EXCITABLE

DESIGN REPORT

TU/e

NEW FUTURES - ADVENTURES IN FOOD

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INTRODUCTION

1 Introduction

Smart devices have an ever-growing presence in our homes. The internet of things is the network between these “physical objects (…) embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.” (Oracle, n.d.). The design described in this report was developed in the context of the ‘IoT sandbox’, the fictional future home of a fictional family living in 2035.

Additionally, we developed this design around the theme Adventures in Food. In 2035, world hunger and unsustainable food production will still be big and difficult issues. (Sova, 2022). Attempts to solve them will have a drastic impact on our diets. We tried to keep this in mind as we developed our design.

During our process we chose to dive deeper into the consumption of food. We set out to change the eating habits of people to ultimately reach a more sustainable future. In this report, we describe the process of developing a concept for a product that would be able to help with that. We tried to balance the urgent need for more sustainable food behaviors with the very human feelings of joy, curiosity, and comfort that food can bring. In our process we will show you the different iterations and other key moments that made us come to our final concept.

By reframing this transition to sustainable eating as a fun adventure, we hope to inspire people to adopt sustainable eating habits more quickly than they would have when acting out of pure necessity.

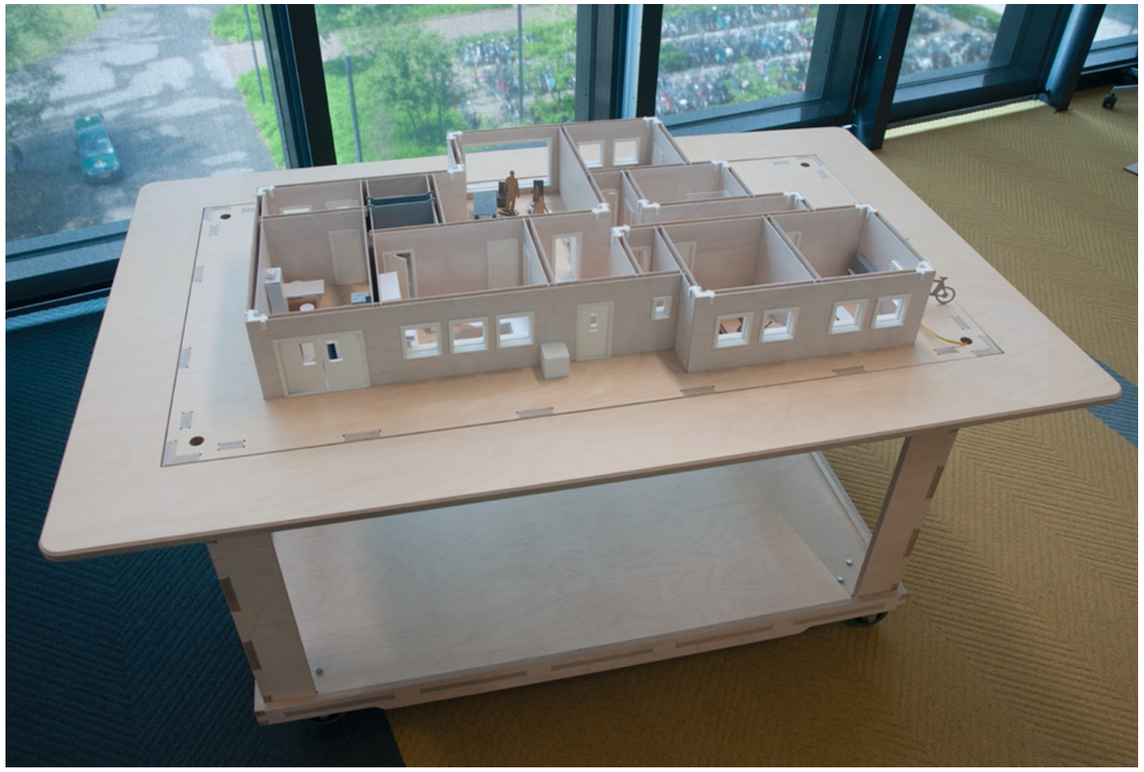


Figure 21: The IoT Sandbox. (Frens et al., 2022)

RESEARCH

2 Adventures in food

We began our process by exploring the Adventures in Food theme. Independently we read articles, collected images, watched videos, and looked around in our own lives for inspiration. We also took a few ‘field-trips’ as a group, during which we visited inspiring locations together. This section describes the most important of our activities, and the insights we gained from them.

2.1 The pressing need for sustainable food

As a design team we think that systemic changes must be made in order to ensure that food can be produced in a sustainable way in 2035. Apart from that, on an individual level we think that people need to gain a more open mindset towards trying new, and maybe at a first glance unappealing, types of food. Examples are lab grown meat or alternative protein sources like insects. Design for behavioral change we think could play a role in this.

According to an article published by Cambridge University Press, “food production will become increasingly difficult and unpredictable in the coming years” (Cooney, 2013). What is also stated is that this is a result of a growing world population and climate change. Furthermore, people need to change their eating habits and meat and dairy consumption need to go down since they have a disproportionally high impact on the climate compared to other food (Cooney, 2013). National Geographic has made a five-step plan to feed the entirety of the increasing world population in the future. One of these steps is to change diets. They mention: “It would be far easier to feed nine billion people by 2050 if more of the crops we grew ended up in human stomachs.” What this means is that a shift towards eating less products from animals or even just making a change to eat less beef (Foley, 2014).

2.2 Trying new food together

We found it important to get have first-person experience with our theme Adventures in Food by trying out food that we had never tried before. Together we visited an Asian supermarket and bought a number of different foods to try out together.

While we were eating together, we noticed there was a strong social dynamic around trying the new foods. Once a person had tried something they would be curious about what the others thought of it. This person would encourage the others to try it as well, even if it was food that initially had looked unappealing to them. We also made new combinations with the food we bought and challenged each other to try our strange combinations. For example, we dipped food in hot sambal. Making these combinations kept the experience exciting once we had tried everything.

From this experience we concluded that the excitement of trying new food is greatly strengthened by a social setting. If a person is eating alone, it is easier to avoid new food than when they are eating together with others, who can encourage or challenge them to try it. Moreover, the experience of trying an unfamiliar food that turns out to taste surprisingly good or bad is more fun when shared with others.

Figure 1 - Exploring in food

2.3 Talking with Bjorn Cocu from Intelligentia

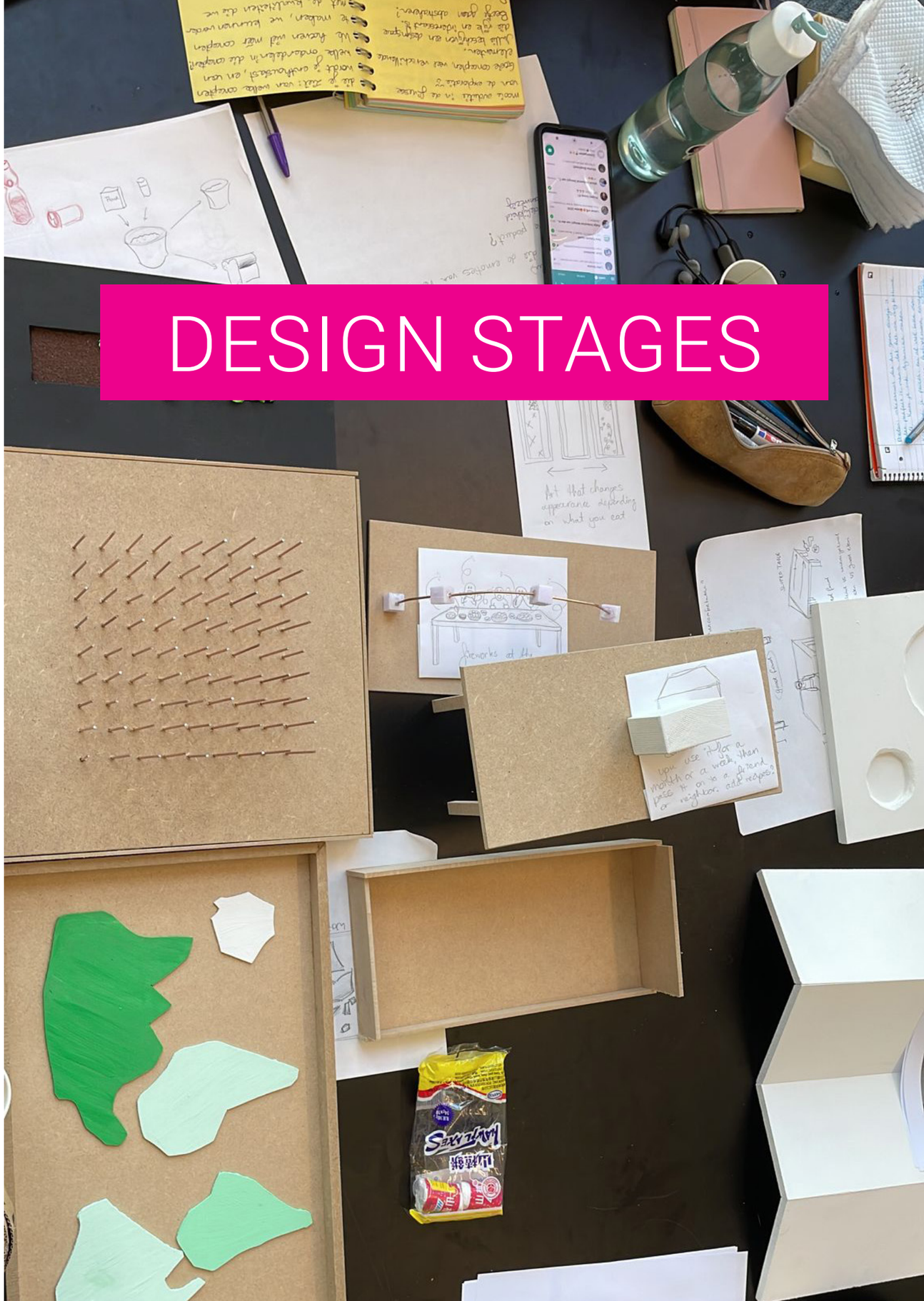
Bjorn Cocu is founder of Intelligentia, an ice cream shop in Eindhoven. This shop is known for its new and exciting flavors, which are continuously changing through the season. Bjorn is an expert in the science of taste and creation of new flavors. He specializes in many different fields related to food.

During our conversation with Bjorn, he challenged us as a group of designers to think about our standpoints about food production. He believes in an affordable and sustainable way of food production, that has a fair process while still meeting the market's demand.
He asked us for example to think about our standpoints about eating meat from wild animals, which are killed to maintain balances in ecosystems.

The experience he creates for people is multisensory. Creating new flavors is only part of this. The concepts of the ice cream shop are a complete experience. The goal is to make people the owner of a part of the experience and to make them feel playful like a child again. His customers are people who are always looking for new flavors, since he does only sell a specific Ice cream flavor for a limited time before he replaces it with something new.

Bjorns vision on the future of ice cream is that mono-sacharides (sugar) will be completely removed. Furthermore, nutrients that are lost nowadays in the proces of making ice cream will be preserved by using new production processes. Production will happen only in authentic and ecologically sustainable ways. Aditionally, by preserving as many nutrients as possible, Ice cream will become a product that adds to your daily nutrient intake and complements your diet.

From this interview can be concluded that food production processes must change according to the interviewee. Main reasons for this are ecological sustainability and dietary demands. This change could challenge people to become more open towards different food or food from different sources, like meat from wild animals. Eating and experiencing food is not only about the food itself, but also on other things like ambience and presentation. The best experiences are interactive and make people owner of a part of the experience, as mentioned by the interviewee.



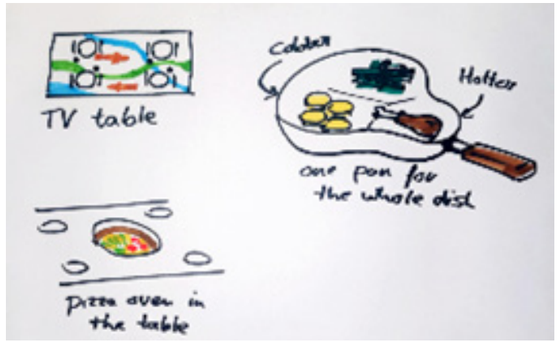
3 Design stage 1

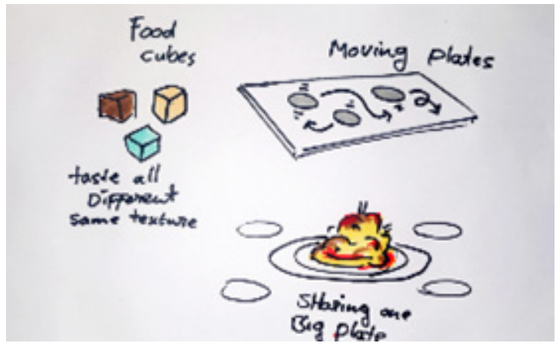
Once we felt more familiar with the context we were working in, we began to generate ideas for a possible product or intervention. This section describes the different steps we took during the beginning of our design process in a semi-chronological order.

3.1 Iteration 1 - Brainstorming and initial sketches

When we began to record our own ideas we did so in 2D sketches. Since we mainly did this to generate a lot of initial ideas, we did not yet focus on specifying the direction of our project. Each of us used these sketches to explore our own fascinations and inspirations up until that point. These included ideas like a set of autonomously moving plates, a table with a screen that shows diners the origin of their food while they eat, and a gamified planting pot that encourages each family member to look after a food crop. After creating around five sketches per person, we reconvened to share our work and ideas.

After having two rounds of sketches and subsequent discussions, we realized our conversations were becoming less and less concrete. There were aspects of most of the ideas that we all liked, but we still could not agree on a single idea to pursue. There was also still a lot of room for interpretation in our sketches. This led to discussions where we tried to criticize or discuss our own interpretations of the ideas, often without realizing we were not quite talking about the same thing anymore. To prevent, or at least lessen this effect going forward, we decided to switch from 2D sketching to physical model making. We kept our design direction very open.





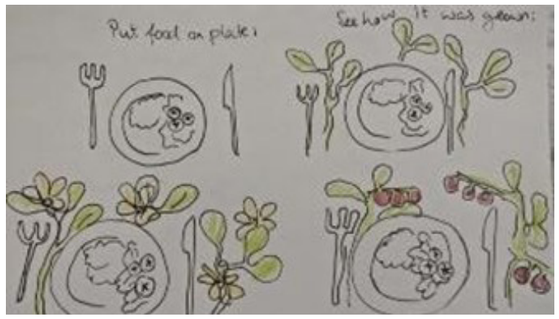


Figure 2,3 & 4: Sketches from the first Iteration

3.2 Iteration 2 – Physical models

We made the models pictured, and more, during a single afternoon in the workshop together. Working simultaneously meant we shared our thoughts as we were working and that we could quickly adopt and elaborate on each other's ideas. Some of the ideas we came up with during this session were a shape-shifting table which creates bowls by lowering parts of its surface, a meal-kit of which the contents are a surprise for the consumer, and a modular fridge that allows the user to keep items at different temperatures. During this session we also created a few 'anti-designs' to explore what the 'opposite' of what we wanted to make would look like. One such design is pictured here: a futuristic contraption that would make the consumption of food a completely automated and efficient process, where food and waste are pumped in and out of the body into small containers the user would only need to fill or empty every other day.

Being able to not only view, but hold and touch these items, meant that we could discuss our designs in much more concrete terms. We held the models to demonstrate their intended use and were able to interact with them while demonstrating, instead of just describing how they would be used. This created a shared understanding of the ideas each of us was proposing and helped us ask much sharper questions, because we were shifting our focus from what something might be like to use, to physically simulating the experience of how it is used . Having physical models also led to discussions about shape, texture, and color. We deliberately decided not to dive too deeply into these yet, because they seemed more appropriate for a later stage of the design process.

At this point, we felt like it was time to specify our design direction. A lot of our favorite sketches and models focused on the family of the IoT sandbox eating together, and the experience of communally sharing a meal. We therefore decided to focus on creating models specifically of dinner tables, since dinner tables are where most families come together to share their meals. We also experienced during our own exploration of new food, that social context is an important aspect in the experience of trying new food. In our own experience, trying new food together with other people makes you feel more encouraged to eat something you normally would not find appealing.

Figure 5 & 6: Shape changing tabletop

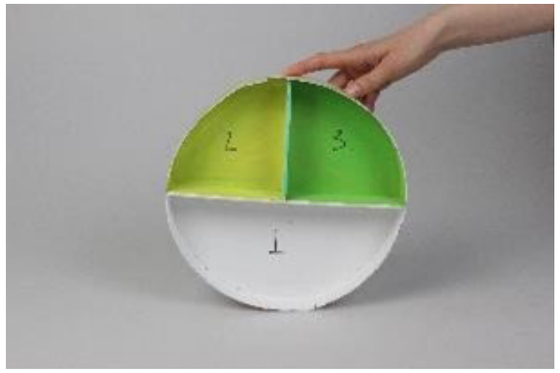


Figure 6 : Exploration box concept

Figure 7: Anti – Design baby force feeder

Figure 8 & 9: : Multi temperature fridge

Figure 10: Anti –design food recycler idea

3.3 Iteration 3 – Dinner Tables

After making a first set of different dinner table models, we sat together and tried to imagine what it would be like to sit and eat at each of the tables. Many of our favorite ideas were based on nudging, encouraging, or downright instructing people to eat certain foods, usually because those foods were more healthy or more sustainable than the food they would otherwise eat. One of the less subtle examples of this is a table which raises a wall in front of you when you attempt to eat food that is 'bad' for you, which makes eating impractical at best, and impossible at worst.

Although we liked that these ideas had a clear goal, we did not like how simplistic and harsh these tables were in their judgments about food. We decided to continue in this direction while trying to add nuance. We made a second set of dinner table models, this time specifically tables that create a feeling of responsibility or awareness about the food you are eating. One of the ideas that came out of this was a table with a built-in planter box which automatically takes care of the plants inside, which takes care of the plants when 'good' food is eaten and neglects them when 'bad' food is eaten. The feedback, in the form of the plants' health, is not instant and reflects a pattern rather than single moments. Another idea that came out of this was a tabletop with removable pieces in the shape of a world map. After dinner, the family would remove the pieces, which would light up on the bottom. Their respective color would reflect whether the food that had been eaten that day was comprised of ingredients from that continent, to help people reflect on the origin of their food.

While we believed we had managed to make our tables less harsh in the second round of dinner table models, the underlying judgment was still present. We also got the feedback that our concepts so far were very normative. Essentially, we were creating a table that would instruct people what to eat, and what not to eat; what food was 'good', and what food was 'bad'. We did not want that to be the direction of our concept, so we began rethinking our concept, and tried to find ways to make the table less 'judgmental' and more encouraging or helpful.

Figure 11: Wall table concept

Figure 12: Garden table concept

Figure 13 & 14: World map concept

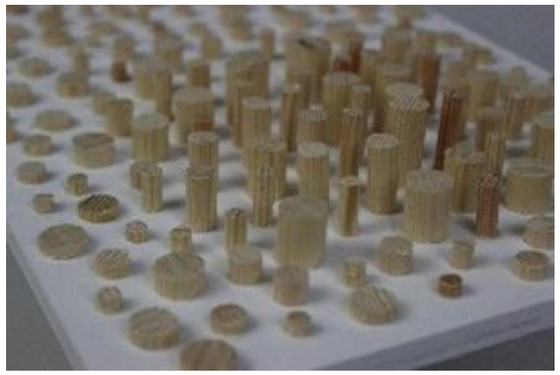


Figure 15 & 16: Scaled demonstration model of the Excitable v1

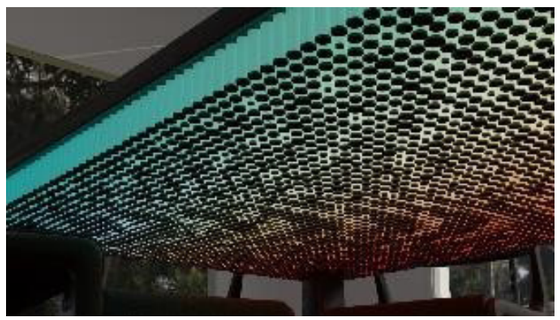


Figure 17,18,19 & 20 : Renders of the Excitable v1

3.4 Iteration 4 – The Excitable v1: pins and light

During the midterm demoday, we presented the first version of the Excitable. The Excitable is a table that gets excited and curious when you try new recipes, ingredients, and dishes. The tabletop is covered with illuminated, rounded pins that move up and down to create animated patterns. It shows its excitement by emanating colorful light from its pins and moving them up and down in playful patterns. It can also express preference for one of the dishes on the table by accentuating it with light and movement. This way the table helps you to get excited for and to fully appreciate the new eating experience you're about to have. It also keeps track of your eating habits over a longer period, and reflects these in the color and luminescence of the lights on the bottom. It specifically reflects how varied and adventurous your eating habits are.

To illustrate and explain our concept, we created a digital 3D model as well as a physical scale model. In general, most visitors stated the concept was clear and aesthetically pleasing to them. Luckily we also got some critical questions and comments, which helped us to refine the concept going forward.

A good portion of these comments were about the feasibility and physical execution of the concept. For example, some visitors asked whether the movement aspect was integral to the design or if it could also accomplish its purpose without it, and whether we could not achieve a lot of the same effects with a projector. There were also people who asked whether we had thought about what actuators to use for such a table. Although the movement in our rendered animations looked smooth and effortless, a few people rightfully pointed out that this would be nearly impossible or at the very least incredibly costly to pull off with existing technology, and that it would likely create an annoying sound due to the whirring of the motors.

We were also asked some interesting questions about the table's communication. Most people indicated that they understood the table's purpose, but wondered how it would actually be able to communicate to the user clearly enough. For example, how does a user know that a certain color is supposed to indicate mild or strong excitement? Very practically, people also wondered whether interaction with a moving table such as this would be disruptive or annoying. Many expressed worries that it might accidentally spill food by moving dishes or plates up and down. Another interesting point a few visitors brought up was that they wondered how the table would even know what food was placed on it, and moreover, what data and judgement criteria it would use to decide whether something could be classed as 'exciting'.

An insight that we gained for the next steps we take after midterm demoday was about the approach that we take with our design concept. If the project would go towards a more speculative approach, research into how the table expresses emotions through its 'body language' could become important, but the feasibility of the implementation of the design would be less of an issue. If the project would focus more on how the interaction with the table influences behavior of users in an everyday setting, making the implementation more feasible becomes more important and dropping the physical movement, but just focussing on light, could be considered. We chose to focus more on the first approach, but to simplify the 3D movement so it would be easier to effectively implement it into a prototype. We also decided to focus on developing the expression and communication through light further, since the message the table is meant to convey through light was not exactly clear to most of the demoday visitors.

3.5 The table's communication

The feedback we received during the demoday motivated us to dive deeper into the interaction between the Excitable and the user. How could the table use fairly abstract means of communication such as light and color to convey specific messages to users? And what is the role of the physical aspect of the interaction: is it merely there to support the visual side, or can it be used to make the interaction more intuitive? As we worked on developing a physical prototype to test out these questions for ourselves, we also tried to find literature to guide our process. This section describes two sources that were specifically relevant to us

Multimodal table interfaces by Hiroshii Ishi

While working on our project, a fellow student recommended that we look into the designer Hiroshii Ishi, since our project is about interactivity via a table interface. Hiroshii Ishi has done a lot of research into shape changing interfaces on flat table surfaces that allow people to have a more natural interaction with the digital world, using more senses than just sight, but also tactile input and feedback. Moving objects and shape changing materials allow for an interface without a flat screen of pixels but with tangible interaction. This literature study gives inspiration for how table interfaces can be made that have a multimodal quality and do not use solely screens. This invites for more active explorations.

The examples in figure 22 & 23 show how two modalities, light and texture, can be integrated in a way that feels natural and intuitive. In figure 22, the 3D objects are physical and can be moved and turned on the surface of the table. The shadows however are created by the projector on the table surface. The flow patterns are also created by the projector. Both the shadows and the flow patterns are adjusted in real time if someone moves the physical objects. An illusion exists that the shadow is created by the objects (Ishii, 2008) (Ishii, Lakatos, Bonanni, & Labrune, 2012). The multifunctional table surface in figure 23 has moving pins that can express texture. With a lycra surface on top, it can also be used to project a landscape with a lot of texture (like the mountains in the example picture above) (Leithinger & Ishii, 2010).

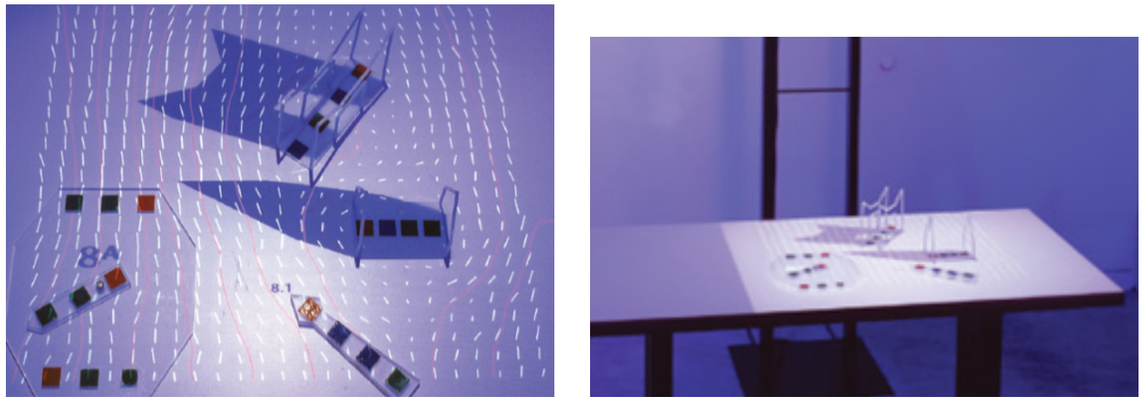


Figure 22: multimodal table interface combining projection with physical objects (Ishii, Lakatos, Bonanni, & Labrune, 2012)

Figure 23: Multimodal table interface combining physical shapes and projection (Leithinger & Ishii, 2010)

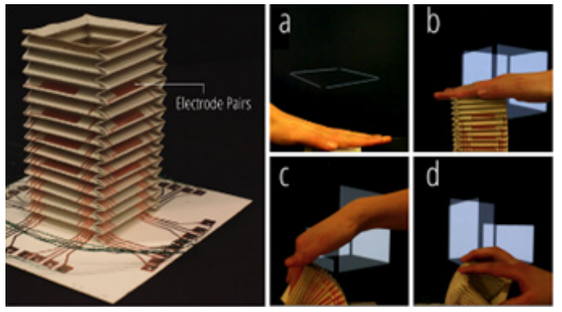


Figure 24: A physical shape that can deform with integrated sensors (Yao et al., 2013)

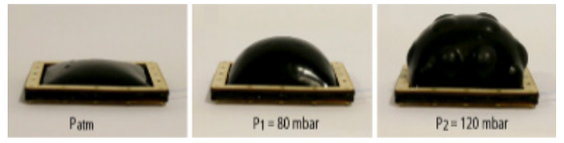


Figure 25: Pneumatic shape changing object (Yao et al., 2013)

With this foldable physical shape in figure 24, the user can modify a digital object. The model has sensors to sense the geometrical deformation that the user applies to the model and translates it to modifications in a digital image (Yao et al., 2013). The physical surface of a pneumatic material in figure 25 changes as the air pressure increases (Yao et al., 2013). These two examples show different materials that can be used to create shape changing prototypes. This is useful for us because we are trying to integrate moving elements into our design. These examples show that there are different ways to do this and that it depends on the type of material that is used what the possibilities in terms of functionality and form are.

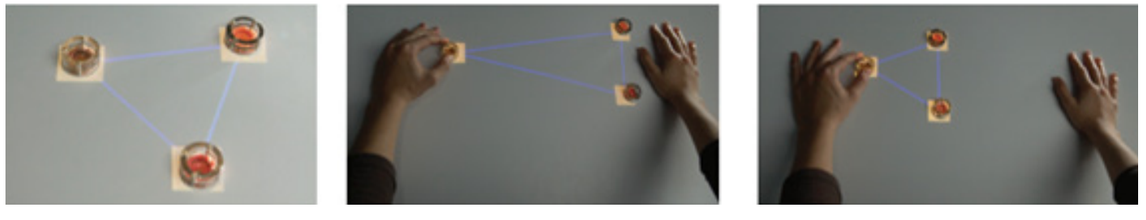


Figure 26: A table surface that reacts to user input by having a defined constraint for distance between objects (James Patten & Ishii, 2007)

Figure 26 shows a system can react to the actions of a user if a constraint is defined, for example: the three objects must be at equal distance to each other. If this constraint is satisfied and you move one of the objects away from the other two, the system reacts (in this case by moving the two other objetcs towards the first one again so the constraint is again satisfied (James Patten & Ishii, 2007). The pins of the table in figure 27 can be pushed and pulled by the user. The position can be read by the table and it can react by moving the pins itself. The pins can thus be used for input and output simultaneously (Ishii, Lakatos, Bonanni, & Labrune, 2012). Concluding from these examples, 3D movement in table surfaces can invite active exploration. They also show what interfaces for interaction between a table surface and a user could look like. In both examples the user actively changes the shape of the table itself or the objects on its surface and the table can react to this.

Figure 27: A physical shape that can deform with integrated sensors (Yao et al., 2013)

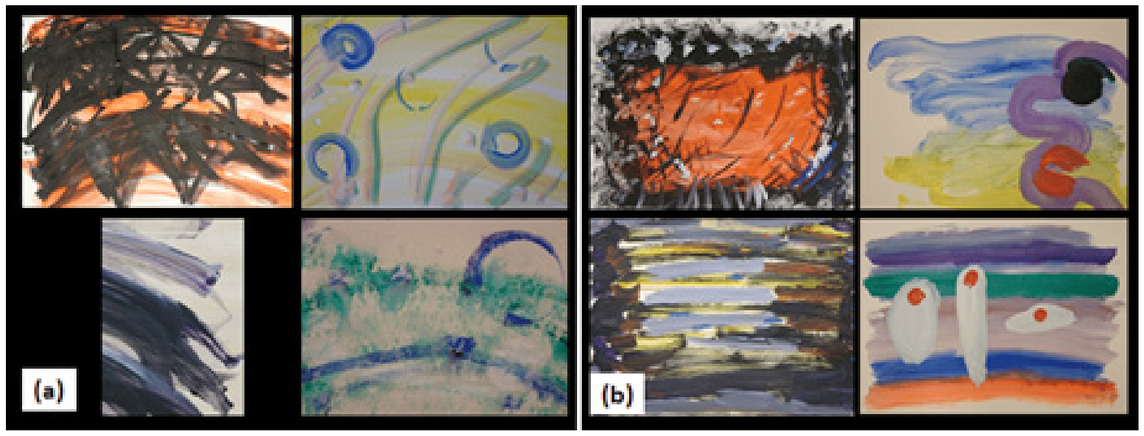


Figure 28: Abstract paintings made by a robot (a) and a human artist (b). (Cooney & Menezes, 2018)

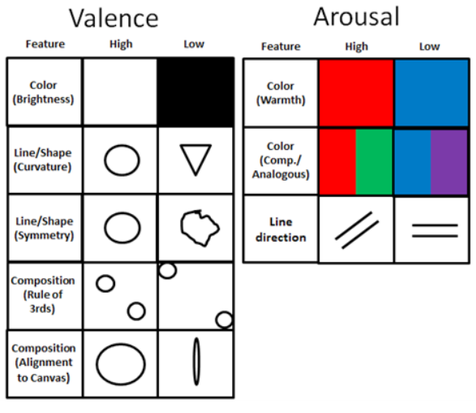


Figure 29: Shapes and colors expressing emotion (Cooney & Menezes, 2018)

Conveying emotions through shapes

Since we wanted our table to be able to express specific emotions (mainly excitement) and relatively nuanced messages, we tried to find literature that might be able to provide some insight. A 2018 article by Cooney and Menezes describes a proposed design for an art therapy robot, based partially on existing literature about mechanisms for expressing emotion. The article very clearly describes how abstract shapes can communicate emotions and messages, using for example the principles shown in figure 29, which is exactly what our tables wants to achieve.

The article talks about how the machine uses two features to generate an expression: color and shape. Figure 28 shows a comparison between paintings made by a robot, on the left, and paintings made by a human, on the right. In both of these, the top left painting is supposed to represent anger, the top right joy, the bottom right relaxation, and the bottom left sadness. The Excitable's communication also uses color and shape, as well as an additional third aspect: movement speed. Using these three features, we created a visual overview of 'expressions' the table could have, as shown in figure 30.

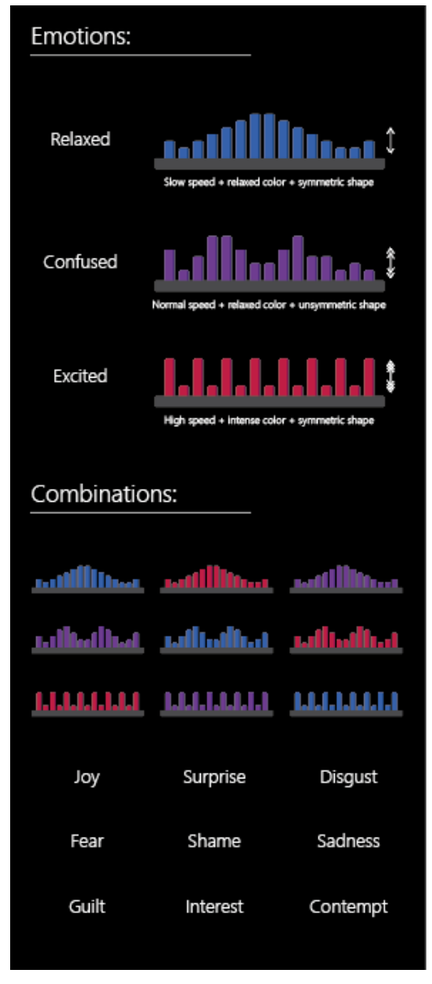


Figure 30: Example of how the table could communicate

4 Design stage 2

4.1 Iteration 5 – First prototype and scenario play

Considering the feedback from the midterm demoday and the feasibility of the concept, we decided that we would need to adapt the concept. As we already had a set of good ideas, we went back over the ideas from the 3rd iteration and saw that in a few of them, the table would only have something happening on it in the middle section. We took inspiration from those ideas and came up with a new design for the table where instead of having moving pins across the entire table, only a small section in the middle would be able to move. The rest of the table would use a digital screen to display visuals. This would allow the table to convey the intended emotions through high resolution visuals, whilst also retaining the shape-changing aspect, albeit simplified.

To get a better understanding of what affects different kinds of visuals and movements have on the user when using a table with a built-in screen, we built a prototype that would allow us to test this.

Figures 31 & 32: Building the first prototype in the workshop at Vertigo

The prototype consisted of a TV and a large wooden structure surrounding it. . The TV screen gave us the ability to accurately represent what it would feel like to have a digital screen as table surface, and it made sure that all visuals were properly visible. As can be seen in the images, the TV was placed into the wooden structure and covered by a sheet of plexiglass. This meant that the area surrounding the TV was one flat surface, with the aim to hide its original purpose as a TV so the experience would feel more natural. The plexiglass additionally also protected the screen from getting damaged when placing objects directly on top.

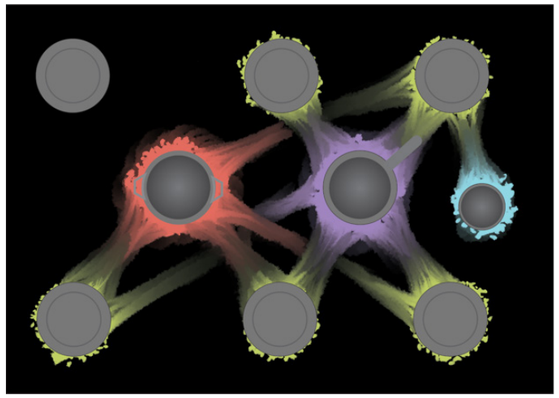
Figures 33 & 34 : Exploration of different scenarios and visuals

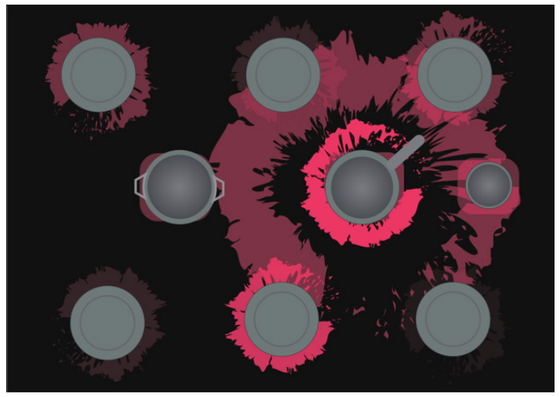
Next to building the prototype, we also wrote five scenarios, in which the different fictional members of the IoT sandbox interact with the table. Using the prototype in combination with the app Magic Fluid (Madscientist, n.d.), we were able to roleplay the scenarios. Magic Fluid is an app that allows users to create various animated visuals such as smoke or liquid by touching the screen, which allowed us to experiment with different materials and effects for the actions in the scenarios. For the exploration we also added a cover which concealed two boards that could be moved by hand to emulate the movement the table could make.

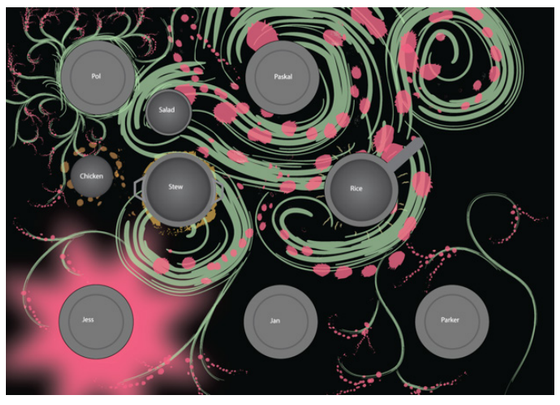
From this exploration, we were able to learn that the visuals had to become more concrete. Whilst the eating experience with the visuals from the Magic Fluid app was very entertaining, it did not clearly communicate to the user what the table expected the user to do. In addition to this, we noticed that the moving parts did indeed influence the eating experience, however, to be more effective, they would have to be visually linked to the visuals on the table.

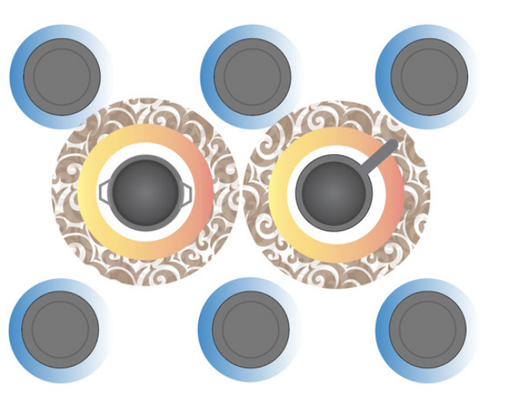
4.2 Iteration 6 – Developing visuals and Adobe XD scenario

To develop the visuals further and think about the ways in which they could communicate messages to the user, we worked out one of the scenarios in more detail. The scenario we used described a regular family meal, which we thought would be most relevant to focus on since it occurs more often than, for example, a large celebration. For each step of the scenario, we each created an illustration of what type of visuals the table could use. To make sure that the visuals are linked to the moving parts in a meaningful way, we made sure to consider this in the ideation and to note down what would happen.

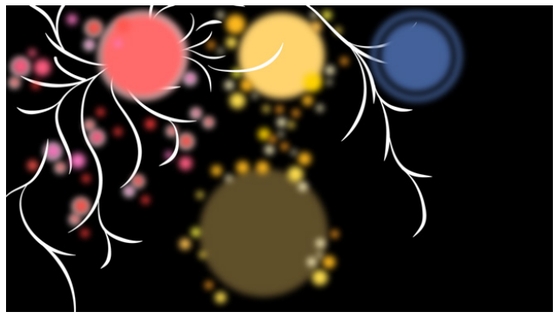








Figures 35,36,37 & 38: Ideation into the different visual styles



Figures 39 & 40: Screens from the Adobe XD prototype for the user testing

After comparing the different visual styles, we chose the one that can be seen in figures 35 - 38. This style was the most expressive and we all felt that it was the one that stimulated the feeling of excitement the most. In addition to this, the visuals fit the type of food that was being served on the table. As the visuals are a particularly important aspect of the project, we wanted to do user testing with them, to make sure people outside of the project would interpret the table's messages as intended.

To be able to do an interactive user test with our prototype, we created a new scenario that only involved one person. We built this scenario in Adobe XD, so that the user would be free (to a certain extent) to make choices within the scenario. Below are two of the visuals used for the user testing.

Using the knowledge that we gained from roleplaying with the first prototype we built an improved version for the user testing. The new model was of the same size as the previous one, however, it did not use a TV screen, but a projector. This way the visuals could be projected onto the surface and the moving parts, to better integrate the two. In the middle of the table there is a section with three squares covered by fabric. These fabric squares can be pushed up to create the table's movement.

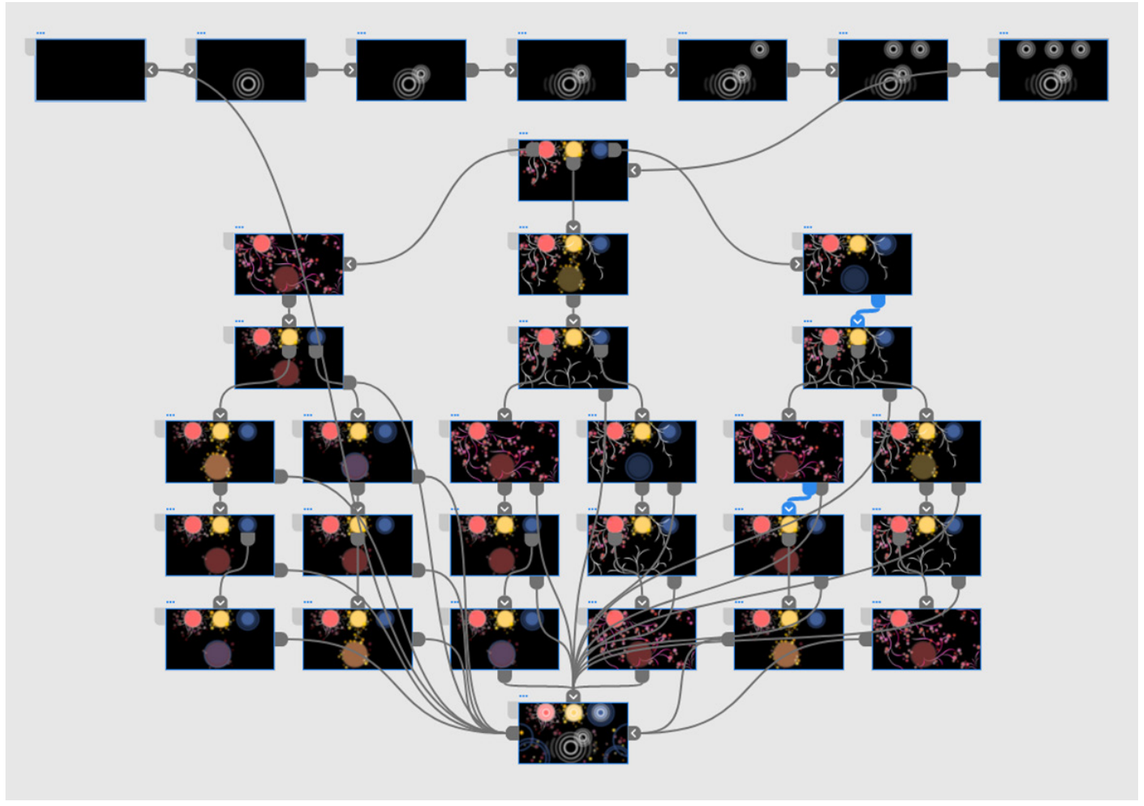


Figure 41: Overview of the Adobe XD prototype and the different paths that could be taken

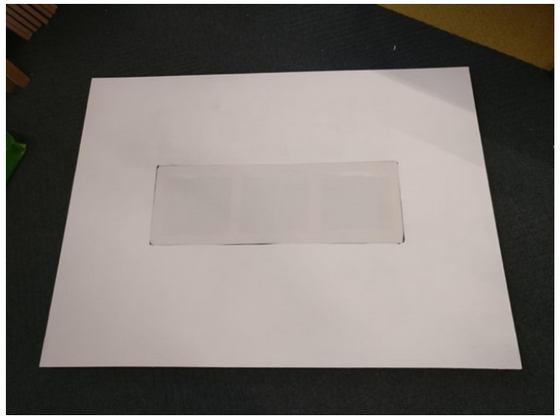


Figure 42: Prototype for the user testing

Figure 43: User testing setup

4.3 Iteration 7 - User test

The goal
For this user test, the goal was to better understand users' understanding of the table's multimodal communication. We let participants go through our prepared scenario, and then asked them about the experience in a semi structured interview. We also wanted to get an impression of the overall user experience of eating at our multimodal, communicative prototype. We used product reaction cards for this purpose, letting our participants pick five words from a list of 48 and asking them to explain why they chose each word. The list of words can be found in appendix ???.

The set up
The white prototype and Adobe XD model described in the last section were used for the user test. A projector was hung above the prototype, to display the images. Because it is not certain which food would end up in which spot, the colors of the visuals did not have a connection the specific foods. Instead, based on the research by Cooney and Menezes described above, red was chosen for the 'most exciting' food, and blue for the 'least exciting' food. The transition between images is a simple fade, other than that the images are completely still. For the user test the room is darkened to ensure sufficient brightness of the visuals.

The procedure of the user test
In the prepared interactive scenario the participant is invited to try three types of food. Based on their choices, the table's (static) visuals and movement changes. Prior to the start of the scenario, the participant is asked about the three foods in front of them, to understand which of these is most 'new', 'exciting', or 'unfamiliar' to them. The foods are then arranged on the table from most to least exciting, but are not explicitly labeled that way to the participant. The most exciting food is the food that the participant has never eaten, or that they have not eaten in a long time. Important to note as well, is that the participant is not told about the purpose or goal of the table.
Since the scenario was prepared in advance, it was predetermined where certain objects should be placed on the table. In the first steps of the scenario the participant is handed a plate, cutlery, and the bowls with different foods. They choose the food that they want to eat. Then they decide if they want to try another type of food to set on the predetermined spots on the table. During the scenario, the table tries to motivate the participant with visuals and 3D movement to try the dish considered most 'new' or 'exciting'. After the test, interview questions are asked to evaluate the interaction and the experience of the participant. First, the participant chooses five reaction cards out of a total of 48 and explains their choice. This way, a discussion is sparked. Next, the participant is asked to what degree they think the table was trying to communicate with them, if they find this way of communicating appealing, how they felt during the test and how they interpreted the message. The participant gets the opportunity to look through the visuals of the scenario again to support their explanations and reflect on the experience.

Results
Awareness of the presence of visuals and 3d movement
Most participants stated that during the user test they were aware of both the 3D movement and the visuals, specifically the shapes and color of the visuals. However, apart from the presence of color and shape, more subtle changes in the visuals were not registered by the user. It was clear that they were often not aware of the specific changes between different visuals, or even that a change had happened at all.

Feelings of the participants
During the interview, participants were asked different questions concerning their feelings about the way the table interacted with them. They expressed a broad range of feelings, for example relaxed and amused, but also annoyed and judged. In general, a feeling of discomfort was often present at some point during the test. Possible explanations are the fact that the 3D movement was not experienced as welcome or pleasant, and the fact that the composition of tableware that was communicated by the table was restrictive, especially for a left-handed user, who felt like they had to shift their position to sit straight in front of the plate. The discomfort emerged also from the fact that users felt that they could not eat the thing they wanted and that they were forced to make a choice: "I felt like I couldn't eat what I wanted. And I had to eat." Another participant mentioned that "there's not a really a relationship between me and the table […] I'm not sure I'm comfortable." Someone also mentioned being startled by the 3D movement.

Communication differences between 3D movement and visuals
Participants found the communication strongest and most present from the table's 3D movement. However, most stated that the communication of the 3D movement was too strong, which made them uncomfortable and was disruptive. Some participants did not know how to interpret the movements. The communication through visuals was perceived as less strong, and sometimes even described calm. One participant described his overall interaction with the table as calming and collaborative. Another found the overall communication unclear. In general, we concluded that the signals for communication were there, but the meaning behind them was often not.

The participants were divided on how cohesive the table's message was. One noted that they felt they could make some sense of the table's visuals, mainly its colors, but were confused by the movement. The opposite was true for others. The message that participants most often interpreted from the 3D movement was that they should choose the food in the moving bowl.

Interpretation of the visuals' colors
The colors of the table's visuals were perceived to be linked to the food inside the bowls in some way. One participant found that the food that was similar in color to the visual surrounding it was more attractive than the others. The red colored visual was sometimes perceived as 'wrong', and the blue colored one as not attractive. Blue was also perceived as the one that that did not belong with the other two. Users searched for meaning in the color during the test and they concluded that it had to be some scale of attractiveness or that there was 'wrong' and 'right' food. What the table meant by this was less clear. The shapes around the food were mentioned less often than the color, but they were interpreted to highlight the food the same way the colors did.

Influence on eating experience
Users were unsure about how the table influenced their eating experience. During the interview it was mentioned that the table triggered an increase of awareness about the food choices that they made. In terms of eating habits, one user mentioned that the table could have a potential to support their already existing interest in trying new food: “maybe [new food] would grab my attention more and maybe this table would hype up a bit of that interest that I have on foods in general.”

Feedback after explaining the goal
At the end of each interview, an explanation of the concept was given by the interviewer, to see if this would lead to additional insights from the participants. For example, after being told the goal of the table, one participant mentioned experiencing a feeling of curiosity about different reactions that the table would show if different choices would have been made: “[It would be] kind of interesting to see what would have happened if I took liquorice. I didn’t because I don’t like it.”

Some participants suggested possible improvements of the concept. One participant suggested making the colors related to the food itself. Another gave the suggestion to increase a sense of friendship between the table and the user by helping to overcome a fear of trying new food: “Maybe if I tried something I didn’t like and he would get excited for me. (…) Maybe in that way I would have understood that he was actually by my side. (…) [H]e wasn’t only there hoping, being like a service, but he was like a friend (…)” Another interesting suggestion was that it would be useful to shift the focus of the goal of the concept towards giving people tips on how to eat, instead of what to eat. For example, what dishes on the table would be interesting to combine? This is a valuable suggestion in the context of this specific scenario, since the person eating alone most likely does only put on the table what he already knows he is going to eat, so what to eat is a question that is already answered before eating at the table. Lastly, a participant suggested to animate the visuals, so the attention is drawn to them.

Improvements
After analysing the results from the user test, we formulated a set of improvements to be made to the table, that we wanted to incorporate in our concept as well as our prototypes going forward.

1.The 3D movement must be improved. The motion should be slower and less invasive. The stability of the movement has to be improved so that it is less jarring and better timed. If this is improved, the user will hopefully not get startled and the interaction will not cause the participant to feel judged.

2.The visuals should be related to the food, and not just represent an abstract level of ‘newness’ or ‘excitement’. Due to the way this user test was set up, the most exciting visual had a fixed color, while the food that was placed at that spot changed depending on the preferences of the participant. In our actual concept and our prototypes moving forward, this should not be the case anymore.

3.The visuals will be animated. This to hopefully improve the user’s awareness of the visuals.

4.The table setting process will be more flexible. The visuals should appear wherever the user places an object, instead of appearing before the user has placed an object, as if to indicate where that object should be placed. This is to make the table setting process feel less restrictive, and to make the table feel more responsive rather than instructive.

Additionally, we formulated a set of improvements to be made to the table that we deemed to have a lower priority. We based this judgement mainly the effort and time it would take to develop and implement these changes properly in the time we had left. We also felt that the four changes detailed prior were the most pressing and integral to the proper functioning of our concept.

1.The 3D movement and the visuals should be better integrated. During our user test some participants got mixed messages from the visuals and the 3D movement. They should ideally not only convey the same message, but support and enhance each other.

2.The user should be able to give feedback about the communication of the table. If the table gives a message that is too invasive or against the will of the user, the user should be able to tell the table to ‘back off’. It is important that users do not feel forced to eat something.

3.Although the relationship between user and Excitable was not a topic of this user test, it was mentioned twice by different participants. Both wanted to feel that the table was on their side before they wanted to be convinced by it to eat new things. The table should therefore find ways to ‘befriend’ the user before beginning to nudge them about what food to eat.

Reflection
During the user tests we realized how tricky it was to choose the ‘most exciting’ food. Because of the nuances in the participants views of the different foods, this was difficult to do in the exact same way for all participants. For example, with one participant we put the food that they found least appealing, but which they had never tried, on the most exciting spot. With another one we put the food they found least appealing, because they had tried it before and didn’t like it, on the least exciting spot. These differences influenced the interpretation of the interaction considerably.
We also realized that because the participants were asked to express their opinion about the food before the user test, they might be biased when they do the scenario afterwards. This is something noteworthy because some users mentioned during the interview, they were making a mental scale of least to most preferred food as expressed by the table. This might be influenced by the questions asked before the user test, during which they were implicitly making a scale from least to most familiar foods as well.
For future user testing, the social context should be included in the evaluation. Not only is the Excitable meant to mainly be used during dinners with multiple people, the dynamic of the participant eating at the table while we watched and took notes created an awkward atmosphere that changed the context of eating at the Excitable. Furthermore, to test behavior changes, a long-term user study is essential. This would also be a chance to evaluate users’ attitude towards the design over a longer time, and whether a feeling of ‘friendship’ as mentioned before is able to develop.

4.4 Final Concept: The Excitable

The final concept of the Excitable is a smart table which observes and responds to your eating habits. It motivates the user to try new foods, and to have an adventurous and varied diet. The table communicates with the user through its surface, which can display animated visuals and gently lift objects.

Figure 44: Overview of the Adobe XD prototype and the different paths that could be taken

The Excitable consists of two main parts. A tabletop that displays animated visuals and a central section where three platforms can slightly move up. The table uses these means of communication both to celebrate the food users place on the table, as well as to invite and encourage users to try dishes that are new to them. The table uses an object recognition camera built into a lightbulb, which is hung above the table. This lets the camera see what objects are placed on the table, and where they are placed.

The Visuals

The colors and shapes of the visuals are based on the ingredients in the dishes that are placed on the table. The intensity, size, and activity of the visuals depends on how new they are to the user. When ingredients are taken out and prepared in the kitchen, visuals appear on the edges of the table representing these ingredients. This serves to introduce the visual theme each ingredient will have during the dinner, as well as to show that the table is 'waking up'. Then, when a dish is placed on the table, a visual appears underneath it, clearly establishing the final visual theme for that specific dish. As users take their seat, the animated visuals grow and change to draw their attention to the newest/most exciting dishes on the table. When a user tries a dish, a celebratory visual appears underneath their plate, reflecting the ingredients and newness (relative to that user) of the food they put on their plate. In figures 45 and 46, examples of visuals the table could show are depicted.

Figure 45: Visual and height reaction to pumpkin soup

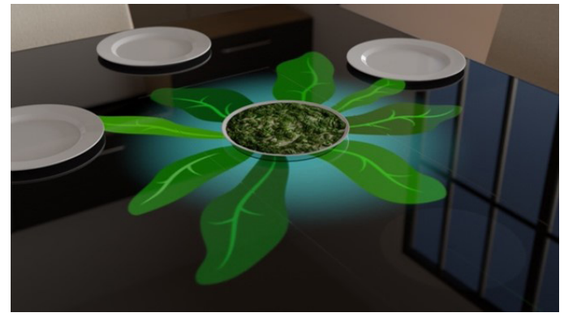


Figure 46: Visual reaction to Spinach

The 3D Movement

The three individual platforms in the middle of the table move synchronously with the visuals. When a dish on one of the platforms is being highlighted with the visuals on the screen, the table will slightly lift that platform up to also create a physical change. The platforms are connected to pistons of pneumatic actuators, which are attached to a compartment below the table. The pneumatic actuators use air or gas to create a mechanical motion which will raise or lower the platforms. (ABB, n.d.) The screen will have three circular cutouts for the pistons to pass through. The pistons will be made of a transparent material to make them less obvious when being lifted. In figure 1, the three actuators can be seen and how they could be built into the table.

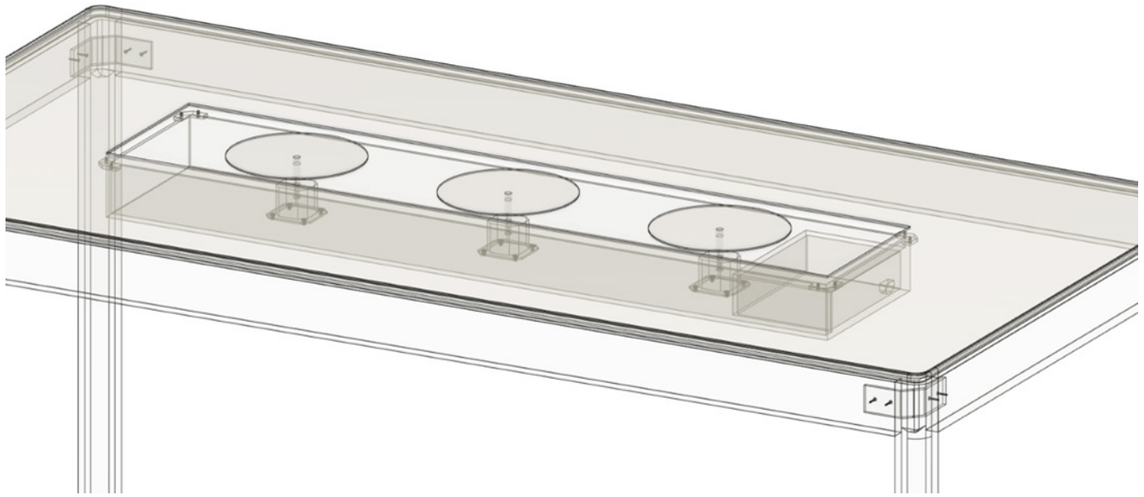


Figure 47: X-ray view of the Excitable

Long term functionality
The table builds up an overview of the user(s)'s eating habits over a longer period of time, and so the judgements on how 'new' or unfamiliar a food is to them will become more nuanced. For example, is the user someone who has a very varied and adventurous diet, or someone who eats mainly the same things? Is the dish placed on the table something the user used to eat very regularly, but now hasn't had for several months, and therefore simultaneously 'familiar' and 'new'? More subtle evaluations of the 'newness', 'unfamiliarity', and 'excitement' of the food become possible as the table gets to know the user better.

The Excitable and Data
As mentioned above, the Excitable will use data from a camera above the table to gather data about what is going on at the table. Using object recognition, it will be able to see where items, such as plates or pots and pans, are placed. It will also be able to recognize the color pallet of a dish served on the table, however, since it is only a visual recognition software, it might not be able to determine individual ingredients inside of a dish that is placed on the table. Next to this, it will therefore also be able to communicate with other devices in the house and exchange data with them. Depending on which devices are installed in the house, the Excitable can react much more intelligently. For example, if a smart product which tracks what sort of food is being stored and taken out is present in the kitchen, the table will be able to show visuals about the ingredients before the following meal even started.

4.5 Final demoday presentation

During the final demoday, we presented an updated version of our first prototype, which used a television screen. Three square sections were cut out in the middle of the prototype, and square platforms were created that fit inside these sections and which could be moved up and down. We created a set of animated visuals for the table, and a processing program that allowed us to make these visuals appear on any spot on the prototype's screen.

OOCSI
We used the OOCSI tool to demonstrate the connectivity of the table with our cluster, which consisted of the products Matt, Ei-Ro, Data Door, and Excitable. OOCSI allowed us to send certain data, that could be read by the other cluster members and which their products could act on. For example, if someone took out a product from Matt, a smart food storing system, a data point would be sent to OOCSI. This data point would then be read by Excitable and would trigger an animation on the screen with a visual based on the product that was taken out.

Demoday Feedback
During the day we presented visitors, who had seen and interacted with our prototype, a small selection of product reaction cars. We asked them to choose three words out of a total of nine, and also left them the option to fill in their own words.

Most of the respondents found the experience they had at demoday entertaining. This is positive, but at the same time this is not the main reaction that we had hoped for, because an entertaining interaction is often associated with a new experience, and this does not guarantee that the long-term interaction will also be a positive experience one. It might very well be that the table becomes less entertaining after a longer period of use due to the fact that the user gets used to this type of interaction.
A large amount of respondents also found the interaction with the table responsive and stimulating. These are more desired reactions. The Excitable was designed to stimulate people to try new food and to respond to the decisions they make.

A few people described the interaction with excitable as collaborative or motivating. This is unexpected since these words say something about a more long-term interaction with the table. The prototype at the demoday only gave people a short experience of interaction.
Few people found the Excitable confusing, unfamiliar, distracting, or disruptive. Since these words are considered more negative responses, their relative scarcity could be caused by people wanting to give positive responses since we were near them while they filled out the form. This result may therefore be biased.
Our conclusion is that based on the demoday feedback, the Excitable managed to create an interaction with the user that was perceived as responsive and stimulating. This is in line with one of the aims of the design concept. However, while this is positive, we are careful to put too much importance in these results, since our feedback process was quite informal.

4.6 Future Development

In any project, there is often a sense at the end that the results would have been that much better if only there was a little more time. We wrote this section to give some insight into how we would have further developed this project, if we had had more time or if it would be a project we were trying to bring to the market.

User Testing
If the project were to be continued, user testing must be done on the long-term experience, to find out if the Excitable has influence on the behavior of the user. Research into the level of variety in the eating pattern of the user over time should be done to validate that the design goal is met. Furthermore, a set up with more than one person would have been a better choice for the user test since it was found at the beginning of our process that social interactions are important when people try new food. A more in depth reflection on this is added in the group reflection section of this report.

Materials and technical execution
The Excitable concept exists of various components. These can be mainly divided in the table frame and the surface with the controls and visual components. Although we have not yet done concrete material research, we have discussed some options for possible materials. The frame could for example be made of powder coated aluminum. This is a light material that is very robust and will fit in the futuristic element of 2035. Production-wise this is also a great material because of the easy frame construction by using welding. The surface is made from a transparent resin or plastic, yet to assign. Underneath this layer is a high resolution, ultra-thin screen that will be placed on the frame of the table.

Furthermore, research would need to be done on the actuators of the moving parts of the table. It would need to be tested whether pneumatic actuators are quiet enough to not be heard by the user, and if they are able to deliver the smooth motion that is desired. Another technical aspect which still needs to be investigated further is the object recognition of the camera system. It will need to be tested to see if it is capable of recognizing the different food, and how comfortable users are when eating with a camera in the lamp above their heads.

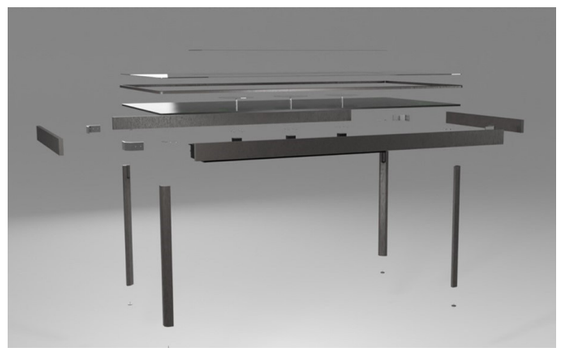


Figure 48: Explosion view of the Excitable

Business possibilities

When the Excitable will be production ready, there are multiple options to bring this product on the market. In this section we will discuss multiple scenarios and look at different business proposition tools to develop our business strategy.

To research the wide possibilities, we want to use multiple models to create an overview of the core identity points of our product. To look at where opportunities are and where the challenges are we want to use a SWOT model in combination with a value proposition canvas. These tools will create a visual and textual overview of our product. We can then analyze this information to create new insights about the opportunities and weaknesses and improve our product.

Using the board of innovation, we will create a possible business proposition that will be visualized. We do this to create a good overview so the proposition will be better explainable for customers and people outside the project. This visualization also helps to create easier workflow within the team, it is easier to change, and teamwork is easier to implement.

Future product optimalization

To make the next iteration for the product concerning usability, costs and producibility we need to do more research on these topics. But we can say that to make this product more feasible, some realistic design changes can be made. We still need research what the effect would be of removing the moving elements on the user for example.

Looking at an assumption of the cost indication, the moving aspect of the Excitable will be very expensive to produce. Removing this aspect from the table will signifiable lower the costs of the table. To increase an investment chance for our product we can make a version that will be a lot cheaper and easier to produce by removing the moving parts inside the table. By adjusting the visuals on the table, we could be able to create a similar like experience without the extra costs of the moving elements. This will make the table a lot more attractive to new customers because the purchase price will be lower. This visual ‘movement’ is yet to be tested and is still an assumption.

CONCLUSION

5 Conclusion

In this design project we used a lot of methods, processes, and techniques to get to the point where we are right now, the final concept. These practices are all different and contribute in their own way to the whole design process because they are from different areas of expertise. In this chapter we want to try to sort these practices into the most fitting area of expertise.

5.1 Creativity and Aesthetics

In the first part of our iterative process, we used our intuition to understand the research we had done and to generate original concepts and ideas. An example for this is the first iteration where we came up with ideas about where we would like the project to go. This led to creative and out of the box ideas.

We also tried to look at the problem from different perspectives. In the second iteration we used anti design to highlight the possibilities and limitations and later we used scenarios to highlight problems that one would not think of intuitively. This created new insights and new perspectives of our 'problem' and thus produced more creative ideas.

A third example is how we used aesthetics to make the concept more intuitive. In our initial concept we used mostly random colors as visuals as the visuals were a very abstract way of communicating. During the user test we noticed that users did not fully understand the visuals and therefore we needed to rework them. In our final concept you can see that the visuals resemble the ingredients and create a more understandable message.

5.2 User and Society

As written above we tested the communication of the table with users to understand how intuitive, expressive, and fun the experience could be. We learned a lot from the qualitative feedback, and it helped us to improve the concept.

During the demo day we also used product reaction cards to get quantitative feedback about the concept. From this feedback we were able to get an image of the general opinion of the concept.

From the interview with Bjorn from Intelligentia, we also learned that the flavor of food is only one part of the experience as it should also convey a certain message. Therefore, we decided to look at the bigger picture of the eating experience.

5.3 Business and Entrepreneurship

As our process was heavily focused on the meaning behind the table and what it would communicate to the user, we had little time to focus on the physical aspects of the table. Using different tools from this expertise area, such as a cost analysis, would have created little value to the concept and we therefore decided not to use them.

5.4 Math, Data and Computing

A good example of this expertise area is how we used OOCSI to communicate and interact with other projects. During the demo day it allowed us to present how data would be used in our cluster and how the 'smart' products of the future would work together to create a 'smart' home.

The final concept will also use data and computing to respond to the inputs it is given. While we did not prototype this, we considered what kind of data the table would gather from its own sensors and other devices, and how it would be used.

5.5 Technology and Realization

As written above we used OOCSI to realize the data communication between the devices in our cluster. During presentations it helped us to demonstrate this interaction and make this more understandable.

For our presentation on demo day, we used processing to make the experience interactive. We coded the visuals in a way that we could click on a laptop where the interaction would take place. This wizard of Oz technique gave the impression that table was responsive and could communicate to the user.

In the user test we used Adobe XD to make the test interactive. The users were free to choose what to do and the table would respond to this. This led the user test to be more open to unusual ways people would interact with the table.

This expertise area comes back in most iterations. In the first iterations this was done via rapid physical prototyping and in the last iterations as mentioned above through the prototypes.

5.6 Math, Data and Computing

When we look back at the process, we can see that we stumbled upon quite a few things but also learned a lot. In the beginning it was difficult to start, in the middle of the process we could not decide where to go and, in the end, we did not know what to deliver. Below is a list of some things we have learned and realized during this project:

-We noticed that during discussion or decision moments we had a tough time deciding and getting to a consensus. Since we were all in charge, no one took the lead to make a decision. We could have done this better by organizing the meetings better, with time limits or conclusion moments but also by appointing someone to take charge.

-The second point elaborates on the first one. Throughout the process there were a lot of different tasks that we would not divide very well. Most of the time we worked on the same tasks. We did this to maximize the quality and so everyone got their say in the discussion. However, this also led to quite a slow process because every time we had to discuss every single perspective. This could have been prevented by appointing clearer roles. This way the responsibility for deliverables would on a specific group member. In the last weeks of the project, we did this by dividing the deliverables of the demo day and it worked very efficiently.

-We also noticed that we did not fully understand what the university expected from us and what the deliverables of the final concept were. This is of course no excuse; we should have considered this earlier. However, it did slow down our process and made it sometimes quite difficult to plan the next step. For next time, it could be important to document the steps of our process better during the project and be sharper in our conclusions after each step. This might make defining the next step easier.

-We should have started with the ‘final’ prototype a lot earlier. This would have made us see problems and necessary insights a lot earlier. It would ultimately lead to a better and more thought-out prototype on the demo day. Next time what we could do to prevent a lack of time to finish a prototype that has the level of fidelity we want, we could make a planning after the mid-term demoday and name everything we want to do to prepare. There we should also mention who is responsible, so we can plan in more time for things like for building the final prototype.

-To support our design choices, we did literature research. However, at the end of the project we noticed that some of the findings that we draw from this research are not strongly related to the design choices we made. What we could have done better is to know what the goal of the literature research is before we started it and make sure that all research is done based on a design challenge that we are facing. This way we can make sure that we know better what to do with the information we find while doing literature research and what research topics are most relevant for us to investigate.

-In the beginning of the project, after exploring foods that were new to us, we found out that the social setting is important when people are trying new foods. During the evaluation of the prototype in the user test, it could therefore have been useful to test in a setting with multiple people to see if the excitable can make people exited to try new food in a group setting and communicate by reacting in the context of the social dynamic at the dinner table. However, this would have added complexity to the user testing that was not possible for us to realize during the time we spent on this project. Also, the next evaluation with users could be focused on testing the excitable in the longer term with a diary study of at least two weeks. This gives insights into whether the design is able to change the long-term behavior of the user to a more varied diet.

5.7 Task division

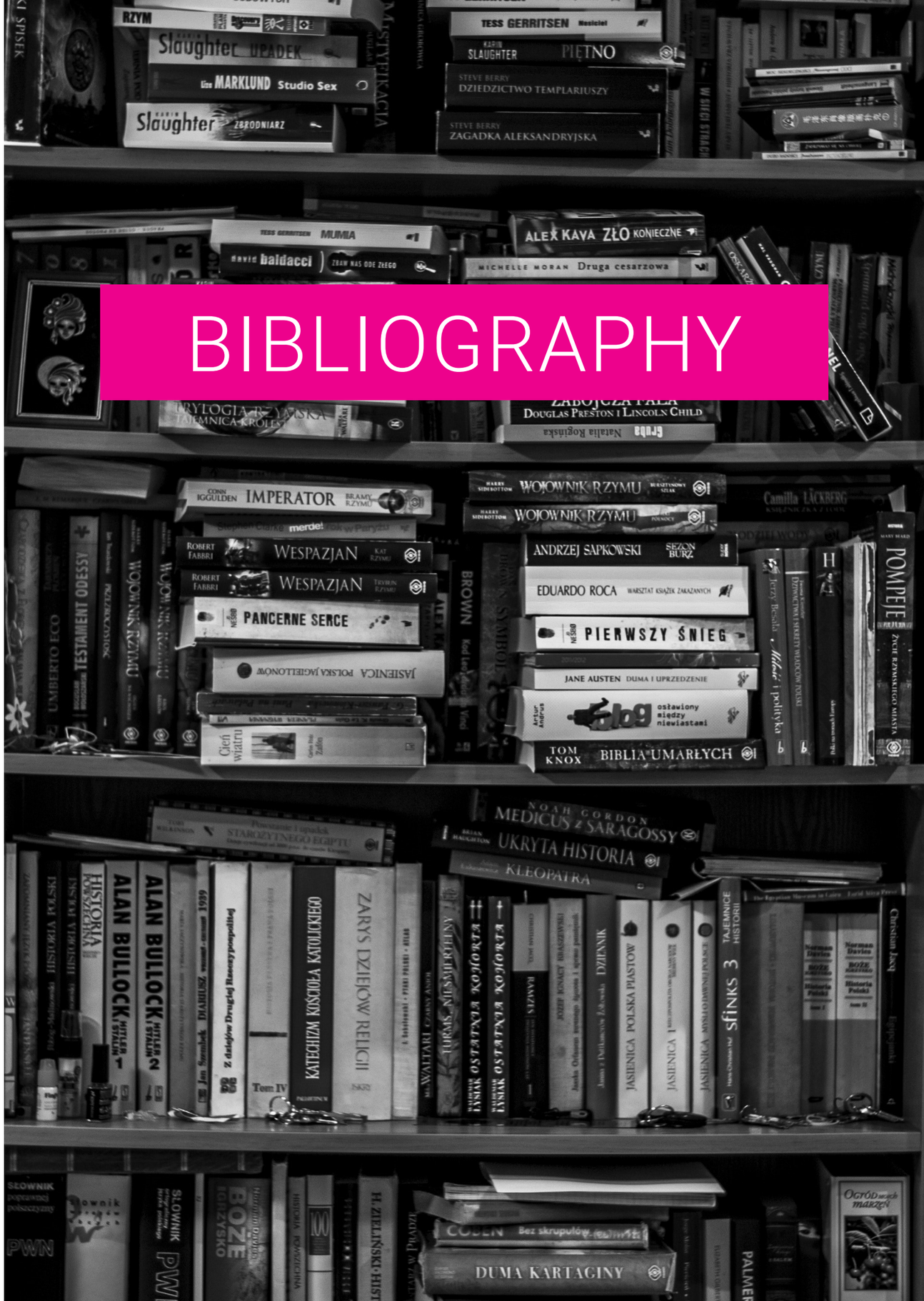
As mentioned before, at the beginning of the course, everyone in the group took part in the same activities. After iteration 3, minor roles were taken on by everyone in the team to prepare for the first demo day. Minck created the scaled prototype that can be seen in figures 15 & 16. Lucas created the renders and animations, and Els, Simone and Titus prepared the pitch and poster for the demoday.

Afterwards, during iteration 5 Titus, Minck and Lucas built the prototype whilst Simone and Els wrote the 5 scenarios. The exploration using these materials was then done by everyone together.

Also, the following ideation into what sort of visuals could be used for the table was done together as a group, however as we decided that Els’s visuals were the most communicative, she proceeded to make the future visuals.

As we needed a new prototype for the user testing, Titus and Minck built it. Next to that, Simone made sure that everything for the user testing was being arranged. She made decisions about the setup with the beamer and prepared things such as correct forms and a location. For the user testing an Adobe XD interface was needed which was made by Lucas. Minck was responsible for the connectivity between our project and the other projects using OOCSI and also wrote the Processing code for the ineractivity. Titus designed the poster and made the video for the final demoday.

For the final report, Minck designed the layout and wrote the conclusion. Els and Lucas wrote about the design iterations and Simone about the literature research, exploration with new food, expert interview and user test. Titus wrote the introduction and the part about technical execution and business opportunities. The first draft of the group reflection was written by Minck. Afterwards everyone could add things that made the group reflection complete.



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APPENDIX

7 Appendix

7.1 Transcription interviews user test

Participant 1

Which five reaction cards would you say describe the experience you just had? If there is a word that is not on the list, you can add it as well.

Unfamiliar, it seems like I've never sat at a table that does these things. And I kind of get got the table trying to like, make me eat a certain thing. That's kind of the feeling that I got like, it really wanted me to have the salad. Yeah. I didn't know what the table wanted me to eat. I felt like that it wanted me to. I don't know. Eat by this one. I don't know if people are moving it or not. But yeah, I was confused. I was confused. I would say time consuming. It takes time. I would say it's a bit disruptive. Like in terms of, like, I'll just, I could just like, you know, just get this stuff and eat it. And that's it. And not have it like, you know, highlighted like that. I guess maybe with one person? It doesn't make much sense. I've never tried this so entertaining Because the whole thing was a bit slow, but I don't think like, in reality, that's what it would be like.

Did you feel like the table "influenced" your eating experience?

Yes, because I couldn't, I felt like I couldn't eat what I wanted. And I had to eat.

How did you experience the table's visuals and movements? (Make sure to only move on to the next question once both the visuals an movement has been discussed)

The visuals were really cool. I think yeah, I think that's really nice. And I imagine like if there's a table where there's a lot of things moving around, that's even cooler. Because now it's like kind of like just myself and I'm just you know, picking them up. Yeah. But they are cool. I was trying to like decipher the colors like is this color a good color? Yes, they want me to eat the licorice is that is the color that is associated with liquorice? I didn't know.

Did the table make you feel a certain way? How?

It made me feel? Yeah, kind of like, judged, I guess. Yeah, judged. Yeah. Yeah.

Did you realize the table was trying to communicate with you?

Yes

How strong was the communication?

It [the communication] was it was it was strong. I would say it was. It wasn't subtle.

How did you interpret the communication? Was it clear to you?

Clear? No, no, because like, I didn't know what it wanted to tell me. Yeah, I kind of guessed like it wanted me to eat a specific one, but I didn't really know if I'm supposed to, like, eat that one. Or, like, ignore that one. combination? Like, should I or is there an order? Like, should I eat first place and then that and then that? And when it moved clearly, like it's like, eat this one? And but I'm like, you know, like, maybe I don't? Yeah. Yeah. Maybe a bit too pushy, This table. Yeah. Yeah. A bit like one sided also, okay. If there was a way that I could say like, Hey, like, don't push me you know?

Now that you know the table was trying to communicate: What do you think it was trying to communicate about the different dishes?

Okay, yeah. Sure you go like one by one or?

Yeah. Okay. This one is like, I don't know, it seems like super exotic shapes. Like, whoo. You know, look at this one. [red/salad] This one's like really boring. It kind of like, the blue is a bit like, reminds me of like medicine. [blue/liquorice]And this one it because you said this is like, I don't know, like, Eastern, some Eastern type of food. Like is this like, okay, so it reminds me a bit of that. Okay. It gives me like, spices and colors and something a bit more vibrant

Was the communication stronger from the visuals or from the movement, or were they equally as strong?

I mean, the movement is pretty clear. You know, like, if the table moves. Yeah. Or, you know, and also the colors were, I don't know what you guys did with the colors. I didn't get like what the thing was with the colors. Actually, this one was the one that I wanted to eat the most based on the patterns [yellow], because this one was too much [red]. I think it also matters. Like what this thing is specifically, like, this thing doesn't seem too appetizing. So I guess like, yeah, this food. Yeah. So I kind of I'm like, I don't like the shape either. Because, but maybe if it had been something nice, I would be like, let's try that. [red]

The purpose of the table is to excite you about your food and to motivate you to try new food. Knowing this now, is there anything that you would change?

The table is trying to make me try new foods, right. I wouldn't want it to move. Like that just seems like too much. Like, maybe. I don't know, I felt like I didn't. I barely knew the table. And it was like, telling me this. No, I mean, like, there's not a really a relationship between me and the table. So it being like, so pushy. Yeah. So pushy. It's like, I'm not sure I'm comfortable. A bit, like, maybe being a bit more subtle.

I'd say like, play more with the colors. Like, give more tips of just like not only like eat this or eat that, because like, if it's on the table, I'm going to try it. I'll probably try even if someone else made. And I was like more. I will try it more. If it's like someone recommended it to me, then like the table just went like that. Maybe more info of like, hey, like, try these two together? That would be fun. And it says like, hey, combine these two, and then you'd like, oh, actually, I didn't know that. Yeah, I think that could be more useful.

Yeah, because what to eat is like, it's already there. I was like, I don't know if I want to eat this. And then the table said, Eat it. And I was like, wow, like, I didn't like that Maybe you you could do like, you could do things that combine and make it like actually suggest a combination. I think that would be like, yeah, because then it has like, an added value. Like, I'm at a table with my family. And I have all these food in front of me, and I'm going to eat it because, like, it's there and someone made it. But maybe there's something that I don't know, maybe like, I'm supposed to eat this with my hand or maybe I'm supposed to wrap it in some way. Like, more like tips and stuff like that. Yeah, if I could say something like, it's, like, make the colors like related to the food themselves.

Participant 2

Which five reaction cards would you say describe the experience you just had? If there is a word that is not on the list, you can add it as well.

I think one of them was calm. Stimulating. Responsive. Entertaining. Collaborative because I, the movement that I was having, I don't know if that was related to my personal interest or not. Because there was light and it like, helped me. Like, indulged me into eating so. [calm] I don't know, maybe the context or the simplicity of all the cups and different snacks and how it was really easy to understand which which food I didn't didn't like or didn't like. [stimulating] For the lights and movement as well. Yeah, yeah. It's, it's, I think they're, they're connecting. I mean, I was presented with three different stacks. So I was seeming stimulated but also then for the lights and how I'm really into being the snacks and from a felt stimulating on doing that. Yeah.

Collaborative? Because I thought, I mean, I have something that is working with me to to have a snack, you know, this is not just a random table or something. I mean, it's something that is made for me to eat or to have snack or whatever. Responsive. Yeah. Always for the for the colors. I felt like it was different colors based maybe on my preferences for maybe how that snack represented itself around color. And I don't know what with what the colors were indicating. Exactly. Responsive? Yeah, because it gave me something about what I what I had in front of me.

Did you feel like the table "influenced" your eating experience?

It did. Because Because I wouldn't, I wouldn't have tried those. I don't know what I mean, I wouldn't have tried those because I knew how they tasted even though I liked them. But they had different color from that. And from that. And so I realize I felt like they were highlighted. They were highlighted.

How did you experience the table's visuals and movements? (Make sure to only move on to the next question once both the visuals an movement has been discussed)

The colors I got the meaning of the colors based on my taste, I think. The movement was interesting. The movement I think also from my preference that I had, so was moving that chips over there. I wasn't really super aware of why was moving. I mean, I think it was for my personal preference, but why are you moving? Maybe to feel more?

Did the table make you feel a certain way? How?

Did you realize the table was trying to communicate with you?

thought something like that. I mean, these are the thoughts that I had. I mean, yeah, the blue color here, for darker color for the things that I didn't like, something that I, I liked, so it was red. So it was stronger color and orange for the or yellowish for this one. So I think it was like, a scale value of colors of what I like. So it was moving these ones because I liked that. So I was like, trying to reach out to me in some way.

How strong was the communication?

It was it was an overall Calm, calm relation that he was trying to have with me, but not in a invasive way. I mean, wasn't wasn't forcing me to do anything. In fact, I didn't take these ones, because I didn't felt like I had to eat those. So yeah, calming and relaxing. Added value, I think.

How did you interpret the communication?

I thought the table was trying to sort of visualize my personal preferences through colors and movements in a sort of engaging way.

Was the communication stronger from the visuals or from the movement, or were they equally as strong?

I think the colors for me were more influenced. Maybe because they made even more sense. The movement wasn't really self explanatory. I mean, it was moving. But what should I do? You know, in the, in the moment, I took these ones that continue to move. So what changes? You know, what, what, what was happening? Yeah, so that wasn't super clear to me.

Would You still have chosen this dish [red] if it was something you have never tried before?

I would have a bit from my personal maybe how I am. So I'd like to try new foods. But even for maybe a visual, like if it was color, and it was moving, maybe it would grab my attention more and maybe hype up a bit of that interest that I have on foods in general. So yeah I think I would.

The purpose of the table is to excite you about your food and to motivate you to try new food. Knowing this now, is there anything that you would change?

So it's a table that hypes up the excitement on what you eat. so it's based on trying new foods and to have a healthier diet. It's not it wasn't for me really clear that he was excited. But now that you tell me it's it's fun. It's a fun idea to have him excited for me to try new food. Maybe if I tried something I didn't like and he would get excited for me. Because I overcome my maybe in that way I would have understand that. He was actually by my side. You know, he wasn't only there hoping, being like a service, but he was like, friend as good as saying, Oh, we try something new. You're okay. I had fun with the moving and visuals. It was strange. It was strange and, and kind of interesting to see what what would have happened if I took like, liquorice. I didn't, because I don't like it.

Participant 3

Which five reaction cards would you say describe the experience you just had? If there is a word that is not on the list, you can add it as well.

Ik zou zeggen in ieder geval fast. Entertaining. Het hield mijn aandacht niet vast zeg maar. Cal m. Effe wennen, unfamiliar. Omdat je dan die ringetjes ziet en dan heb je die drie bakjes en dan oh ja het is best logisch om dan die drie bakjes op die drie plekjes te zetten zegmaar, maar dat is effe zo van oh ja, oh ja ja ja, dat is dan toch best logisch. Kan ik die tekening nog een keer zien wat er afspeelde? Ohh, dat heb ik helemaal niet gezien! Dit heb ik wel gezien. Daarna is er niks meer gebeurd? Oke, dat heb ik ook niet gezien.

Waarom denk je dat je het niet hebt gezien?

Nou, het verandert vrij ineens dus als je ogen en je hebt het in je veld dan trekt het je aandacht, maar op het moment dat je effe wegkijkt en je ziet niet die verandering en je kijkt terug, dan is er geen beweging dus geen reden om mijn aandacht te trekken, snap je wat ik bedoel?

Dus als het een geanimeerd beeld zou zijn zou het beter zijn?

Ja, als het een geanimeerd beeld zou zijn dan trekt het denk ik constant je aandacht. Want ik heb dit wel gezien, maar al die blaadjes hierzo niet, en dit ook niet. Terwijl ik denk als dit zo zou ademen ja, dan trekt het later je aandacht nog, want nu zou het er altijd al kunnen hebben gezeten.

Denk je dat het ligt aan de beamer, zou het beter zijn als we een tv scherm hadden gebruikt?

Nee ik denk dat het de beweging is en als je een grotere beamer koopt dan heb je ook fellere, dus dat is niet perse het probleem dat niet het licht van de tafel is. Nou ja meer omdat zegmaar op een gegeven moment zag ik dan wel daar komt iets dat had ik wel door en toen zo die kleuren en het bewegen, nou ja daar schrok ik een beetje van. En dan vervolgens pak je die bakjes ga je eten en dan ben je klaar met eten en dan, ja. [calm] Ja, dat het niet te druk is, het is niet dat ik denk van wow.

Did you feel like the table "influenced" your eating experience?

Het eten zelf niet, maar wel hoe ik mijn tafel heb ingedeeld.

Het eten zelf niet?

Nee nee en mijn aadacht werd natuurlijk door dat duwen naar het bakje getrokken, maar dat was toevallig het bakje wat ik sowiso als eerste zou hebben gekozen, dus wat dat betreft heeft dat niet veel verandert voor mij, maar het trok wel mijn aandacht, omdat het bewoog en eh ja.

How did you experience the table's visuals and movements? (Make sure to only move on to the next question once both the visuals an

movement has been discussed)

ja, nauwelijks. Het eerste waar ik wel nar ging kijken is betekenen die kleuren iets. Heeft dat iets te maken met het eten wat er staat

Did the table make you feel a certain way? How?

Het eerste waar ik wel nar ging kijken is betekenen die kleuren iets. Heeft dat iets te maken met het eten wat er staat.

Did you realize the table was trying to communicate with you?

Met dat ene bakje wel, ja

How strong was the communication?

bijna angstaanjagend

How did you interpret the communication?

Ja, kies mij! Denk ik [bij het bewegende bakje]. [andere bakjes] nee, vrolijk gewoon. fout [rood] vrolijk [geel] neutraal [blauw].

Now that you know the table was trying to communicate: What do you think it was trying to communicate about the different dishes?

Daar kan je van groeien? Geen idee

Was the communication stronger from the visuals or from the movement, or were they equally as strong?

Nou de feedback richting mij met het bewegen was duidelijker [dan de visuals], maar dat vond ik niet prettig.

The purpose of the table is to excite you about your food and to motivate you to try new food. Knowing this now, is there anything that you would change?

Dan zou ik zeggen dus een visual die is subtiel, uitwijdt, beweegt, dat zou mij meer aanspreken dan een tafel, die hier zo por por, hier hedde ge wat. Die beweging, maar dat heb ik gezegd ik zou er bewegend beeld van maken en rood is inderdaad wel een aandachtskleur, dus misschien als ik erop terug kijk dan kijk je ook wel het eerste naar rood ehmm. Ik vind die blauw zo zielig.

Participant 4

Which five reaction cards would you say describe the experience you just had? If there is a word that is not on the list, you can add it as well.

Nou ik denk sowieso entertaining, ik vind het grapping om zo alles te zien en het licht en de beweging vond ik er grappig uitzien. Ik zou ook zeggen gets in the way, niet perse omdat het in de weg zit fysiek, maar als ik bijvoorbeeld op een gegeven moment dacht van dropjes zijn wel lekker en dan zit die cassave zit dan heel erg te bewegen dus dan komt er in je brein een beetje heb ik in ieder geval van die worden zeg maar aangeraden voelt het, maar ik wil toch het andere. Dat voelt een beetje alsof het je tegenhoudt. Ja het voelt een beetje van eigenlijk moet ik die nemen nu want het wordt me aangeboden. Na ik weet het doel zeg maar waarom de tafel een schaaltje zou gaan bewegen weet ik niet dus ik zou ook zeggen het is eeen beetje distracting, omdat ik niet van noou ja waarom kiest ie dan per se die en dan ga ik daar gewoon over nadenken en dat beinvliedt ook een beetje je keuzes. Ik vind het wel heel appealing want ik vind het wel grappig om de verschillende kleurtjes te hebben en dat het licht er overal zat en dat het bewoog maakt het welwat iets wat aantrekkelijker. En ik denk responsive want het stopt en het verandert en het voelt wel alsof het interact. Je kon een bordje neerzetten en toen kwam ook van dat

waar ik dan interpreteer van daar moet mijn dopper staan dat ik m dan daar neer kan zetten. Dus dat het wel een beetje let op wat ik aam het doen ben en daarop reageert, dus responsive ja.

Did you feel like the table “influenced” your eating experience?

Nou het heeft me zeker bewuster gemaakt bij wat ik aan het doen was en ook welke ik koos, omdat ik ja dingen zie bewegen dus het voelt een beetje van hij biedt dit aan en daardoor ga je wel denken van waarom kies ik iets anders en niet dat, dus het heeft het wel wat beinvloedt, maar ik denk dat ik anders nog steeds dezelfde keuzes had gemaakt, maar ik denk wel langer na over mijn keuzes.

How did you experience the table’s visuals and movements? (Make sure to only move on to the next question once both the visuals an movement has been discussed)

Nou sowiso de kleuren en dat her hier extra fancy dingetjes waren. Ja verder hier was veel detail in het blaadje en dan hier minder details. en dat komt waarschijnlijk ook omdat het licht blauw is maar je ziet de kleur minder goed, dus het is een beetje alsof het in de schaduw staat alsof het niet echt ebij hoort. Ik weet niet of de visuals verder echt invloed hadden met de kleur en hoe ze eruit zagen anders dan dát ze er waren.

Did the table make you feel a certain way? How?

Nou dat het bewoog was zeker alsof het gewoon aangeboden werd, net als wanneer iemand met een schaaltje naar je toe komt van hier neem wat, alleen dan nu de tafel duwt het omhoog. Bij het bord neerzetten en het dopper neerzetten dan heb je natuurlijk van ik moet het daar neerzetten, dan ben ik ook van plek gaan veranderen zodat ik recht voor mijn bordje kon zitten dat ie precies zo in die cirkel komt. Maar in mijn eetgedrag weet ik het niet zeker, alhoewel ik ben wel als eerst voor de tucjes gegaan, dus misschien wel.

Did you realize the table was trying to communicate with you?

Met de bewegingen zeker dat was en ja met de kleuren van het eten weet ik iet zo goed, maar inderdaad dus met het borden plaatsen en de aanwezigheid van de licht indicatie en de bewegingen dat wel ja.

How strong was the communication?

bewegingen wel. Van het eten wat minder en van het bord neerzetten en de dopper dan weer wel

How did you interpret the communication?

Nou ik weet niet wat de tafel van mij wil als ie iets laat bewegen, dus in dat opzicht niet echt duidelijke communicatie, omdat zeg maar het beweegt maar is het dan van: zet het weg? Of ja wat moet ik ermee? En zeg maar het is wel van je moet er iets mee doen maar ik weet niet wat dus in dat opzicht de communicatie is er maar de boodschap komt niet echt over. Ja, dan is het wel meer van kies dit want alle interessante dingen komen daar vandaan en die leiden daar naartoe.

Deze visual kwam nadat je de keuze had gemaakt. Had je dat door?

Ja ik heb het niet echt doorgehad. ja het is opzich wel van: ja ik heb de juiste keuze gemaakt, ...jaah

Now that you know the table was trying to communicate: What do you think it was trying to communicate about the different dishes?

Nou ik had dus het iedee van deze had van die leuke stipjes en streepjes en deze had allen stipjes en deze leek echt gewoon alleen het

licht, dus het was een beetje alsof die deze het interessantst probeerde te maken en dan die ook wat interessant en deze eigenlijk zo min mogelijk. want ja het kan natuurlijk van dat licht komen maar dat blauw valt minder op omdat er best veel blauw in de lucht zit in het licht dat dat de mindere keuze is.

Was the communication stronger from the visuals or from the movement, or were they equally as strong?

Dan, het bewegen dat valt mij meer op want dus inderdaad dat dit veranderd was dat is me niet echt bijgebleven. Het bewegen was wel een heel duidelijk signaal maar hoe ik het moest interpreteren dat wist ik niet zo goed.

The purpose of the table is to excite you about your food and to motivate you to try new food. Knowing this now, is there anything that you would change?

Ik denk dat de visuals dat ze detail hebben en steeds minder detail krijgen is wel een heel duidelijk signaal. Het bewegen is wel een heel duidelijk signaal maar ik vond het zelf een beetje irritant zo overduidelijk dat het opdringerig wat aanvoelt, maar dat is persoonlijk ook. Keuzes niet maken is erger dan een keuze maken en er later op terug komen

7.2 Personal reflection on process and teamwork

Simone:

Taken verdelen maakt het proces sneller

Ga iets maken als je vast komt te zitten in discussies als een groep. Met een fysiek object voor je kun je makkelijker discussiëren omdat je zeker weet dat je allebei over hetzelfde praat

Maak conclusies na elke design activiteit in het proces. Dus niet stemmen voor wat de beste is als iedereen een eigen model of visual heeft gemaakt bijvoorbeeld maar kijken naar de kwaliteiten en die proberen samen te brengen

Eerder taken verdelen de volgende keer. Miss meteen na midterm demoday

Minck:

Started earlier with making the final prototype

Distribute tasks faster and earlier in the process

Not getting stuck with small problems, not always letting everyone decide

Understanding the deliverables earlier

Organize more efficient meetings

Lucas:

Different educational backgrounds so we all had our own process in mind

No one was enthusiastic about the project in the beginning, so we all had to first get into it

Splitting up the tasks will be more effective. I think we should have started doing it earlier, however, I think its good that we didn't do right from the beginning as that might have influenced the group dynamic in a negative way

Lots of time spent on discussions as to what to do as a next step or what solution is best

Getting used to a different design process or way of going about the design process from the TU/e

Titus:

Uitstellen van keuzes in het verslag was niet bevorderend en had anders aangepakt moeten worden. Daar naast hebben we vele meningen in de groep en af en toe waren hier meningsverschillen in.

De taken eerder verdelen zodat er meer werk gedaan kon worden ipv allemaal hetzelfde

Wellicht meer inspelen op de expertise area's

Eerder beginnen met een prototype bouwen zodat we deze beter konden user testen en op konden reflecteren

Sneller knopen door hakken en minder diep in discussie gaan wellicht maar lijkt op punt 1

De groeps dynamiek was desondanks erg goed en we bleven optimistisch wat ons een goede moed heeft gehouden.

Els:

When there are two possible things to do, it's better to try out both rather than spend the time trying to convince each other why one is better than the other.

It is okay for different team members to "chase different leads"/work on different things. These can be combined/brought together.

Different design processes can compliment rather than contradict each other.

Beware of endless discussions. Just trying out/ creating things, or appointing one person with the authority to make the final decisions in a specific area, can help to not get stuck.

It is difficult to feel engaged with the project when you don't feel a close connection to the subject matter. It helps to either find a personal interest in a part of it, or to make it fun together, so that the whole team feels more engaged. I.e. by doing things instead of discussing, or by making sure to include activities into the process that the team members enjoy and are good at, and not just boring meetings.

7.3 Ethical Review Form Education

See next page:

Ethical Review Form Education

(Version 17.07.2020)

This Ethical Review Form should be completed for every research study that involves human participants or personally identifiable data. The form should be submitted and approved by your supervisor before potential participants are approached to take part in the research study.

Part 1: General Study Information

1	Student name and email	Titus Blekemolen t.q.blekemolen@student.tue.nl Simone Janssen s.j.d.janssen@student.tue.nl Lucas Licht Pradillo l.g.w.licht.pradillo@student.tue.nl Els van Raaij e.v.raaij@student.tue.nl Minck van Tuijl m.v.tuijl@student.tue.nl
s	Supervisor name and email	Joep Frens j.w.frens@tue.nl
3	Degree Program	Industrial Design
4	Bachelor/master	Pre-master
5	Bachelor/master end project?	no
6	Course name and code	DFP003 New Futures – Connectivity in the Home with Energy, Systems and Sound
7	Project title	Excitable
8	Research location	Atlas 8.304
9	Research period (start/end date)	01-06-2022
10	[If Applicable] Proposal already approved by (external) Ethical Review Board: Add name, date of approval, and contact details of the ERB	Not applicable
11	Research question	To what level people understand the message communicated by our design prototype and why?
12	Description of the research method	Participants take part in a user test with a physical prototype and afterwards they answer questions in a semi-structured interview.
13	Description of the research population, in- and exclusion criteria	Anyone can participate
14	Number of participants	4
15	Explain why the research is socially important.	This research is important to validate the effectivity of communication by a multimodal interface in a dinner table. The dinner table communicates to the user its excitedness about the different types of food presented on the table.
16	Describe the way participants will be recruited	Through the personal networks of the researchers
17	Provide a brief statement of the risks you expect for the participants or others involved in the research and explain. Take into consideration any personal data you may gather and privacy issues.	The data will be removed 4 weeks after collection. No privacy sensitive questions will be asked.

Ethical Review Form

	Part 2: Checklist for Minimal Risk	Yes	No
1	Does the study have a medical scientific research question or claim (see definition below) *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 analysing 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 yes or maybe: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 2
2	Does the study involve human material (such as surgery waste material derived from non-commercial organizations such as hospitals)?	☐	☒
		If yes or maybe: This is only allowed if your supervisor has consulted with the medical coordinator. Continue with question 3	If no: Continue with question 3
3	Will the participants give their explicit 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?	☒	☐
		If yes: Continue with question 4	If no: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval
4	Will the study involve discussion or collection of personal data? (e.g. name, address, phone number, email address, IP address, BSN number, location data) or will the study collect and store videos, pictures, or other identifiable data of human subjects?	☐	☒
		If yes: The handling, storing and de-identification of the personal data should be discussed with your supervisor. Continue with question 5 if you met all requirements for handling personal data (see …)	If no: Continue with question 5

Ethical Review Form

		Yes	No
5	Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g. children, people with learning difficulties, patients, people receiving counselling, people living in care or nursing homes, people recruited through self-help groups)?	☐	☒
		If yes: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 6
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, or anxiety)	☐	☒
		If yes: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 7
7	Will the participants receive any compensation for their participation? Such as a coupon or a chance to win a prize?	☐	☒
		If yes: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 8 or 10, depending on the type of study (see red text below)
The following questions 8-9 are for *observational* research (e.g. (semi-)structured interviews; focus groups; (participatory) observations). If your research is *experimental*, then skip questions 8-9 and continue with question 10			
8	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)?	☐	☒
		If yes: This is only allowed when observing behavior in public space. If so, continue with question 9. If you observe people in non-public space without their consent, your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 9
9	Will participants be asked to discuss or report sexual experiences, religion, alcohol or drug use, or suicidal thoughts, or other topics that are highly personal or intimate?	☐	☒
		If yes: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with part 3

Ethical Review Form

The following questions 10-13 are for *experimental* research (e.g. measurements on yourself or another person; testing a prototype/device; influencing behavior through manipulation (e.g. light or temperature). If your research is *observational*, then skip questions 10-13 and continue with part 3			
		Yes	**No**
10	Is the study invasive (i.e. it affects the body such as puncturing the skin; taking blood or other body material (such as DNA) from the participant)?	☐	☒
		If yes: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 11
11	Does the device have a medical purpose sucs as diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease or injury?	☐	☒
		If yes or maybe: Your supervisor should submit the study to the ERB. You cannot get automatic ethical approval	If no: Continue with question 12
12	Will the experiment involve the use of physical devices that are 'CE' certified for unintended use (meaning you will use existing CE certified devices for other things than they were originally intended for?	☐	☒
		If yes: This is only allowed if they are completely harmless. They should have a harmless voltage of <5V and hazardous waste (fumes/gas/substances) should not be released. You should discuss with your supervisor whether you need to have the device tested for safety	If no: Continue with question 13
13	Will the experiment involve the use of physical devices that are not 'CE' certified?	☐	☒
		If yes: This is only allowed if they are completely harmless. They should have a harmless voltage of <5V and hazardous waste (fumes/gas/substances) should not be released. You should discuss with your supervisor whether you need to have the device tested for safety	If no: Continue with part 3

Ethical Review Form

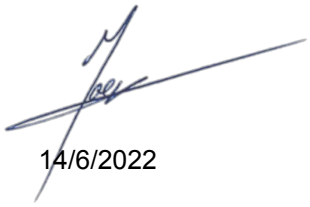
Part 3: Enclosures and Signature		
1	Enclosures (tick if applicable): ☒ Informed consent form (link to template); ☒ The survey the participants need to complete, or a description of other measurements (such as interview questions or a description of the prototype); ☐ Text used to find participants (such as brochures, flyers, etc); ☐ Approval other research ethics committee;	
2	I hereby declare that I have completed this form truthfully Signature(s) of the student(s) Date	 14-06-2022

Discuss this form with your supervisor. If any of the boxes your ticked in Part 2 suggest that your supervisor should submit your study to the ERB for ethical approval, try to change your research design in such a way that your supervisor can approve it instead. If this is not possible, ask your supervisor to submit the proposal to the ERB. It will take two to five weeks before you receive a decision from the ERB.

Part 4: Review by supervisor			
		Yes	**No**
1	Does the data storage adhere to all requirements of responsible data management (link toevoegen)?	☒	☐
		If yes: Continue with question 2	If no: Discuss with your student the necessary steps to adhere to the requirements
2	Does the research proposal adhere to all requirements for automatic approval?	☒	☐
		If yes: Please skip the questions 3-6 and sign the form	If no: Discuss with your student if any alterations can be made in order to adhere to the requirements for automatic approval. If you decide that the study cannot adhere to the requirements, then you as a supervisor need to submit the proposal to the ERB. Please answer the following additional questions (3-6)

Ethical Review Form

Additional questions for ERB approval		
3	Elaborate on the topics from part 2 that do not allow for automatic approval. Describe how you safeguard any potential risk for the research participant for each topic.	Not applicable
4	Describe and justify the number of participants you need for this research, taking into account the risks and benefits	Not applicable
5	Explain if your data are completely anonymous, or whether they will be de-identified (pseudonymized or anonymized) and if so, explain how	Completely anonymous
6	Who will have access to the data?	The research team that consists of five students. Names and email addresses mentioned in section general study information.

Part 5: Signature by supervisor		
	I hereby declare that I have completed this form truthfully Signature of the supervisor Date	 14/6/2022

Participant's ID:

Technische Universiteit Eindhoven University of Technology

Informed consent form

This document gives you information about the "**Excitable**" study. This study has been designed by a group of pre-master students at the department of Industrial Design at Eindhoven University of Technology. This study is also being carried out by this group of students. Before the study begins, it is important that you learn about the procedure followed in this study and that you give your informed consent for voluntary participation. Please read this document carefully.

Aim and benefit of the study

The aim of this study is to find out how visuals and movement on the surface of a dinner table are perceived by a user.

Procedure

The study lasts for 30 minutes.

Procedure: 1)we will let you test a prototype.
2)we will let you answer questions in a short interview.

Notice: data is collected by recording the interview.

Risks

The study does not involve any risks or detrimental side effects.

Duration

The data collection will be stored for 4 weeks.

Voluntary

Your participation is completely voluntary. You can refuse to participate without giving any reasons and you can stop your participation at any time during the study. You can also withdraw your permission to use your data up to 24 hours after the study is finished. All this will have no negative consequences whatsoever.

Confidentiality

For your information, this study involves data recording. Only the research team will be able to view your data and they will be used only for scientific analysis. All video recordings will be deleted after analysis.

The information that we collect from this study also is used for writing scientific publications and will only be reported at group level. It will be completely anonymous and it cannot be traced back to you. Neither your name nor any other identifying information

Participant's paraph ____

will be used in presentations or in written products resulting from the study without your written consent.

Further information

If you want more information about this study, please contact Simone Janssen.
(Contact email: s.j.d.janssen@student.tue.nl).

Certificate of Consent

I, **(NAME)……** have read and understood this consent form and have been given the opportunity to ask questions.

I have the following responsibilities: perform experimental tasks, participate in the group interview, and answer the questionnaire to the best of my ability.

Participant's Signature	Date

Description of measurements User test 01-06-2022

1. Product reaction cards

Annoying	Appealing	Approachable
Boring	Busy	Calm
Collaborative	Complex	Confusing
Connected	Cutting edge	Dated
Difficult	Disruptive	Distracting
Dull	Easy to use	Effective

Empowering	Entertaining	Exciting
unfamiliar	Fast	Flexible

Frustrating	Gets in the way	Hard to use
Impersonal	Inconsistent	Ineffective
Innovative	Integrated	Motivating
Not valuable	Ordinary	Time-consuming

Overwhelming	Personal	Powerful
Predictable	Responsive	Slow
Stimulating	Stressful	Time-saving
Usable	Useful	Valuable

2. Interview questions:

    1. Did you feel like the table "influenced" your eating experience?
    2. How did you experience the table's visuals and movements? (Make sure to only move on to the next question once both the visuals an movement has been discussed)
    3. Did the table make you feel a certain way? How?
    4. Did you realize the table was trying to communicate with you?
        a. If yes: How strong/clear was the communication?
        b. If yes: How did you interpret the communication?
    5. Now that you know the table was trying to communicate:
        a. What do you think it was trying to communicate about the different dishes?
        b. Was the communication stronger from the visuals or from the movement, or were they equally as strong?
    6. The purpose of the table is to excite you about your food and to motivate you to try new food. Knowing this now, is there anything that you would change?

3. Picture of the test seup: