BORED TO BE ALIVE

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SQUAD INFORMATION

This project is done within the New futures squad, this adds a few defined aspects towards the design process, therefore it is mentioned now. The squad is based the ideology of a shared environment, wherein products and designs are not a singular item that functions autonomously, but are part of a growing system inside the home; The IoT sandbox. This is a physical house that is furnished by the students in the first two weeks of the project. Every aspect is defined by the squad, including the people living in the house. The overarching goal of this is to create a future context to work in, wherein all designs are created for the same future reality. This future is in the year 2038, 15 years from now.

There were some requirements present that will be presented now to minimize confusion at the end of this report. One of these is the integration of sharing data with two groups/individuals, this will be further discussed in the final design section. The second requirement was to create a trio of products that would work together within an IoT environment to achieve their goal. This has impacted certain design decisions, which will be referred to when these were reliant on this requirement.
Within the squad there are several themes to work on, one of which is the good home. This was chosen by our group, because at that time we felt there was a lot of opportunity in this topic, mainly because the specific topic is defined less clearly.

Picture of current IoT sandbox ->

INTRODUCTION

In the year 2038 the expectation will be a slow shift towards a post growth based society, which could result in that economic growth has flattened and there will be fewer available resources. A result of this on people could be that there is less focus on the pressure to work, creating a shift in what one might consider being pleasure and fulfilment in life; less focused on the consumption of materials and focused on passion and what live has to offer. More care could be taken for the things we own, and what their value is instead of just ownership.
Considering the extra time people will have, the team experienced and in our near environment that people don't allow themselves to get bored anymore. Research shows that being bored can have many benefits, it can enhance self-awareness and can result in feeling more productive and(Harris, M. B. 2000. Schubert,D. 1978). This has led to the following goal: The project aims to raise awareness about the advantages of boredom by creating a unique, one-time experience set in repair cafés within a post-growth society.
To achieve our goal, we used an explorative first-person hands-on approach, the process was led by creating physical artefacts that could create insights and to generate ideas. Trough out this process different iterations were created and tested. To raise awareness, we implemented the Trans Theoretical Model made by James O. Prochaska. This provided us with key points to get users from the precontemplation to the contemplation phase.
Having the key points in mind we came up with the idea; Bored to be Alive. This one-time traveling experience is designed to be placed in spare rooms. This wall divides an existing room in two spaces. A transition space and a boring space. The wall provides the user with information and guidance to the boring space. After the boring experience the user will come back in the transition space and will be asked to answer questions and will be guided to the exit. Throughout the experience Prochaska key points are implemented to get the best result towards our goal.
This report will show the journey that was taken towards reaching our goal, it will elaborately present all iterations made and steps taken. It will discuss the assumptions made and how our choices are augmented.

RELATED WORKS

Memories

Everything a person experiences is based on information received through a combination of senses: sight, touch, hearing, taste and smell. A person's capacity to store and retrieve that information is called memories. (Zlotnik, G., & Vansintjan, A. (2019). Memories are important for human life and need to be maintained. This can be done by retrieving the memory. (Kandel, E. R., Dudai, Y., & Mayford, M. (2014). It is well known that human memory is not an exact reproduction of past experiences but is instead an imperfect process (Schacter, D. L., Guerin, S. A., & St Jacques, P. L. (2011). Due to this fact a person needs to make his own version of the past event, by recalling memories a nostalgic feeling is created. Individuals with higher conscientiousness and openness and lower neuroticism tend to perform better on memory-recall tasks (Luchetti, M., Terracciano, A., Stéphan, Y., Aschwanden, D., & Sutin, A. R. 2021). Next to that, memory recall perspective research indicates that nostalgic thoughts and memory recalling has a positive effect on a person's positive self-regard and strengthens feelings of social connectedness, like social support, love and protection. (Rogers, R. (2020). There are big design opportunities to implement memory making into a home, by creating nostalgic feelings people will feel better about themselves which will have a positive influence on the good home.

Post growth

A post-growth society explores a shift in economic and societal thinking that challenges the normal model of continuous economic growth. A post-growth society recognizes the ecological, social, and psychological limits of endless economic growth. This concept proposes a more sustainable and long-lasting approach to development, seeking to decouple well-being from strictly economic values. Of which in Europe a majority is in favor of working towards this model (Paulson & Büchs, 2022). Over the past few years, Europe has seen a slow decline in economic growth(European Economic Forecast, 2022).
The shit towards a post-growth society questions the use and implementation of what is thought technology should do. The thought process of a post-growth society makes different factors primary and focuses less on a constantly increasing GDP, an increase in social safety or equality can be seen as a more important societal achievement. This promotes a system that considers the different boundaries of Earth and humans. Building upon the view proposed in the book "post-growth living: for an alternative hedonism", philosopher Kate Sopers proposes an alternative hedonism in which we change our perception of pleasure. A result of this could entail a life that offers more opportunities for exploration of oneself, with decreases in the pressure on the achievement of materialistic goods as a primary goal. This view is constantly applied the the project.

RELATED WORKS

Boredom

According to the psychodynamic theory, to be bored is to be in a state of longing for activity but unaware of what it is that one desires and to look to the world to solve the impasse. (Eastwood, J. D., Frischen, A., Fenske, M. J., & Smilek, D. 2012). It often arises when the current situation is no longer stimulating enough (Bench, S. W., & Lench, H. C. 2013). This temporary uncomfortable situation can be remedied by a small change in circumstances. Negative feelings are common for people with regards to boredom, one of the reasons is that time passes more slowly when someone is bored (Greenson, R. R. 1953). From research in which 20 minutes actually lasted 10 and 30 minutes in two different groups. It turns out that in the 30-minute group (so where the 20 minutes felt longer), tasks that the participants had to perform often seemed more boring than in the 10-minute group (London, H., & Monello, L. 1974). Boredom is also negatively correlated with a sense of purpose in (Melton A. M., Schulenberg S. E. 2007) (van Tilburg W. A. P., Igou E. R. 2011). Research from the USA shows that boredom often arises from monotonous or difficult tasks such as at work or school. Also, activities in which someone's autonomy might be constrained (Chin, A., Markey, A., Bhargava, S., Kassam, K. S., & Loewenstein, G. 2017).

There are 5 different types of boredom (Goetz, T., Frenzel, A. C., Hall, N. C., Nett, U. E., Pekrun, R., & Lipnevich, A. A. 2013b), all of them have a different effect on a person. People often associate boredom with negative aspects because it leads to feelings of uselessness and worthlessness (van Tilburg, W. A. P., Igou, E. R., & Sedikides, C. 2013). This is caused by the so-called searching, reactant and apathetic boredom. However, boredom also encompasses several positive aspects. It has been researched that the state of boredom affects creativity and productivity (Harris, M. B. 2000. Schubert,D. 1978). It can be assumed that boredom arises when the current situation no longer stimulates an individual (Bench, S. W., & Lench, H. C. 2013b). Boredom causes people to strive for new goals and experiences, thereby becoming a driving force behind the pursuit of a new life purpose. Research indicates that individuals tend to nostalgic thinking when experiencing boredom. This behavior arises from a sense of meaninglessness during boredom and tries to counteract this feeling by returning to moments when they achieved something in their life. These pleasant feelings are caused by indifferent and calibrating boredom.

RELATED WORKS

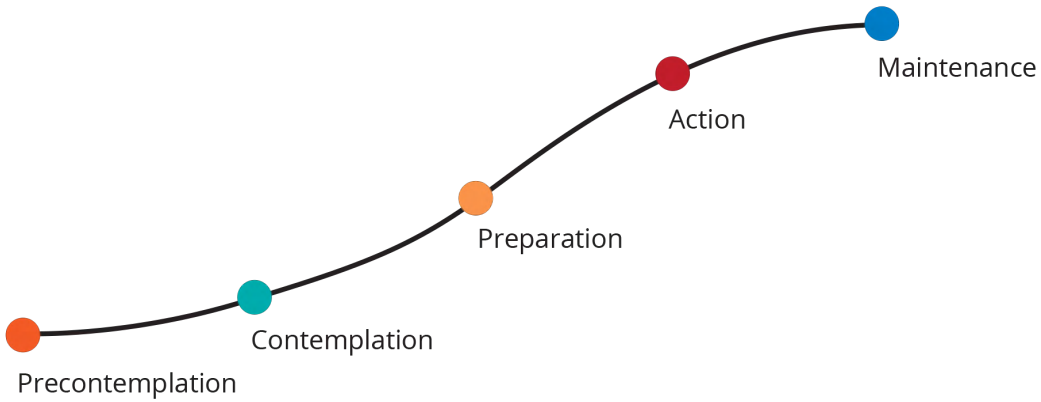
Behavior change

With regards to boredom, it is shown that this human state is commonly overlooked at by researchers and by people in everyday life (Westgate, E. C., & Steidle, B. 2020). In a previous part in this report the benefits of boredom are stated, however recognition for boredom is very low. Raising awareness for boredom could be a step in a good direction to let people integrate boredom in their daily lives.

For raising awareness, the Trans Theoretical Model by James O. Prochaska can be used (Prochaska J.O., Velicer WF, 1997). This theory describes different stages of change people go through during a change in behaviour over time. It states that the attitude towards a certain goal change and that different moments in time call for different approaches. Figure 2 shows the different stages a person goes through within behaviour change. For raising awareness, the first two stages are important. This early in the process a person is not intending to take action in the foreseeable future and is probably unaware of the effect of a certain behaviour (precontemplation). Or a person is starting to recognize that a certain behaviour has positive/negative effects, the pros and cons will be thought through (contemplation).

The model provides multiple interventions suitable per stage to support the process, these points are also called frameworks. Consciousness raising, dramatic relief and environmental re-evaluation can be used to go from the precontemplation to the contemplation phase. To go from contemplation to the preparation phase self-re-evaluation is needed. Later in this report the implementation of these frameworks within the product will be explained.

Evaluating the effects of an intervention for attitude change towards boredom can be quite hard, it takes time for people to change their behaviour. The current state of the project gives not enough time to assess boredom. Testing boredom can be done by psychological and physiological tests, these tests are not in the field of work for a designer and are also deducted way after the intervention. The things that can be tested during the intervention is the willingness to perform a certain behaviour. It is known that behaviour of a person is based on his/her self-efficacy towards a certain behaviour, see appendix I.



[2]

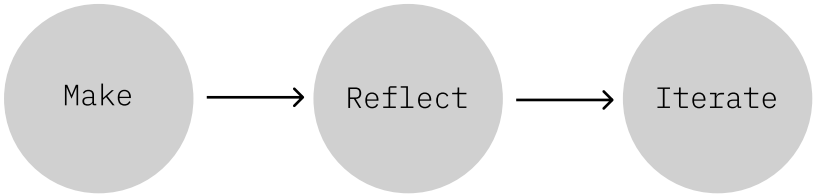
Process Description

The vision and method were determined at the start of the design process based on the students' PI&V in combination with the workshop given by the new futures squad in which they worked on what the world will look like in 15 years from now. This vision emerged at the beginning of the project:

'This project aims to design a physical artefact that will support the future of post-growth and moderate living within the home to create a good home. Focusing on self-actualization (Maslow, 1943), where the human becomes aware of their personal goals and values.'

While making design choices, the group always checked whether this was in line with the vision, ultimately there were shifts in the vision as explained in the following three iterations. Ultimately, the vision is scoped and placed in the context of boredom.

The approach used during this design process can be described as a first-person hands-on exploratory design approach. During the various design iterations, several low-fi prototypes were made and experiments were carried out as an exploration of the topics during the ideation sessions.



Final Project Goal

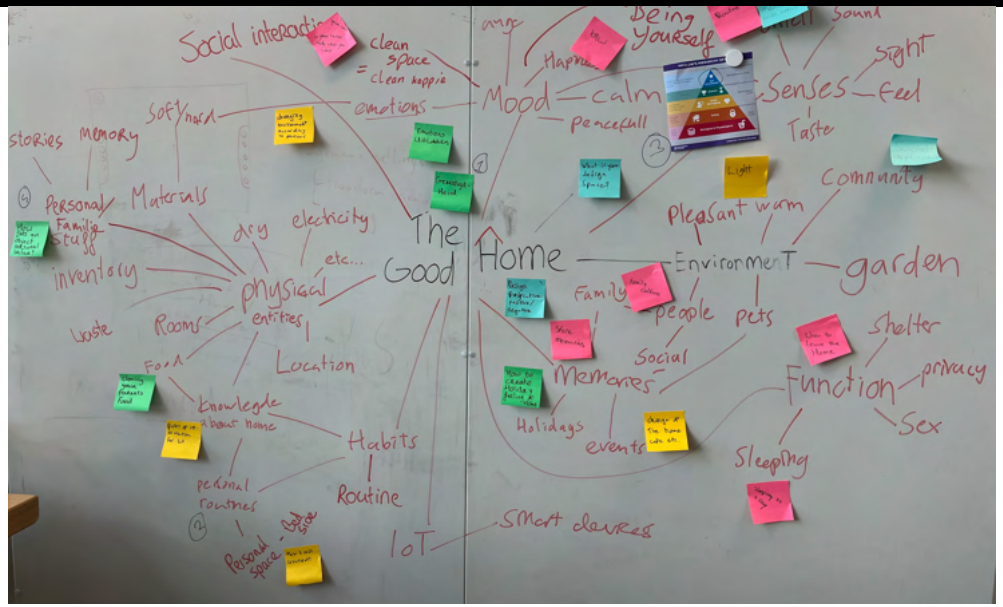
Raise awareness about the advantages of boredom by hosting a unique, one-time experience set in repair cafés within a post-growth society.

DESIGN PROCESS

Explore the perception of memories within the home, to enhance our perceived value of objects and spaces. Our design needs to enhance the memory making with products/ space to improve the feeling of being in a good home.

First scoping

Starting off the Good Home project there was decided that a first-person hands-on exploratory design approach should be implemented. The aim with such an approach is to create as much as possible to gain more insights into interesting aspects of this theme. The first step in this project was to write down every thought there was on the good home(figure 3). Post-it's were placed on topics that had design potential and four of the most interesting post its where further researched. Related works shows the knowledge gained from these four topics. After discussing the 4 topics a direction was chosen to explore: memories (related works & appendix A). A vision and scoping where formulated to make a clear goal and to include the multiple aspects of the already collected information.



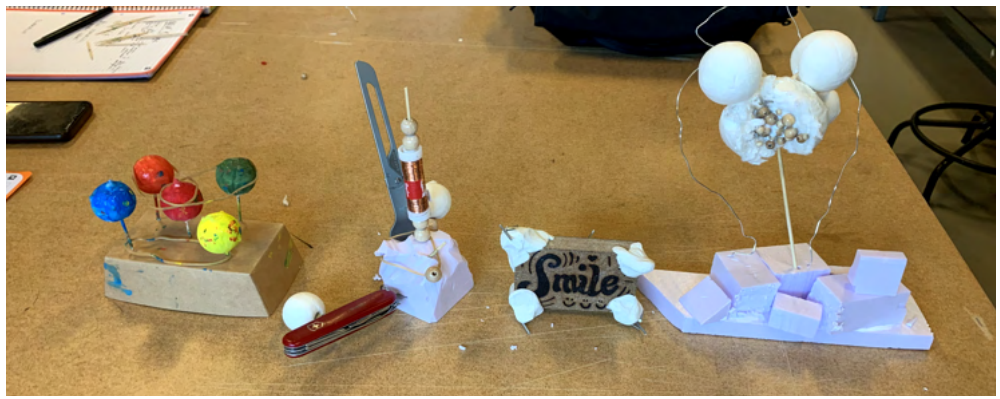
MEMORY MAKING

To explore memory making in first person, a challenge was set up. Each member of the group was assigned a ‘worthless’ object and the task was to make as much memory with the object as possible over a period of 6 days. The objects where; an empty marker, a piece of iron wire, a lighter and a wooden block (figure 4 & 5). After the six days, stories where shared and a discussion came forward. One of the observations was that the ‘worthless’ object were already given value due to this test and more value was created by using it in an improper way.

[4]

[5]

The next step was to use a hands-on approach to analyse and dive deeper into the findings from the previous user test. The design challenge was to create a physical objects that represented memories, the perceived experience with the ‘worthless’ object and an idea that can be used as final concept for the project. 15 minutes where the given time span to design and create for every topic (figure 6 and appendix B & C. A). few questions came forward after presenting the creations. Can you force or create memories for someone? Is it possible to fake memories? Are you a person without memories?



[6]

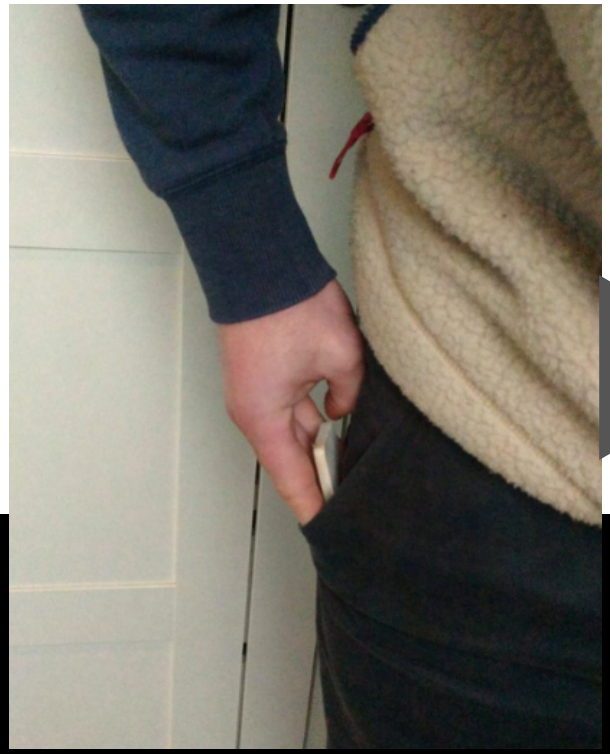
With these questions in mind, an ideation session was started. The insights from the research, the memory making test and the design challenge were used to make new ideas that fitted in the vision and scoping. (appendix D)

MEMORY MAKING

By converging the multiple ideas about memory making a concept was created: Het Blokje. This small pocket-sized block is made to record certain audio fragments through the day. During the daily toilet time the user can put Het Blokje on a device that plays the recordings of that day and previous days. This is to enhance memory recalling and to create a nostalgic feeling. The positive effects of these actions can be found in the related works. The concept of Het Blokje was further designed so it could be presented with a mock-up design at mid-term demo day (figures 7, 8 & 9)

With the feedback from multiple assessors and fellow students some flaws within the concept were pointed out, the ethical considerations, the location of usage, the relation with the vision, the interaction steps and the connection with the sandbox. After determining the pros and cons a decision was made to not work further on the concept Het Blokje and memory recalling. The key findings from the research and design explorations were taken with in further steps.

[7]



[8]

[9]

EXPLORING BOREDOM

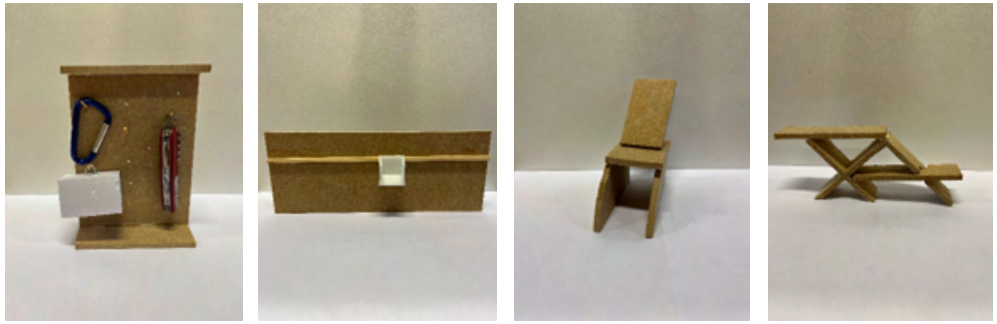
Itteration 2

Coming from the ‘Het Blokje’ concept as a starting point, the prototype did not fit the expectations of the vision, resulting in broadening the project again. The vision changed, where a new exploration step was taken. Comparing multiple ideas via brainstorming, ideation sessions, future scenarios, and user tests. To eventually come to the concept of designing for boredom. This chapter will explain the steps, choices, and outcome of implementing boredom at the location of the toilet.

To get a new idea started multiple brainstorms were done, the first one being ‘no words’. It consists of 3 sketches being guessed by others (Appendix E). Resulting in multiple ideas, that were used to make a 15-minute design challenge in vertigo (figures 10,11,12,13). This challenge was done to explore new directions..

This gave the idea of starting to write future scenarios of what products or services would look like in the year 2038 (Appendix M). To give a better understanding of what problem needs to be solved. Resulting in more ideas on how products would link to different scenarios. The key findings from these scenarios where the following:Perception of time, hedonism, and habits. Where new sketches were made for to get a better understanding of the possibilities (Appendix F).

[10,11,12,13]



Translating to scenario’s

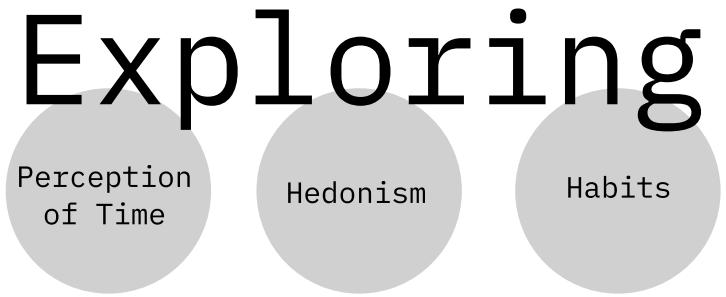
Scenarios

All-in-one smart device

Reusing materials and sharing

New life environment through AI

Chosen topics



EXPLORING BOREDOM

Iteration 2

Literature research was done on these three topics, these are further elaborated in the related works. The definitive topic needed to be decided out of these insights. Research on the topic boredom, also combined with hedonism (Moore A, 2019). Combining these topics to a post-growth society, led to the idea of creating more time. But with focusing on time perception, see related works, the outcome resulted that having boredom was the key of creating the first iteration of Bored to be alive. Chancing the vision as shown on the right.

In a post-growth society, people have more free time on their hands. Being more conscious of the decisions they make, see related works. The artifact tries to create awareness to fit the vision. This iteration aims to get the user from the pre-contemplation phase to the contemplation phase, see related works. Next to that another theory that is used for the artifact, is the ‘Fogg Behavior Model’ (Fogg, B.J. 2019)(Appendix G). What this indicates in our concept is how to make a concept that is at the bottom of the green line, making it an easy to do with almost no motivation is needed.

This project aims to change the perception of time through boredom in the good home to enhance the practice of hedonism that aligns with the current post growth societal system (2038).

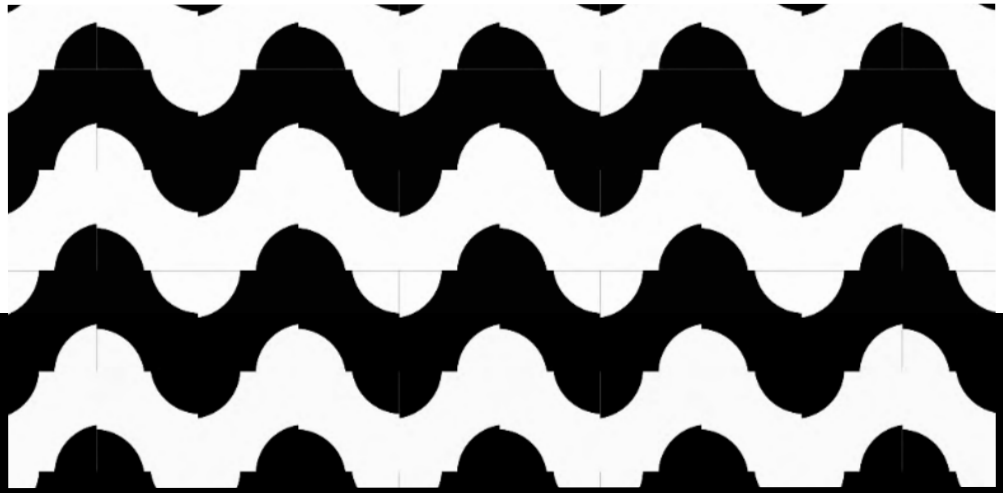
Redefined scope

EXPLORING BOREDOM

The idea of a boring room resulted in making two user tests. The first user test (figure 14) existed out of two parts, one being in a room with nothing to do and the other in the same room with 2 different games. Using Processing, Arduino and Touchdesigner to realize the games. The idea for the games was to make them simple, so the user get's bored while playing it. The games came from research on existing games (Appendix O) and the literature research resulting that the input has to be as low as possible, eventually getting the user bored.
The outcome showed that boredom was not achieved while playing the game. Doing nothing on the other hand gave people more time to think and evaluate daily activities or so, which were insights of interviews(Appendix J,K,L,N). Which made the change of getting bored more likely. That's why a second user test was done to test the principle of doing nothing in the room.

For the second user test (figure 15) the stimulus was removed from the room, so there was no distraction. The test began by following 5 A3 sheets giving information, as the picture shows. Then entering the room and doing nothing, so the user had a chance of experiencing boredom. There user was able to leave the room when they wanted resolving in leaving the room quickly. So to see differences in the time people leave the room we told them nothing will happen, creating new insights. After leaving a decision tree was shown (appendix I). Giving insights on the behavior in the room, and to start the interview with these outcomes. Doing the interview after the test was done, gave more information which was used for the third iteration.

First User test [14]



Second User test [15]

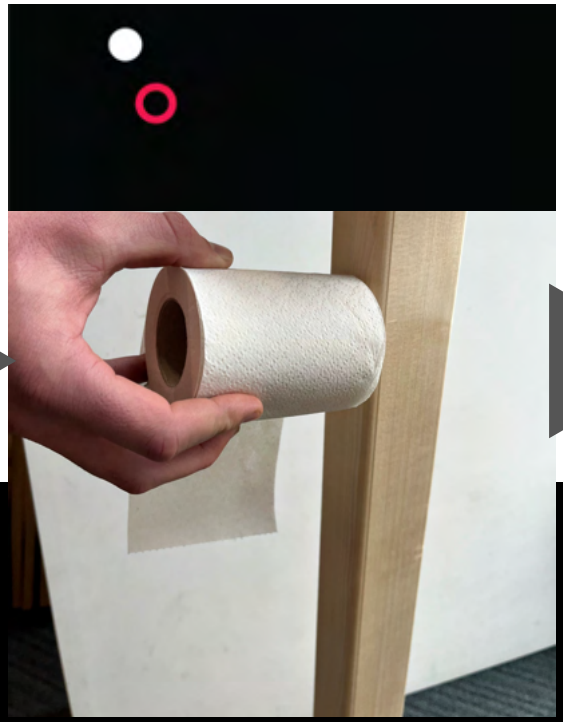
EXPLORING BOREDOM

The concept that resolved out of this is based on 2 phases (figures 16,17,18). The first one is playing a simple game, where the user follows a dot with a cursor. This is made so the interaction with the game get's boring after a while because nothing will happen when the dot is hit. The user has then more time to think about other things than just the game, having a chance of daydreaming. This daydreaming causes the mind to think about other topics related to their lives, see related works.

Then the next step is reflecting, where the user looks in the mirror to see statements on what just happened. This reflecting part can help the user understand more that reflecting is good to do, see related works. With the confronting way of looking in the mirror, the first steps of behavior change can be triggered. Then after the experience is done the user can later think about what just happened and reflect on it. stimulating them to do more with reflection in their spare time.

Experience [16]

Interact [17]



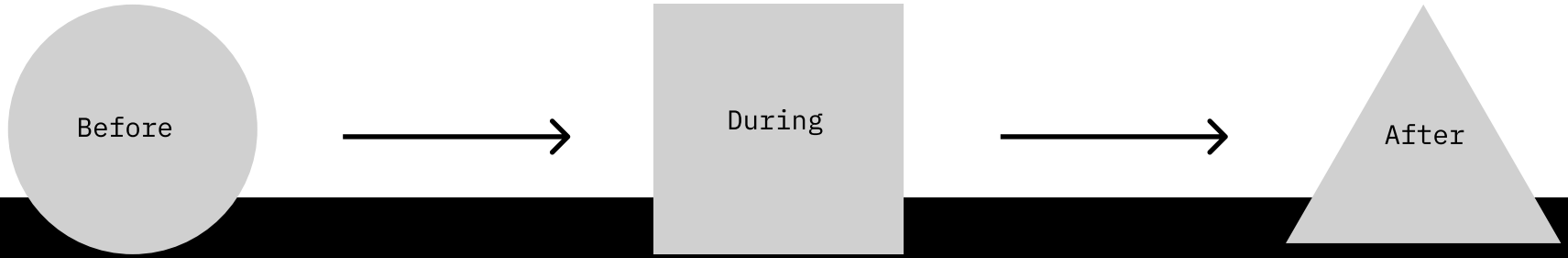
Reflect [18]

Change

Design around boredom

To define the key points different discussions where held that resulted in drawings and insights about what the parts before and after the experience should be. One aspect of the design is that the goal is to create a transition between the fast world we regularly live and the experience that we want to offer that is about doing nothing. As the designers it was clear that that had to be created.

From the previous user test was learned that the information to build up anticipation for the experience could be done textual, in this case the user had to move themselves to progress reading the text. This lead to an investigation of if we could offer this experience, but while moving the provided information physically. While reading there is still active participation needed from the user to participate in the experience, to further strengthen the participation degree there was finally opted to facilitate the required information trough sound. Paradoxically this is more suited to how current media forms operate and keep people's attention. Once this attention is achieved, a voice will guide you throughout the process and what it will entail. A familiar voice was chosen to express trust. While this is done the physical source of the sound will slow down to make the participant physically have slow down to gain the information needed to participate.



- Remove external stimulation
- Informing

- The addition of nothing

- Speeding up
- Reflecting
- Dramatic effect

BOREDOM EXPERIENCE

[19]

[20]

The information required is given beforehand to comfort the user into the experience of doing nothing. By doing this the goal is to take away aspects of frustration that could arise when experiencing boredom. As stated in our project goal, the goal is to have people experience the positive aspects of boredom. One of the key points was therefore to remove as much of the frustrating stigma that is associated with boredom. To support this we ask the participant to enter the time they would like to be present, this comforts the user, because a certain expectation is set. This removes a part of the unknowing aspect of what will happen.

As done in the previous tests the experience builds upon offering a feedback moment. This allows the participants to think and reflect on their experience. The tree diagram from before was further developed into a set of questions that could be answered by the participants, adding an interactive element to strengthen its impact.
To realize this into a demonstrator a choice was made to create from a perspective that only achieves its functionality, any additional parts would only create access waste that is not needed to convey the message (Figure 19). A modular approach was taken that would allow the experience to grow and alter over time, it is an expression of the subjective view of the team and can adapt in the future to better/differently fulfill its purpose.

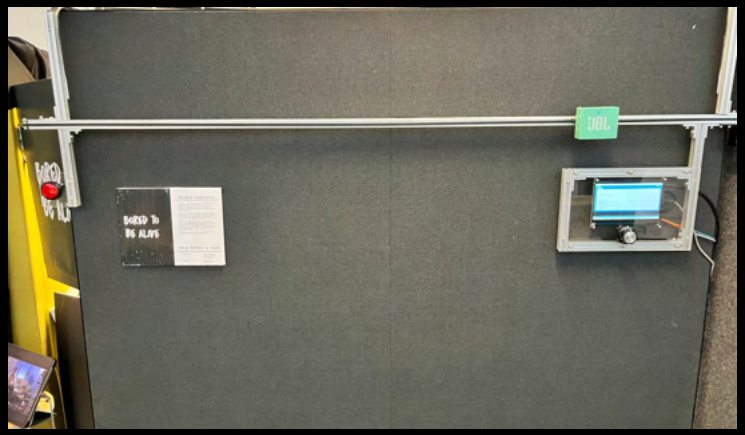
BOREDOM EXPERIENCE

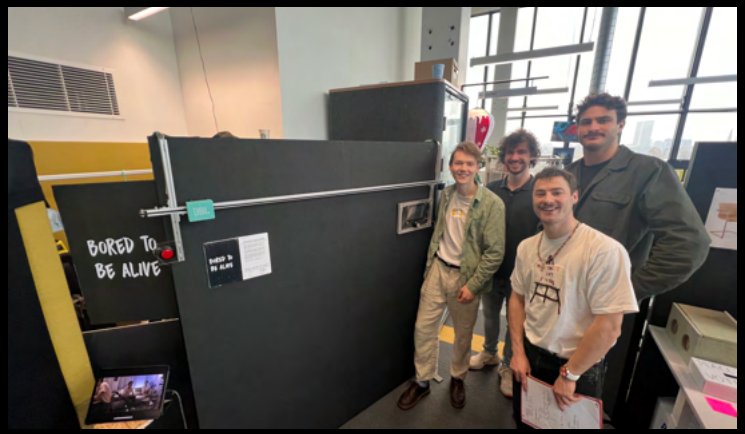
As an opportunity was seen in a discarded 3d printer[VJ1] from one of the team members, extrusion profiles where used as the backbone of the physical realization. This is in aligns with its environment which is set in repair café's, opportunity for change and expansion is thereby provoked. Because of this the total consumption of goods could be minimized, while realizing the goal. This creates a design that has a few unique properties in the sense that it could be recreated, but that is not the intended goal. The final design does not imply it needs to be mass produced to fulfill its desires. By traveling and impacting individuals at different times only one needs to exist, therefore not inherently relying on the active production of goods.
To realize its functionality Processing and Arduino were used, as they are open source and easy to use. The used code and screens can be found in Appendix P,Q,R & S.

DEMO DAY

During demo day many could experience bored to be alive. It was inspiring to see so many wanting to participate, even forming a waiting line for being bored. Because a demo day setting is hardly comparable to a repair café there was decided to perform another validation.
Next to that a video was made for boosting the experience on demo day.

[21,22,23]





Video link: https://www.youtube.com/watch?v=xVoYGkbBEpA

EVALUATION

Setup
For the final evaluation of the concept the experience was placed in an extra space next to the study association's Lucid bar, this was done to get close to the actual environment of a future repair café. Participants were asked to do the experience about boredom, but were not informed beforehand of any of its details to remain as unknowing as possible before participating. The experience itself offers an opportunity for data collection through the feedback system that is already implemented, besides this, an interview was used to gain more in-depth information on one's perception of the experience.

[24,25,26]

Results:
The average time entered in the user test set is 6 minutes, but people spent an average of 11 minutes. The participants reported that they did not use any external stimulation such as a phone during this time. In addition, the participants described the general experience as positive.

Findings:
When the user test was carried out, there was a quiet working atmosphere in the bar with few people present. A calm environment leads to more willingness to participate in longer experiences, the transition needed is less extreme than in a setting where there are many stimuli. It is noticeable that each participant spends time doing mindless tasks such as counting holes in the wall or observing specific objects. There were different outcomes about the experience of the information told by the voice-over. The participants described the information in terms of productivity as a moment in which you pause to think about what you are doing and what still needs to be done. This gave them the energy to return to work, which they could describe as more productive. During the interviews, interesting conversations arose about what should be present in the boredom room. First, the participants said that they might need some stimulation. When asked about this, they concluded that they are always trying to avoid having that boredom come up. This resulted in counting holes in the wall, for example. From these conversations, participants gained insights that no stimulation is indeed exactly what a boring space needs.

BORED TO BE ALIVE

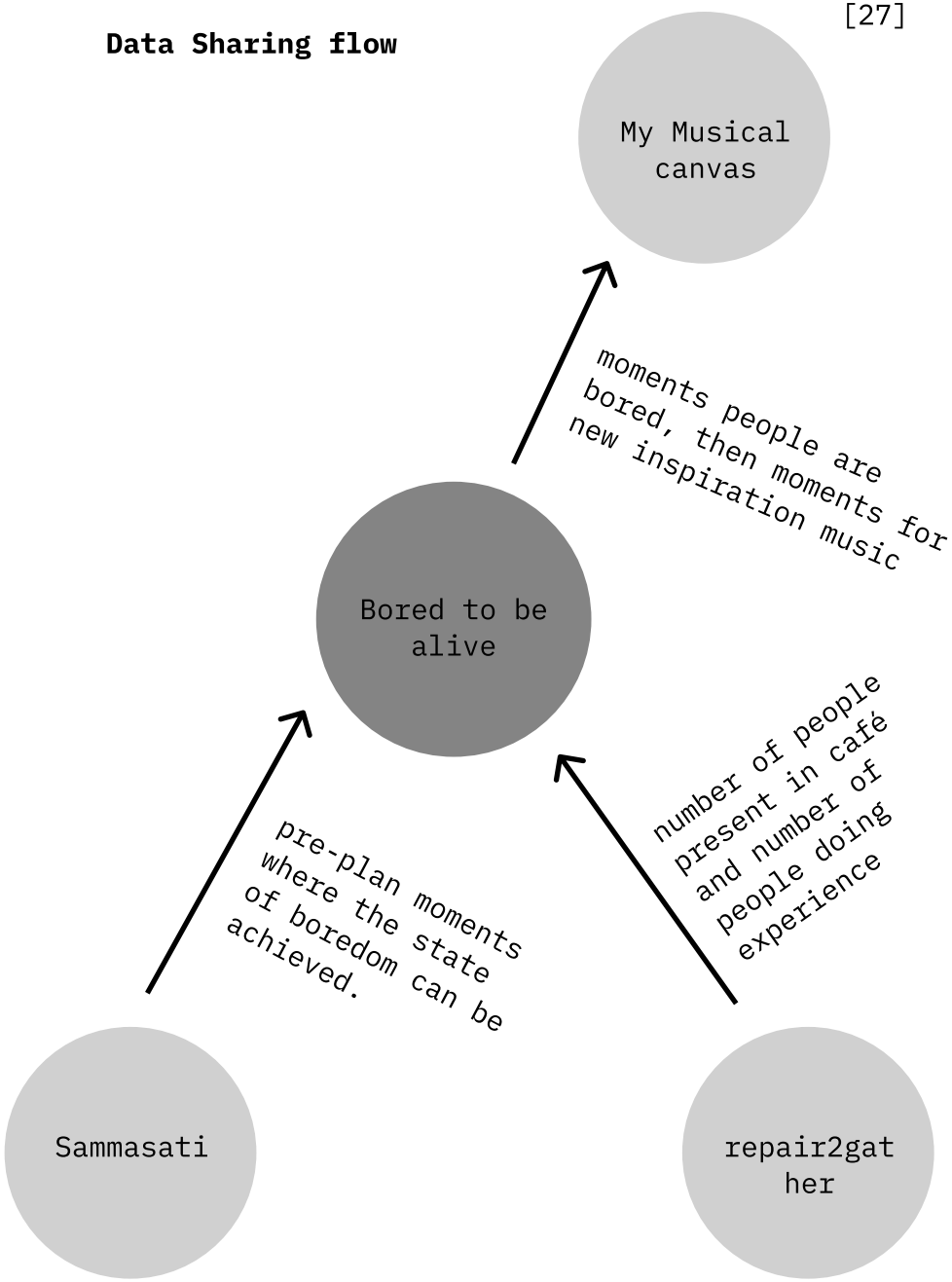
Bored to be Alive is a traveling exhibition with a boredom experience that wants to introduce people to why it is good to occasionally allow the state of boredom. It is an experience in which people transition from a busy repair café to a calm state to experiencing boredom.
Bored to Be Alive aims to get people from the precontemplation phase to the contemplation phase, according to the Trans Theoretical Model made by James O. Prochaska. To achieve this, the model provides some key points that are the main functions such as providing information, asking questions, acknowledging the issues, and making a dramatic relief.

Experience

Upon entering the experience, the user must follow a prerecorded audio fragment that provides instructions. Following this, the user can specify the duration they wish to be in a state of boredom. Once this duration is filled in, the person may take a seat in a separate room excluded of external stimulation. If the person decides to leave after a certain period, they will be asked to answer questions regarding their experience. Additionally, they will receive the precise duration they spent in a separate room. Following the reflection using these questions, users transition from this calm environment, by the moving audio fragment, to the repair café.

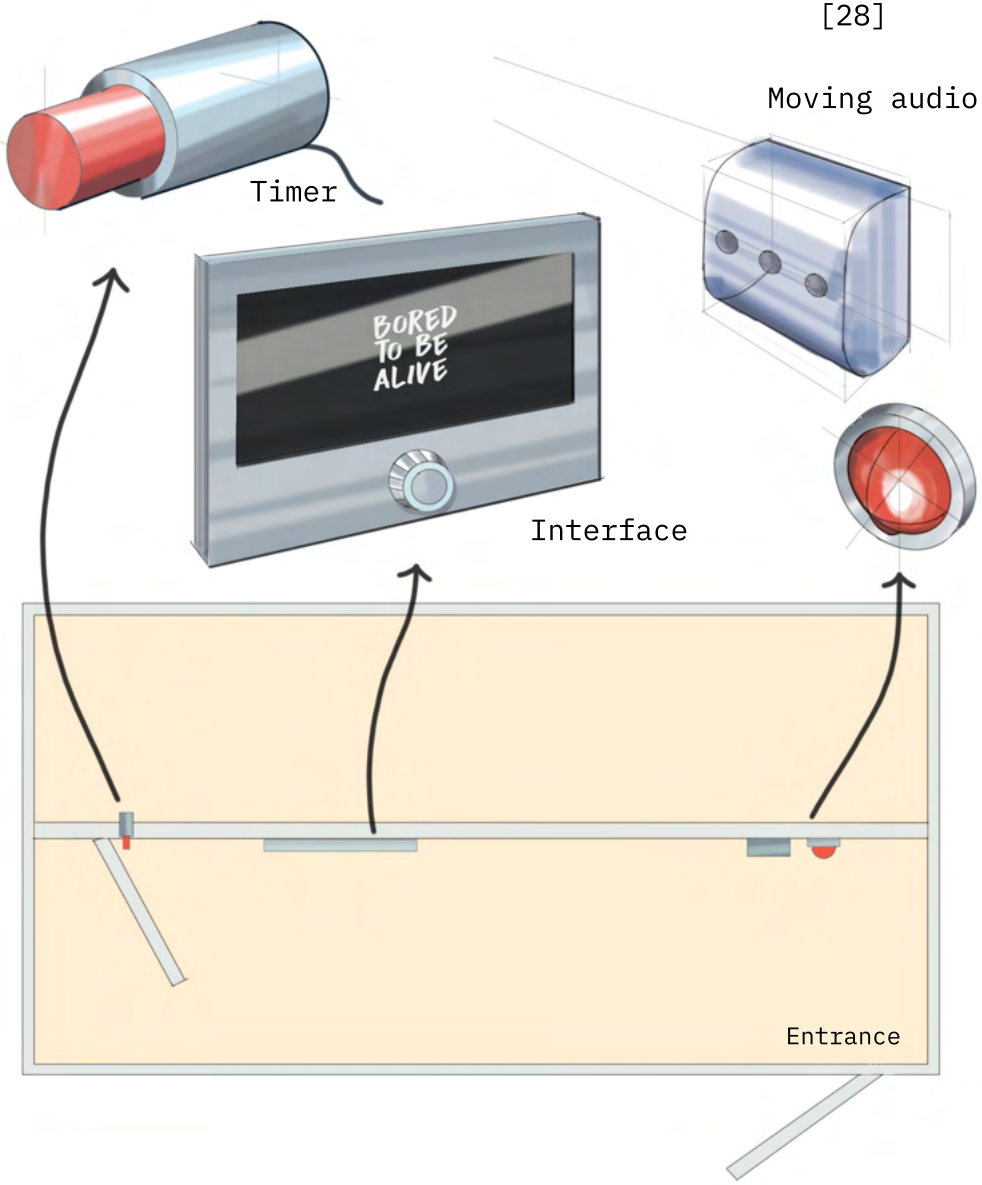
[27]

Data Sharing flow



BORED TO BE ALIVE

[28]



It is composed of 3 separate products, each with a different function. The moving audio ensures that the transition from busy to calm and back again is achieved. The timer is placed at the door from the boredom room. The interface screen is used for a moment of reflection to let people think about the experience they have gone through.

The 3 products are supported with a modular wall system. This wall ensures that it can be placed in any exhibition space, by placing the wall with a door in it, the space is automatically divided into two parts. Furthermore, born to Be Alive uses reusable materials from various repair cafes. The example is shown in the prototype using old 3D printer materials from a student. These two choices come from the first vision of an economy within a post-growth society.

DISCUSSION

Several elements of the project need to be considered regarding the validity of the results.
Throughout the process the designers were the main perspectives that were discussed and considered in making choices. External knowledge was implemented trough research and served and an addition to the insights created, therefore the design process was led by the consensus defined by four individuals.
Considering the more speculative approach towards the future scoping it is important to consider the impact of the surrounding study environment and its impact on the process.
The proposed design is placed into a future scenario, this creates certain uncertainty about its viability. A certain future needs to be partially in place to support its use. This is created by the designers and their perspectives on what a future can entail. Along the process, there is critically consider what the effects are of this perception, to stay true to a future that can be realistic in its development.
The proposed physicalizing in final design serves as an example of what artefacts can look like in this new future. It can therefore conform less to values that are currently considered as subjectively good design. It poses a new perspective on its goal and the correlation between design and provocative art. For example, the fact that materials are reused in this specific concept will probably not impact the world in it consumeristic habits, but allows other to see how design can change to adapt to large change in societal systems.

The concept validation was done trough several test performed at the Tu/e. This automatically targets a certain demographic that is less representative of a society as a whole. The result can therefore be impacted and influenced in an manner that might not have been considered properly. The test done only asked about future behavior and if the experience has created room for thought, this was however done right after. The active change in perception of the mind and its habits are not validated and the proposed change is therefore more seen as an act of provocation to start thought process.
The specific topic of boredom is an interesting discussion point, because in the project it is presented as an important pivotal point regarding the concept. What was noted, is that the topic of boredom can carry associated thoughts that are more negatively oriented. The goal is to change this perception towards a more positive associated thought process in relation to boredom. To do this people experience boredom trough a guided experience that implies the boredom experienced will be more positive, this is however, not always in control and could lead to a more negative experience. Confrontation with oneself is perceived as something positive from the perspective of the creators, but can be a negative experience due to personal issues for example.

FUTURE WORKS

A big opportunity in future works is validating the boredom space, if the user is monitored inside the boredom space conclusions can be made drawn if the desired state of boredom is reached within our design. This can be done with the help of a psychological and physiological expert on boredom. With the extra expertise more information can be added for future iterations.

All the user tests are performed at TU/e, this resembles a certain demographic. To make sure the product can be applied at different groups it needs to be tested in public space. This can give insight on the willingness to attend the experience and the willingness to change their behavior in the future for wider range of people. During such a test, overall experience can be questioned and monitored. Adjustments can be made at the audio, interface and aesthetics if needed.

To test if people really change their behavior over a longer period of time, the test persona need to be contacted a couple of months after. A questionnaire on their experiences and their willingness to change behavior should help to conclude if our intervention pushed them in the right direction.

As for a business aspect, the concept needs to be presented to the important stakeholders, given in appendix V. The stakeholders need to be open to let our experience into their facility. Otherwise the experience won’t reach the users and thus it will not complete the goal. This is a very important step for this project, if this doesn’t work out then the whole concept should be considered.

Finaly there are some design possibilities in the transition space from our product. In the current state we used the audio and the movement to slow people down before they go into the boredom space. The usage of lights, narrowing space, smell and temperature can be implemented and tested to enhance the transition.

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Joep Elderman
Bastiaan van Hout
Bart Hengeveld
Pim visser

ChatGTP
This tool was using during the coding phase, it helped to resolve issues and serve as basis to build up our code. It seemed important to state this as it could impact our credibility during the project.

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IMAGE REFERENCES

[1] final Iot Sandbox new futures squad

[2] Steps in behavior change from the Trans Theoretical model (Prochaska J.O., Velicer WF, 1997)

[3] Picture of brainstorm on The Good Home

[4] Picture before memory exploration, with worthless object

[5] Picture before memory exploration, with worthless object

[6] 4 designs from design challenge Vertigo

[7] Picture steps for concept Het Blokje mid-term demo day

[8] Picture steps for concept Het Blokje mid-term demo day

[9] Picture steps for concept Het Blokje mid-term demo day

[10] Picture of exploration in vertigo

[11] Picture of exploration in vertigo

[12] Picture of exploration in vertigo

[13] Picture of exploration in vertigo

[14] Usertest touchdesigner outcome

[15] Usertest Atlas 2 setup

[16] Exploring boredom interaction

[17] Exploring boredom interaction

[18] Exploring boredom interaction

[19] Prototype building at Strijp S

[20] Steps in behavior change from the Trans Theoretical model (Prochaska J.O., Velicer WF, 1997)

[21] Demo day experience bored to be alive

[22] Group picture demo day made by Dan Lockton

[23] Still video demo day boredom made by Jens Vervoort

[24] Setup evaluation testing bored to be alive

[25] Setup evaluation testing bored to be alive

[26] Setup evaluation testing bored to be alive

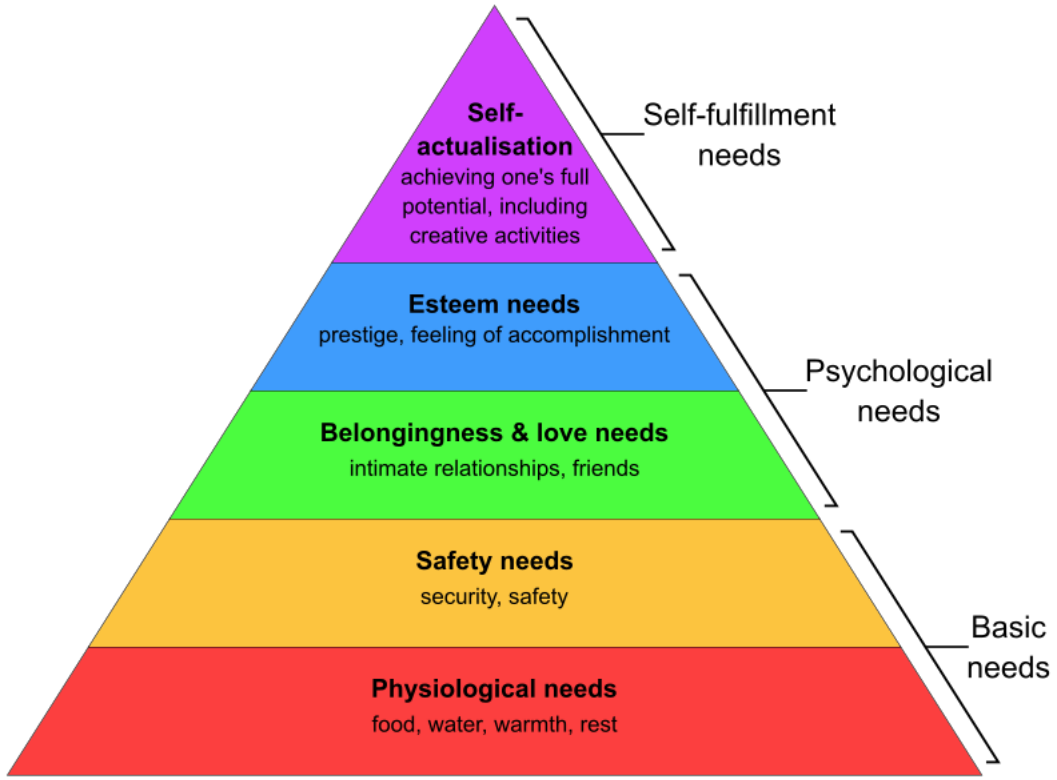
[27] Data sharing diagram

[28] Sketch bored to be alive by Rijk Herremans

APPENDIX A: RELATED WORKS

Self-actualization

Self-actualization can have various definitions depending on the context of usage. In this research it is defined as the realization of one's full potential. There can be added great value to the good home in 2038 if persons living in it are self-actualized. This theme is mostly explored and brought into prominence within the domain of psychology by Abraham Maslow. He created a hierarchy of human needs in 1943 which is shown in figure (x) (Maslow, A. H. 1943). The pyramid is split into three parts, basic needs, psychological needs and self-fulfilment needs. Maslow estimated that approximately 1% of all the people are truly self-actualized in their lifetime (Maslow, A. H. 1970). Through this case study he stated that self-actualized people have multiple personal traits in common. Some can influence the good home massively; they accept themselves and other for what they are, able to look at life objectively, concerned for the welfare of humanity and they can establish deep satisfying interpersonal relationships. If the product can enhance self-actualization in the good home the future will be a better place to live in.

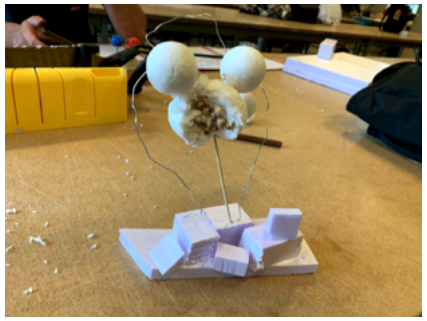


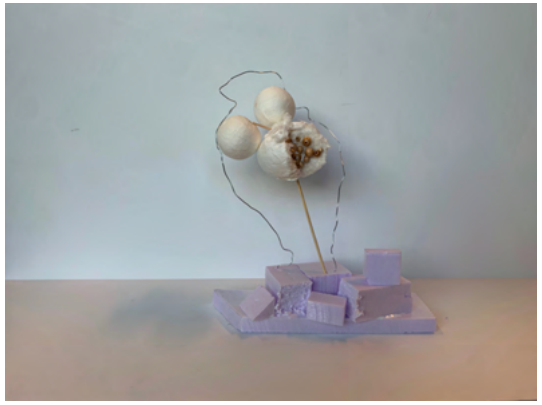
Piramide of maslow (Maslow, A. H. 1970).

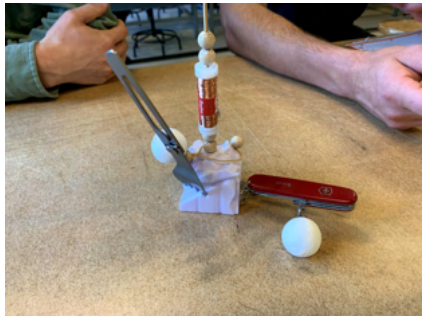
Time perception

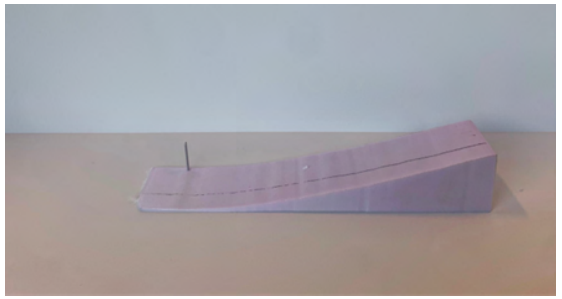
A person's sense of time is closely linked to cognitive functions, personality factors, and emotions. Pleasant activities can create the perception of time going faster, but this varies per person (Sackett et al. 2010). To induce a slower time perception of time, the introduction of boredom can intensify the user's experience, aiming for a more profound effect (Wittmann M. 2009).

APPENDIX B: DESIGN PROCESS

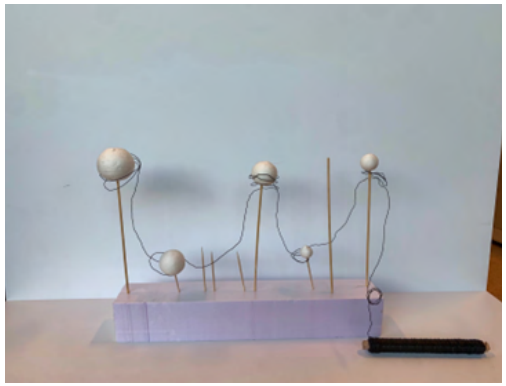


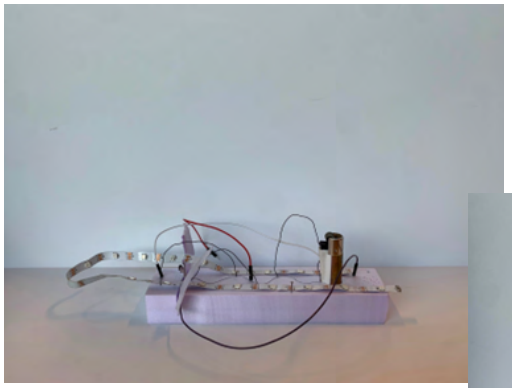






Vertigo design chellange



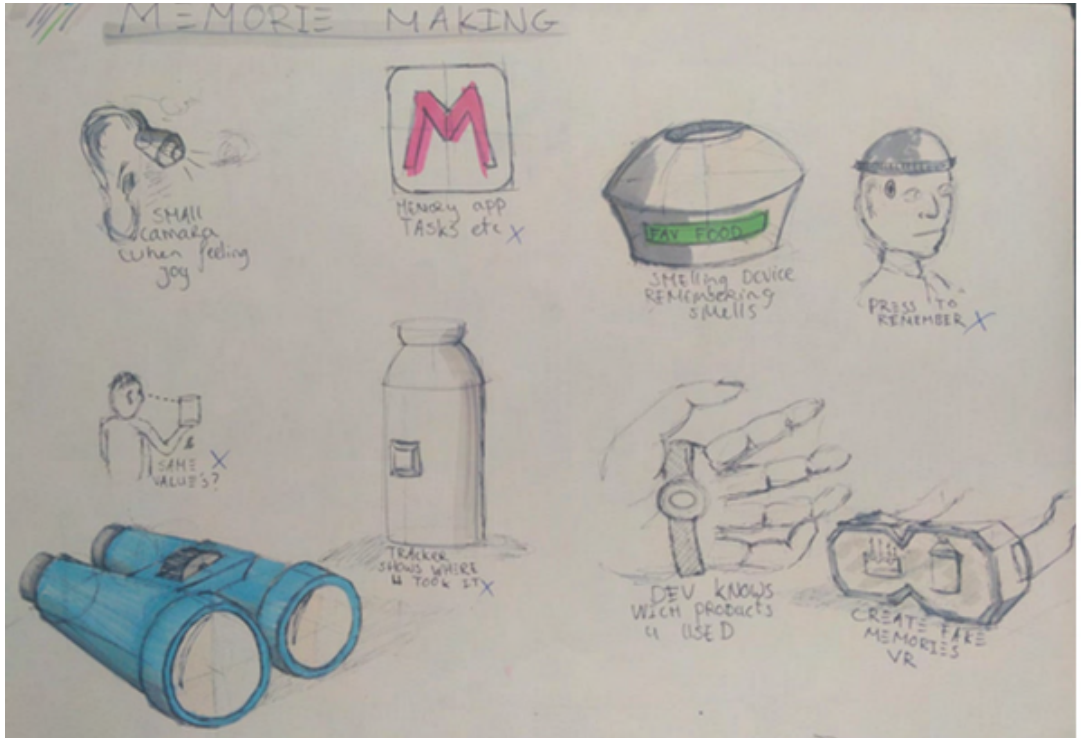


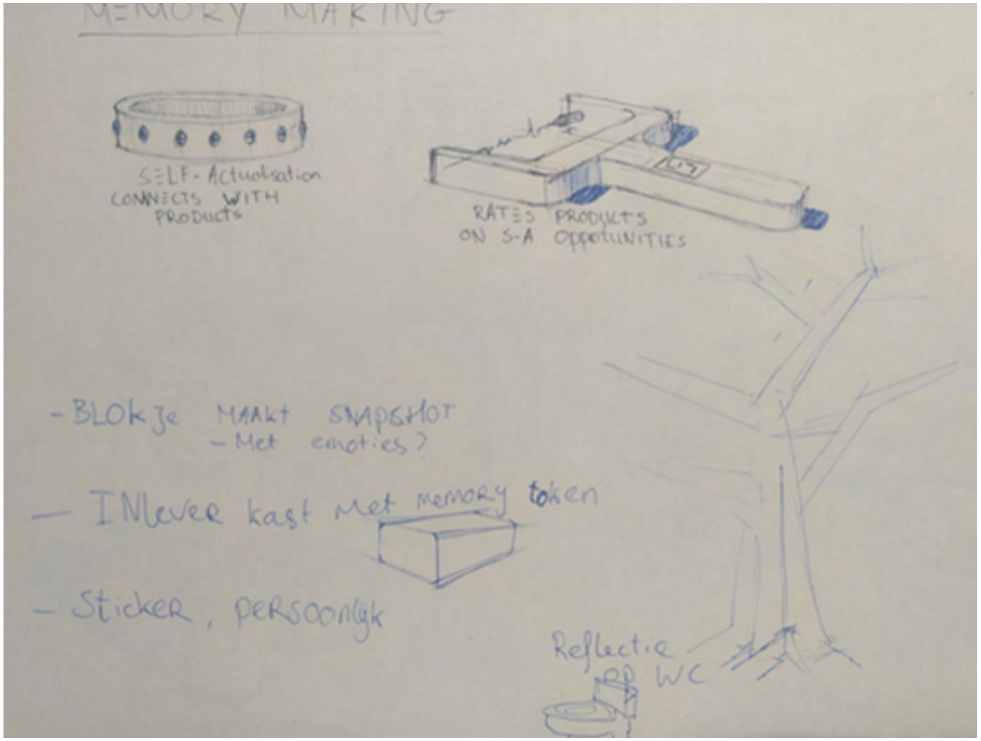
APPENDIX C: VERTIGO EXPLORATION

Vertigo design chellange, final concept presentation

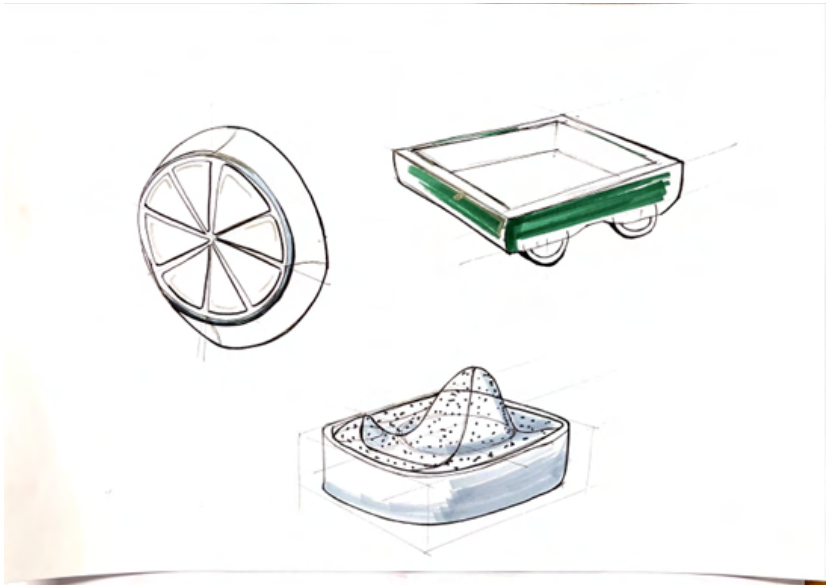
APPENDIX D: EXPLORATION

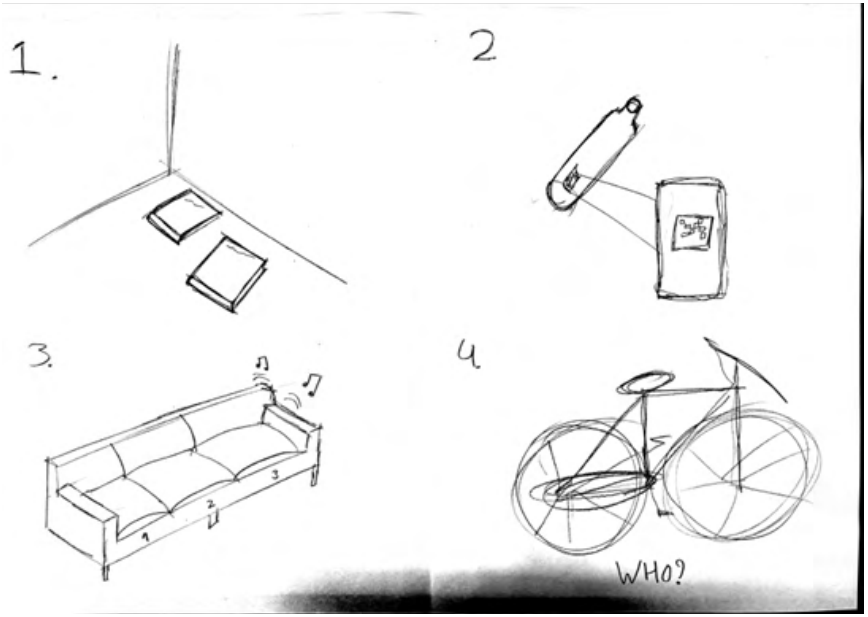
Ideation after Vertigo session
Idea of blokje

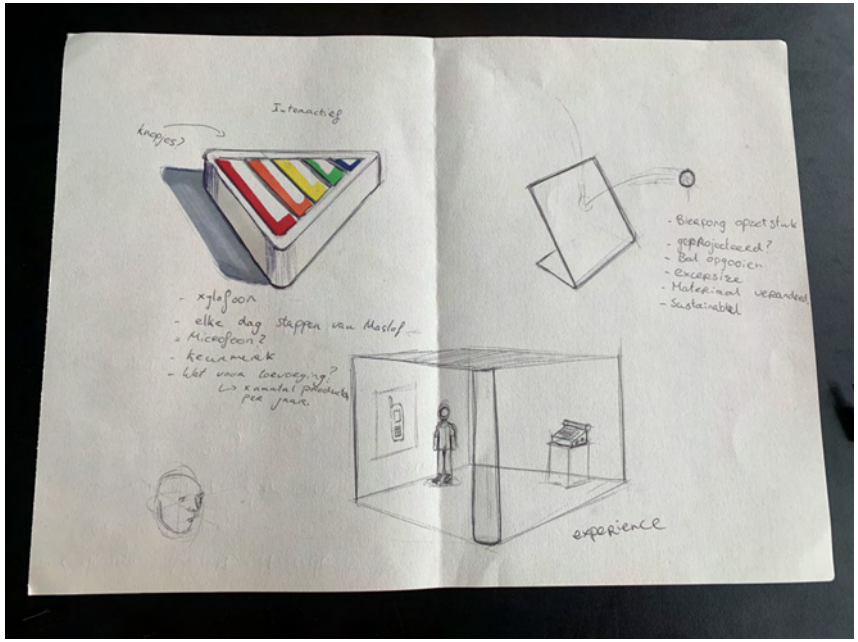


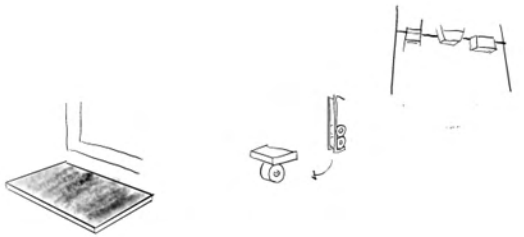


APPENDIX E: DRAWINGS

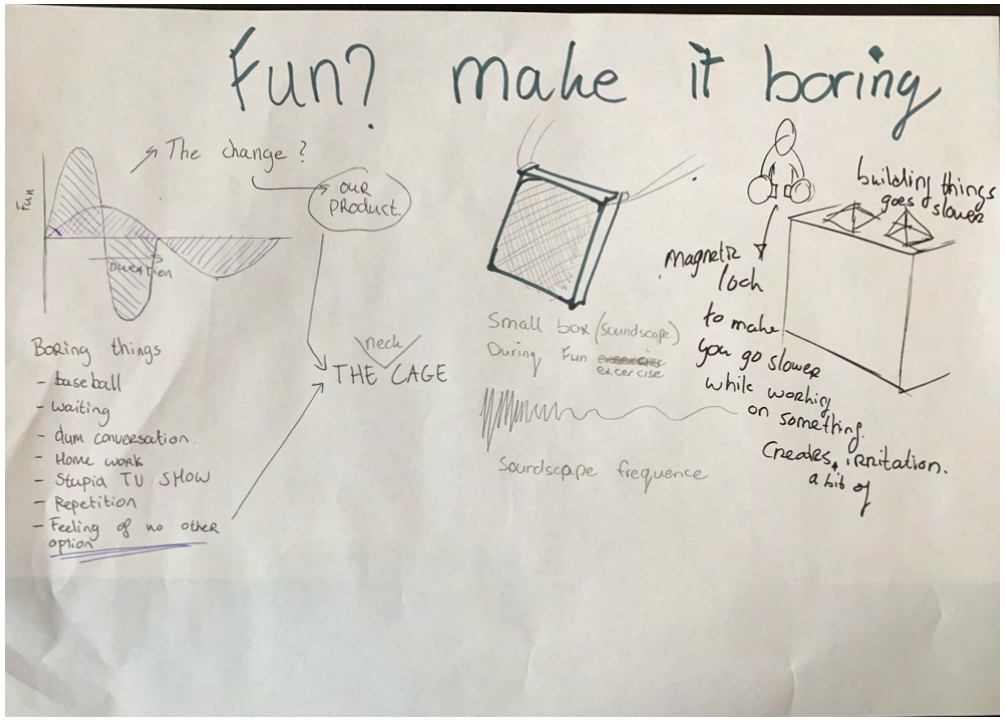


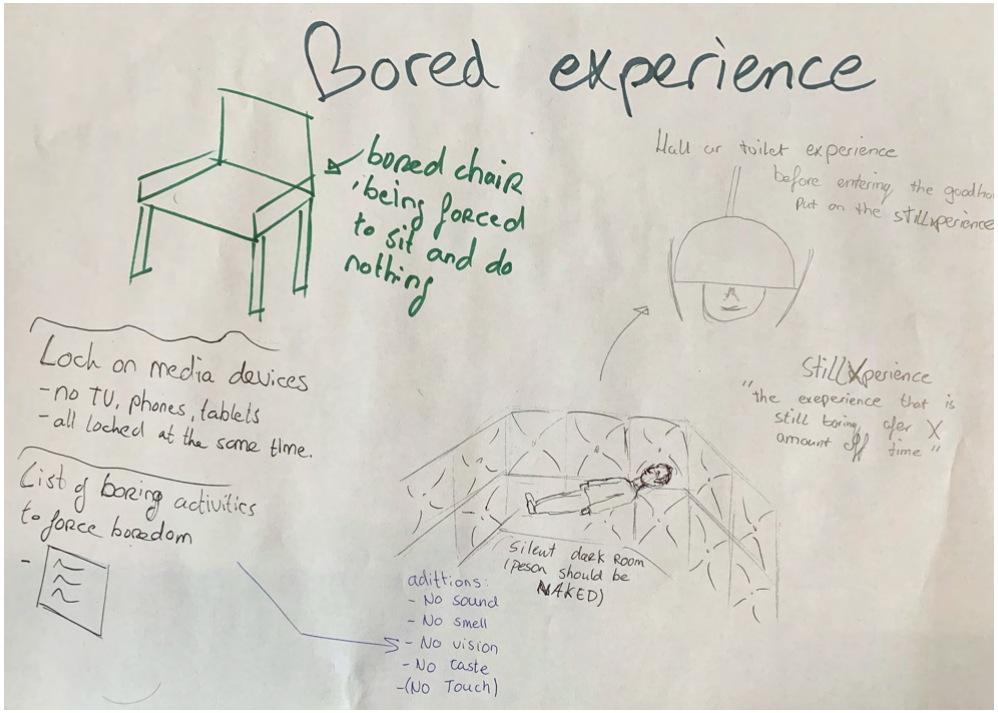


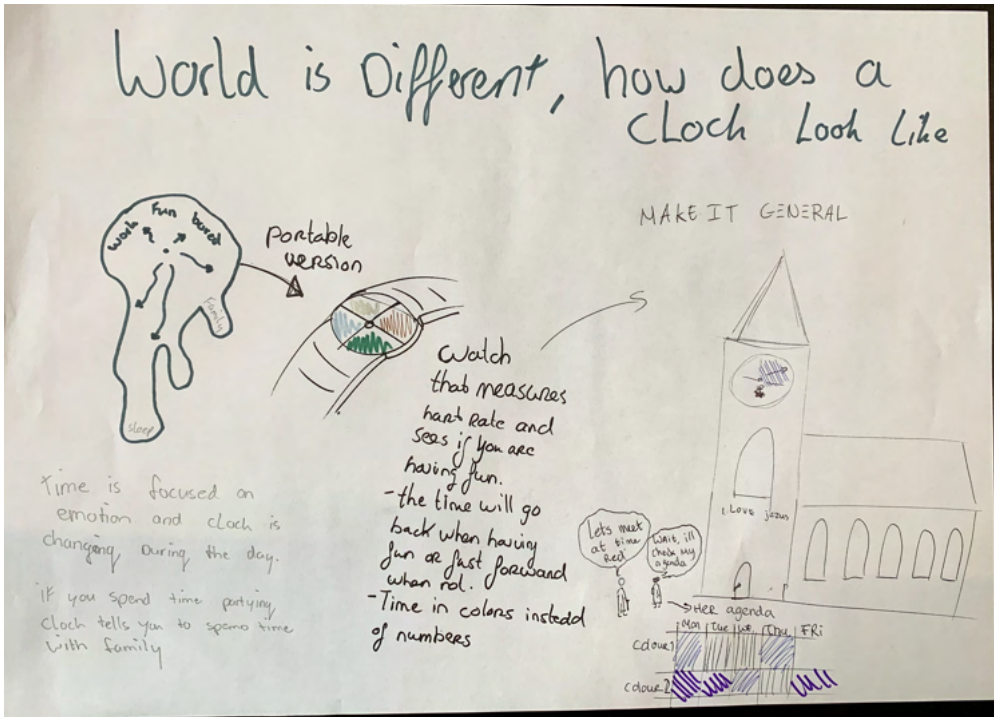




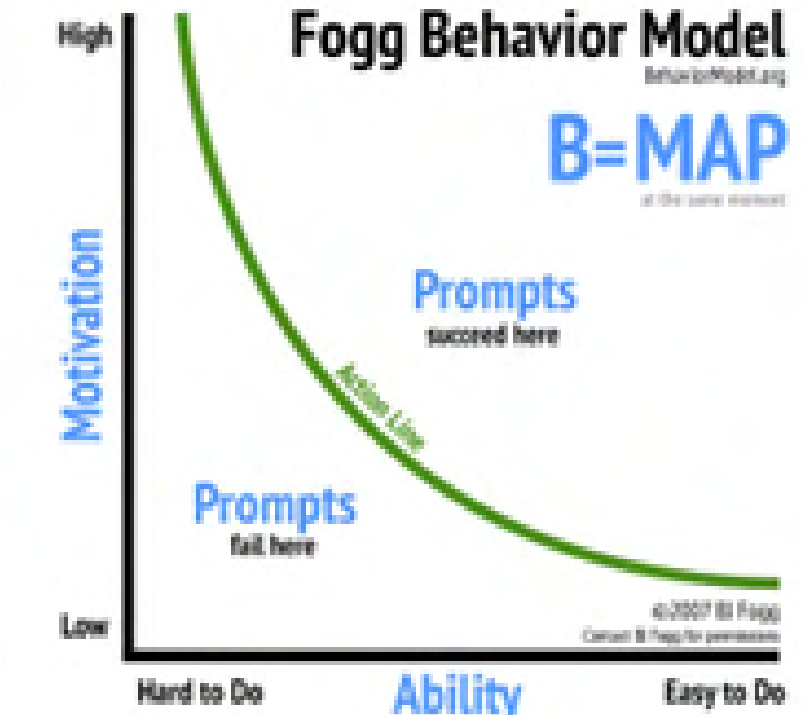
APPENDIX F: SKETCHES



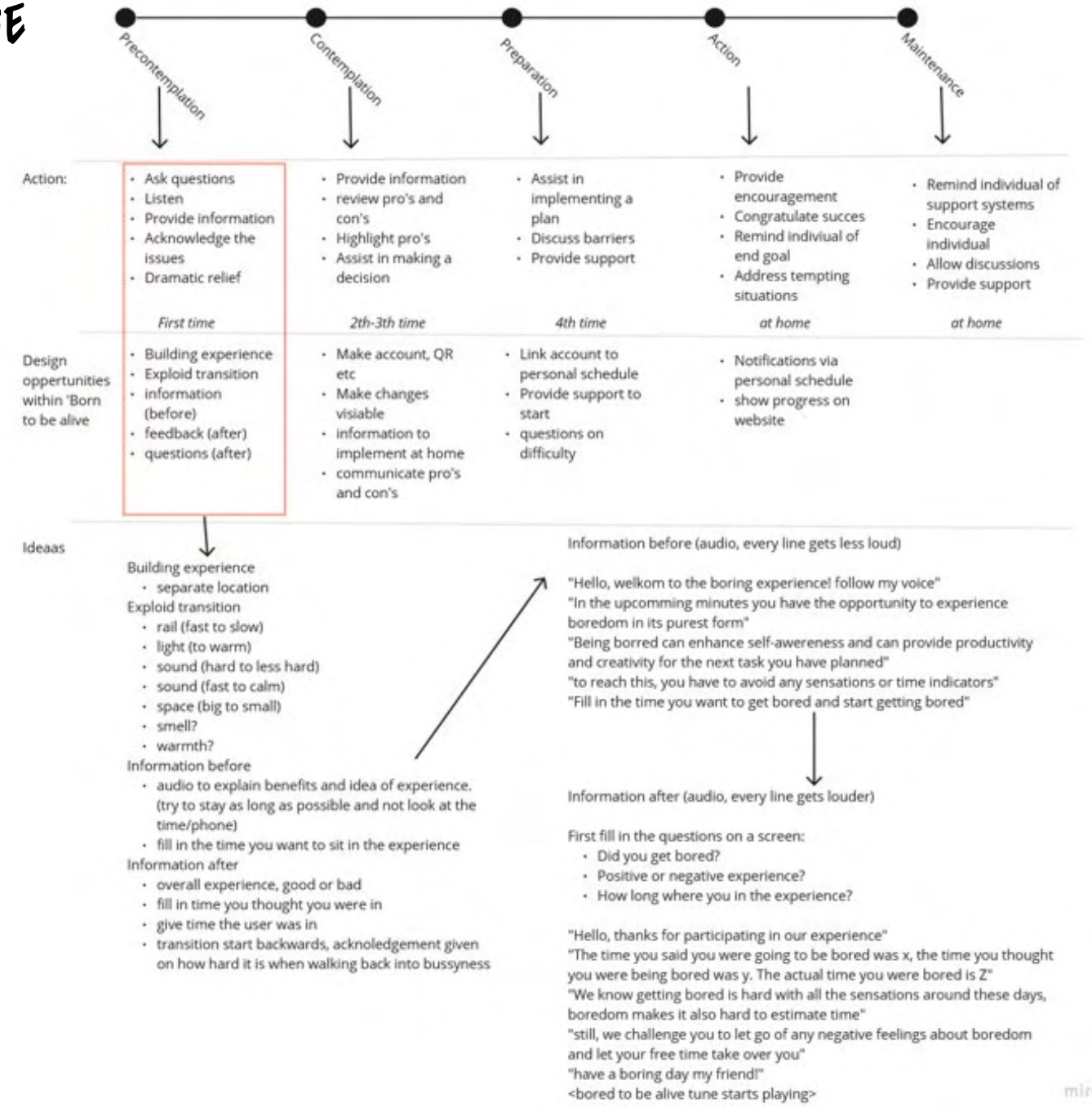




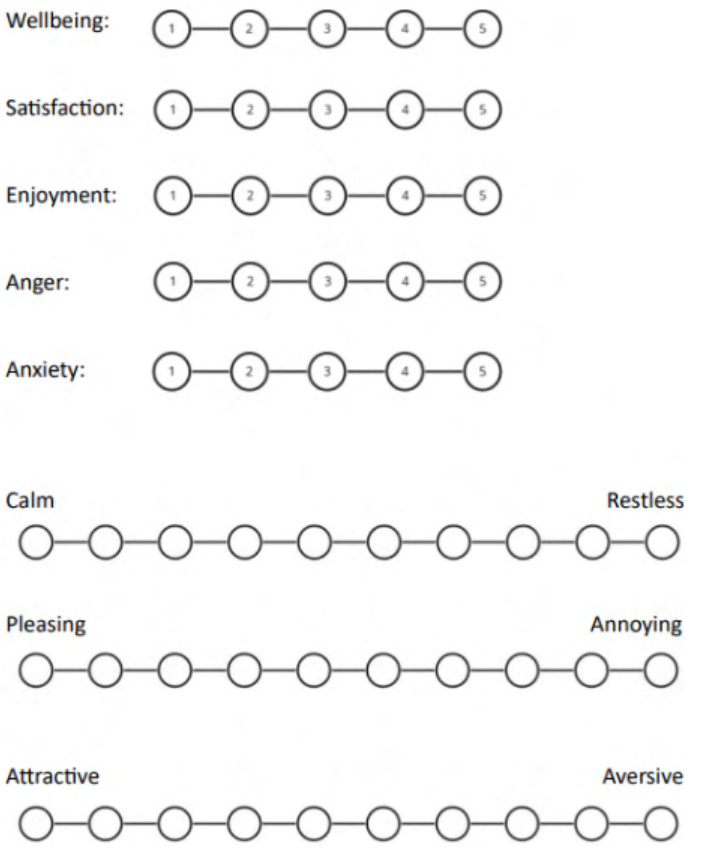
APPENDIX G: BEHAVIOR CHANGE MODELS

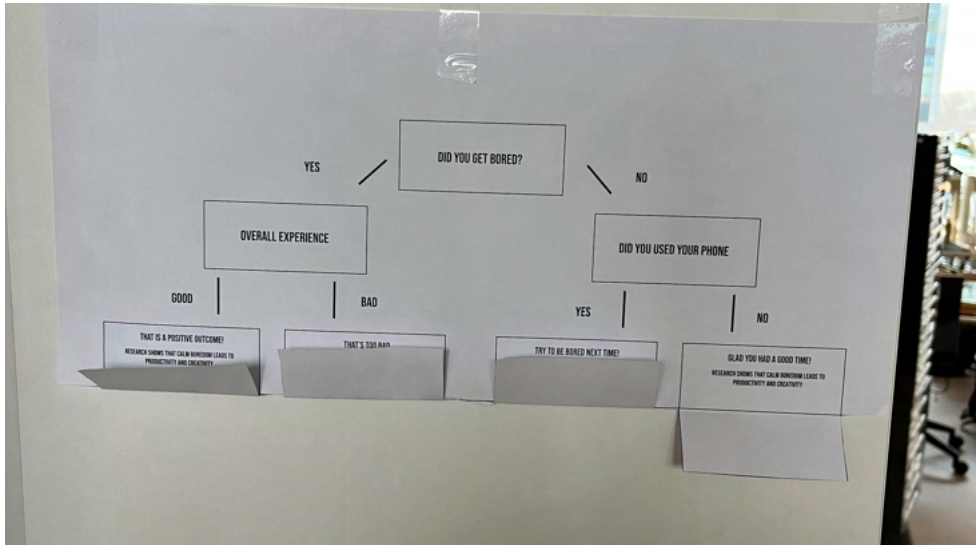


APPENDIX H: BEHAVIORAL CHANGE MODELS



APPENDIX 1: BEHAVIORAL CHANGE MODELS





Appendix J: Transcription user test 1

Participant 1 (p1)

Jens: Kan je omschrijven wat je dacht?
P1: uhhm, het was redelijk duidelijk, ik wilde meteen kijken waar dat balletje naartoe ging. Als die dan weer opnieuw spawnt. Er gebeurde voor de rest niets. Dacht probeer hem nog een keer te raken maar er gebeurd nog steeds niets. Toen had ik hem aan het einde net gemist, toen vond ik het mooi geweest.
Jens: hoelang dacht je dat je binnen was?
P1: echt 40 sec
Jens: uhm ja, was je sensatie positief of negatief toen je de kamer verliet?
P1: iets meer positief dan gemiddeld denk ik. En ik vond het irritant dat dat ding alleen op en neer kon en niet schuin
Jens: dus irritaties
P1: dacht alleen van dat is jammer, maar had dat laat door
Jens: nice, wat zou je willen doen nadat je verveeld bent
P1: iets leuks, met vrienden chillen
Jens: waarom doe je dat niet tijdens de verveling dan
P1: vaak kan dat niet, normaal is de reden dat ik me verveel dat ik vast zit ergens, haha o laatst een keer echt verveeld op DDW in mn eentje. Godverdomme
Jens: Kan je iets over die ervaring vertellen?
P1: er was gewoon geen kut te doen, ik probeer het dan nog voor mezelf leuk te maken door, uhmm ik probeer het zo leuk te maken als ik kan maar als dat op een gegeven moment niet meer kan. Dan is het gewoon de tijd uitzitten
Jens: Als we zouden zeggen dat verveling prima is, het is goed voor je. Zou je het dan fijner vinden om jezelf af en toe te vervelen
P1: Ja, maar ik zie dat niet als vervelen. Ik heb laatste maanden wel gedaan, dat ik op mn kamer zit en gewoon expres geen muziek aan zet. Gewoon niks, dat zie ik niet als vervelen maar meer als reflecteren. Gewoon even pauze. Ik zie dat niet als verveling
Jens: Verveling is voor jou echt meer een vorm van ik moet ergens zijn?
P1: Ja, ik kan daar niet weg tot een bepaalde tijd
Jens: oke, we sluiten m af
Simon: als we hadden gezegd je moet hier 5 minuten moet zitten met dit kut spel had je het anders ervaren eh?
P1: ja 100 procent

Participant 2 (P2)

Recording 2.1
Jens: wat was je overall experience
P2: ja ik ben best wel druk vandaag en gestrest. Want ik wilde zo beginnen aan een deel van een prototype. Maar ik had het nog niet helemaal uitgedacht. Dus ik kon nu alles op een rijtje zetten. Dat was denk ik de helft van de drie minuten en daarna ging ik staren.
Jens: dus je was bezig met het nadenken over het prototype. En toen was het klaar, wat gebeurde er toen?
P2: toen weet ik niet hahah, ik ging staren en ging ik kijken naar dit (de muur). Kijken of ik daar figuurtjes in kon zien. Maar dat kon ik niet en dat vond ik ook niet erg ofzo. Ik vond het best relaxed eigenlijk
Jens: nice, kan je daar dieper op in gaan? Waarom ging je daar naar staren? Wat gebeurde er?
P2: Ik had niks meer om over na te denken dus toen ging ik staren. Ik was waarschijnlijk wel aan het nadenken maar niet iets wat me is bij gebleven.
Jens: Hoe zou je dat gevoel omschrijven wat je net had?
P2: wel kalm
Jens: nice, zou het als verveling kunnen omschrijven?
P2: nee geen verveleing. Ik ben zelf sowieso niet snel verveeld
Jens: hoe zou je verveling omschrijven?
P2: meer als een soort frustratie. Een oncomfortabel gevoel wat me frustreert omdat het lang duurt.

APPENDIX K: TRANSCRIPTION USER TEST 1

Jens: hoezo was dat nu niet?
P2: omdat het voor mijn gevoel niet lang duurde
Jens: en omdat je wist dat het snel afgelopen zou zijn?
P2: ja misschien dat ook
Rijk: 5 minuten kan best lang zijn natuurlijk, als we tegen jou hadden gezegd dat het oneindig zou duren. Had je je dan meer verveeld?
P2: ja als je niet had verteld wanneer, had ik me wel verveeld en was ik wat gaan zoeken om te doen. Kijken naar die figuurtjes of dat ik misschien mensen kon verstaan maar dat lukte ook niet
Jens: dus je was dus constant aan het zoeken om dingen te doen
P2: ja een beetje wel
Jens: en je zei dat je niet zovaak verveeld was, maar kan je je momenten van verveling omschrijven?
P2: denk de laatste keer was dat ik bij mijn vriend in bed lag, en dat het lang duurde voordat hij wakker werd. En ik had mijn telefoon ook niet, dan ga ik altijd figuurtjes in het houten plafond zoeken
Jens: zou je kunnen zeggen dat al die momenten dat je verveelt was dat dat onder zelfde omstandigheden waren. Dus je zegt al geen telefoon bijv. wat is een overkoepelend thema voor verveling?
P2: ik denk wachten, altijd als ik wacht ben ik verveeld

Jens: zou je iets kunnen vertellen over je experience?
P2: ik vond het een beetje een saai spel. Ik had hem een keer en toen gebeurde er niks en toen dacht ik van nja oke. Kan het wel nog een keertje doen maar het is best wel saai. Toen ben ik wel verder gegaan maar toen werd ik ook snel afgeleid van waarom steken hier draadjes uit. Ik ging daar een beetje op letten. En ik was gefascineerd door dit knopje (joystick). Toen raakte ik snel afgeleid door de dingen buiten het spel om. En ik merkte ook dat ik deze keer de tijd bij kon houden
Jens; ja hoelang denk je dat je gezeten heb
P2: ja ik kon het zien, dus 3 of 4 minuten
Jens: wat vond je van het spel? Wat deed het met je?
P2: eerst vond ik het irritant, waarom gaat mijn rode balleteje langzamer dan die witte. En ik vond het irritant dat die niet schuin kon. Dus ik vond het een beetje een irritant spel. Maar het helpt wel tegen verveling. Dat je misschien minder verveelt bent als je een spelletje speelt.
Jens: het is inprincipe zo dat we juist willen designen voor verveling. Dus dat mensen zich juist gaan vervelen tijdens ons ding. Wat zou je daar over zeggen? Dat het niet zozeer tegen verveling is
P2: ik dacht het tegen verveling zou zijn. Ik vond het juist verveling opwekken
Rijk: Het gevoel dat je eerder had, dat je aan het weg denken was over je project. Had je hetzelfde gevoel tijdens het spelen van het spel?
P2: ja ik was wel over andere dingen aan het nadenken dan het spel, omdat het niet zoveel prikkels zijn
Rijk: wil je vertellen waar over?
P2: vooral over de antwoorden die ik aan jullie al had gegeven
Jens; op momenten dat je verveeld bent. Wat zou je graag doen, willen, zien?
P2: vaak helpt muziek wel, altijd als ik een saai iets moet doen voor school ofzo dan denk ik het altijd ik kan het op drie manieren chiller maken, met muziek, comfy houding en met iets lekkers hehe
Jens: wat als ik je vertel dat het juist goed is om jezelf te vervelen? Dat het nice is als je x aantal uur jezelf verveeld
P2: ja ik zou het fijn vinden om mezelf te vervelen, want dat zou betekenen dat ik tijd heb
Rijk: hoe zou jij het verhaal overbrengen dat verveeldheid goed voor je is?
P2: ik zou vooral vertellen waarom het goed voor je is

Appendix L: Transcription user Test 1

Participant 3 (p3)

3.1 & 3.2
Simon: I still have a few questions, how was your overall experience?
P3: well it was interesting, first I was like what am I going to do for 5 minutes. I started counting. But that didn't get me anywhere. Then I started planning next steps for my own project. So in my head I was figuring out what to write etc. that was quit nice. Only bit that was distracting was that people where walking over your head. There is noice that keeps you interested in it. But next to that it was quit nice to focus on the stuff to you have to do next.
Simon: did you experienced it as bored?
P3: I thought the first couple of minutes it would be that, but after, I guess after counting to 100 I wasn't bored
Simon: then we have the next part…..
Simon: So how was this experience?
P3: it made me curious, having a red button in front of you doesn't encounter you any day. And to be able to freeze the visuals is quit nice. I came to the conclusion that there is one thing that isn't satisfying, that there is never black and white lines. But generally speaking it was quit funny. First 30 sec I started focussing on this. What happened after is that I got sort of a tunnel vision. It almost felt like one of those back in the day facebook videos where you have to stare at a dot to see visuals. It gave you something to do.
Simon: and how long do you think you where sitting in the room.
P3: I would argue, around 4 minutes
Simon: and did you experience any boredom here?
P3: not really, It also didn't really allow to let my thoughts wonder. But I wasn't bored.
Simon: overall topic is boredom. And we have some questions about that as well. So how would you describe boredom itself?
P3: hmm, it's a state where you either there is something you will know will happen in a while. Then there is a time frame that you don't have enough time to start something really good but also to short to do something else. That's sort of the time where you are not productive and you don't really have fun. Its just time passing, it feels slower, than moments that I am having fun. An hour can feel like three.
Simon: and how often do you experience boredom
P3: depends a bit, I think I am trying to escape boredom through dum scrolling. At least keeping the eyes and the eares busy. Technicaly speaking when I am taking this time doing useless stuff as time you can do boredom it would be every evening for a couple of hours I guess.
Simon: what is your biggest irritations about being bored and your biggest pro's
P3: when you are in a state where you except there is nothing going to happen for a while now then you come to the conclusion that your brain starts working and thought start to wonder of. I think that is really beneficial. Cause you can start reflecting on things. But the irritating fact about boredom is that there is always some sort of attraction happening. Why cant i do nothing for an hour why is it that you always have to keep yourself busy? Why does it feel like I have to do something?
Simon: does boredom occur in the same circumstances?
P3: for me it's the same circumstances, it always at campus. When I get bored I start talking to people. I get myself back in the flow. But when I am home alone it is a different story. Instead of writing or working I will go to the library. It is a different kind of setting, it is not your own four walls.
Simon: thank you for participating.

APPENDIX M SCENARIO'S

Scenario 1

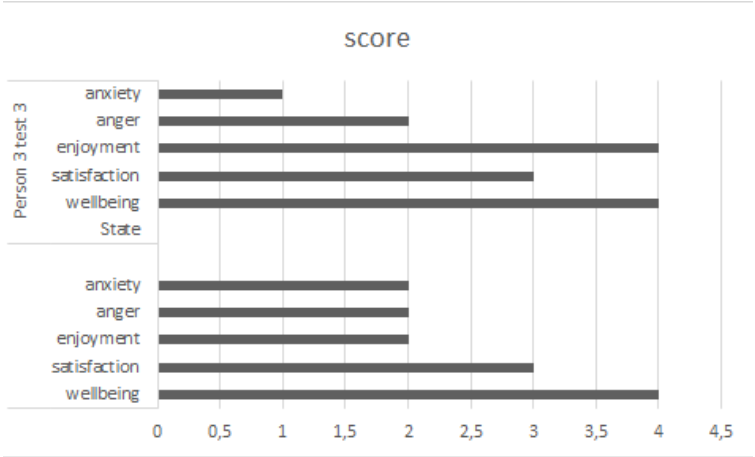
The evolution of the smartphone goes over the top. In such a way that the smartphone isn't a smartphone anymore, it became a 'smart'.
China had a big rise in their smartphone industry and has most of the precious metals on the globe. So, the western tech companies had to combine to keep up with the Chinese and they developed the new 'smart' series. A 'phone' that has everything on it. But when one of its functions fails the user can replace it. Like Lego, or that other phone company from which I forgot the name. They do this because they know the west doesn't have enough resources to keep producing new 'phones'. This one device stands in line with the postgrowth idea of not having to buy new new new all the time. And the collection and recycling of failed functions on the 'smart' keeps the resources on a needed level. (more digital, New stuff is made, allot of data)

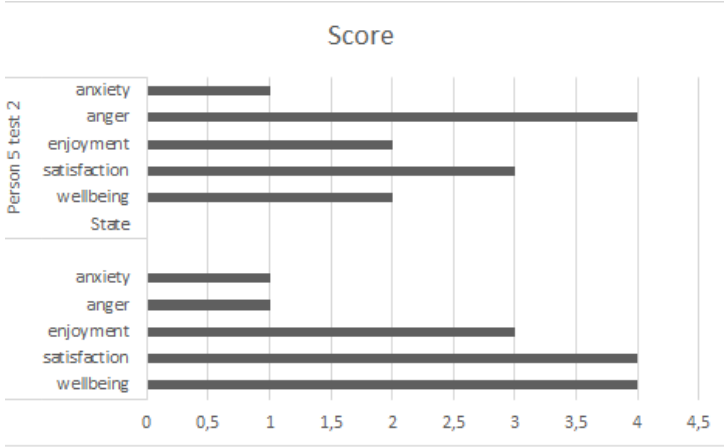
The Everything on one device:
-Keys
-Lights, indoor outdoor
-Texting
-Temperature meter
-Speaker
-Pen
-TV
-Calling
-Wallet
-Camera -Car keys -Bike keys -OV -Laptop -Hairbrush
-Private zone (sound thingy)

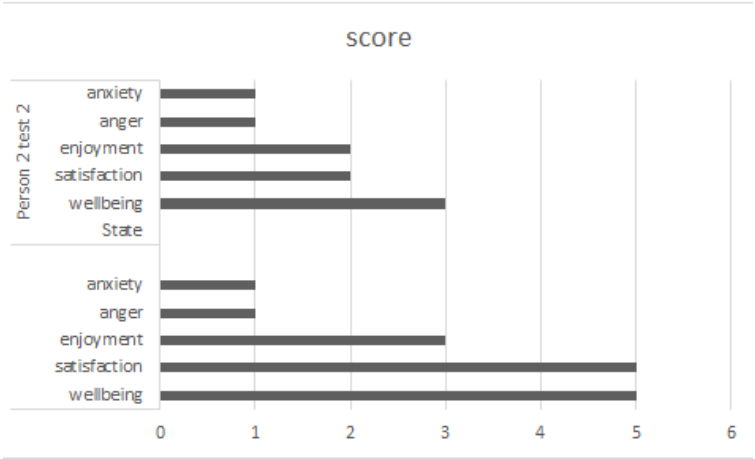
Scenario 2

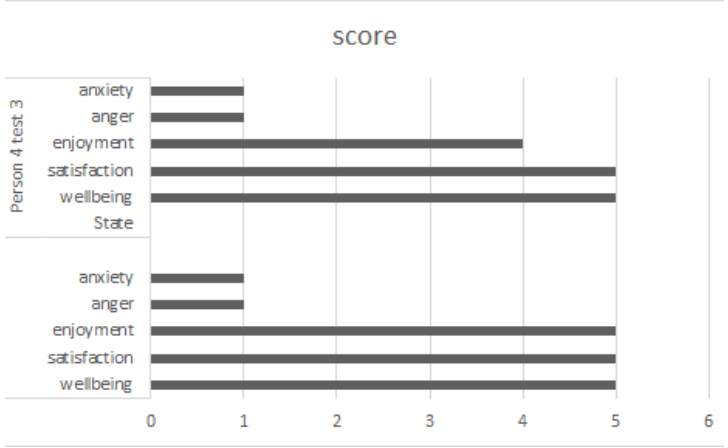
Because of the shift that is starting in the work environment, people have more free time to spend. The AI has started to be more than just a gimmick, it is taking jobs. From creative to administrative work, people have to accept that their future will be different. How can we as a community deal with this? Do we have to stop the AI applications or start a new way of interacting with it, make a job out of using the AI properly.
But there is also an advantage to this, people now see what important things are to them. They have more time to reflect, socialize and be happy. It is now seen that we as hard-working people don’t always now what is the best thing to do. People start traveling more, see what the world has to offer. Or do hobby’s they always thought of since they were teenagers. And for the first time have the ability to ask what makes me really happy?
The materialistic world becomes more interesting to people, because the digital world is foremost based on AI applications. They start doing more with their hands, see the value of reusing materials and the purpose of carbon neutral world.
This will be in the history books as one of the next shifts of the human species, next to the industrial revolution.

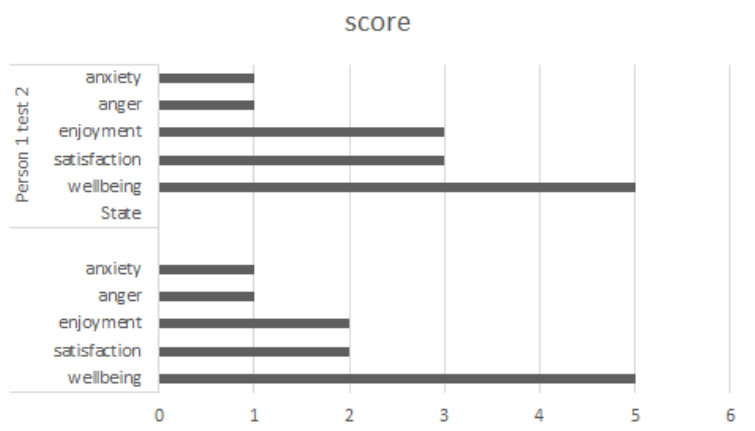
APPENDIX N: RESULT USER TEST











APPENDIX 0: INSPIRATION GAMES

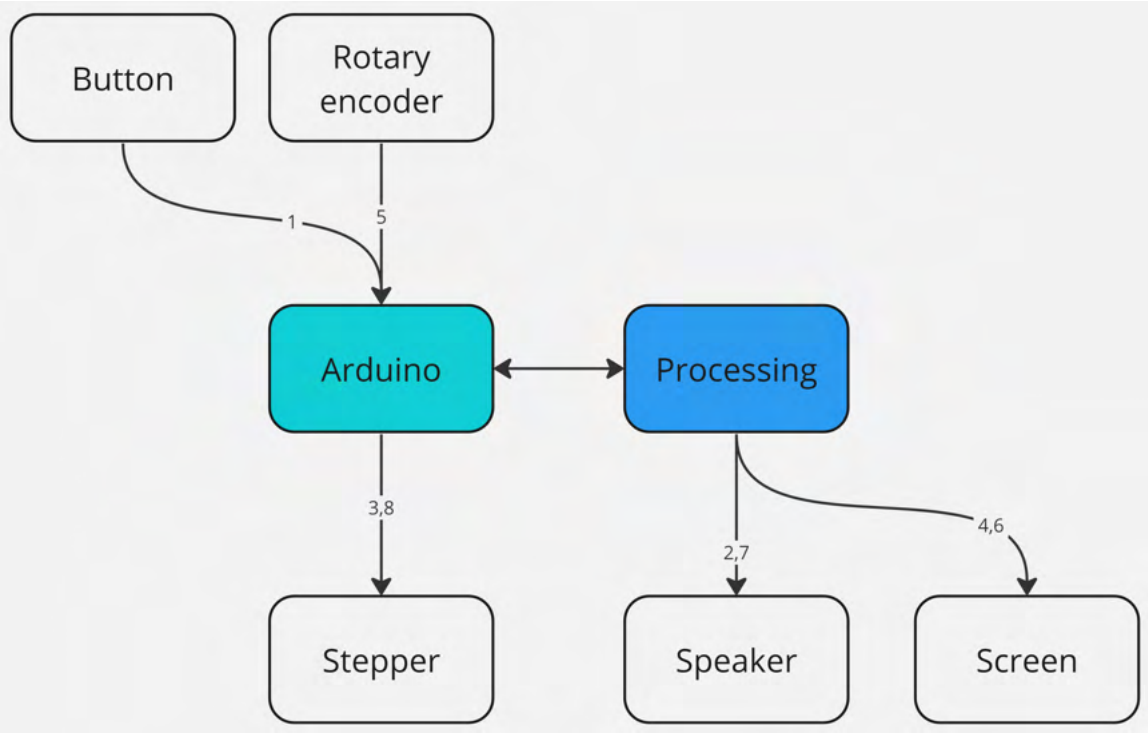
•Sorting colors on toilet.
- having people look at a lay out of different colors and sort them by them self.

•Kick the can
https://www.csmonitor.com/1991/0108/ukick.html

•Dessert driver
-https://www.youtube.com/watch?embeds_referring_euri=https%3A%2F%2Fwww.nme.com%2F&embeds_referring_origin=https%3A%2F%2Fwww.nme.com&source_ve_path=Mjg2NjQsMTY0NTAz&feature=emb_share&v=2LtiHla1dNg

•Not catching the fly
-User has to follow the light with cursor. End result is a drawing that the user made by following 'The Fly'.

APPENDIX P: APPENDIX CODE SCHEMATIC



1. Button is pressed
2. Speaker activates with introduction
3. Stepper starts moving speaker
4. Screen light up with start screen
5. Time is entered-> feedback is given
6. Screen changes questions
7. Speaker is activated for return sequence
8. Stepper returns to original position

APPENDIX Q: APPENDIX PROCESSING CODE

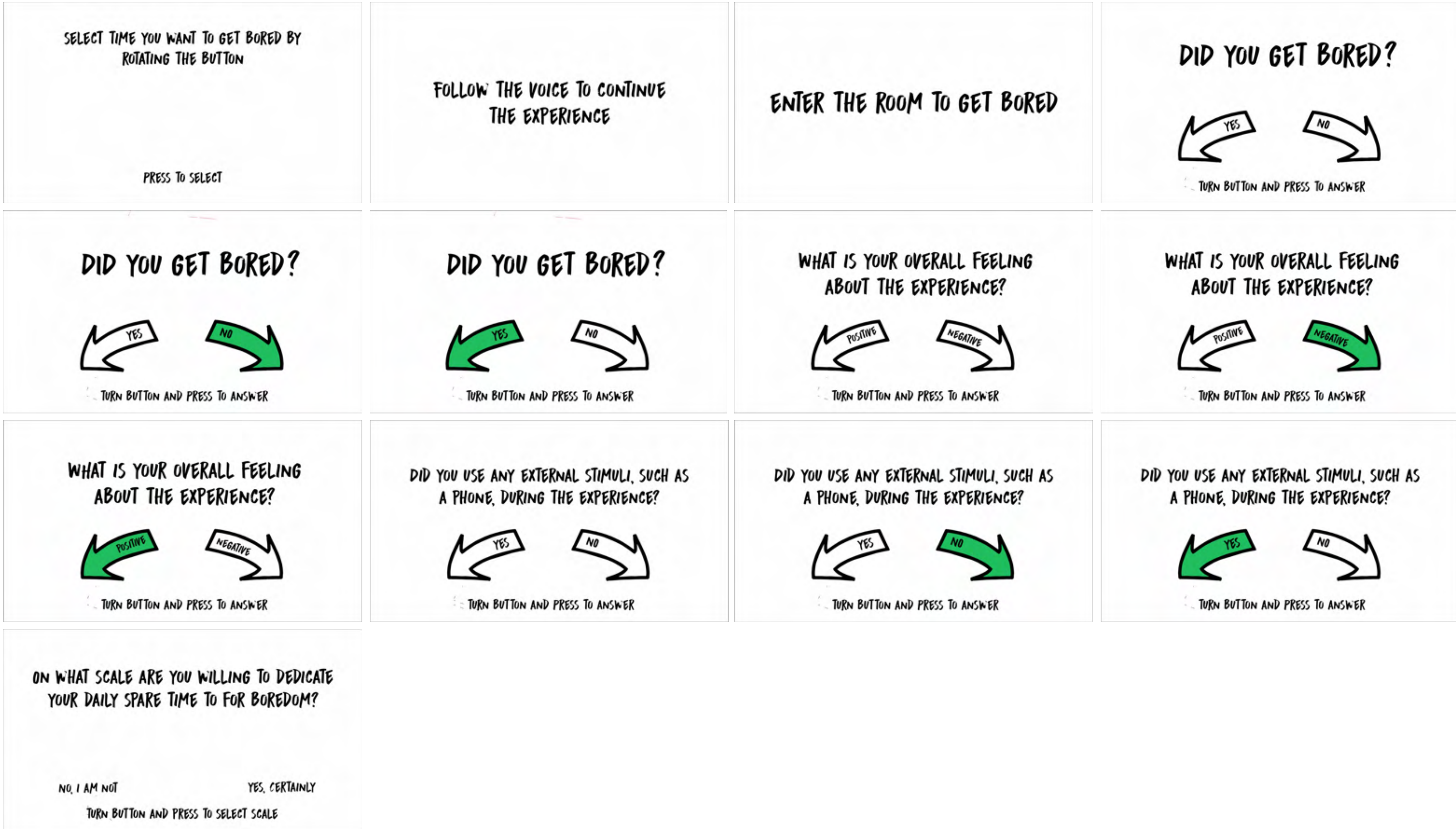
```
import processing.serial.*;

import ddf.minim.*; // audio

Serial arduino;
int minutes = 0;
int currentScreen = 0; // 0: Timer, 1: Intro, 2: Questions, 3: End
int currentQuestion = 0;
PImage[] questionImages = new PImage[13]; // Change the array length to match the number of
questions
int sliderValue = 0;
int[] questionStates = new int[5];  // State for each question, 0: Initial state, 1: Yes state, -1: No state.

int lastMillis = 0;
int rotationDelay = 100;  // Adjust this value to make it less sensitive
int beginScreenDuration = 5000;  // 10 seconds for end screen
int endScreenDuration = 10000;  // 10 seconds for end screen

//audio
//Serial myPort;
Minim minim;
AudioPlayer player;
AudioPlayer player2;

byte arbitraryCode = 22; // Borntobealive
byte arbitraryCode2 = 23; // nog niks
byte arbitraryCode3 = 70; // stoppen

boolean playing = false;

PFont customFont; // Declare a variable for the custom font

void setup() {
fullScreen();

  // audio
  // arduino = new Serial(this, "COM4", 9600);


  // Load question images
  questionImages[0] = loadImage("timerbackground.jpg");
  questionImages[1] = loadImage("introscreen.jpg");
  questionImages[2] = loadImage("question1.jpg");
  questionImages[3] = loadImage("question2.jpg");
  questionImages[4] = loadImage("question3.jpg");
  questionImages[5] = loadImage("question4.jpg");
  questionImages[6] = loadImage("endscreen.jpg"); // Add the end screen image

  // Load additional images for yes and no states
  questionImages[7] = loadImage("question1_yes.jpg");
  questionImages[8] = loadImage("question1_no.jpg");
  questionImages[9] = loadImage("question2_yes.jpg");
  questionImages[10] = loadImage("question2_no.jpg");
  questionImages[11] = loadImage("question3_yes.jpg");
  questionImages[12] = loadImage("question3_no.jpg");



  // Initialize question states
  for (int i = 0; i < questionStates.length; i++) {
    questionStates[i] = 0;  // Initial state
  }

  // Change the port name to match your Arduino's port
  arduino = new Serial(this, "COM4", 9600);
  minim = new Minim(this);
  player = minim.loadFile("boring experience1.mp3"); // heenweg audio file
  player2 = minim.loadFile("boring experience3.mp3"); // terugweg audio file

    customFont = createFont("Chopshop-Regular.ttf", 20); // Replace "DKBuntaro.otf" with your font file
and size
  textFont(customFont);
    // textSize(100);
}

void draw() {

  switch (currentScreen) {
    case 0: // Timer
    background(0);
    setCurrent();
    break;
  case 1: // Timer

    displayImage(0);
    drawTime();
    updateTimer();
    break;
  case 2: // Intro Screen
    displayImage(1);
    updateIntroScreen();
    break;
  case 3: // Questions
    updateQuestions();
    if (currentQuestion == 3) {
      displayImage(5); // Index 6 corresponds to the end screen image
      displaySlider();
      updateSlider();
    }
    break;
  case 4: // End Screen
 // setCurrentBack();
    displayImage(6); // Index 6 corresponds to the end screen image
    updateEndScreen();

    break;
  }
}

void displayImage(int index) {
  // Display the specified image
  image(questionImages[index], 0, 0, width, height);
}

void setCurrent(){
  while (arduino.available() > 0) {
    int inByte = arduino.read();
    if (inByte == arbitraryCode) {
    //  playing = true;
      player2.pause();
      player.rewind();
      player.play();
      delay(30000);
      currentScreen = 1;
    }
  }
}

void setCurrentBack(){
      player2.rewind();
      player2.play();
    }

void drawTime() {
  fill(0);
  textSize(200);
  textAlign(CENTER, CENTER);
  String timeString = nf(minutes, 2) + ":00";
  text(timeString, width / 2, height / 2);
}

void updateTimer() {
  while (arduino.available() > 0) {
    String message = arduino.readStringUntil('\n');
    if (message != null) {
      if (message.trim().equals("CW") && millis() - lastMillis > rotationDelay) {
        // Rotate clockwise, increase timer
        minutes = (minutes + 1) % 100;
        lastMillis = millis();
      } else if (message.trim().equals("CCW") && millis() - lastMillis > rotationDelay) {
        // Rotate counterclockwise, decrease timer
        minutes = (minutes - 1 + 100) % 100;
        lastMillis = millis();
      } else if (message.trim().equals("PRESS")) {
        // Encoder pressed, go to intro screen
        currentScreen = 2;
        lastMillis = millis();
      }
    }
  }
}

void updateIntroScreen() {
    if (millis() - lastMillis > beginScreenDuration) {
    // After 10 seconds on the end screen, go back to the timer
    currentScreen = 3;

  }
}

void updateQuestions() {
  // Display images for yes and no
  if (currentQuestion == 0) {
    if (questionStates[0] == 1) {
      displayImage(7); // Load the image for the first question - Yes state
    } else if (questionStates[0] == -1) {
      displayImage(8); // Load the image for the first question - No state
    } else {
      displayImage(2); // Load the image for the first question - Initial state
    }
  } else if (currentQuestion == 1) {
    if (questionStates[1] == 1) {
      displayImage(9); // Load the image for the second question - Yes state
    } else if (questionStates[1] == -1) {
      displayImage(10); // Load the image for the second question - No state
    } else {
      displayImage(3); // Load the image for the second question - Initial state
    }
  } else if (currentQuestion == 2) {
    if (questionStates[2] == 1) {
      displayImage(11); // Load the image for the third question - Yes state
    } else if (questionStates[2] == -1) {
      displayImage(12); // Load the image for the third question - No state
    } else {
      displayImage(4); // Load the image for the third question - Initial state
    }
  }

  while (arduino.available() > 0) {
    String message = arduino.readStringUntil('\n');
    if (message != null) {
      if (message.trim().equals("PRESS")) {
        // Button pressed, go to the next question
        currentQuestion = min(currentQuestion + 1, questionImages.length - 2);
        lastMillis = millis();
```

APPENDIX Q: PROCESSING CODE

```
        if (questionStates[currentQuestion] == 0) {
          questionStates[currentQuestion] = 0;  // Assuming initial state for the next question
        }
      } else if (message.trim().equals("CW")) {
        // Rotate clockwise, change to No state
        if (currentQuestion < questionStates.length) {
          questionStates[currentQuestion] = -1;
        }
      } else if (message.trim().equals("CCW")) {
        // Rotate counterclockwise, change to Yes state
        if (currentQuestion < questionStates.length) {
          questionStates[currentQuestion] = 1;
        }
      }
    }
  }

  // Check if all questions have been answered, go to the end screen
  if (currentQuestion >= questionImages.length - 2) {
    currentScreen = 4;
    lastMillis = millis();
  }
}

void displaySlider() {
  // Display slider interface
  fill(255);
  rect(50, height / 2 - 50, width - 100, 100, 10);
  strokeWeight(7);

  // Draw squares based on sliderValue
  int numSquares = 6;
  float squareWidth = (width - 100) / numSquares;
     for (int i = 0; i < numSquares; i++) {
    float x = 50 + i * squareWidth;
    float y = height / 2 - 50;
    rect(x, y, squareWidth, 100, 5);
  }

  for (int j =0; j < sliderValue; j++) {
    float x2 = 50 + j * squareWidth;
    float y = height / 2 - 50;
    fill(0, 255, 0);  // Green
    rect(x2, y, squareWidth, 100, 5);
  }

}
void updateSlider() {
  while (arduino.available() > 0) {
    String message = arduino.readStringUntil('\n');
    if (message != null) {
      if (message.trim().equals("CW") && millis() - lastMillis > rotationDelay) {
        // Rotate clockwise, increase sliderValue
        sliderValue = min(sliderValue + 1, 6);
        lastMillis = millis();
      } else if (message.trim().equals("CCW") && millis() - lastMillis > rotationDelay) {
        // Rotate counterclockwise, decrease sliderValue
        sliderValue = max(sliderValue - 1, 0);
        lastMillis = millis();
      } else if (message.trim().equals("PRESS")) {
        // Encoder pressed, exit questions and go to end screen
      player2.rewind();
      player2.play();
        currentScreen = 4;
        lastMillis = millis();
      }
    }
  }
}
```

```
void updateEndScreen() {

  if (millis() - lastMillis > endScreenDuration) {
    // After 10 seconds on the end screen, go back to the timer
    currentScreen = 0;
    minutes = 0;  // Reset the timer
    currentQuestion = 0;
    sliderValue = 0;
      strokeWeight(0);
  }
}
```

APPENDIX R: PROCESSING SCREENS



APPENDIX 5: ARDUINO CODE

```
const int stepPin = 4;
const int dirPin = 5;
int Counter = 0;
bool direction = LOW;

byte audiostart = 22;      // play heenweg bestand
byte audioend = 23;        // play terugweg bestand
byte interfacestart = 24;  // motor is op het einde dus interface kan beginnen

const int RedButtonPin = 2;  // Define the pin for the button

bool motorMoving = false;  // Flag to track motor movement

// Rotary Encoder Inputs
#define S1 10
#define S2 11
#define KEY 12

int currentStateS1;
int lastStateS1;
unsigned long lastButtonPress = 0;

int buttonCountDraai = 0;

void setup() {
  Serial.begin(9600);

  pinMode(stepPin, OUTPUT);
  pinMode(dirPin, OUTPUT);
  pinMode(RedButtonPin, INPUT_PULLUP);  // Set the button pin as INPUT_PULLUP

  pinMode(S1, INPUT);
  pinMode(S2, INPUT);
  pinMode(KEY, INPUT_PULLUP);

  // Read the initial state of S1
  lastStateS1 = digitalRead(S1);
}

void loop() {
  int redbuttonState = digitalRead(RedButtonPin);

 // Serial.println(Counter);
 // Serial.println(redbuttonState);

  if (redbuttonState == 1) {
    Counter++;
    delay(200);
  }
  if (Counter > 1) {
    Counter = 0;
  }

  if (Counter == 1 && !motorMoving) {
    Serial.println("Button pressed!");
    Serial.write(audiostart);
    Serial.println(audiostart);

    // Start the motor loop
    motorMoving = true;  // Set the flag indicating motor movement

    direction = LOW;
    digitalWrite(dirPin, direction);  // Set initial direction

  // Move in the initial direction
    for (unsigned long step = 0; step < 31000; step++) {
      digitalWrite(stepPin, HIGH);
      delayMicroseconds(120);
      digitalWrite(stepPin, LOW);
      delayMicroseconds(120);
    }
    for (unsigned long step = 0; step < 31000; step++) {
      digitalWrite(stepPin, HIGH);
      delayMicroseconds(170);
      digitalWrite(stepPin, LOW);
      delayMicroseconds(170);
    }
    for (unsigned long step = 0; step < 31000; step++) {
      digitalWrite(stepPin, HIGH);
      delayMicroseconds(200);
      digitalWrite(stepPin, LOW);
      delayMicroseconds(200);
    }

    Serial.write(interfacestart);
    Serial.println(interfacestart);
  }

  if (motorMoving && buttonCountDraai == 5) {
    motorMoving = false;  // Reset the motor movement flag
        Serial.println("Motor  movement  complete.  Reversing
direction.");
   // Serial.write(audioend);
   // Serial.println(audioend);

 // Change direction
    direction = HIGH;
    digitalWrite(dirPin, direction);

    // Start the motor loop in the opposite direction
    for (unsigned long step = 0; step < 31000; step++) {
      digitalWrite(stepPin, HIGH);
      delayMicroseconds(200);
      digitalWrite(stepPin, LOW);
      delayMicroseconds(200);
    }
    for (unsigned long step = 0; step < 31000; step++) {
      digitalWrite(stepPin, HIGH);
      delayMicroseconds(170);
      digitalWrite(stepPin, LOW);
      delayMicroseconds(170);
    }
    for (unsigned long step = 0; step < 31000; step++) {
      digitalWrite(stepPin, HIGH);
      delayMicroseconds(120);
      digitalWrite(stepPin, LOW);
      delayMicroseconds(120);
    }
    buttonCountDraai = 0;
    Counter = 0;

     // Additional logic for motor movement in the opposite
direction
  }

  // Rotary encoder logic
  currentStateS1 = digitalRead(S1);
);

  if (currentStateS1 != lastStateS1 && currentStateS1 == 1) {
    if (digitalRead(S2) != currentStateS1) {
      Serial.println("CCW");
    } else {
      Serial.println("CW");
    }
  }

  lastStateS1 = currentStateS1;

  int btnState = digitalRead(KEY);

  if (btnState == LOW) {
    if (millis() - lastButtonPress > 50) {
      Serial.println("PRESS");
      buttonCountDraai++;
    }
    lastButtonPress = millis();
  }

  delay(1); // Slight delay for debouncing
}
```

APPENDIX T: ERB FORM

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Ethical Review Form

	• *(commercial) partners, companies, government bodies, municipalities, consultancy firms, hospitals or care institutions that provide data (e.g., contact details of participants, data for further analysis).* *Indicate which role each party plays: who defines the means and purposes in the study, who will supply the data (external parties?), who will process/handle the data, who will be able to access the data during and after research (only researchers at TU/e or also others)?*	External parties • Other universities/institutions: None • Others: .....
13	Have any special agreements already been made with an external party, such as a Non-Disclosure Agreement (NDA) or a data sharing agreement?	☐ Yes, namely: ☒ No
14	Has your proposal already been approved by an external Ethical Review Board or Medical Ethical Review Board? *Additional explanation: For example, when you are collaborating with another university and the project has been approved by their Ethical Review Board, or when you received a WMO-waiver from a Medical Ethical Review Board.*	☐ Yes ☒ No
15	If yes: Please provide the name, date of approval and contact details of the ERB. Please also include the registered number for your project approval. Additionally, please send in the Ethical Review Form upon which ethical approval was granted together with this form.	
16	If you process personal data that are likely to result in high privacy risks for participants, you need to perform a Data Protection Impact Assessment (DPIA). Have you done this for this or a very similar project? ***Please read the information below: a DPIA is not the same as a regular privacy impact assessment. More detailed questions on privacy will follow in the section below.*** *Additional explanation: A Data Protection Impact Assessment (DPIA) is a formal document that must be drafted under the guidelines of the General Data Protection Regulation (GDPR). Think of research with vulnerable people, high-risk medical research.* *The Dutch DPA (Autoriteit Persoonsgegevens) and our website provides more information about a DPIA.*	☒ Not applicable (no high privacy risks) ☐ Yes (the form is attached to the application) ☐ No
	Part 2: Medical study	
1	Does the study have a medical scientific research question or claim? *Additional explanation: Medical/scientific research is research which is carried out with the aim of finding answers to a question in the field of illness and health (etiology, pathogenesis, signs/symptoms, diagnosis, prevention, outcome or treatment of illness), by systematically collecting and analyzing data. The research is carried out with the intention of contributing to medical knowledge which can also be applied to populations outside of the direct research population. If your research contains questions about health and health related parameters (such as well-being, vitality, feelings of anxiety or stress) but your research question is not primarily medical, then you can answer 'no' to this question.*	☐ Yes* ☒ No *If yes or in doubt, please contact Susan Hommerson via s.m.hommerson@tue.nl

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	Part 3: Use of (medical) devices in the study	
1	Does your research include a device? *Additional explanation: A device is a complete piece of physical hardware that is used to compute or support computer functions within a larger system. Devices can be divided into input-, output-, storage-, internet of things-, or mobile device.*	☐ Yes, not self-made ☒ Yes, self-made ☐ No
2	Please describe your device or link to an online description of the device	
3a	Will you use a device that is 'CE' certified for **unintended use** (meaning you will use existing CE certified devices for other things than they were originally intended for) or use a device that is not 'CE' certified? *Additional explanation: You can find more information about CE certification here*	☒ Yes ☐ No ☐ ☐
3b	If no: Please explain to what extent the device was assembled according to relevant standards and provide a risk assessment *Additional explanation: You can find more information about a risk assessment here*	
3c	If yes: Do you use a device or software that has a medical purpose such as diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease or injury?	☐ Yes, my device or software currently has a medical purpose ☐ Yes, my device or software could have a medical purpose in the near future ☒ No ☐ I'm not sure
	Part 4: Information about the study	
1	What are your main research questions? *Additional explanation: You need to provide at least one clear research question.*	How is the reaction of people to boredom in a specific room setup?
2a	Please check the box that indicates the relevant study population *Additional explanation: Please select which persons are eligible for your study.*	☒ Students ☒ General healthy population ☐ General population with specific feature, e.g., pregnancy, specifically ..... ☐ Patients, specifically ..... ☐ Other, specifically .....
2b	Age category of participants	☐ Younger than 12 years of age ☐ Older than 11 and younger than 16 years of age ☒ 16 years or older
3	Description of the research method (select all that applies)	☒ (Semi-structured) interviews ☒ Surveys

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	Additional explanation: Please specify your research method. Note that you need to provide information about the research method in an additional file that you attach to the ERB form. E.g., for interviews you provide the interview questions, for surveys you provide the survey questions, etc.	☐ Group workshops/roundtable discussios ☐ Diary studies ☒ Behavioral observations ☐ Building sensor data ☐ Wearable device (e.g. Fitbit watch, on-skin sensors) ☐ User testing ☐ Pilot study ☐ GPS tracking/location data ☐ Living Lab ☐ Other, namely .....
4	Description of the measurements and/or stimuli/treatments *Additional explanation: Think about your outcome measures and the variables you will be collecting and describe them in a way such that another person understands what the participant will experience. For example: Participants will perform task A and see pictures from database B, and we measure validated Scale 1.*	The participants will be in a room where they find themselves confronted with boredom. The time when leaving the room will be measured. Then they will be asked to fill in a form and after that an interview about the experience they had. Then the participants will be in a room with a game. The information will be gathered the same way.
5	Describe and justify the number of participants you need for this study. Also justify the number of observations you need, taking into account the risks and benefits. *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	The study will include about 15 participants. To have a valid basis for a conclusion.
6	Explain why your research is societally important. What benefits and harm to society may result from the study? *Additional explanation: What benefit will the results of your study have to society in general?*	The behavior of people around boredom can give insights into how people act and share insights on how different types of boredom can be used to benefit people's productivity afterward.
7	Describe the way participants will be recruited *Additional explanation: How will you recruit participants for your study? For example, by using flyers, personal network, panels, etc.*	☐ Survey link posted online, e.g., social media platforms ☐ On campus flyers ☒ Personal network ☐ Via a company, namely ..... ☐ Via a hospital, namely ..... ☐ Via an organization ..... ☐ By a Consortium Partner, namely ..... ☐ Other, namely .....
8	Provide a brief statement of the risks you expect for the participants or others involved in the study and explain. Also take into consideration any personal data you may gather and associated privacy issues. *Additional explanation: Risks for the participants can be anything from risk of data breach to risk of safety or well-being (think about stress, extreme emotions, visual or auditory discomfort). Describe these possible risks and describe the way these risks are mitigated.*	There will be a low-risk setup. Losing the saved data on the OneDrive could be a risk.

APPENDIX T: ERB FORM

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Ethical Review Form

Part 5: Self-assessment checklist

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1a	Does the study involve human material? (e.g., surgery waste material derived from non-commercial organizations such as hospitals)		x
1b	Will blood or other (bio)samples be obtained from participants? (e.g., hair, sweat, urine or other bodily fluids or secretions, also external imaging of the body)		x
2	Will the participants give their consent – on a voluntary basis – either digitally or on paper? Or have they given consent in the past for the purpose of education or for re-use in line with the current research question?	x	
3	Are the participants, outside the context of the research, in a dependent or subordinate position to the investigator? Additional explanation: Think about doing research on your own students or on your own employees. When there is a dependency or power imbalance between you and the research participants, you need to answer 'yes' to this question.		x
4	Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g., children (<16 years of age), people with learning difficulties, patients, people receiving counselling, people living in care or nursing homes, people recruited through self-help groups)		x
5	Will participating in the research be burdensome? (e.g., requiring participants to wear a device 24/7 for several weeks, to fill in questionnaires for hours, to travel long distances to a research location, to be interviewed multiple times)?		x
6	May the research procedure cause harm or discomfort to the participant in any way? (e.g., causing pain or more than mild discomfort, stress, anxiety or by administering drinks, foods, drugs, or showing explicit visual material)		x
7	Will financial inducement (other than reasonable expenses and compensation for time) be offered to participants? Additional explanation: For an explanation of what is considered a reasonable compensation, see the topic participant fees from the HTI group		x
8a	Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g., covert observation of people)		x
8b	If yes: Will you be observing people without their knowledge in public space? (e.g. on the street, at a bus-stop)		
9	Will the study involve actively deceiving the participants? (e.g., will participants be deliberately falsely informed, will information be withheld from them, or will they be misled in such a way that they are likely to object or show unease when debriefed about the study)		x
10	Will participants be asked to discuss or report sexual experiences, religion, alcohol or drug use, suicidal thoughts, or other topics that are highly personal or intimate? Additional explanation: Think about your research population. For some participants, particular topics can be considered sensitive or intimate, whereas the same topics will not be perceived as such by other participants.		x
11	Elaborate on all boxes answered outside of the blue boxes in part 5. Describe how you safeguard any potential risk for the research participant.		

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Part 6: Self-assessment on privacy

The following questions (1-11) concern privacy issues, as laid down in the General Data Protection Regulation (GDPR). The Data Stewards and – if necessary – privacy team of TU/e will assess these questions. In some cases, more information is required to assess the privacy risks. If this is the case, you will be notified that the Data Stewards team will contact you.

The GDPR defines 'personal data' as any information relating to an identified or identifiable natural person ('data subject'). Personal data also includes data that indirectly reveals something about a natural person. Personal data can lead to the physical, physiological, genetic, mental, economic, cultural or social identity of a natural person. There are two main categories of personal data: regular personal data and special category personal data.

If you are not sure whether some of these questions below should be answered with a Yes or No, please contact a Data Steward first through rdmsupport@tue.nl.

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1	Will the study involve discussion/collection/processing of **regular** personal data, or will you collect and (temporarily) store video or voice recordings for the purpose of conducting interviews? *Additional explanation: For example, name, address, phone number, email address, IP address, gender, age, video or interview recordings? If you are not sure whether your data contains personal data, please contact the Data Stewards Team (rdmsupport@tue.nl).*	x	
1A	If yes: Please describe which regular personal data you will collect in this study?	Save the audio from the interview.	
2	Will the study involve discussion/collection/processing of **special category** personal data or other **sensitive data**? *Additional explanation: Examples of special category personal data are race, religion, health information, political views, genetic or biometric data for the unique identification of a person, sexual preference, etc. Health information concerns personal data of the physical or mental health of persons, including the provision of health care. Examples of other sensitive data is information such as communication data, financial records or credit scores, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, criminal records, data of vulnerable persons (children, people with disabilities, refugees), BSN number etc. Please be aware that the use of special category personal data in research requires extra security measurements in order to safeguard the privacy of data subjects and to comply with the GDPR. Processing of this special category data is prohibited, except for specific purposes and under certain circumstances. If you need to process special category data, please consult the data stewards at rdmsupport@tue.nl.*		x
2A	If yes: Please describe which special-category personal data and/or sensitive data you will collect in this study?		

If you answered yes to either question 1 or 2, please answer the questions below. If you answered no to both questions, you can skip this part and continue onto part 7. Also, if an answer to any of the following questions is 'yes', please contact a Data Steward at rdmsupport@tue.nl

		Yes	No
3	Will your project involve the processing of personal data on a **large scale**? *Additional explanation: In general, any processing that involves more than 10.000 data subjects should be considered "large scale". However, if the data of approximately 1000 persons (or more) are involved, the data processing may still be considered large scale. In that case, besides the number of persons involved in the study, one should also assess (i) the amount of data collected from these persons taking into account the type/risk level of the personal data, (ii) the duration of the data processing, (iii) the geographic scope or extent of the processing. For example, if you would collect and process data across several European countries with 10+ socio-economic data items of 1200 individual persons for several years in a row, that is likely "large-scale processing". Other examples of a large-scale processing activity are:* • *Monitoring driving behavior of road users on Dutch highways* • *Collecting data of Covid patients* • *A hospital that processes patient data as part of its usual operations* • *A transport company that processes travel information of people who travel by public transport in a certain city. For example, by tracking them through travel maps.*		x
4	Does this processing activity involve the use of new or innovative technologies? *Examples of a new technology: combining fingerprints and facial recognition for physical access control, the use of bodycams in public spaces, the use of new technical methods in conducting research such as AI. This question also refers to new technologies that have not been deployed by TU/e so far.*		x
5	Does your study involve systematic (c.q. automated) monitoring of persons? *Additional explanation: Consider data processing activities that have the purpose of observing, monitoring or controlling individuals, for example in circumstances where the individuals are not aware by whom their personal data is collected and how it is used. Examples of such activities are using camera systems to monitor driving behavior on highways, monitoring email inactivity or employee phone use, certain applications of machine learning and artificial intelligence.*		x
6	Does the study involve collaborations (with third parties) in which data are shared or exchanged in order to link or combine data? *Additional explanation: This may often apply in a collaboration between the university and a commercial party, contract research, etc. It is important to assess this for all data in the entire project, not just your own data. An important consideration in this situation is whether the person whose data is involved could have expected that data from these different databases or sources of information were to be combined. For example, it is less likely for data subjects to expect that databases from different parties will be combined and the results are used for different purposes than one could reasonably expect; this may apply for example in a collaboration between the university and a commercial party.*		x
7	Will the study include data processing activities that prevent data subjects from exercising their rights or using a service or contract? *Additional explanation: Examples include processing operations carried out in public places that people cannot avoid (train station, airport, shopping mall, public university premises, etc.) or processing operations whose purpose is to allow or not allow data subjects to use a service or enter into a contract (examples: by refusing to pay a benefit, not being able to apply for a loan, etc.).*		x
8	Will the study process personal data to score, rank or profile persons? *Additional explanation: Examples: monitoring (highway) roads to give road users a "score" based on their detected driving behavior, a bank assessing its customers based on their creditworthiness, or an organization building behavioral and marketing profiles based on use of their website or navigating their website.*		x
9	Does your data processing include activities that involves composing "**blacklists**" – and, in particular, in relation to sensitive or special category data, such as communication data, financial records or credit scores, genetic data, biometric data, health data, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, etc. *Additional explanation: This situation will not be a common occurrence in research, but you may indirectly be involved in this. In general, this typically concerns processing operations involving personal data relating to criminal convictions and offences, data relating to unlawful acts, data concerning unlawful or annoying behaviour or data concerning bad payment behaviour by companies or individuals are processed and shared with third parties (blacklists or warning lists, as used, for example, by insurers, hospitality companies shopping companies, telecom providers as well as blacklists relating to unlawful behavior of employees, for example in the healthcare sector or by employment agencies, etc.).*		x
10	Will personal data be transferred or shared outside the EU/EEA? EU data protection rules apply to the European Economic Area (EEA), which includes all EU countries and non-EU countries Iceland, Liechtenstein and Norway. *Additional explanation: The GDPR has drafted additional requirements for transfers data outside of the EU/EEA. Typically, additional safeguards must be implemented to protect the personal data of residents in the European Union. For example, if you collaborate with an American, Indian or Chinese university or other third party outside the EU/EEA, you must first check whether this is allowed and under which conditions this is allowed. Another typical example is storage of data on American providers of cloud (storage) services. Please contact the data stewards first to discuss this.*		x
11	Will any raw or anonymized personal data or any other sensitive data or research results from the project possibly be transferred to a high-risk country*? ***High risk countries**: China, Russia, Iran, Turkey, and North Korea.* ***If personal data or other potentially sensitive data is exchanged with one of these countries, or if part of the data processing takes place in one of these countries: an advice from the Data Protection Officer, the kennisveiligheidsteam (Knowledge Security team), and the CISO (Chief Information Security Officer) is ALWAYS required.***		x

APPENDIX T: ERB FORM

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Ethical Review Form

Part 7a: Processing of research data

1	Is consent your legal basis for processing the personal data in your study? *Additional explanation: What is a legal basis? One of main principles in the GDPR is to ensure that personal data is processed lawfully, fairly, and transparently. To comply with this principle, the processing of personal data also requires that you have a valid legal basis for the personal data processing activity.* *In research projects, the legal basis is often but not always consent. However, it is possible that it is not clear or not possible to establish whether to use consent as a legal basis.* *Some examples where consent may not be applicable as legal basis are covert research, data collection in public spaces, secondary data analysis of existing data, data that are transferred to you by a third party, consent is not possible or would require disproportionate effort, etc. In that case, please indicate which legal basis you think that applies or (preferably) contact a data steward first.*	☒ Yes and it will be obtained via a informed consent form. An informed consent template* is attached to this application. ☐ No, I will use another legal basis to process the data. Namely, …….. * You can download a suitable template **here**.
2	Where will the data come from?	☐ Data obtained from another party (secondary data use) ☒ New data collected only by my research team ☐ New data collected together with collaborators
3	Which of the following tools will you use to process personal data?	**Surveys** ☐ Qualtrics ☐ Limesurvey ☐ MS Forms ☐ Other, namely …….. **Interview/workshop recordings** ☒ Voice/video recorder ☐ Phone in a flight mode ☐ MS Teams ☐ Other, namely …….. **Transcription** ☐ Manual transcription ☐ Microsoft Office software (e.g. Word, Teams) ☐ Other, namely …….. **Statistical analysis** ☐ SPSS ☐ R ☐ Other, namely …….. **Other tools**, specifically……..
4	Where will the data and in particular the personal data be stored during and after completion of the study? If you have already uploaded your Data Management Plan, you can refer to your Data Management Plan.	☐ SURF drive ☒ Onedrive ☐ Research Drive ☐ Network Drive

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	Additional explanation: University supported-storage facilities are SURFdrive, SURF Research Drive, Ceph, departmental drives (this includes BE Project Drive), and the TU/e instance of Microsoft OneDrive. For most personal data, the use of SURF Research Drive, departmental drives (including BE Project Drive) and SURFdrive is required.	☐ Research Manager ☐ Other, namely ……

Part 7b: Safety and security measures

1	Will you pseudonymize/anonymize the data? *Additional explanation:* *Anonymization: remove all direct identifiers (name, address, telephone number etc.) but also indirect identifiers (age, place of birth, occupation, salary) that, linked with other information, can lead to a person's identification. Anonymization to the point that a data subject is no longer identifiable means that the anonymized data is not considered to be personal data anymore.* *Pseudonymization: replacing the unique identifier of a data subject with an artificial pseudonym. This means that identification is still possible with the identification key. The identification key needs to be stored securely and separately from the pseudonymized data. If the data subject can be identified by combining data with additional information, the data is also called pseudonymous.*	☒ Yes ☐ No If yes, describe how: via Anonymization, as described.
2	Is access to (personal) data restricted? (Select all that apply)	☐ No ☐ Yes, via access control ☐ Yes, via password protection ☒ Yes, access only given to TU/e research team ☐ Yes, access only given to research team, including non-TU/e collaborators ☐ Other, specify……
3	Who will have access to the data during and after completion of the project? (Select all that apply)	☒ Main researcher ☒ TU/e supervisor(s) ☐ External supervisors ☒ TU/e research team ☐ Other, specify……
4	Will you store data for future research?	☒ No ☐ Yes, in a public data repository ☐ Yes, in a public data repository under restricted access ☐ Yes, in a TU/e-recommended storage (SURF Research Drive, Network Drive)
5	Will you share data outside the TU/e?	☒ No ☐ Yes, in a fully anonymized form ☐ Yes, raw or pseudonymized data* *If you selected this box, make sure that a suitable data agreement is put in place. You can contact the Data Stewards for support in preparing such an agreement
6	How long will data be stored after the end of the project?	20-12-2023

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Part 8: Closures and Signatures

1	Enclosures (tick if applicable and attach to this form):	☒ Informed consent form ☐ Informed consent form for other agencies when the research is conducted at a location (such as a school) ☐ Text used for ads (to find participants) ☐ Text used for debriefings ☐ Approval other research ethics committee ☐ The survey the participants need to complete, or a description of other measurements ☐ Data Protection Impact Assessment checked by the privacy officer ☐ Data Management Plan checked by a data steward
2	Signature(s)	Signature(s) of applicant(s) Date: 29-11-23 Signature research supervisor Date: 29-11-23

APPENDIX U: CONSENT FORM

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Information sheet for research project "Reaction to different types of boredom"

1. Introduction

You have been invited to take part in research project "Reaction to different types of boredom",because you agreed to participate in this research.

Participation in this research project is voluntary: the decision to take part is up to you. Before you decide to participate we would like to ask you to read the following information, so that you know what the research project is about, what we expect from you and how we deal with processing your personal data. Based on this information you can indicate via the consent declaration whether you consent to take part in this research project and the processing of your personal data.

You may of course always contact the researcher via m.a.scheurink@student.tue.nl, if you have any questions, or you can discuss this information with people you know.

2. Purpose of the research

This research project will be managed by Max Scheurink.
The purpose of this research project is to see the effect of boredom on the behavior of the participants.

3. Controller in the sense of the GDPR

TU/e is responsible for processing your personal data within the scope of the research. The contact details of TU/e are:

Technische Universiteit Eindhoven
De Groene Loper 3
5612 AE Eindhoven

4. What will taking part in the research project involve?

You will be taking part in a research project in which we will gather information by:

- Interviewing you about the experience and decisions made and to record your answers via audio.
- Presenting you a questionnaire about the experience and emotions that are observed during the test, which you can fill in in writing.

For your participation in this research project you will not be compensated.

5. Potential risks and inconveniences

Your participation in this research project does not involve any physical, legal or economic risks. You do not have to answer questions which you do not wish to answer. Your participation is voluntary. This means that you may end your participation at any moment you choose by letting the researcher know this. You do not have to explain why you decided to end your participation in the research project.

6. Withdrawing your consent and contact details

Participation in this research project is entirely voluntary. You may end your participation in the research project at any moment, or withdraw your consent to using your data for the research, without specifying any reason. Ending your participation will have no disadvantageous consequences for you.

If you decide to end your patricipation during the research, the data which you already provided up to the moment of withdrawal of your consent will be used in the research.

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Do you wish to end the research, or do you have any questions and/or complaints? Then please contact the researcher via m.a.scheurink@student.tue.nl.

If you have specific questions about the handling of personal data you can direct these to the data protection officer of TU/e by sending a mail to functionarisgegevensbescherming@tue.nl. Furthermore, you have the right to file a complaint with the Dutch data protection authority: the Autoriteit Persoonsgegevens.

Finally, you have the right to request access, rectification, erasure or adaptation of your data. Submit your request via privacy@tue.nl.

7. Legal ground for processing your personal data

The legal basis upon which we process your data is consent.

8. What personal data from you do we gather and process?

Within the framework of the research project we process the folllowing personal data:

Category	Personal data
Personal identity	*Gender , age*

9. Confidentiality of data

We will do everything we can to protect your privacy as best as possible. The research results that will be published will not in any way contain confidential information or personal data from or about you through which anyone can recognize you, unless in our consent form you have explicitly given your consent for mentioning your name, for example in a quote.

The personal data that were gathered via audio recordings and other documents within the framework of this research project, will be stored on OneDrive storage.

The raw and processed research data will be retained for a period of 3 weeks. Ultimately after expiration of this time period the data will be either deleted or anonymized so that it can no longer be connected to an individual person. The research data will, if necessary (e.g. for a check on scientific integrity) and only in anonymous form be made available to persons outside the research group.

This research project was assessed and approved on [date] by the ethical review committee of Eindhoven University of Technology.

***** Scroll down for the consent form *****

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Consent form for participation by an adult

By signing this consent form I acknowledge the following:

1. I am sufficiently informed about the research project through a separate information sheet. I have read the information sheet and have had the opportunity to ask questions. These questions have been answered satisfactorily.
2. I take part in this research project voluntarily. There is no explicit or implicit pressure for me to take part in this research project. It is clear to me that I can end participation in this research project at any moment, without giving any reason. I do not have to answer a question if I do not wish to do so.

Furthermore, I consent to the following parts of the research project:

3. I consent to processing my personal data gathered during the research in the way described in the information sheet.

   YES ☐ NO ☐

4. I consent to making (sound/image) recordings during the interview and to processing my answers into a transcript.

   YES ☐ NO ☐

5. I consent to using my answers for quotes in the research publications – without my name being published in these.

   YES ☐ NO ☐

Name of Participant:

Signature:

Date:

Name of researcher:

Signature:

Date:

APPENDIX U: CONSENT FORM

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Ethical Review Form

(Version 2.1)

This Ethical Review Form should be completed for every research study that involves human participants or personally identifiable personal data and should be submitted to ethics@tue.nl. For more information about how this process works please click here. Please check if you are using the correct form: Ethical Review Form (version 2.1). Please click here to obtain this latest version.

Part 1: General Study Information

1	Project title / Study name	Reaction to different types of boredom
2	Name of the researcher / student	Jens Vervoort, Simon Nieuweboer, Rijk Herremans, Max Scheurink
3	Email of the researcher / student	j.a.j.vervoort@student.tue.nl , s.p.nieuweboer@student.tue.nl, r.l.herremans@student.tue.nl, m.a.scheurink@student.tue.nl
4	Supervisor(s) name(s) *Additional explanation: Please write down the name of your direct supervisor. You can mention several supervisors if appropriate, but at least one supervisor should be mentioned.*	Dan Lockton, Emilia Viaene
5	Supervisor(s) email address(es) *Additional explanation: Please give the email address of the supervisor(s) mentioned in question 4.*	d.j.g.lockton@tue.nl, e.m.j.j.b.viaene@tue.nl
6	Department / Group *Additional explanation: Please specify group if relevant e.g. JADS or HTI*	Industrial Design
7	What is the purpose of this application?	☐ Scientific study ☐ Bachelor education. Course:…… ☒ Master education. Course: New Futures Squad ☐ Other (e.g. external, following external regulations):……
8	Research location *Additional explanation: Where will the data collection take place? On campus, in a company, in public space, online, etc.*	☒ Eindhoven University of Technology campus ☐ Other, name organization(s):…… ☐ Public space ☐ Online
9	Start date data collection *Additional explanation: Please state when your data collection will start. Please note that you do not have to provide information about your complete (PhD) project, but only on this particular sub-study that you are submitting for approval in this form.*	30-11-2023
10	End date data collection	30-11-2023
11	Does your project receive external funding (e.g., NWO, relevant for special regulations from funders)?	☐ Yes. Name Funder: ☒ No

12	Which internal and external parties are involved in the study? Think about sharing data or information between TU/e and other universities, commercial companies, hospitals, etc. *Additional explanation: Describe all internal and external parties that are involved in the study or project, including:* • *researchers or research groups at the TU/e who participate in the study;* • *(Researchers at) other universities/institutions that provide data/services, help analyzing the data, etc.;*	Internal parties • Researcher(s): Jens Vervoort, Simon Nieuweboer, Rijk Herremans, Max Scheurink • Supervisor: Dan Lockton, Emilia Viaene

APPENDIX V: SWOT ANALYSIS

Our mission is to reach as many people as possible with our experience. It should have such a impact through a dramatic relieve that people will remember the event. We envision that after usage a conversation is created with friends and family about the topic boredom.

The experience can be seen as an artistic set up due to its unique form and topic. The possible locations where it could be placed are art institutes, repair café's, a 'hip' café and public spaces. We see that the probability of these places agreeing with our product in their space is the highest. Knowing that art institutes, repair cafés and hip café's attract certain groups of people, which are not very diverse. To reach as many people as possible the experience needs to be placed in public spaces. This way we will have more participation from different groups. This is in line with our mission and a more accurate dataset can be made. Different stakeholders can be pinpointed to make this happen.

Stakeholders:

- Art institutes
- Repair Café's
- Progressive Café's
- Local municipalities
- Users/visitors locations
- Own personnel

Benefits

Bored to be alive brings many benefits. As an institute you will promote art, human well-being and a less materialistic view on the world. This will attract people to the location in question. Next to that, [VJ1] customers will probably stay longer in your café because the experience takes multiple minutes for every person. And users will have a great topic to talk about after.
Competition

After research there wasn't another boredom experience found. There are allot of books and info about the topic on the internet. We don't see that as competition, we see that as added value to our vision. Looking at other experiences, we think both the events can profit from each other. Promotion would be easier and people visiting are open to participate in such an experience.

Marketing/promotion

As the experience isn't that big and it takes long for one user we don't think that massive promotion is necessary. If the promotion is kept local it can have the desired effect. So promoting in and around the institute and via a newsletter should be enough. As for the experience itself, it should attract people from the outside. If it has a boring exterior the people probably won't try it out.