Amsterdam University of Applied Sciences | DIGITAL SOCIETY SCHOOL | exodus

INTENTION MIRROR

How to make information more accessible for ex-offenders to reduce crime?

FALL 2018 SEPTEMBER - JANUARY

HOW TO CONVERGE DIGITAL WITH PHYSICAL FOR SUSTAINABLE SOCIETY?

WHEN DIGITAL SOCIETY RISES...

...WHAT IMPACT DOES IT HAVE ON OUR PHYSICAL WORLD?

INTERNET OF THINGS

THE EVOLUTION OF MAKING OBJECTS

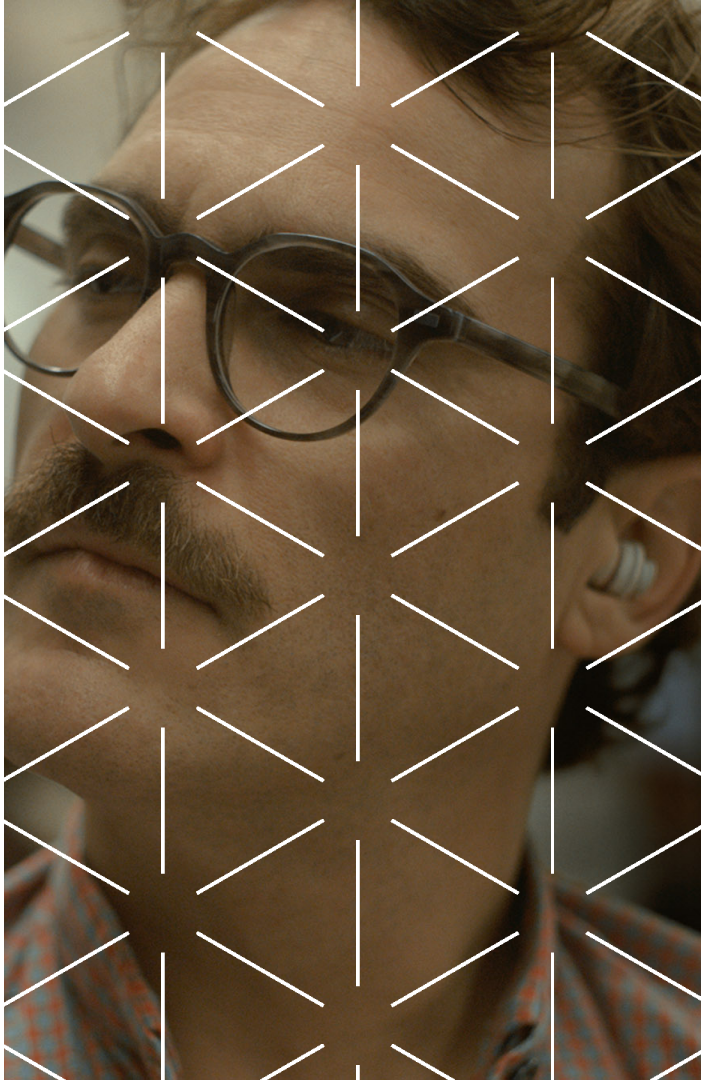
A NETWORK OF 'SMART OBJECTS' THAT

LET'S THEM COMMUNICATE TO EACH OTHER

WITHOUT NEEDING HUMAN INTERACTION.

INTERNET OF PEOPLE

A HUMAN-CENTRED DESIGN APPROACH TOWARDS THE INTERNET OF PEOPLE, WHERE THE EFFECT ON SOCIETY IS RESEARCHED AND UNCERTAINTIES ABOUT OUR FUTURE IN THE ‘PHYSICAL’ WORLD ARE RAISED.



DIGITAL DESIGNERS HAVE A POWERFUL AND GROWING INFLUENCE OVER HOW WE INTERACT WITH OUR PHYSICAL WORLD.

- KRISTIN ALDRED CHEEK

WE NEED
SHARED GOALS
TO HELP US HAVE
REAL IMPACT


1 NO POVERTY
2 NO HUNGER
3 GOOD HEALTH
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 CLEAN ENERGY
8 GOOD JOBS AND ECONOMIC GROWTH
9 INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION
13 PROTECT THE PLANET
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE AND JUSTICE
17 PARTNERSHIPS FOR THE GOALS
THE GLOBAL GOALS
For Sustainable Development

SEMESTER PROJECT

HOW TO MAKE INFORMATION MORE ACCESSIBLE FOR EX-OFFENDERS TO REDUCE CRIME?

Amsterdam University of Applied Sciences | DIGITAL SOCIETY SCHOOL | exodus

INDUSTRY PARTNER

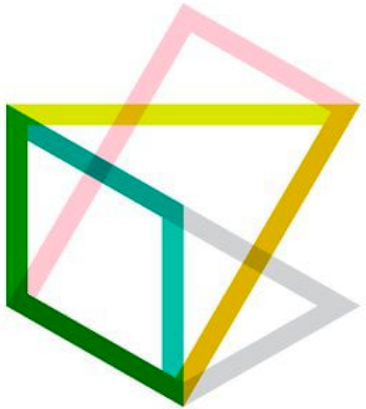
For over 30 years the Exodus foundation has contributed to a safer and more inclusive society by supporting ex-offenders and their relatives to restore their lives after detention and avoid future criminal behaviour. They provide mentoring programs and the foundation has housing facilities in more than ten cities and mobile care and volunteer services in many more municipalities.

INDUSTRY PARTNER

Exodus is constantly improving the way they work. They approach this by inspiring and facilitating the realization of new ideas and possibilities among their professionals and volunteers. This leads to interesting but sometimes relatively short-term and isolated improvements.

To work towards a more future oriented and broader innovation approach, Exodus is interested in building partnerships with other innovators and design thinkers, by developing lighthouse concepts that can connect stakeholders in this area of work to increase their joint impact.

CONSORTIUM PARTNER



Reframing Studio is a design agency specialised in design thinking. Together with Exodus Zuid-Holland, they have worked towards future concepts; an exploration of innovative techniques to contribute to the resocialisation of ex-convicts.

SUSTAINABLE DEVELOPMENTS GOALS

In order for nations to flourish, equality and prosperity must be available to everyone - regardless of gender, race, religious beliefs or economic status. When every individual is self sufficient, the entire world prospers.

Compassion and a strong moral compass is essential to every democratic society. We must ensure that we have strong institutions, global standards of justice, and a commitment to peace everywhere.

The Global Goals can only be met if we work together. To build a better world, we need to be supportive, empathetic, inventive, passionate, and above all, cooperative.

RESEARCH QUESTIONS

- HOW CAN WE CREATE DATA OWNERSHIP?
- HOW CAN WE REDUCE DIGITAL ILLITERACY TO COMPLY WITH TECHNOLOGICAL EVOLUTION?
- HOW CAN WE TRANSLATE TRUST IN AN INTERFACE?

RESEARCH TEAM

Anushree Jain
(IN)

Game Designer
National Institute of Design

Ginger Ultee
(NL)

Software Engineer
Amsterdam University of Applied Science

Alec Stewart
(US)

User Experience Designer
The Hague University of Applied Science

Roxane de Jong
(NL)

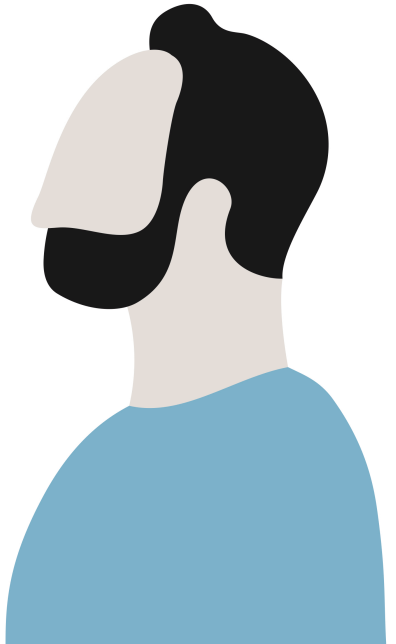
Communication Designer
Design Academy Eindhoven

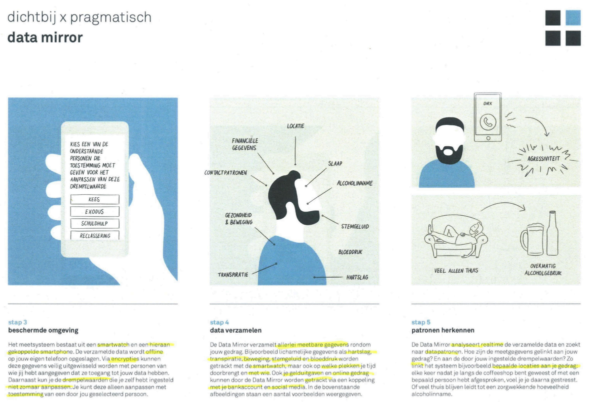
THE FUTURE CONCEPT CALLED: ‘DATA MIRROR’ WAS BROUGHT IN TO INSPIRE THE PROJECT.

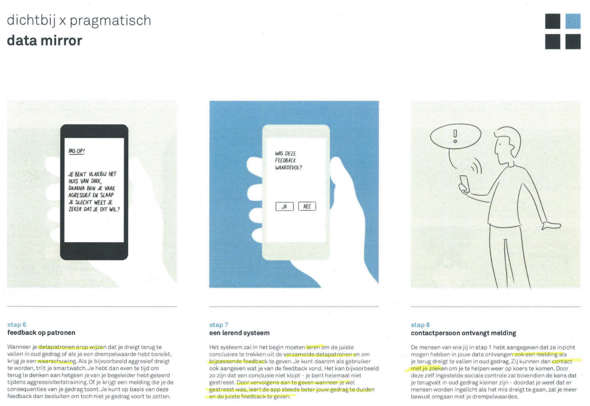
augustus 2018

concept: data mirror

reframing terugkeer na detentie







TRACKING.
INZICHT KRIJGEN IN ZIJN OF HAAR EIGEN GEDRAG
HULP VRAGEN
BESTAANDE ALGORITMES EN SYSTEMEN
TRANSPARANTE MANIER TE ANALYSEREN
WAARSCHUWING DATA MIRROR
DATAPATRONEN
ZELFSTANDIGHEID
ZELF BEPALEN WIE ER MEE KIJKEN
EN HOEVEEL ZIJ ZIEN
DREMPELWAARDEN VOOR WAARSCHUWING
SMARTWATCH EN SMARTPHONE
OFFLINE OP JOUW EIGEN TELEFOON VERZAMELD
ENCRYPTIES

SECOND-PARTNER VERIFICATION
VERZAMELT MEETBARE GEGEVENS
BLOEDDRUK, HARTSLAG
LOCATIE / GPS
GELDUITGAVEN EN ONLINE GEDRAG
REALTIME VERZAMELEN
ZOEKT DATAPATRONEN
GEDRAGSPATRONEN
FEEDBACK OP PATRONEN
AGRESSIEF GEDRAG, TRILT JE SMARTWATCH
LAST MINUTE HALT
JUISTE CONCLUSIES
FEEDBACK OP LEARNING
SECOND-PARTNER NOTIFICATION

QUESTIONS AFTER ANALYSIS

The concept outlined by Reframing Studio brought certain questions:

- **How will the end-user interpret graphic visualisation of collected data?**
- **How able are the participants in navigating such tasks on an app?**
- **How can we measure 'Bad' behaviour of the user?**
- **How does the app collect data from just a phone?**
- **Will the users appreciate disruption of their daily behaviour by prompt?**

FORMULATED PROBLEM SPACE

The information that helps participants of the Exodus program in their resocialisation process is accessible, but incomprehensible due to the length of information and graphical visualisation. Because of this, participants are too dependent on their care taker for guidance in their return back to society and limits the care the care taker can give to practical tips on sustaining a life in society, and not on actual resocialisation. This increases the chance on recidivism.

RESOURCES

Datasets regarding behavioural patterns could not be delivered by Exodus, and therefore: The first goal was to look at how behaviour data could be collected and utilised for a machine learning algorithm. Adding to this, the sketched concept has a lot of reliance towards third parties, who have to approve use of their datasets to develop a working prototype.

AIM OF 20 WEEKS PROJECT

CREATE A DEVICE THAT COLLECTS DATA THAT CAN BE USED TO CREATE A MACHINE LEARNING (ML) ALGORITHM.

INCLUSIVE RESEARCH TO COMMUNICATE BENEFITS OF SELF-TRACKING.

By understanding the complex social dynamics participants face, the Digital Society School can develop a product that helps participants to stick to their desired behaviour intentions. The project needs to be tailored to the user's understanding of digital language and required simplified user interfaces and interactions.

The work done by the Digital Society School and its learners need to be communicated clearly to participants of the Exodus program and tools should be developed to include participants in inclusive research. By rapid prototyping, the team has a chance to help people who are willing to learn from their behaviour and find their way back into society.

QUANTIFIED MOVEMENT

The ‘Quantified’ movement began in 2007 and tries to incorporate technology into data acquisition on aspects of a person’s daily life.
The ‘Quantified’ movement is separated in four aspects:

- **Quantified Self**
- **Quantified Us**
- **Quantified Other**
- **Citizen Science**

QUANTIFIED SELF

If the individual has chosen to monitor themselves and uses this data to receive feedback on their own life, we speak about 'Quantified Self' (QS).

QUANTIFIED US

If a group of people has chosen to track their behaviour as a group, share this data with each other, and receive the feedback, we talk about 'Quantified Us' (QU).

QUANTIFIED OTHER

An individual being tracked by a device, but provides data and feedback to another party is called a 'Quantified Other'. (QO).

CITIZEN SCIENCE

When a larger group of people are monitored for the purpose of collecting data to provide feedback to third parties, this falls in the domain on Citizen Science.

RELEVANCE TO ‘INTENTION MIRROR’

Each of these ‘Quantified’ movements have a relevance to digital society and the ‘Intention Mirror’ project. The one most aligned with the shared goal of inclusivity and data ownership is that of the ‘Quantified Self’.

The choice to focus on the Quantified Self resulted in a focus on three behavioural patterns that are causes of recidivism.

BEHAVIOUR DATA MAPS

ISOLATION:

\+ LOCATION & COMMUNICATION

\- COULD BE A CHOICE

FINANCE:

\+ BEHAVIOUR PATTERNS & DATASETS

\- DEPENDABLE ON A THIRD PARTY

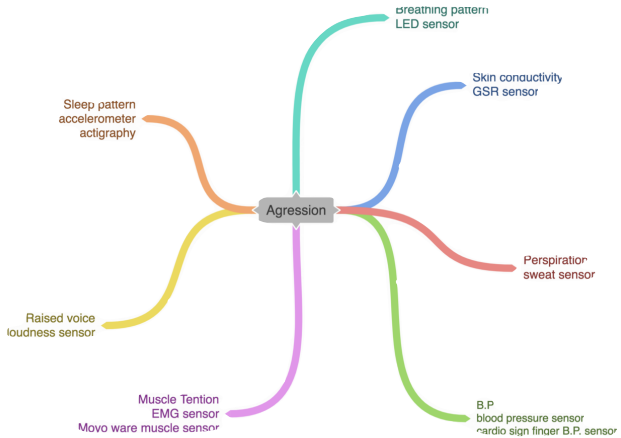
AGGRESSION:

\+ EASIEST TO MEASURE

\+ USER IS PRONE TO MAKING MISTAKES

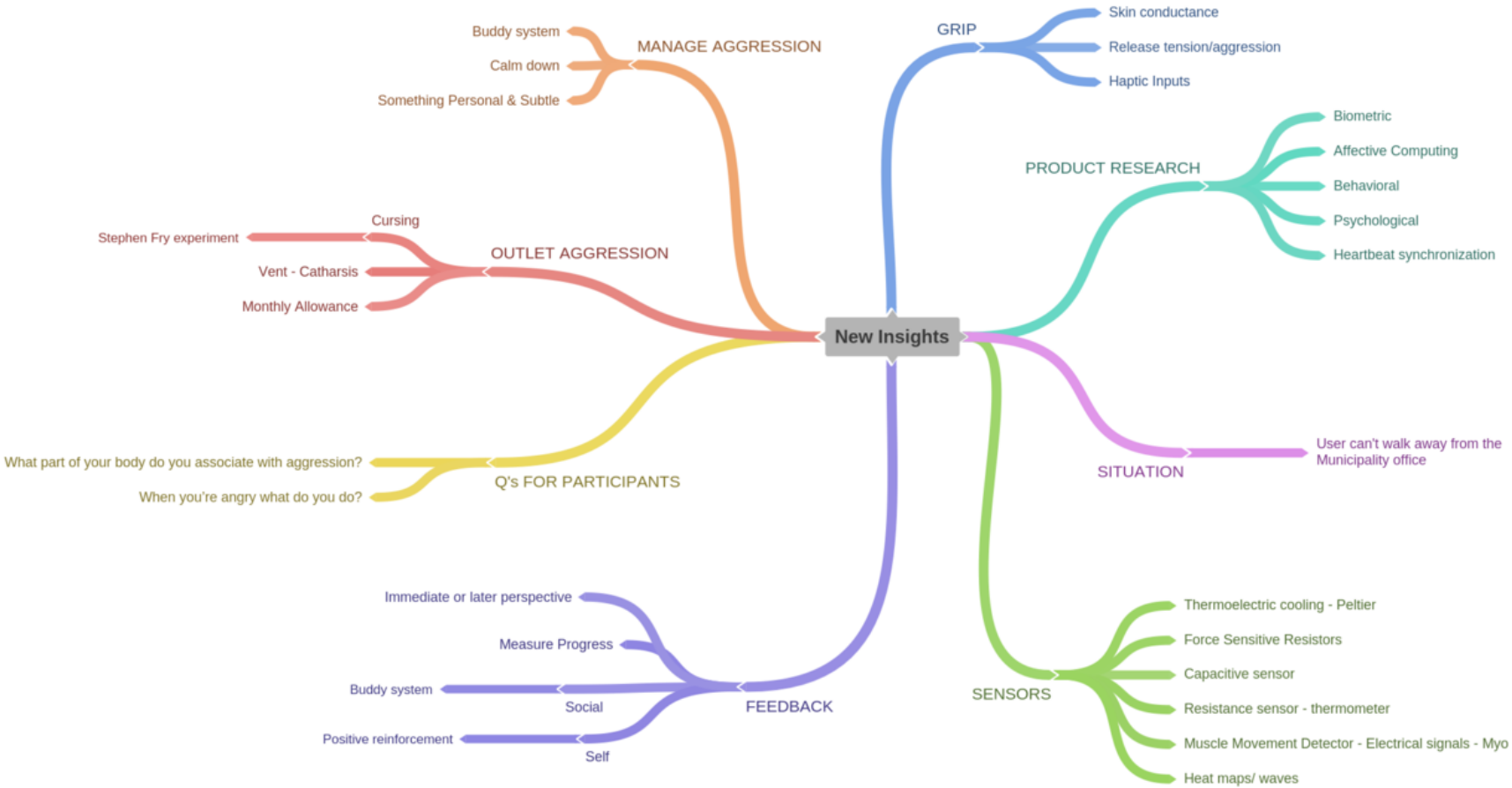
\- STIGMA OF ‘BEING AGGRESSIVE’

MEASURING ‘AGGRESSION’



The domain of ‘Aggression’ had the most potential for further exploration, as it can be measured by behaviour, heart beat, skin conductivity and social behaviour.

The objection towards this area was the stigma related to ‘being aggressive’ as the majority of people do not wish to be labeled as such.


New Insights
MANAGE AGGRESSION
Buddy system
Calm down
Something Personal & Subtle
OUTLET AGGRESSION
Cursing
Stephen Fry experiment
Vent - Catharsis
Monthly Allowance
Q's FOR PARTICIPANTS
What part of your body do you associate with aggression?
When you're angry what do you do?
FEEDBACK
Immediate or later perspective
Measure Progress
Buddy system
Social
Positive reinforcement
Self
GRIP
Skin conductance
Release tension/aggression
Haptic Inputs
PRODUCT RESEARCH
Biometric
Affective Computing
Behavioral
Psychological
Heartbeat synchronization
SITUATION
User can't walk away from the Municipality office
SENSORS
Thermoelectric cooling - Peltier
Force Sensitive Resistors
Capacitive sensor
Resistance sensor - thermometer
Muscle Movement Detector - Electrical signals - Myo
Heat maps/ waves

FIRST PROTOTYPE

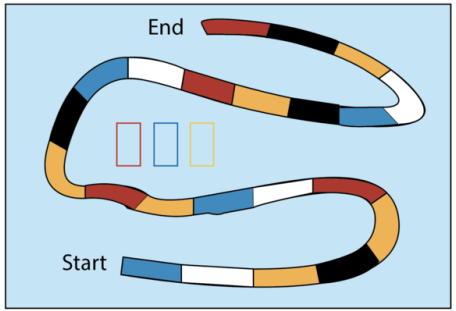
PAPER PROTOTYPE

Objective: Test a prototype with participants of Exodus during a visit on the 7th of October to Exodus Rotterdam.

Goal: Get insights on the participants reaction towards data tracking, graphical visualisation and feedback vocabulary.

GAMIFICATION METHODOLOGY

We started designing a game that will make it easier to talk about aspects of frustration, happiness and calm moments with the participants of our survey.



Talking:
- Tell someone about your 1 frustrating moment
- What is the one thing that frustrates you?

Feeling:
- How do you feel today?
- How do you feel when someone raises their voice?
- How does your body feel when you are aggressive?

Doing:
- What do you do when you are frustrated?
- What do you do to calm down?
- Some people are good with controlling their feelings. What can you do to control yours?

4 people
20 cards of each (talk, do, feel)
Spin the wheel/throw dice to move
Score points (D-15, T-10, F-5)
Reach the finish line

PROTOTYPE TESTING

Date: 7th of October

Location: Exodus Rotterdam

Surveyed: Two caretakers, one participant, one volunteer

INTERVIEW INSIGHTS

- “EVERY PARTICIPANT IS DIFFERENT AND DESIGNING A SOLUTION FOR ALL OF THEM CAN BE EXTREMELY HARD.
- EXODUS ROTTERDAM USES A THERMOMETER TO HELP UNDERSTAND THE PARTICIPANTS MOOD 4 COLOURS: AGGRESSIVE (RED), FRUSTRATED (YELLOW) HAPPY (GREEN) AND CALM (BLUE).
- IF THE JUSTICE DEPARTMENT WOULD REQUEST DATA ABOUT THE PARTICIPANT, EXODUS HAS TO COMPLY WITH THEIR REQUEST.
- NOT EVERY PARTICIPANT HAS A SMARTPHONE, OR HAS THE DESIRE TO HAVE ONE
- A GIVEN SMART WATCH IF PRONE TO BE SOLD BY PARTICIPANTS ONCE THEY ARE IN NEED OF MONEY
- THE MAJORITY OF PARTICIPANTS ARE NOT ABLE TO INTERPRET THE FILES GIVEN TO THEM AND THIS SHOULD BE SIMPLIFIED TO START A CONVERSATION ABOUT THESE FILES

ADJUSTING THE GOALS

- IMPLEMENTING THE SOFTWARE ON A SMARTPHONE OR SMARTWATCH IS NOT INCLUSIVE ENOUGH AND RISKS THE POTENTIAL TO BE OBSOLETE IN THE LIFE OF THE PARTICIPANT.
- GRAPHICAL VISUALISATION DOCUMENTS ABOUT COLLECTED INFORMATION SHOULD BE SIMPLIFIED.
- THE THERMOMETER IS A SIMPLIFIED APPROACH TO COMMUNICATION AGGRESSION.
- REFRAME ‘AGGRESSION’ INTO FRUSTRATION TO AVOID STIGMATISING USER GROUP.

RAPID PROTOTYPING

CREATE A PROTOTYPE THAT SHOWS THE DESIRED FUNCTIONALITY TO HELP PARTICIPANTS NEGATE THEIR FRUSTRATION LEVELS.

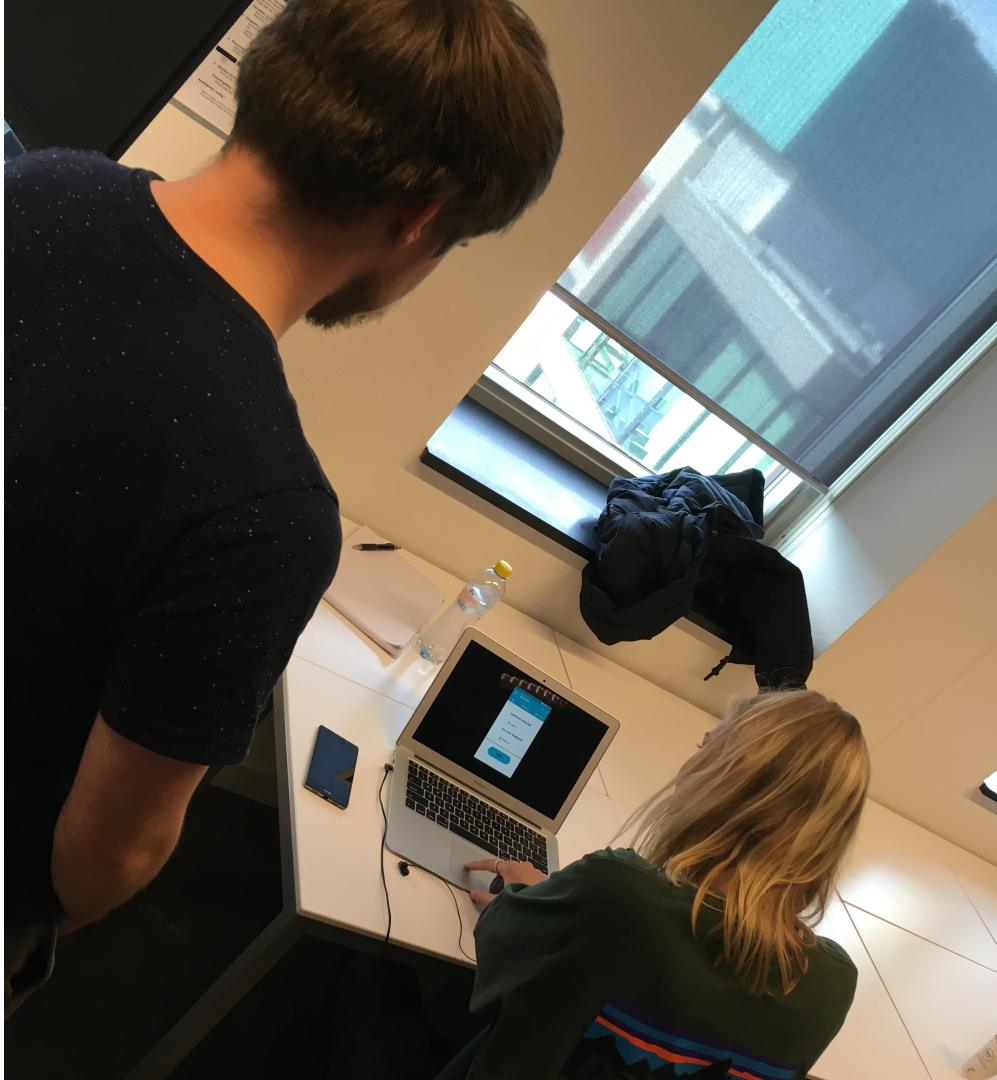
OUT OF THIS CHALLENGE, 4 PROTOTYPES WERE CREATED

PORTABLE

‘Stress ball’ and
‘Sympathetic Heartbeat’

Objective: Create a prototype that would have a disruption in the daily pattern of the user and urges them to meditate.

Goal: Get insights on the notion of disruption, calm technology and prompt meditation.



AT HOME

‘VR Breathing’ and
‘Smart Mirror’

Objective: Create a prototype that would become a ritual in the daily life of the user to reflect on their day.

Goal: Get insights on the notion of ritual, embedded technology and meditation.

PROTOTYPE INSIGHTS

- IF THE PARTICIPANT IS IN A FRUSTRATED STATE IT IS ALREADY TOO LATE.

  WE SHOULD AIM TO GIVE INSIGHTS INTO WHAT CREATES THIS STATE FOR THEM.
- PROMPT MEDITATION IS INEFFECTIVE, DUE TO NON-COMPLIANCE IN FRUSTRATED STATE.
- MEDITATION IS NOT THE MAIN FOCUS, BUT REFLECTION.

INTERVIEW INSIGHTS

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FINAL RESEARCH STAGE

THE TEAM CONDUCTED TRANSLATE SESSIONS WITH EXPERTS IN THE FIELD OF IOT, WEARABLES AND TECHNOLOGY.

RESEARCH INSIGHTS

- A MACHINE LEARNING ALGORITHM REQUIRES A DATA BASE AND IN THE CASE OF THE INTENTION MIRROR: A SELF-INITIATED HUMAN LABELLED DATASET.
- CREATE AN OBJECT THAT SERVES AS A RITUAL, SOMETHING THE USER CAN REFLECT ON WITHOUT TOO MUCH INTERACTION NEEDED.
- TRANSLATE THE THERMOMETER INTO A COMMUNICATION DEVICE, THIS METHODOLOGY IS KNOWN TO THE USER AND DOES NOT REQUIRE THEM TO LEARN A NEW SYSTEM.
- GIVE THE USER OPTIONS TO SHARE THEIR DATA WITH THEIR CARETAKER.
- GIVE THE USER THE OPTION TO NEGOTIATE THE MEASURED VALUE AS IT COULD BE MEASURED INCORRECTLY AND GIVES AN INCORRECT INSIGHT IN THEIR RESOCIALISATION PROCESS.
- KEEP THE DATA SAFE BY USING LOCAL STORAGE WITH RFID INSTEAD OF USING A CLOUD-BASED DATABASE

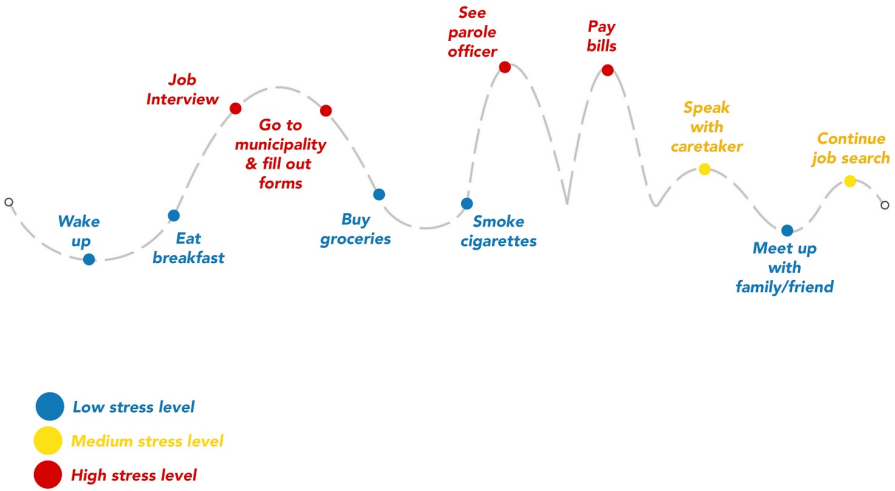
COMBINED WITH THE PARAMETERS OF THE PROTOTYPE, RESEARCH INSIGHTS AND PARTNER WISHES: THESE ARE THE DESIGN CHOICES FOR THE FINAL PRODUCT:

DESIGN CHOICES

- WEARABLE THAT MEASURES THE DAILY FRUSTRATION LEVELS OF THE USER.
- RITUAL OBJECT THAT COMMUNICATES MEASURED VALUES AND HELPS USER UNDERSTAND THESE.
- THIS RITUAL OBJECT NEEDS TO TRANSLATE MEASURED VALUES WITH SIMPLIFIED LANGUAGE; LIGHT.
- DATABASE THAT CAN BE SHARED WITH CARE TAKER TO ASSIST WITH CREATING A HUMAN-LABELED DATASET OF VALUES FOR MACHINE LEARNING. (TO BE IMPLEMENTED IN THE CONTINUATION OF THE PROJECT).
- OPTION FOR SETTING UP A BUDDY, SOMEBODY WHO HAS ACCESS TO SHARED DATA AND CAN INTERVENE WHEN MEASURED VALUES OF FRUSTRATION ARE HIGH.

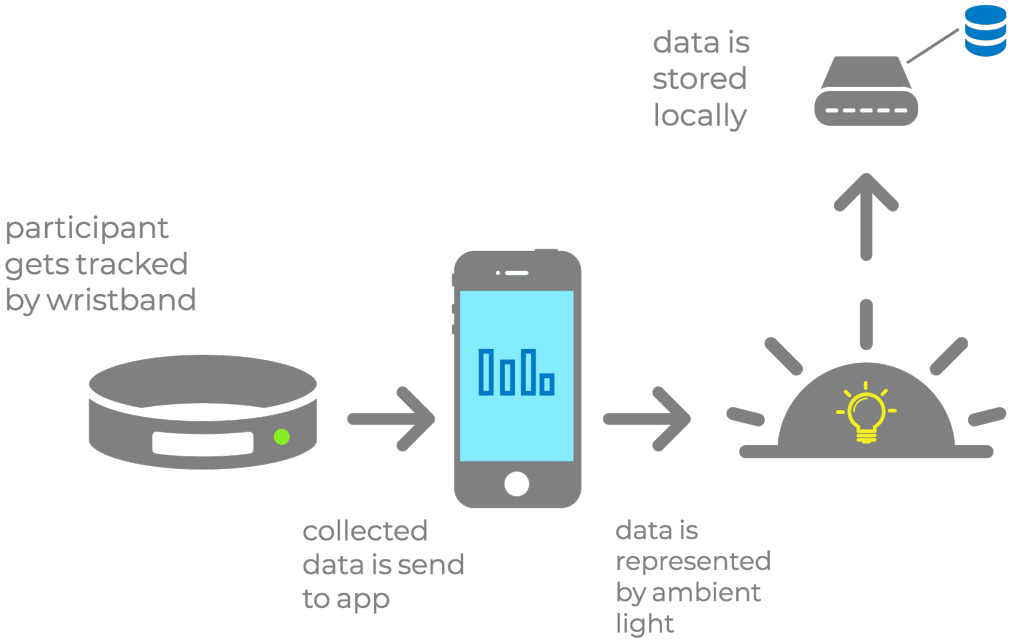
GRAPHICAL VISUALISATION

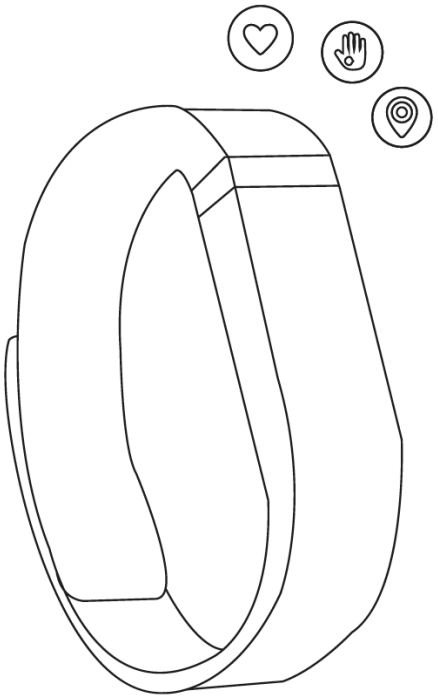
By using a simplified graphical visualisation; users can negotiate measured values together with their caretaker. This will also lead to conversation about activities and measured values.



FINAL PROTOTYPE

INTENTION MIRROR SYSTEM





WEARABLE

Objective: Measure frustration values throughout the daily life of the user.

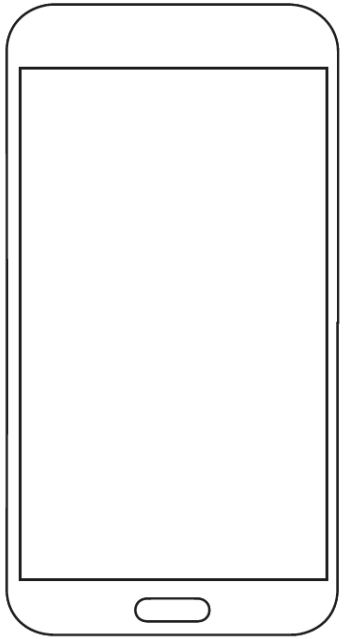
Goal: Measure values for labelling to set up a machine learning algorithm.

Technology: Heartbeat sensor, Galvanic Skin Response sensor, GPS tracker.

WEARABLE

Design: The wearable will have no screen for interaction with the user. The reason why is because we don’t want it to be used for disrupting the daily rhythm of the user, but instead should be a passive and silent contributor to the machine learning algorithm.

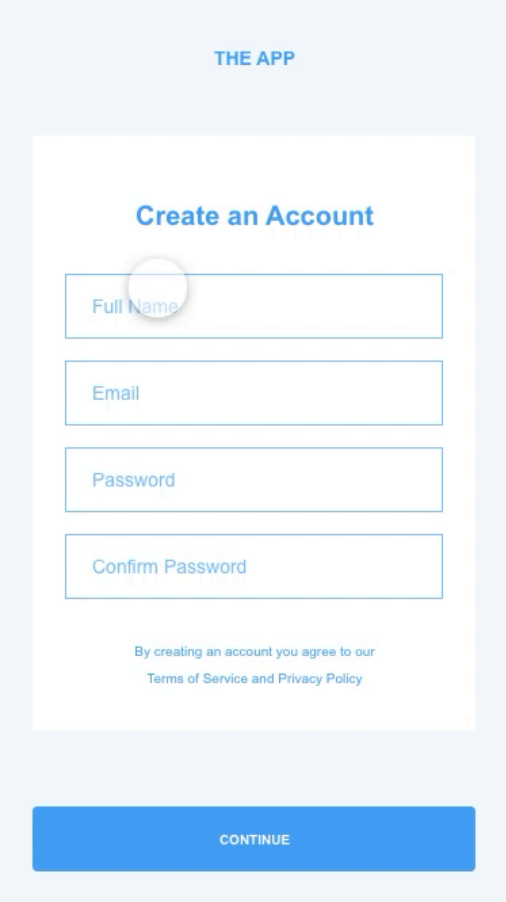
APPLICATION



Objective: Give insight in measured values to user / caretaker and function as assist for help.

Goal: Give user and caretaker option to negotiate measured values of frustration.

Technology: Machine learning, RFID.

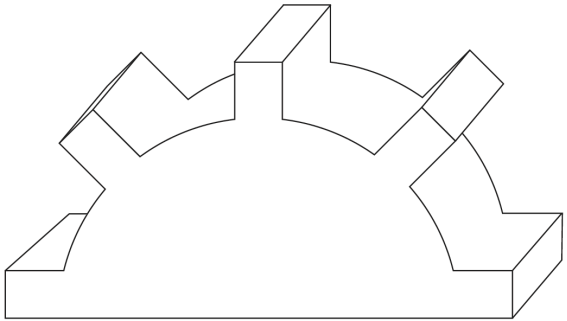


APPLICATION

Design: The UI is designed with the branding of Exodus in mind. This increases trust of the user towards the application, since they will be familiar with the branding.

The user can opt to share their data with the caretaker and/or their buddy.

AMBIENT VISUALISATION



Objective: Communicate **measured frustration values to** user **and** caretaker **to spark** discussion **on** measured values**.**

Goal: Communicate **measured values with** light **to** address daily frustration levels **to user and caretaker**

Technology: RFID**,** Local storage**,** Arduino

AMBIENT VISUALISATION

Design: The ambient visualisation is designed to look as unobtrusive to other amenities in the house hold of the participant. The design takes its shape from a rising and setting sun, a symbol of one day.

The visualisation is divided in 4 elements: morning, midday, evening and night. With this division, it will become easier to pinpoint specific moments in the daily routine of the user.

AMBIENT VISUALISATION

We see this visualisation useful in the first stages of the product, it is to communicate the added benefit of labelling activities of measured values and to train the machine learning algorithm for the future.

SHOWCASE

CONCEPT

UNDERSTANDING EMOTIONS BY UTILISING BIOFEEDBACK OF FORMER PRISONERS

PROBLEM

34.895 people are sentenced to imprisonment in the Netherlands. When leaving prison, they receive assistance in many ways but not in one crucial area: understanding their emotions! This is one possible factor that can cause recidivism.

TARGET AUDIENCE

Participants in the Exodus program. These are people who have recently left detention and are either living in an Exodus house or have regular check-ins with Exodus caretakers.

PARTNER

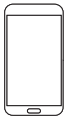
Exodus is an organisation that helps people leaving prison and focuses on care and personal strength rather than control. There are Exodus houses all around the Netherlands which house many of their participants.

SOLUTION: REFLEXION: WEAR. FEEL. REFLECT

Includes a **wearable** that measures excitement and stress.

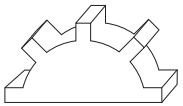
Our **wearable** is equipped with a **GSR** (Galvanic Skin Response) sensor alongside a **heart beat sensor**, combining these two can give a good indication of stress and excitement. We will soon implement a **GPS Sensor** as well.

An **application** that gives users insight into their emotional state and connects them with people.



Our **application** provides users with a **graphical representation** of their excitement and stress **throughout the day**. The app will allow users to log moments in their day, and see these logged moments as points along their graph. This also helps the system to learn about its users. The app has additional functionality, like the status of **care lines**, and the ability to change **feedback settings**.

An **ambient visualisation**, that provides users with an intuitive snapshot of their day.



Our **ambient visualisation** is a **tangible** representation of the user's emotions in a day, with the day being **separated into four sections**. It is also a way to promote **conversation** and **connection** between Exodus **caretakers** and Exodus **participants**.

MAJOR INSIGHTS

Machine learning

Our application needs to learn about its users, and use the raw data it's given to create useful feedback for our users.

Direct feedback

Our users prefer actionable advice and interaction that can help them in their daily lives. These include notifications, haptic feedback, and the ambient visualization.

Security data

Our user group highly values data security. Many are skeptical about a device collecting information about them, so keeping data secure is of the utmost importance. Utilizing local data storage, data is kept between the user and trusted individuals.

Careline system

Our users prefer actionable advice and interaction that can help them in their daily lives. These include notifications, haptic feedback, and the ambient visualisation.

SUSTAINABLE DEVELOPMENT GOALS

Building an inclusive product that brings disadvantaged to 'Quantified self' movement.

Giving agency to participants to take control of their resocialisation process.

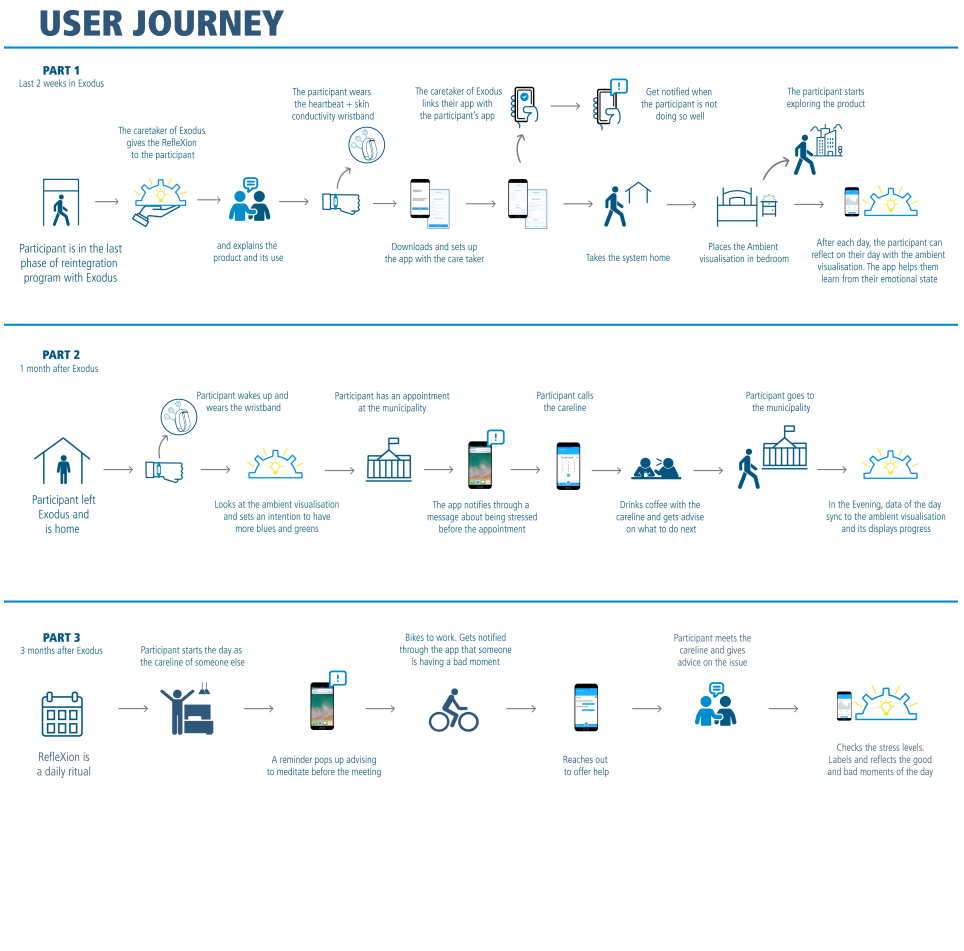
Questioning the ethical values of justice and working towards a solution for all stakeholders

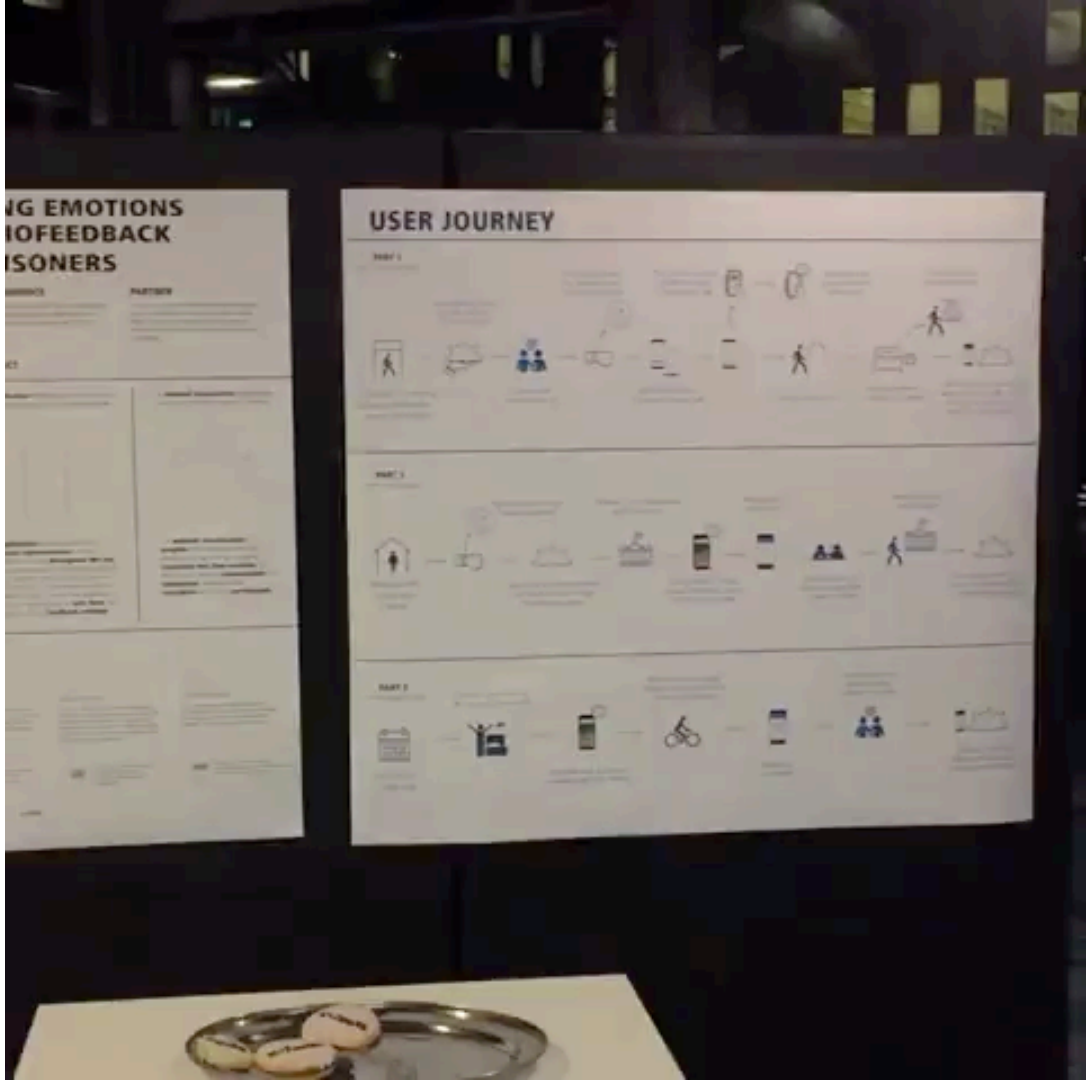
Building a network of users, stakeholders and partners whom would like to develop this concept.

Amsterdam University of Applied Sciences | DIGITAL SOCIETY SCHOOL | exodus

Coach: **Mick Jongeling**
Learners: **Alec Stewart, Anushree Jain, Ginger Ulton, Roxane de Jong**
Partner: **Roselyne van der Heul, Ed Doij**

USER JOURNEY




NG EMOTIONS
IOFEEDBACK
ISONERS
USER JOURNEY

IMPACT

IMPACT ON UN SDG'S

Giving agency to the participants of the Exodus program to take control of their resocialisation process and work towards a better future.

Questioning the ethical values of justice and working towards an inclusive solution for all stakeholders

Building a network of users, stakeholders and partners who would like to develop this prototype further.

IMPACT ON ETHICAL DESIGN PROCESS

By including the end-users (and therefore most-impacted), caretakers, policy makers and judicial offices in our design solution, we have created a system that brings the users to the quantified movement.

IMPACT ON INDUSTRY

We have not found any quantified wearable that is specifically designed with the purpose of reducing recidivism. We believe the Intention Mirror is a novel product that has the potential to scale up to more users.

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