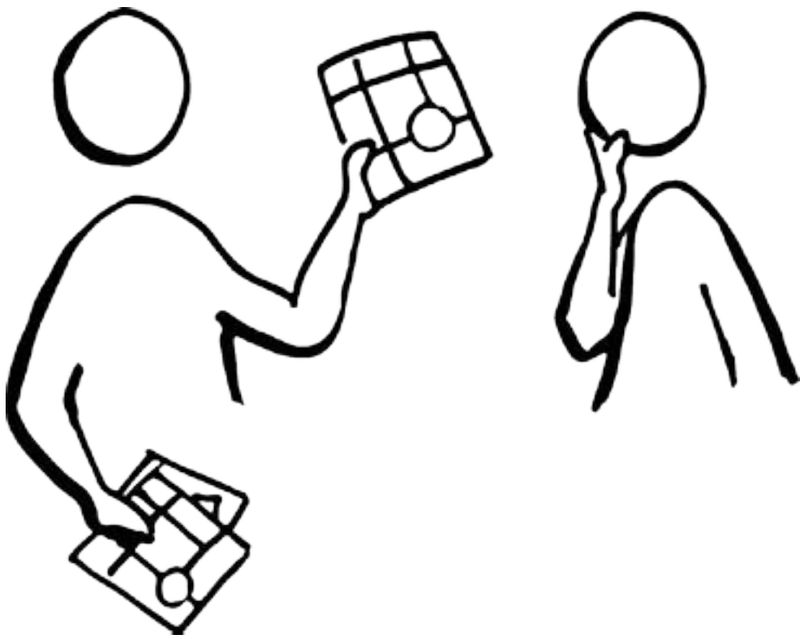
Realization

Family Window

Iterate

This iteration is focused on finalizations in usability.

"Het ging ook heel goed en snel met die knoppen vond ik! Ik ben heel verbaast! Ze heeft eigenlijk nooit met een iPad of laptop gewerkt! [lachend] Alleen drukt ze af en toe wel iets TE hard tegen dat scherm." – Son of an older adult with dementia living in a Zuyderland care house.



Ideation

Mood boards

To find out more about what appearance would resonate with my end users I asked multiple of my contacts what mood board is preferred by their relative or acquaintance with dementia. I took this outcome with me when designing the final appearance of 'Family Window'. I found the aesthetics of the device to be very important as some of the elder adults I spoke with expressed worry for being easily overwhelmed by technology. With a friendly looking appearance I want to take away this worry.

2 votes

8 votes

0 votes

0 votes

Aesthetics

Astell, et al. (2010) explain that reminiscence Therapy (RT) involves the discussion of past activities, events and experiences with another person or group of people,
usually with the aid of tangible prompts such as photographs, household and other familiar items from the past, music and archive sound recordings (Astell, et al., 2010).
To learn more about what material would be preferred by my end users for 'Family Window' I brought samples of different material possibilities to a user test. Here I let the participant with dementia touch and play around with the different blocks of material options. When asked my user told me that the block covert in a cotton case was the one she preferred. She explained that it was her favorite because it reminded her of the past, her mother namely used to crochet as well.
It was interesting and unexpected to see that the cotton can cause reminiscence. In earlier iterations I tried to get the same effect by shaping the device as an old television, not realizing that the same effect can be gained by a much more subtle style aspect.
Next to this stimulating of reminiscence cotton also has a friendly appearance and is nice to touch or lay on your lab. I decided to continue with cotton for the case of 'Family Window'.
For the shape of the device I had two criteria. Firstly the user should be able to use it on their lab as well as on a table. Secondly the device should be steady and not fall over after a hard push on one of the buttons.
My final shape is strongly inspired by beanbags. It is not heavy, soft to touch, stable, and hard to push over. It is hard to push a beanbag over because the inside is filled with many little balls instead of a solid surface. The base of the 'beanbag' case will still be a triangle (ideal for watching video material) only now with the screen horizontally instead of vertical to create a larger surface area for stability.

Image 23, Material samples

Realization

Case

The case of the final design consist of the following components. A cardboard triangular skeleton as a base for the shape. A piece of black fabric surrounding the skeleton, this fabric is filled with little plastic balls. Velcro is attached to one side of the prototype to stick the tablet on. At last there is a crocheted case surrounding this prototype.

Image 24, Realization

Image 25, Realization

Digital interface

Image 26, Realization

Image 27, Realization

Family Window

The final design of ‘Family Window’ consists of two important aspects. The digital interface and the tactile product case.

The digital interface makes has large easy to press buttons with color schemes that have high contrast ratios to promote ease of readability. The amount of text and choice options per screen are minimized to avoid over-stimulation and confusion. Every interaction screen includes three aspects. Firstly a question or statement, this question or statement will be communicated both visually and verbally. For example when the question if the user wants to see the video again appears on the screen the question will also be played out loud, in case the user was not looking at the screen.

Secondly each screen includes instructions on how to act. These instructions will be written below the question or statement. This text is smaller and not included in the audio message as for most users it will be unnecessary however in a case of doubt it will provide the user with confirmation on how to fulfill the action. In the example of the question to watch the video again, the instructions will tell the user to press either the ‘yes’ button or the ‘no’ button.
At last there are the action buttons at the bottom of the screen. The buttons have a neutral color that stands out against the other colors of the device (high contrast ratio).

Besides interaction screens there are also information screens. Every important thing that is happening digitally is in this way communicated to the user. Giving the user both clarification and confirmation they did the right thing. An example of this is the information screen after recording the video, telling the user that the video is now being send to their loved one.

The tactile product case is made from a soft and familiar material for the surrounding case of the device that is inviting to touch. The color and rounded shape are based upon an organic and warm mood board favored by people with dementia and their families. The shape of the case offers stability as well as possibility for movement of the device, so it pleasantly can be used on both the table and on the lab.

Image 27, Final Design

DISCUSSION & IMPROVEMENT

The design challenge I got to work on this past semester is: How can I use technology to help people with dementia to longer maintain their social network?

Throughout the semester I had close contact with two families with a family member living in a dementia care house. One of these families was involved in one user test, the other in three. For more generalized conclusions to be drawn, more participants would have been needed. The validation after the second and third iteration was done with a small sample of participants. Only one older adult with dementia got to try out the device.

The families, with a member who has dementia and is in the transition phase of moving from home to a care house, that are willing to get involved in the project are rare and often find it difficult to open up about this difficult and personal situation. The small sample may have led to a one-way view and less accurate results. Having a larger test pool will help to spot patterns and trends and might help improve the design of 'Family Window'.

Secondly my target group were people with dementia in the transition phase of moving from their home to a care house. However the end user of one of the two participating families has already been living in the dementia care house for almost three years. Still the results from the tests with this user were assumed to hold for the target group as well, but the accuracy of this still needs to be tested. However the fact that the participating user could still operate the device even though she has a further stage of dementia then my target group might indicate that the tool can be continued to be used also after the transition phase.

Furthermore, an important topic that needs more consideration is the act of charging the device. I personally see possibilities in using a wireless charging platform to use as a place to store the 'Family Window' on a table or other surface. However this does not prevent the user with dementia from moving the device and not placing it back in place, allowing it to discharge. When living in a care house this matter can be discussed with the staff, but when still living at home this is possibly a large issue. However these are personal expectations of what problems could occur during a longitudinal study at a user's home. More research is needed to prove this is indeed a problem.

FUTURE WORK

RESEARCH POSSIBILITIES

Longitudinal study

Elongating the maintenance of a social network is a process that can only be measured over a long period of time. In this design process I could not test on a long-term basis, because of a 16-weeks- project period. Therefore my focus in this project mainly laid on the usability of the tool. Nevertheless it is interesting for researchers to look into whether the usage of the tool will influence social networks of people with dementia positively, neutral, or negatively over time. The current prototype is not yet suitable for a longitudinal study as the sending and receiving of the video messages is not yet cloud based (currently done by hand). However I did look into the possibilities for developing this, these results can be found in appendix.

Stimulation

Looking into the use of personal video messages to stimulate people with dementia to take more initiative could be an interesting topic to explore in further research as well. Family members already expressed interest in using the video messages to stimulate their loved one to undertake action (e.g. take medication), during interviews.
"Het zou ook zeker meerwaarde hebben gehad toen ze nog thuis woonde. Toen belde we elke dag om 12 uur om te vragen of ze de pillen had genomen, helaas met werk lukte dat niet altijd precies rond 12. Als we dan gewoon hadden kunnen instellen dat om 12 uur dat filmpje bij haar speelt, zou dat wel veel gescheeld hebben." - Son of an older adult with dementia living in a Zuyderland care house.

Measuring engagement

Cohen-Mansfield, Dakheel-Ali, & Marx (2009) presented in their paper 'Engagement in persons with dementia: the concept and its measurement' a method to measure engagement in people with dementia. In their model, engagement is conceptualized as consisting of 5 dimensions: 1) rate of refusal of the stimulus; 2) duration of time that the resident was occupied or involved with a stimulus 3) level of attention to the stimulus; 4) attitude toward the stimulus, and 5) the action towards the stimulus, such as holding it or talking to it, the target of the person's talk while engaged with the stimulus (e.g., the stimulus itself or another resident), and the content of the person's talk while engaged with the stimulus (Cohen-Mansfield, Dakheel-Ali, & Marx, 2009). I found this method to sound interesting to use for analyzation of a user test with 'Family Window'. Due to the limited time frame and participants I did not manage to use it, however I do think it has a possibility for added value in future research.

DESIGN POSSIBILITIES

There are five main aspects that possibly add value to the concept to be taken into account regarding future design possibilities.

App
The project was entirely focused on the usability of the device for the end users with dementia. Therefor I did not develop that app for friends and family to use to communicate with 'Family Window'. However during both my pilot test as my first user test I received insights in how family members of a person with dementia feel about recording video messages and what they would possibly like to see in the app.

"Praten terwijl ik een video bericht opneem kan soms een beetje ongemakkelijk zijn, als ik bijvoorbeeld op school ben of in de trein, daarom zou ik hier niet filmen voor oma. Toch maak ik op die plekken bijvoorbeeld wel vaker Snapchat filmpjes, maar daar praat ik meestal niet in, dan voeg ik gewoon tekst toe." – Granddaughter of an older adult not diagnosed with dementia from my pilot test.

Recording the reaction to the video message
During the sessions with family members of a person with dementia, interest was shown in wanting to know if their video message has been watched, even if their loved one does not respond back.

"Het zou fijn zijn dat wij dan ook een melding krijgen van, oh mam heeft de video gekeken. Een terugkoppeling! Als dan antwoord te lang uitblijft dan kun je altijd nog een video er achteraan sturen om haar te herinneren. En ook als ze geen zin heeft om terug te reageren, dan weet je toch dat ze het gezien heeft." - Son of an older adult with dementia living in a Zuyderland care house.

There is a design possibility to take this request even further than a phone notification. It could possibly be a good addition to the concept to record the live reaction of the loved one with dementia while watching the video message. Now genuine outings of laughter or first responses can be captured and shown to the person who send the video message.
This way the design will include a learning curve that grows with the users as the dementia develops. It makes sure the product can still be used in further stage of dementia when the ability of talking back is no longer guarantied. However if this also is something that will be appreciated by users will still have to be tested.

Culture
Cultural aspects were not yet taken into account in our design process, such as the meaning of colors, materials and shapes in different communities.

Taking the first step
In the current design it is not possible for users with dementia to take the first step in seeking contact with their loved ones and sending the first video message, as it only offers the opportunity to respond. This was a well-considered design decision to not over complicate usage of the device and avoid distraction by . Next to usability also lack of urge to take initiative have been the reason to not include this option in the final design.
However if the option could be incorporated in the design it could add a lot of value to the product for users with mild dementia. It would be best if a learning curve could be added to the device that will grow with the development of the dementia of its user. Meaning that users with mild dementia can in fact use the tool to contact their loved ones, while users with more severe dementia do not get distracted by this possibility.

Hygiene
At last the hygienic aspect of the tablet case is an important point to keep into consideration. It is very important to keep everything clean in a care house, which includes the tools the older adults own. At the moment the screen is removable from the case, this allows for the case to be washed. I strongly recommend to keep this a possibly in future iterations and redesigns of the device.

CONCLUSION

The goal of this project was to design a way how technology can be used to help people with dementia to longer maintain their social network. As an individual final bachelor student in cooperation with the association Pleyade I developed ‘Family Window’. It is a video messaging tool to where the loved ones of a person with dementia can send personal video messages! The tool will guide the user with dementia by an easy and intuitive interface to watch, and if they like, reply to the video messages.

The final design is based upon three previous iterations and their use in context by dementia patients. There has been chosen for a soft and familiar material for the surrounding case of the device that is inviting to touch. The color and rounded shape are based upon an organic and warm mood board favored by people with dementia and their families. The shape of the case offers stability as well as possibility for movement of the device, so it pleasantly can be used on both the table and on the lab.
The interface of the device makes use of easy to press buttons with color schemes that have high contrast ratios to promote ease of readability. Text and options per screen are minimized to avoid over stimulation and confusion. Every screen includes a written explanation about what action to undertake as well as an automatically playing spoken message explaining the same information as is readable on the screen.
Does this mean my goal is met? I have no proof this device can make an impact in longer maintaining a user’s social network as a longitudinal study would be needed, as well as a larger test pool, to proof this. I however do have proof that there is interest in the device and that my target users recognize it’s potential. Involved family members of a person with dementia were exited to start using the device and to start sharing more moments of their daily lives with their parents.

“Video’s opnemen is voor ons helemaal geen probleem, juist een leuke kans iets leuks zeggen tegen mam. Mijn zus zou het al helemaal geweldig vinden, die zou elk uur iets sturen.” – Son of an older adult with dementia living in a Zuyderland care house.

Involved people with dementia did not only show ability to operate the device, they also showed excitement to start using the device as well.

“Oh joh, ja ik vind het fantastisch! Ja heel graag [wil ik vaker filmpjes zien] dat maakt me wel blij hoor! En van de kinderen! Dat vind ik echt geweldig!” – Older adult with dementia living in a Zuyderland care house.

“Als het makkelijk kan, zou ik het heel leuk vinden om filmpjes te zien van de kinderen! Voor als het bellen weer niet lukt! Ja een antwoord terug sturen lijkt me ook heel leuk!” – Older adult with dementia living in Pleyade care house.

This leads to me believing this device shows a lot of potential in helping these users to maintain their social network. Both participants are currently no longer in (frequent) contact with their friends and grandchildren, but if the device could be implemented in their lives today, this would be possible again. So yes, my goal is met. However there is always room for enhancement, you can read more about this in the discussion.
The devolvement of ‘Family Window’ is of significance as there is a lack of products on the market helping people with dementia to stay in touch with their loved ones. Isolation is something that happens to people with dementia all over the world, which makes this case a global issue. The concept holds a lot of potential and could possibly end up helping many people.

ACKNOWLEDGMENTS

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At last this project was also supported by the following staff members from dementia care houses; Ingeborg van Hemert, Carla Koops, Helma Beuting, Miranda Eberson, Simone Zeegers, and Sonja Zeegers. Thank you all for the pleasant cooperation, provided insights, and connections.

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