



THE **DESIGN RESEARCH** **PORTFOLIO** SELECTION.

By Veerle van Wijlen

MSc Industrial Design (TU/e)

ABOUT ME



As a **multi-disciplinary design researcher** I aim to empower and socially integrate people that are restricted to participate in everyday life due to their (social/mental/behavioral) health issues or other limitations. **I want to enable people to be their 'best self' in society!**

Therefore, I find it important to **apply knowledge from multiple disciplines** such as psychology, behavior change, didactics, mechanical / electrical engineering, music theory and playful interaction design in my iterative design research processes to provide "vulnerable" target groups with novel evidence-based design propositions.

Personal interests?

Storytelling, poetry & songwriting



Fight sports & rugby



Singing & playing the guitar



Design research approach

I approach my projects and iterative processes applying the next **5 main design research characteristics:**



UX (participatory) design research methods



empathy as superpower



concept development for wicked problems



interactive design probes (for research & innovation)



mixed methods data collection & analysis

various clients



variety in user types & contexts



various stakeholder collaborations





RELAX-CHANGE

The relaxation effects & future design directions of a novel expressive, multi-sensory, playful and tangible design probe RELAX-CHANGE — a drum to decrease anxiety for people with elevated anxiety in daily life

Design Research

for mental healthcare

Final Master Project

Individual project for graduation

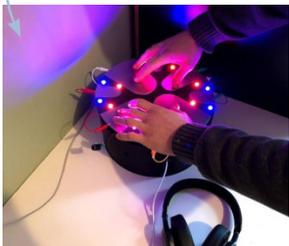
Time Period

February 2021 - July 2021

Applied & Learned Skills

Literature research & scoping; brainstorming techniques; 3D modeling; Diary study methodology (ESM) & mixed methods data collection approaches; Mixed methods data analysis & visualization

improved prototype



IN SHORT

In this master thesis, the **relaxation / state anxiety effects** of the probe in **daily home contexts** is researched (in **2 iterations: a first person perspective iteration and one involving the target group**); and the probe's **future design directions** are explored. This through 1-week diary studies, with 3 participants, mixed methods data collection around usage of the prototype and in-between ideation & conceptualization. To provide an overall contribution to enhancing accessible "daily" relaxation support for this target group and to making a start of evidence-based and accessible products that offer a novel pathway to relaxation for people with elevated trait anxiety to be used in daily life "mental health" contexts, where individuals first seek assistance.

I started this project halfway my first year masters at the Industrial Design department at the TU/e. In that first half year I created the probe RELAX-CHANGE. The probe supports **people with elevated trait anxiety** to build towards a peak of multi-sensory expressive drum play (tension) to flow into relaxation (release). The general potential of the design probe to support relaxation was emphasized through the results from two focus groups involving participants with elevated anxiety, and two psychotherapy expert interviews. Despite the found potential to be used at home or within therapy, flexibility of the multi-sensory interaction had to be improved to fit a larger variety of anxiety patients. Furthermore, the potential of the probe in a clinical mental health setting had to be researched to broaden knowledge about the potential for people with elevated anxiety. Therefore in the first half of my second year masters, I investigated the values, weaknesses, opportunities, and threats of the design probe to offer relaxation support in psychotherapy research and practice. I did this at the psychotherapy department in Giessen, Germany in collaboration with prof.dr. Julian Rubel. Moreover, a high level version of the RELAX-CHANGE prototype was developed.



first prototype

We are living in a more inclusionary world, in which all kinds of people are accepted and offer a source of inspiration to others around us in society. However, people with elevated anxiety (18-35 years old) experience periods of everyday negative thinking that are difficult to control. This limits their daily functioning and ability of being “their best self in society”. Therefore this target group has a high need for effective pathways to cope with phases of negative thinking and to come to relaxation.

Current relaxation interventions do not show the same level of effectiveness across individuals in the anxiety spectrum, are rather digital, rather soothing and lack the ability to provide deep absorption and support for releasing all three anxiety responses: negative thinking, emotions and bodily tensions. The potential of the combination of playful expression, multi-sensory stimulation, and tangibility which are important aspects for deep absorption to prevent rumination and releasing various tensions (Cevasco et al., 2005) are overlooked. Even in current percussive musical relaxation interventions lack the combination of expressive drum play and relaxing harmonic percussive play to provide optimal deep absorption, prevent rumination and release of all three anxiety tensions (cognitive, emotional and bodily). As a result, not everyone with anxiety receives optimal relaxation support to cope with acute phases of anxiety, panic attacks, and/or on-setting negative thoughts. Furthermore, barriers to mental health support for this target group limit benefits from existing relaxation interventions in mental healthcare contexts that are currently the norm. Therefore, it is needed to bridge the gap between effective relaxation notions from music therapy, psychotherapeutic cognitive-behavioral therapy, playful interaction design (research) for relaxation and practical tools for relaxation in daily life contexts.

Which is aimed at with the previously designed probe RELAX-CHANGE — a novel playful, expressive, multi-sensory and tangible drum to decrease anxiety. The probe supports building towards an expressive peak in drum play (tension), through multi-sensory feedback, flowing from there into relaxation (release). Current work and accessibility limitations in the mental health field, emphasize that evidence-base is needed around the efficacy of RELAX-CHANGE. Furthermore, future design directions need to be outlined to contribute to a continuation of the creation of playful, expressive, multi-sensory and tangible design directions for optimized novel relaxation support for this target group in daily contexts. In this work, the RELAX-CHANGE prototype is at the center of constructing knowledge.



EXPRESSIVE TENSION-RELEASE PLAY

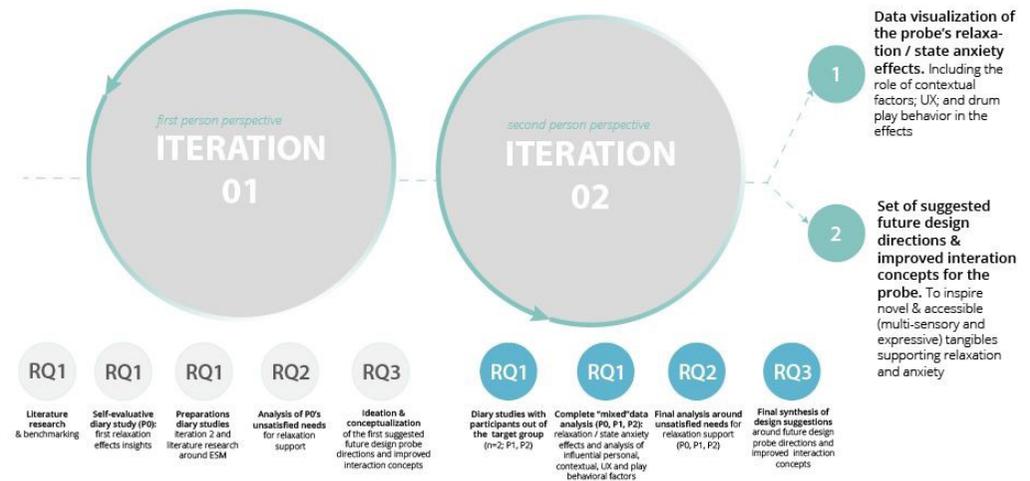
as an engaging and absorbing task to flow into relaxation



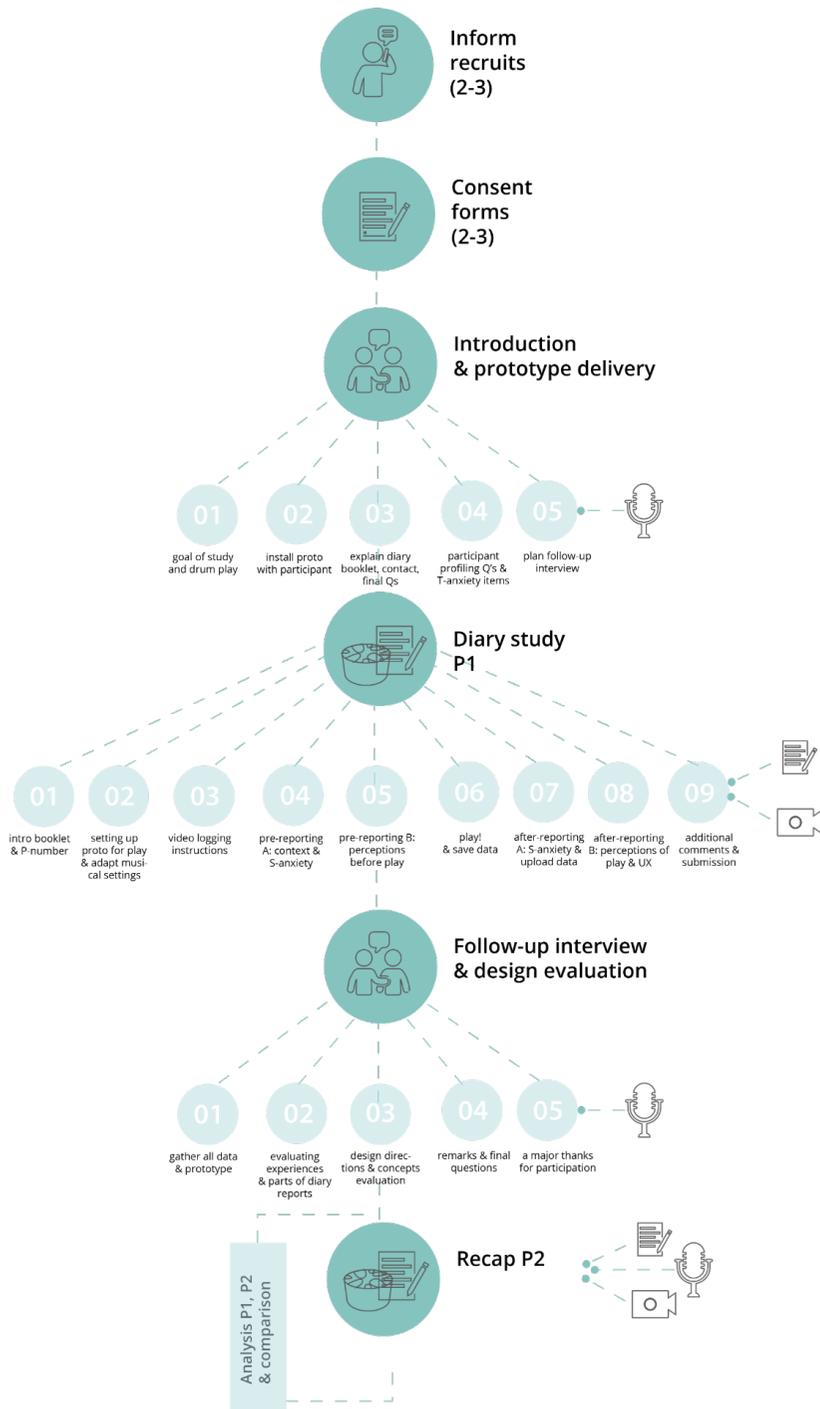
MULTI-SENSORY LIGHT & SOUND FEEDBACK

as a support mechanism to optimally benefit from expressive tension-release play, absorption and release from anxiety responses

Design research process



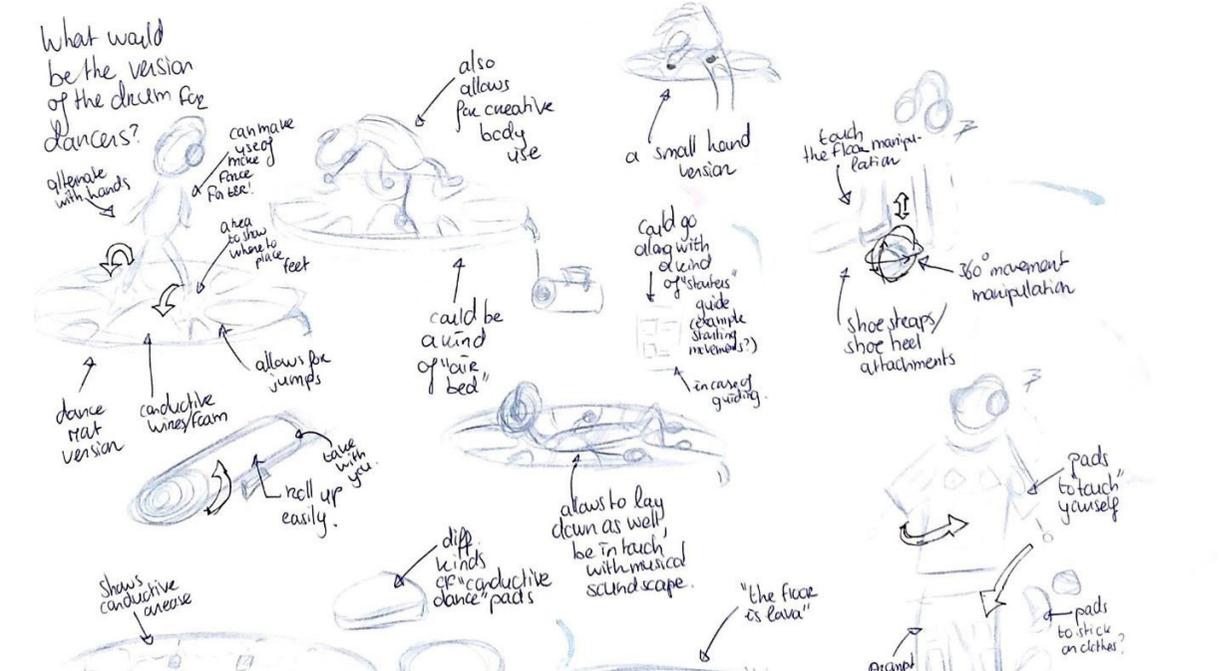
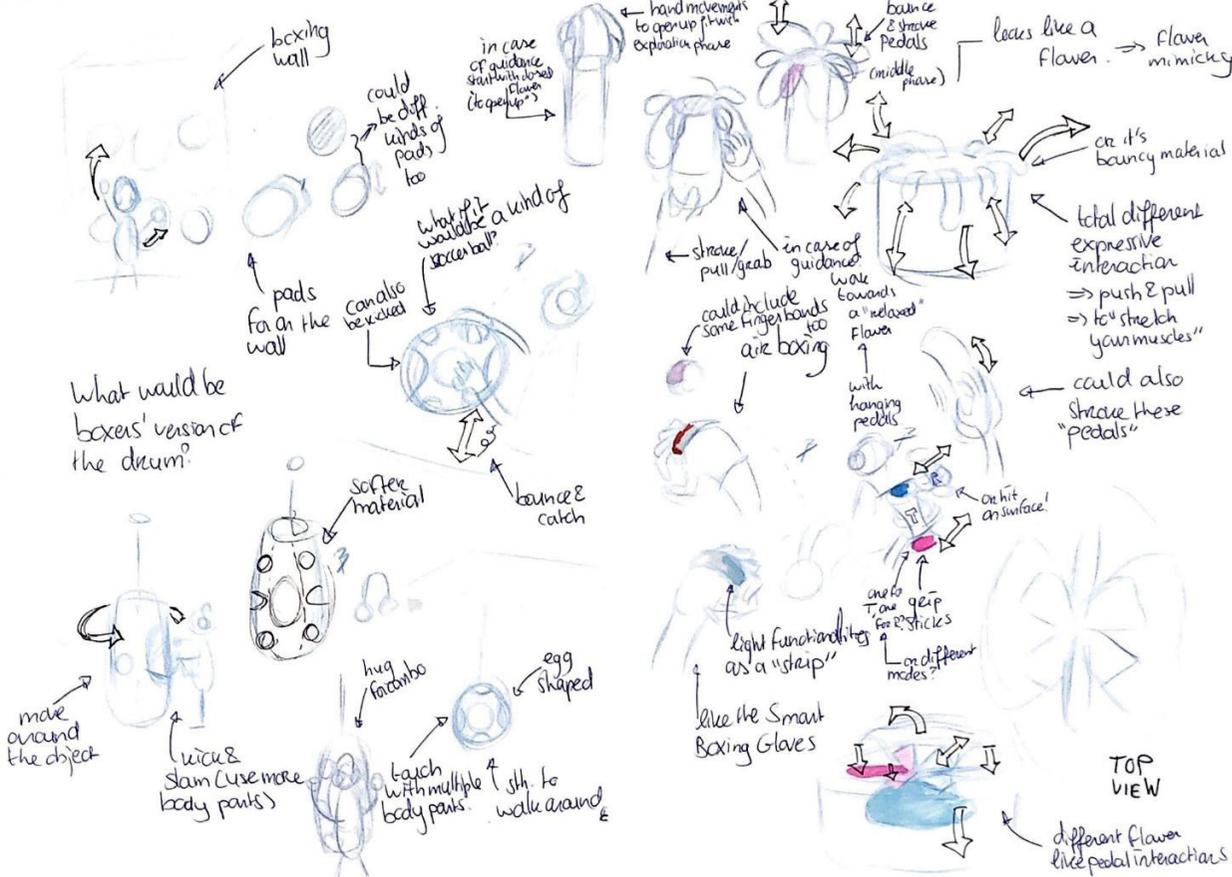
In two iterations, the relaxation / state anxiety effects of the probe in daily home contexts are researched; the unsatisfied needs in expressive drum play for relaxation are investigated; and future design directions are explored. Furthermore, I explored the use of the Experience Sampling Method (ESM), using diaries, semi-structured interviews, and questionnaire data at multiple points in time with a small pool of participants (n=3). A UX method that allowed me to gather mixed data in context about the relaxation effects and unsatisfied needs around the probe to visualize the relaxation / state anxiety effects, and as creative design material to outline future design directions. Moreover, ESM allowed me to implement a first person perspective diary study in the first iteration, incorporating own experiences and gaining empathy beyond understanding with the target group around the probe.



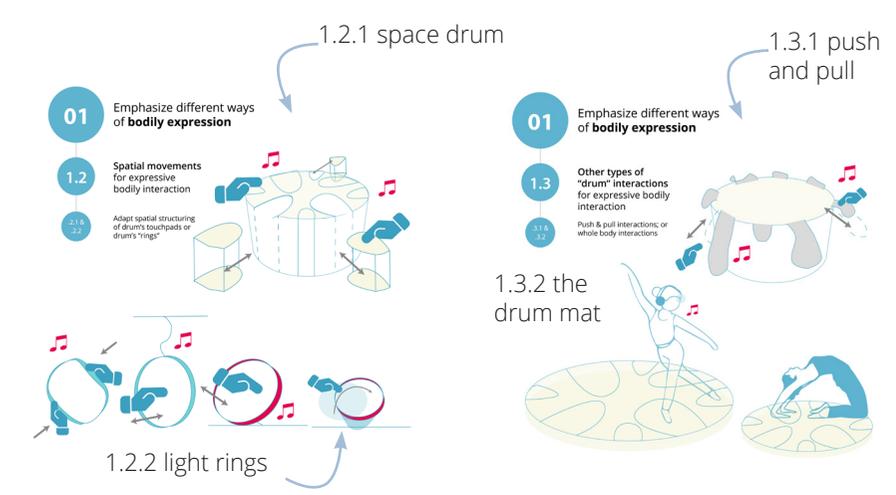
After recruitment and consent, the diary procedure consisted of three phases: the 1) introduction & prototype delivery, 2) the diary study, and 3) the followup interview and future design directions evaluation. Similar procedure was repeated for the next participant and “mixed” data analysis was done in parallel. The mixed data was first analyzed per participant. Afterwards combined and compared, in 4 steps resulting in 1) Effects of the probe’s novel relaxation principle on relaxation and anxiety and 2) Unsatisfied needs for relaxation and future design directions.

Quantitative data analysis of each participant contained: 20 trait anxiety items (introduction) were scored using Excel, resulting in a baseline anxiety (t-anxiety) score for each participant. Differences between the state anxiety scores before and after play for each of the participant’s drum play sessions were calculated (based on the diary forms). Furthermore, drum play videos were annotated, coding participant’s drum play behavior characteristics in video recordings that corresponded to a 1) “top” effect drum play session (highly effective) and a 2) “flop” effect drum play session (ineffective). The videos were annotated with the MAXQDA coding software and through a designed video coder guide, inspired by play behavior insights from the first iteration and literature research.

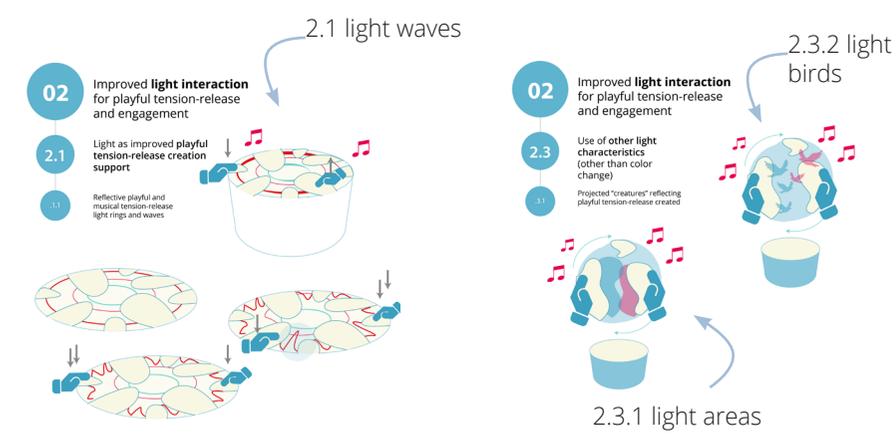
Qualitative data analysis of each participant contained: Thematic analysis of the written diary reports from iteration 1 was done. Introductory interviews were transcribed and a selection of quotes around anxiety, relaxation and musical experiences was made. Qualitative diary reports were summarized and compared with remarkable state anxiety / relaxation effects. Furthermore, followup interviews were transcribed and a selection of quotes around relaxation effects experiences (UX), expressive drum play for relaxation, absorption in play and multi-sensory interactions (UX) corresponding to remarkable drum play sessions was made. Furthermore, a selection around the participants’ mentioned unsatisfied needs in drum play for relaxation, future design directions suggestions and reasoning behind the top-3 suggested improved interaction concepts for RELAX-CHANGE was made.



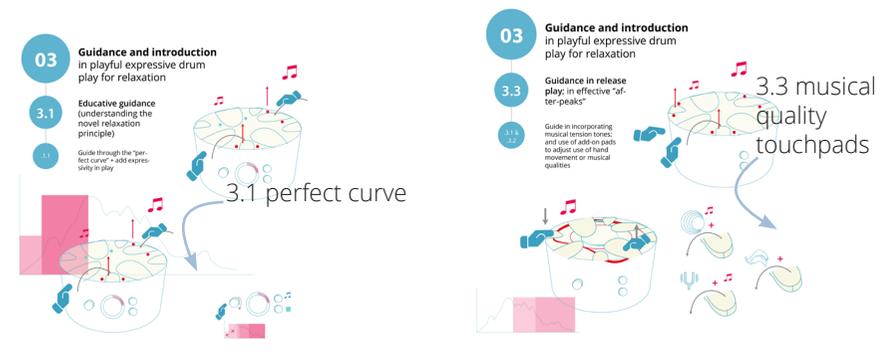
1. Optimizing expressive bodily drum play



2. Optimizing light interaction



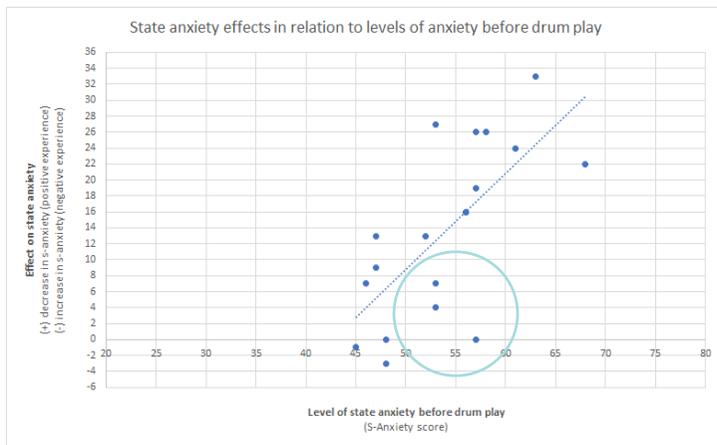
3. The exploration of playful guidance



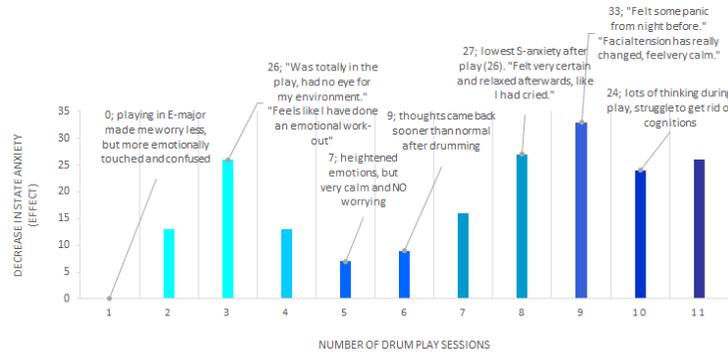
Through the 1-week diary studies, with 3 participants, and mixed methods data collection around usage of the prototype, the relaxation and state anxiety effects are overall positive, with an **average decrease in the participants' state anxiety levels** of 17.5. A decrease that can make the difference in daily functioning.

Four unsatisfied needs around the probe's relaxation support are presented leading to **three suggested future design directions**. Including: 1) optimizing expressive bodily drum play; 2) optimizing light interaction; and 3) the exploration of playful drum guidance through multi-sensory interactions.

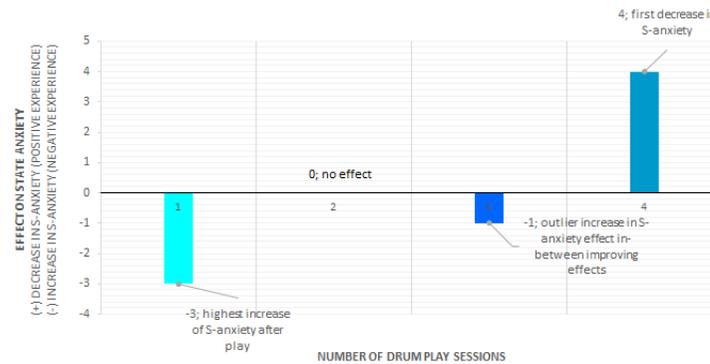
The main focus point considered to inspire future designs of the novel drum for this target group includes: **the drum mat concept**, providing whole body interaction, combined with contextual and reflective guidance. To support increased flexibility in bodily expressive drum play, release of bodily anxiety tensions and to provide a fit with different types of expressive and contextual daily relaxation needs.



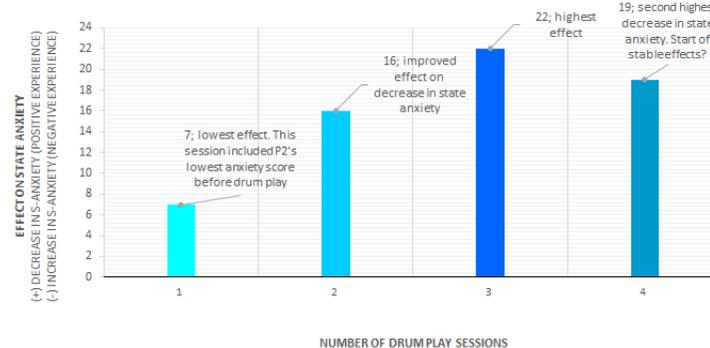
STATE ANXIETY EFFECTS P0 (FIRST PERSON PERSPECTIVE DIARY STUDY)



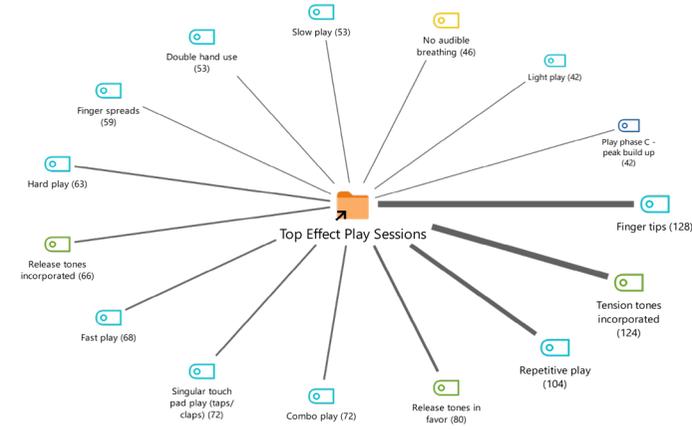
STATE ANXIETY EFFECTS P1 (SECOND PERSON PERSPECTIVE DIARY STUDY)



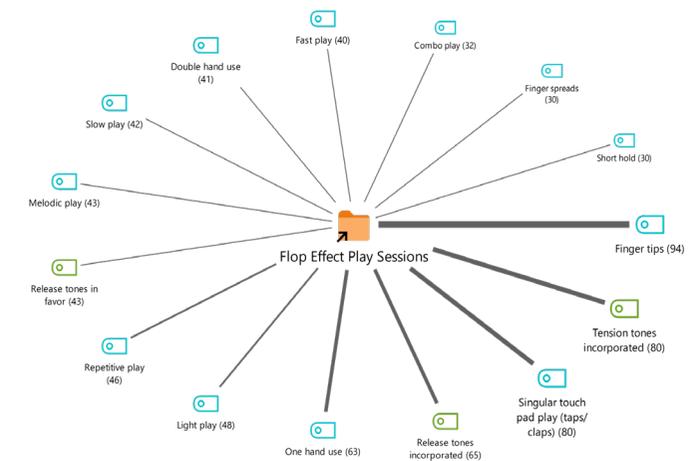
STATE ANXIETY EFFECTS P2 (SECOND PERSON PERSPECTIVE DIARY STUDY)



Top effect drum play behavior characteristics



Flop effect drum play behavior characteristics





The creation of RELAX-CHANGE

A Physical, Expressive and Multi-sensory Drum Tool Changing The Perspective on Relaxation for People With High Levels of Anxiety

Design Research
for mental healthcare

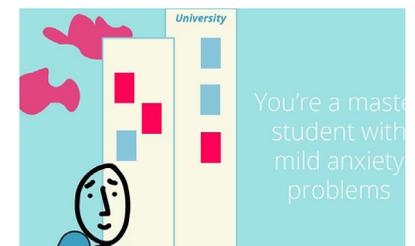
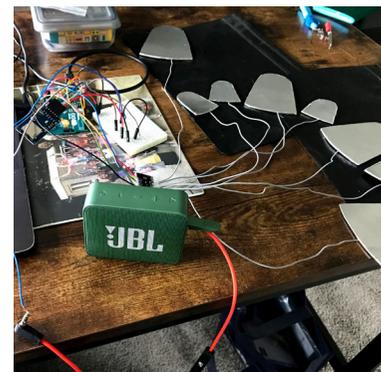
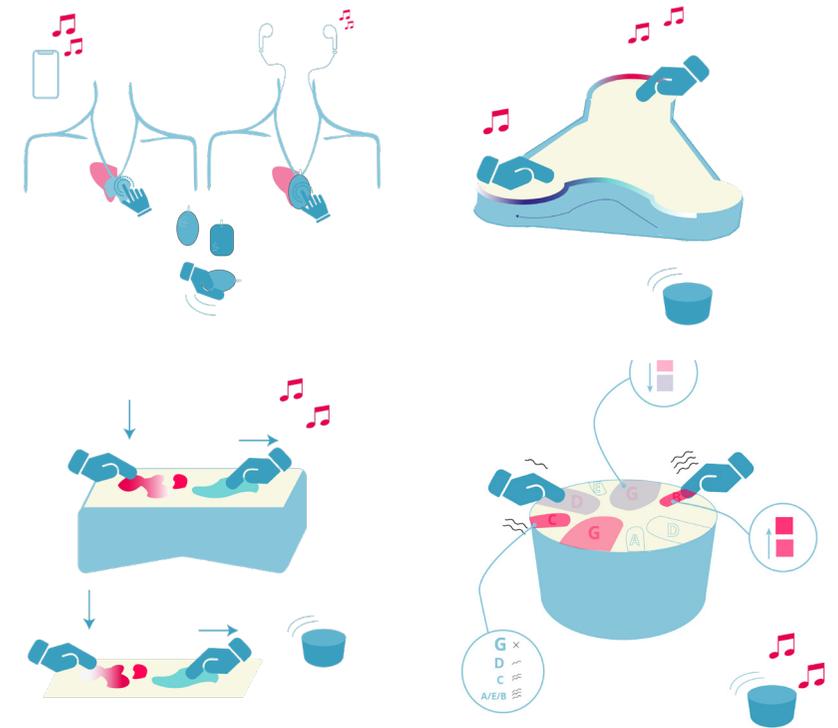
Master Project
Individual project
2nd year masters

Collaboration
psychotherapy research experts prof. dr. Julian Rubel & dr. David Rosenbaum

Applied & Learned Skills
Literature research & scoping; multi-disciplinary collaboration; focus groups & expert interviews; video probes; qualitative data analysis; interaction prototyping

IN SHORT

In this project, the probe RELAX-CHANGE is designed; together with a very first prototype; two highly qualitative and evaluative online focus groups were done, with in total 7 participants; and 3 expert interviews, with 2 experts from the field of clinical psychology. It was found that in general, RELAX-CHANGE has the potential to support in relaxation and is expected to have positive relaxation effects due to its underlying principles and engagement potential of specific design aspects. This was based on certain design principles that were valued by the participants, as low engagement barriers, "useful tension", physical activity/mind-body workouts and distraction. Moreover, results show that 'recognizability' of the drum, 'freedom' in expression and 'fun' in crescendo building led to positive potential for engagement in the design, and so support in relaxation. However, boundaries of the design potential emphasize improvements in the multi-sensory aspect of the design.





RELAX-CHANGE in psychotherapy

The investigation of the values, weaknesses, opportunities, and threats of the design probe RELAX-CHANGE to offer novel relaxation support in psychotherapy research and practice, for people with anxiety disorders and beyond

Design Research

for clinical mental health-care (at psychotherapy department in Germany)

Collaboration

psychotherapy research experts prof. dr. Julian Rubel, hired electrical engineering student & Innovation Space

Master Project

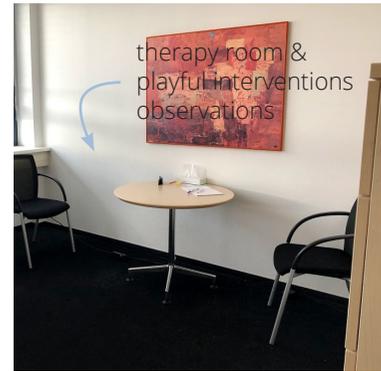
Individual project
2nd year masters

Applied & Learned Skills

Multi-disciplinary collaboration; multi-stakeholder semi-structured interviews & co-reflection; qualitative data analysis; SWOT; technical drawings; psychotherapy knowledge; music theory

IN SHORT

This design research contained two phases 1) background research and semi-structured multi-stakeholder interviews, and 2) evaluation and clinical & design implications, performed in three iterations. 11 semi-structured interviews were done with various participants in the clinical field such as clinical psychology students (BSc / MSc) (n=7), clinical psychology / psychotherapy researchers (n=3) and therapists (n=1). Moreover, a high level prototype of RELAX-CHANGE was developed. Resulting clinical and design implications contribute to supporting a larger part of the target group in relaxation and beyond; to increasing the intervention space for clinical practitioners / researchers; and to enhancing mutual understanding amongst designers, psychotherapists and researchers. In general it was found that psychotherapists and researchers are open minded towards new technologies and the design probe can even extend horizons, however individual patient's and therapist's needs have to be considered. Moreover, design qualities such as 'accessibility and flexibility', 'visible direct feedback', 'engagement and absorption potential' and 'playful musical approach' have potential to add value in clinical contexts. Moreover, the probe's 'educative and reflective' qualities, 'measurement' qualities, 'connect therapy with daily life' quality and quality to 'fit with the relaxation needs from therapists' shows its potential to stretch the boundaries of the use of tangible design in mental health.



#2 (tangibles) Added value and opportunities

- 24** Subthemes
some highlighted: 'support in expression, 'drum's engagement and absorption potential', 'visibility and directness of feedback', or 'drum as specific homework tool'
- 596** Codes

#3 Positioning of tangibles in psychotherapy

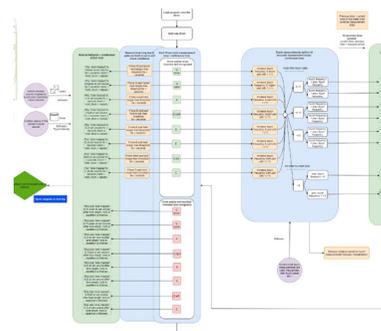
- 4** Subthemes
'music related interventions', 'interventions for relaxation', '(verbal) expression in therapy', and 'current clinical psychology research and practice'
- 44** Codes

#5 Unexpected opportunities

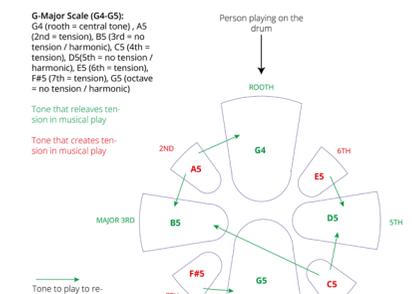
- 8** Subthemes
some highlighted: 'drum for education, discussion and reflection'; 'use for therapists themselves'; and 'drum as objective measurement tool'
- 288** Codes

#6 Future visions in psychotherapy

- 3** Subthemes
'future of psychotherapy', 'design important for the future', 'role of new technologies in psychotherapy'
- 34** Codes



Harmonic Tension & Release (major & minor scales)





Talki Talkie

A product-service system that empowers elderly in nursing homes to communicate their healthy eating opinions through voice agents

Service Design

for elderly healthy eating in nursing homes

Master Project

Team of 2 students
1st year of the masters

Client

Archipel (nursing home)

Applied & Learned Skills

Service (multi-stakeholder) design approaches; user journey mapping & service blueprint tools; co-reflections; contextual inquiries & observations; qualitative data analysis; video probes; programming & electronics for interactive tangibles



IN SHORT

Talki Talkie is a product-service system that empowers the elderly in care homes towards choosing what they eat. A personal voice agent gives notifications of the food production process. This raises transparency and enhanced communication. Through a non-intrusive and slowly breathing light ring, the elderly get to know the circumstances of their food. Sound playback and voice recognition enable easy communication about food choices. Additionally, caretakers can provide feedback on the residents' choices through a corresponding digital platform.

DUTCH DESIGN WEEK 2020

Talki Talkie got selected for the Drivers of Change exhibition as part of the digital Dutch Design Week 2020 last year! Especially because 1) the project raises awareness of the elderly's autonomy (in nursing homes) and lets their voices be heard; 2) Talki Talkie is an attempt to apply the voice agent in the elderly nursing home context; and 3) The focus on caring and warm interaction through holding and communicating with a personal tangible object, which creates a new opportunity for interacting with a voice agent in this context.

<https://ddwtue.nl/projects/talki-talkie/>

Ageing population is a phenomenon occurring all over the world. The amount of older adults over 65 years old in the Netherlands is expected to be around 4,6 million in the year 2040. This rise concerns in the caregiving industry and the elderly's daily quality of life (QoL). With aging, elderly's daily life situations change, such as transition to nursing homes, and decreased physical health which can create feelings of loneliness and a lack of positive emotion negatively affecting their daily QoL. Therefore, research emphasizes on healthy aging amongst older adults. Next to this, it is seen that the number of elderly in long-term care facilities with increased dependency on caring staff is expected to rise, due to more complex health needs. Due to changing working conditions, caring staff in nursing homes experience high workload and increased stress levels. This results in decreased caring quality having consequences for the elderly's QoL.

Need for autonomy in healthy eating

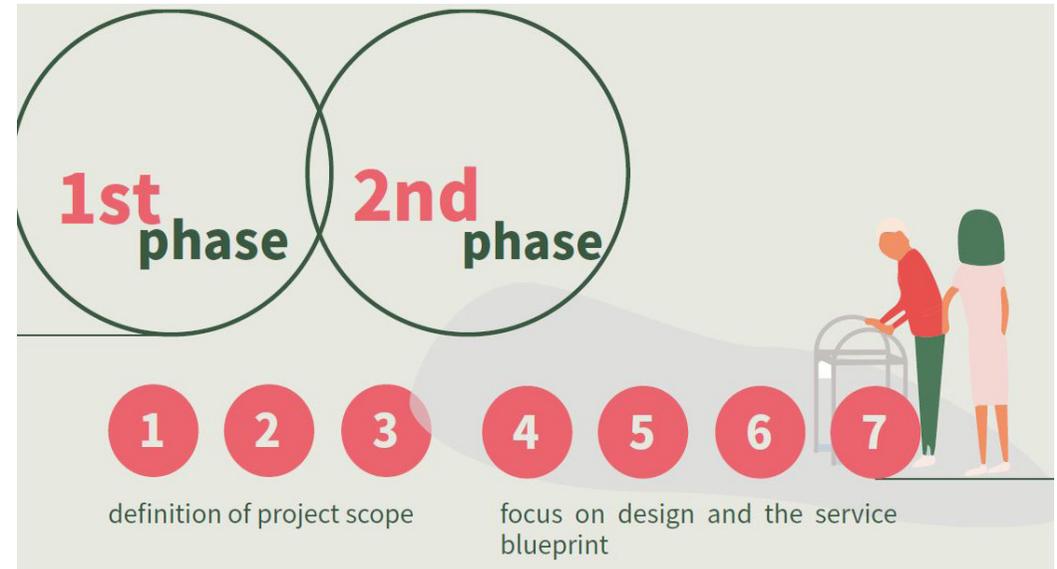
A variety of eating problems amongst older adults is one of the causes for the elderly's greater dependency on caring staff. Aging affects the older adult's eating patterns and ability to eat. Therefore, elderly experience decreased sensitivity to taste and smell and have decreased ability to seek variety in their meals. In order to provide quality of care, empowering care has been researched beneficial, making sure older adults keep in control of their lives and so increase their QoL. In this way one of the challenges for designers is to increase elderly's authority to decide what to eat which is of major importance in order to positively influence their healthy eating behavior.

Service design focus

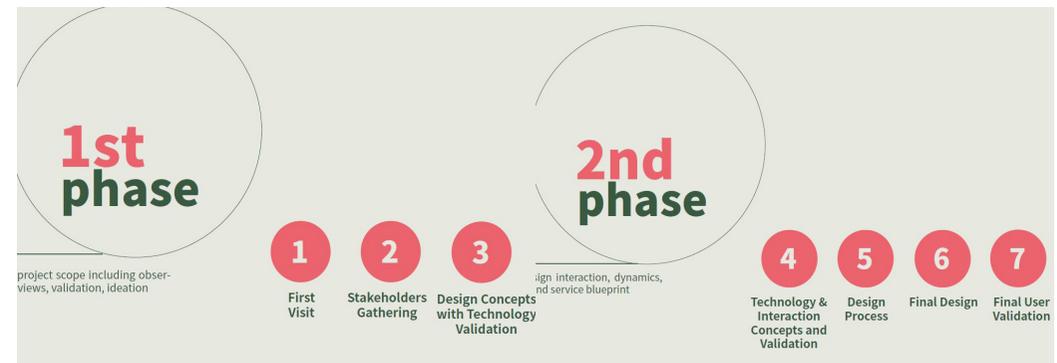
That is why in this project, it is mainly aimed at improving the communication of elderly residents with the other stakeholders in their healthy eating process in a nursing home by empowering them a personal platform to choose meals, involve in healthy choices, and let their voices be heard.

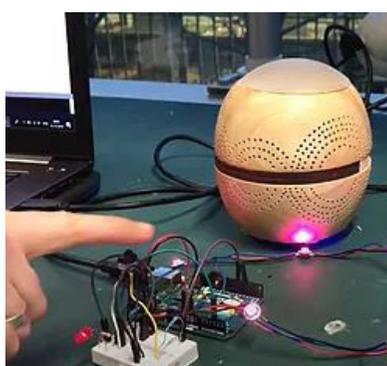
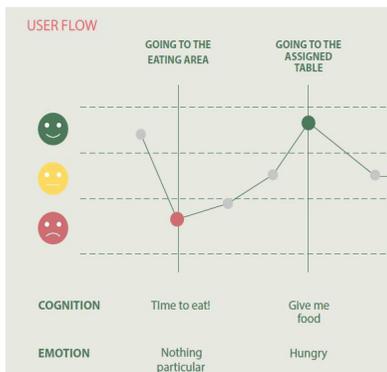


Design process



The design process contained two phases and seven iterations. The first phase represented the definition of the project scope through contextual design including a first design concept. In the contextual design, the steps included: contextual inquiry, eating room observations and multi-stakeholder co-reflections (reflecting on values & eating journey). In phase 1, we changed our design concepts from various ideas related to autonomous food choosing, for example, food shopping through VR technology, herbs gardening table, co-creation menus, to choosing games using hologram technology. The second phase was mainly focused on the design of the final voice agent product-service system, including interaction, dynamics, technology and the service blueprint. Moreover, this phase clarified the stakeholders involved in nursing home, discovering the insights of elderly's daily life and the needs during their eating process. In the final 3 iterations, we validated 4 different kinds of interactive choosing games through video probes and 6 activities led to the final result of a product-service system Talkie Talkie exploring the needs of the elderly healthy eating in caring home ecosystems.

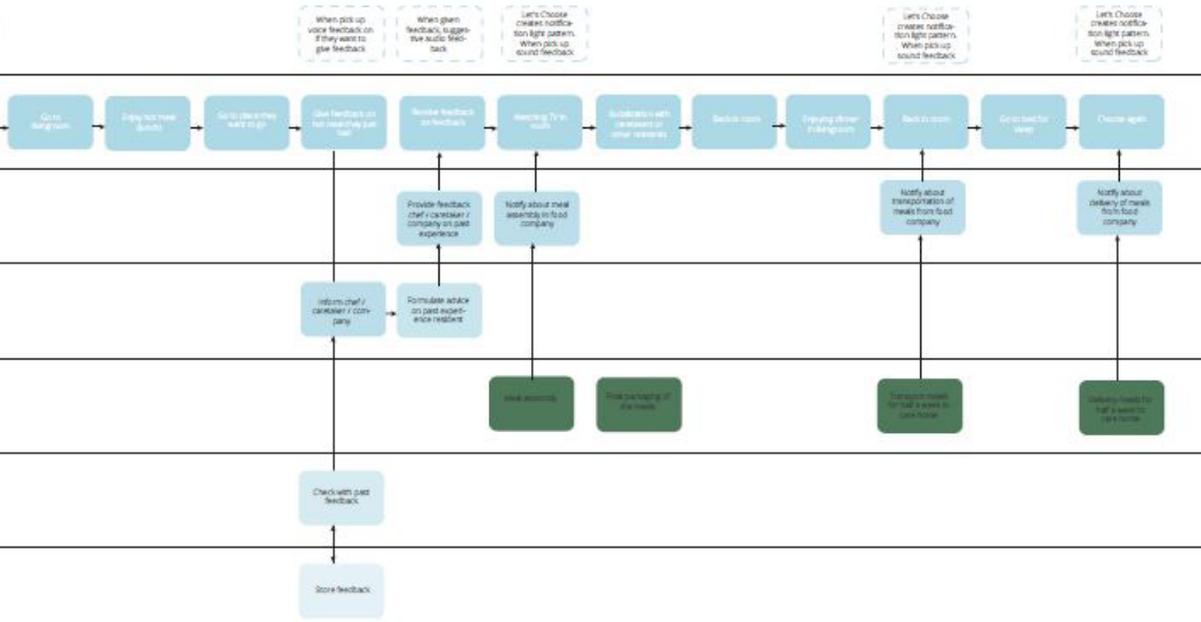
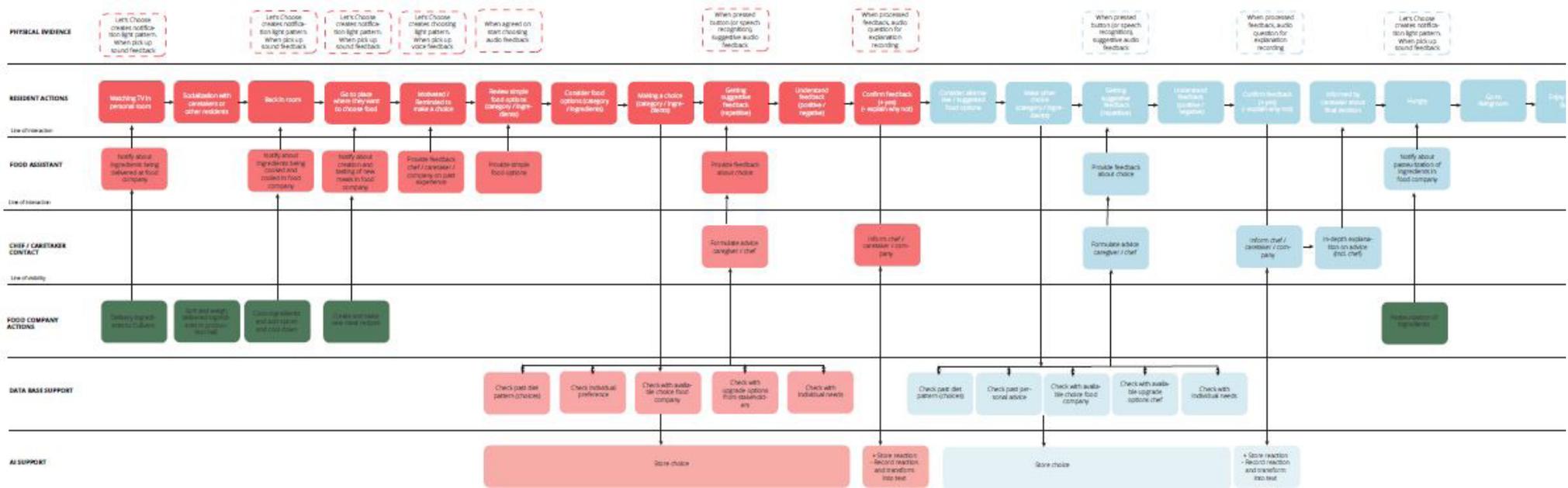




Results



Talki Talkie is the evolution out of previous concepts from both phases. It is a **personal voice agent** situated in the personal rooms of the elderly residents (55-85 years old) living in long-term facilitation in nursing homes. Goals for the design are to make their opinion heard to all involved stakeholders as caretakers and food company; and to directly couple back stakeholder feedback to the residents. Furthermore, to increase trust towards the overall eating process and therefore the design offers information in the form of notifications about the food company's food producing process phases.



In order to support and sustain elderly healthy eating within this, wider, multi-stakeholder context a service was created and visualized into a **service blueprint**. In this way we were able to show how the service can be implemented in caring home ecosystems and used by the elderly residents. The design of this blueprint contains physical evidence from Talki Talkie, resident actions, the frontstage (actions occurring directly in viewpoint of residents), including food assistant, chef/caretaker contact and finally the backstage, including support activities. Most important found out from the blueprint that this service can bridge the gap in communication between all layers as elderly – caretakers / chef, elderly – food company, caretakers / chef – food company. In short-term it improves communication between all stakeholders and in the long-term improves the quality of the meals and meal selection by food company. The blueprint shows that through database and AI support, the meal choosing process can be fully personalized to the residents based on their past diet pattern, preferences, past recorded feedback, food company offers, upgrade options from stakeholders and individual needs, decreasing workload for caretakers.



Internship Studio Tast

Designing a smart tangible-digital product (proof of concept) that teaches children in primary schools multiple arithmetic domains: “weight concepts”, “spatial awareness” and “telling time”. Based on Tast’s innovative Goed Wijzer clock tool

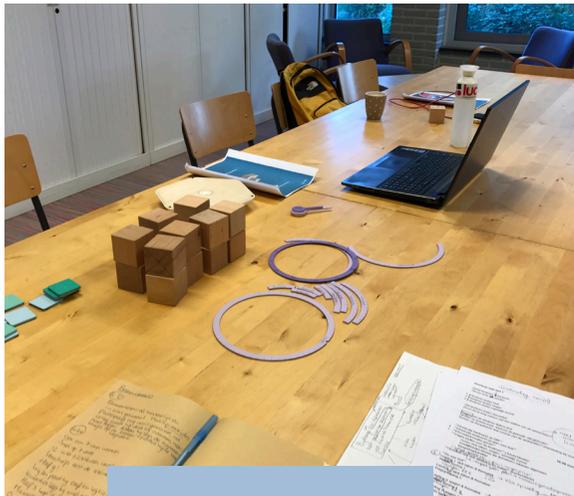
Multi-disciplinary Design for education

Collaborations
Tast employees, didactic expert, Salto primary schools

Client
Studio Tast - educational design studio

Applied & Learned Skills

Persona and user journey UX tools; multi-disciplinary expert & stakeholder interviews (educational & didactic field); field user tests (at primary schools & at the studio); qualitative data analysis; rapid tangible prototyping; graphic design & 2D visuals



User test of tangible Goed Wijzer tools with prototypes for the new arithmetic domains @ primary schools (main project)



Experience interior design for studio Tast's meeting room Tast Lab (side project)



Graphic design tasks (side project)



Kooko

Design research: does preparing a meal with guiding cooking tools motivate seniors with mild to moderate dementia engage in a group activity in a nursing home environment?

Multi-disciplinary Design Research
for seniors with dementia

Collaborations
3 fellow students; caretakers;
Pleyade Innovation Team, re-
search experts (van Berlo)

Client
Pleyade - nursing homes

Applied & Learned Skills

Desk research & scoping; ethnographic studies (observations, in-context evaluations with tangible prototypes); user study design & data collection tools (observation schemes / question sets); multi-stakeholder interviews; and thematic analysis (qualitative)



Design research process
(6 iterations)

USER STUDIES & PROBES

Participating in lunch preparations within a Pleyade living unit; observations; in-context design evaluations



Digital guiding cooking interaction evaluation using the "Cooking Mama" application



Participation in lunch preparations and in-context lunch observations



Final user study with the tangible guiding Kooko cooking tool prototypes to evaluate affected motivation & social engagement

social engagement.	Level of Refusal	Duration	Level of Attention	Level of Attitude
Names of participant				
MARY	✓	1 min	medium	Positive "I'm not sure if I'll be able to do this"
JAMES	✓	1 min 30 sec	low - medium	Neutral
DANIEL	✗			Very Negative "This is so difficult"
YV (D)	✗	1 min 30 sec		Very Negative "I don't want to do this"

mood.	Before the activity	During the activity	After the activity
Names of participant			
MARY	😊	😊	😊
JAMES	😊	😊	😊
DANIEL	😞	😞	😞
YV (D)	😞	😞	😞

Behavioral observation schemes user studies



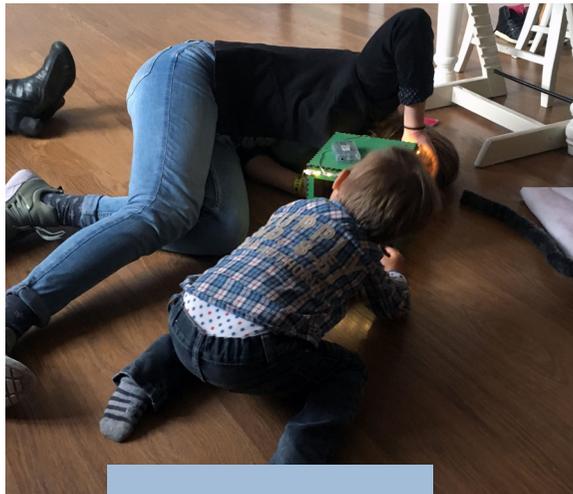
Data downloading (qualitative analysis user study 2)

WANT TO KNOW MORE ?

Go to: <https://www.veerlevanwijlen.com/>

e.g. about the

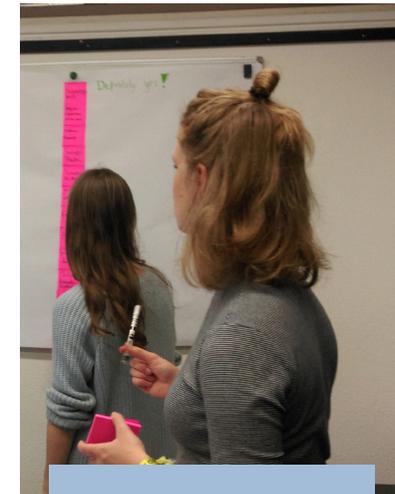
MIAUSE PROJECT



In-context user test to evaluate bonding tools and evidence-based mechanisms for visually impaired children & their parents (participation & immersion)



Co-reflection with ambulatory bonding therapists for families with a visually impaired child



Leading a qualitative data analysis session within a team of five project members