

Kompassie: an artefact that simulates the approachable nature of communication between high school students during conventional recess in isolation

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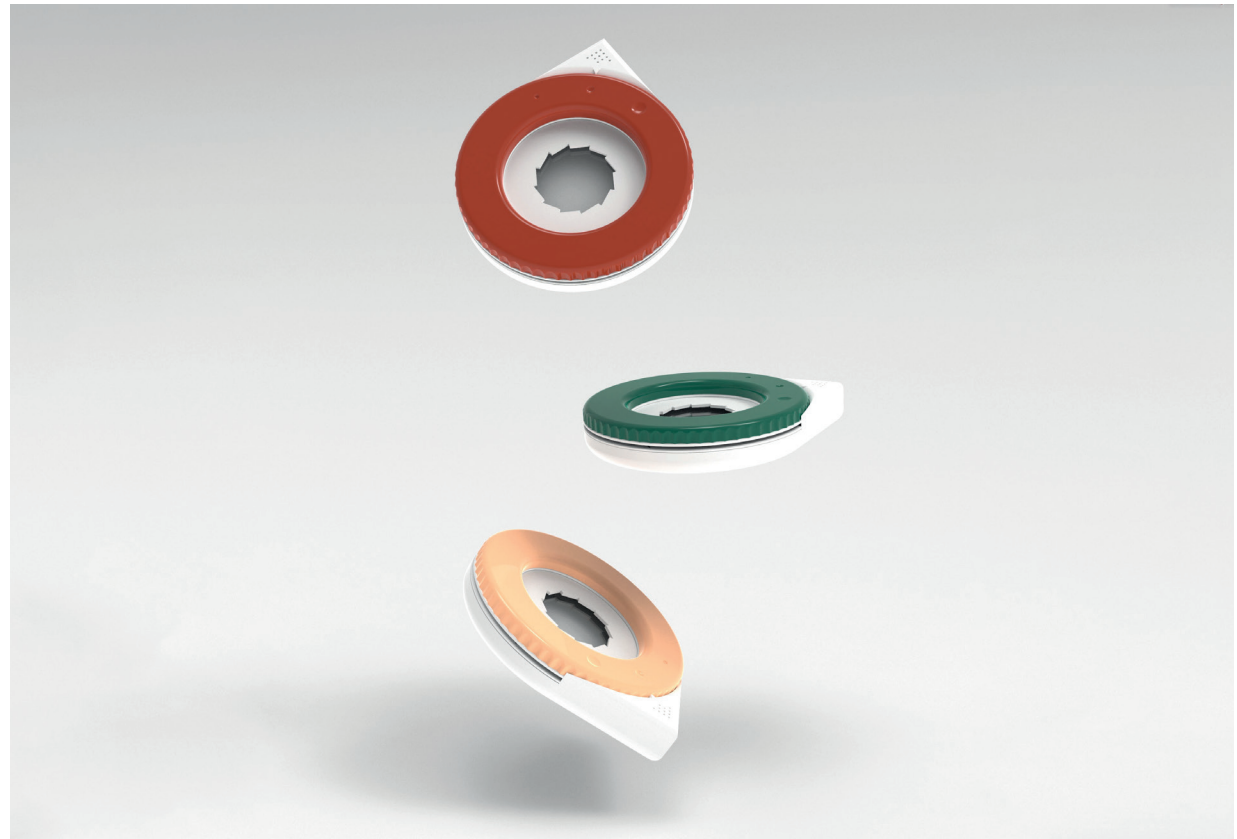
Abstract

With the current isolation period due to the COVID-19 pandemic, high school students are forced to work from home. While current remote communication tools are well designed for small groups of 4-5 people, they tend to be less effective and meaningful for larger social groups. The act of formally initiating the communication by calling can also act as a barrier and reduce the number of interactions. In real life, one could simply approach people and initiate a conversation. Kompassie tackles this challenge by shifting from being call based, to location based. Participants enter a virtual room through which they navigate by physically walking with Kompassie.

This study researches whether a product that simulates the approachable nature of communication between high school students during conventional recess influences their social interaction during isolation. The research has shown promising results and show that students in isolation could have a benefit from having a communication tool such as Kompassie.

Keywords

Social inclusion; High school students; Recess; Remote communication;



Kompassie: Bringing those closer who are far away

INTRODUCTION

In the Netherlands children are to go to school under the age of eighteen [13]. From the age of eleven until eighteen, most children attend public or private high schools that have an average of 670 students per school [10]. It is safe to assume that school becomes as much a place for social interaction, as a place for education to high school students. This is especially the case during recess – which students are on average given 45 minutes a day – and most often takes place in a designated hall or cafeteria.

While recess serves as a great time for groups of students to come together and socialize, it is also a place where students who lack social contact from others – for whichever reason – are confronted by their loneliness. Loneliness is a very stressful experience that can hinder the student’s social development and affect their physical and mental health [7] [20].

Children who study from home, either because of an illness, living remotely or in a travelling household, or recently because of nationwide CoViD-19 measures [14], lack this experience of having recess with their classmates.

The results of our first user study (Appendix D2) showed that for high school students who are in isolation, and thus do not have recess with their classmates, this means that during recess they might only have direct contact with friends they feel comfortable calling or texting directly, whereas they would have contact with a lot more students either via other friends or by coincidentally running into them.

Current communication channels lack a way for users to freely move between people and conversations. Especially in a large group (more than 20 for example), people can now only have one conversation and not quietly say something to only a part of the group.

In this project we design an artefact with an “Approachable nature of communication” (see related work) in order to stimulate social interaction in isolation. Therefore in this paper, we answer the following question:

How does an artifact that simulates the approachable nature of communication between high school students during conventional recess affect the social interaction during isolation?

To achieve this, we have designed an artefact with which you can easily switch between people and conversations. Several prototypes have been developed and tested throughout an iterative process, to generate new knowledge which can be used for further research. Our contribution in this paper is showing the effect of an artefact simulating the approachable nature of communication on the social interaction between high school students.

RELATED WORK AND BENCHMARK

It is becoming increasingly easy for people to communicate with each other remotely. Obvious examples like the telephone and text messages allow for fast, convenient one-on-one communication between two people, no matter the distance between them.

With the rise of the internet, remote communication only became faster and richer with the incorporation of video- and mass-communication. Web applications like Skype [9], WhatsApp [21] and Discord [1] enable more than two people to participate in a single video call, where they can see and hear each participant simultaneously. Speaking from personal experience, these mediums only really support communication for at most five people simultaneously before feeling overcrowded causing an experiencing decreasing quality as more join. When using Skype and WhatsApp, users have to call other users to communicate. The act of calling poses a barrier to communication which communication in a physical space does not have. This act of calling someone may prohibit students from talking to peers, who they would otherwise have no problem approaching in a physical space.

Discord [1] distinguishes itself by being 'channel-based' instead of 'call-based'. Here, users can see who is in a 'channel' and freely join and start communicating immediately. This is in a way more similar to face-to-face communication, where people can look around to see who is present and immediately walk up to someone and start talking, without the need to call them first.

Online communication tools that can facilitate live communication between thousands of people like Twitch [18] - a website where people can livestream video and audio content next to which viewers can participate in a live chat - do not solve the problem of overcrowded communication since it can be seen as communication between only the viewers and the streamer, since communication between viewers is limited to an - often crowded - auto-scrolling chatbox.

To improve remote communication, some designers made exploratory prototypes and research artefacts which include a variety of richer or subtler forms of communication like body language and touch.

One example of an enriched remote communication experience is ShareTable [22]. By combining a video call between two people with a shared table top task

space, it enables users to simultaneously see each other's table top. It can be used to for example draw together, play board games together or anything else that you could normally do when sharing a table. The limitation of this product lies in the fact that it only facilitates communication between at most two people who both have a ShareTable, which is about the size of a cupboard.

The Gustbowl [5], a bowl shaped product, is similar to the Sharetable in the sense that it also facilitates communication between two people with a product that is always visible present in the user's home. The Gustbowl does not facilitate video or audio communication however, but only a projection of the content of the other's Gustbowl, similar to the shared table top task space. It also has the same limitations as the ShareTable.

Most often though, these products only facilitate one-on-one communication between two people, and do not tackle a way of communicating with three or more people. The BuddyWall [11] is a product that tries to do this, by representing friends as large plastic entities that light up according to the friend's availability to communicate. Still the BuddyWall only promotes one-on-one communication by not providing means for a group of people to communicate as a whole.

All of these products, since they're physical products, have the advantage of always being present in the user's home environment. This means that the user, is always reminded of its existence, and incidentally of its social contacts' presence, in contrary to online communication media, for which users need to be active on a digital product (like a laptop or smartphone) beforehand.

Something that all of the aforementioned digital and physical products lack, is a way for users to freely move between people and conversations. In a physical space filled with a large amount of people (more than 20 for example), people are for example able to participate in a large group conversation, while also being able to quietly say something to the person next to them as well. After doing so - since by being able to look around they are always aware of who is around them - they might leave the conversation to discreetly join a conversation between three people across the room, of which they only know two. Since all these interactions do not involve calling someone, making a group chat or waiting for someone to reply, communication in this way is a lot more approachable. In the end, this could allow

people to communicate with more people and for longer.

A product that does replicate this ability to freely move around - while providing communication that embraces this ability - is Habbo[16]. Habbo is an online social networking service where users can create a virtual avatar to enter virtual online rooms where users can see each other's avatars and chat. The rooms, which are decorated to resemble a real space, contain tiles on which the avatars can stand. This means that avatars can stand near or far away from each other. When chatting, users send text messages that appear above the avatar's head and move up over time. This means that in a room with hundreds of people, users can still communicate clearly in small groups by standing close to each other and only focussing on their own text messages (which is easily done since the text messages appear above the avatar's head), while still being able to look around and see other groups of people communicating with each other. To illustrate how different communication tools compare in their approachable nature of communication, a matrix is plotted (figure 1) with with approachability on the y-axis and tangibility on the other.

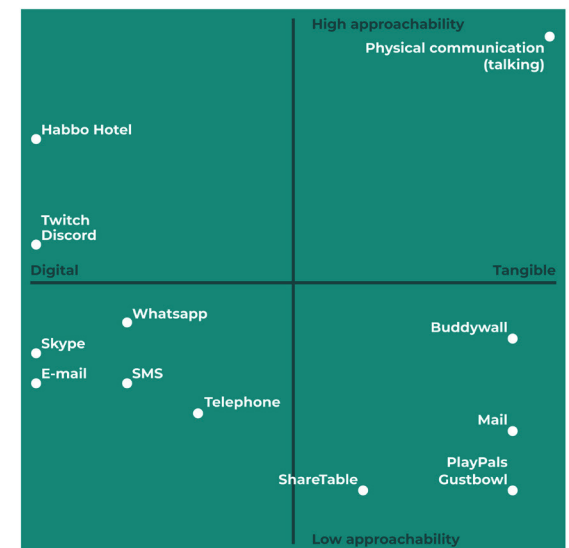


Figure 1: Benchmarking

The six parameters are:

1. How easy it is to initiate communication.
2. Whether you can initiate communication without knowing anything about the other person (e.g. a phone number).
3. Whether a reaction is needed from the other person (e.g. picking up the phone) before you can communicate.
4. How easy it is to switch communicating between people.
5. With how many people you can communicate at the same time.
6. The kind of communication the product facilitates (e.g. audio, video, gestures, chat etc.).

The answers to the parameters for each communication tool can be seen in Appendix A1.

DESIGN PROCESS

Gathering literature

To better understand our project theme and to see what has already been done we read literature. We gathered literature about social inclusion, empathy, and working with teenagers. We also gathered design research studies about rituals, play, remote communication, collaborative interaction in addition to the aforementioned themes.

Getting to know our user

The aim of our first user study was getting to know our target group and establish an understanding of their values and priorities with a special focus on recess. This study was conducted in a classroom with 5 participants between thirteen and fourteen years of age that were in the same class. Four were male and one female. All participants were students at the Luzac college Eindhoven, a private high school. (Appendix B1) The study consisted of three parts:

1. Open card sorting (figure 4) [15] with the whole class

Having food during recess and being able to go outside are very important for the participants based on the card sorting. The card sorting shows that next to the standard benches, a large tribune shaped object is a popular meeting spot for the students. Where a table with 5 chairs for instance does not facilitate space for more than 5 people and is thus not dynamic, the shape of the tribune might allow for more social interactions and flexibility as there is a lot more room for students

to sit. Participants expressed enough space for everyone during recess is really important.

2. Social mapping (figure 5) [6] individually

At the beginning it was made clear that we were interested in their social environment within Luzac college. These social maps help us to understand the environment we are designing for, making it easier for us to design a product or service for social interaction.

The participants grouped all the students they frequently speak at their high school. While grouping, the researcher asked how they got to know these people or where they know them from. From these questions we found that Luzac high school students usually meet people during class or on the tribune while having recess. Friendships did expand outside high school sometimes, gaming together for instance. Some students also expressed they do not see their classmates necessarily as friends and sit with people from another class in the break. In general, the amount of students they talk to at school was quite small, around five peers. This is also due to the fact that Luzac has small class sizes or around five to fifteen.

3. Design exercise individually

We gave four of the five students the task of designing something which could improve their recess. They mostly thought of convenience products; a bicycle cover, bag hooks, food tables and a supermarket. These things solve a small but recurring problem that in itself does not have any consequences. When asked why a certain student would want to add a petting zoo to the school yard, they mentioned liking the interaction with animals during recess.

To make an image of the typical Luzac high school student we created a persona (Appendix G3) based on the insights from the first user study. This to help us to understand users' needs, experiences, behaviours and goals.

How can we translate this into a design?

With the knowledge of the benchmarking and the user it was important to start generating ideas. The 100 sketches challenge (figure 3) was done to come up with a lot of ideas and concepts (Appendix G1). These were generated through our own experiences and inspiration and insights gained from papers we had collected and read beforehand.

From these papers, the hundred sketches and the first user study, a first concept was created. This concept was a bench that can seat up to five people. This bench, which has lights, could encourage people to sit next to each other. Say the middle seat lights up and someone sits on it. The two seats next to them would light up as well. This invites people to sit next to this person in the middle, instead of sitting farther away from them. This concept also has a lot of different action possibilities, for example when all five seats are occupied a game might start inviting the five people to work together and engage with each other to encourage socializing.

We already started to work out this concept by making a first prototype to show on midterm demo day. After this the prototype was meant to be used as a base to further develop the concept, and eventually conduct research with at Luzac in order to see how the students would respond to this bench being placed in their recess space. And if their behaviour during recess might change because of it.



Figure 2: The wood for the bench concept

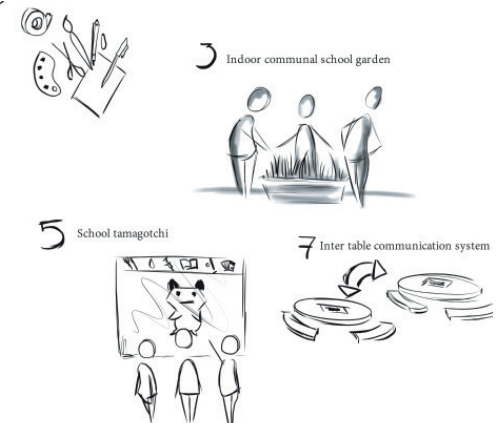


Figure 3: A few sketches made for the 100 sketches challenge

CARD SORTING EXERCISE

Five high school students aged 13-14

10/03/20

Answers ordered by themes, themes ranked by relevance

WHAT WOULD BE THE IDEAL RECESS FOR YOU?

Food	Time	Outside	Space	Calm	Social	Not social
Food Healthy food Free food A lot of cheap food Albert Heijn	Short break, 30 min 45 min Long break, 45 min	The option to go outside Go outside	A lot of space	Calm at the canteen	Talking to others	On your phone

WHAT WOULD BE YOUR IDEAL RECESS SPOT?

Outside	Benches	Food
Outside spot Park Courtyard A lot of space Outside on benches	Comfortable A lot of benches Benches In the canteen at the tribune or on benches with tables A lot of tables Long benches	Microwave Cozy Store/restaurant

WHAT WOULD BE YOUR WORST RECESS EVER?

Food	Weather	Chairs & Tables	Noise	Herres
No food No drinks No food left Too little food	Short No courtyard Hall/rain	Very busy/no seating spots Chairs and tables No tribune	A lot of noise	Unkind people around me Dispute

Figure 4: Open card sorting results

SOCIAL MAPPING EXERCISE

Three high school students aged 13-14

10/03/20

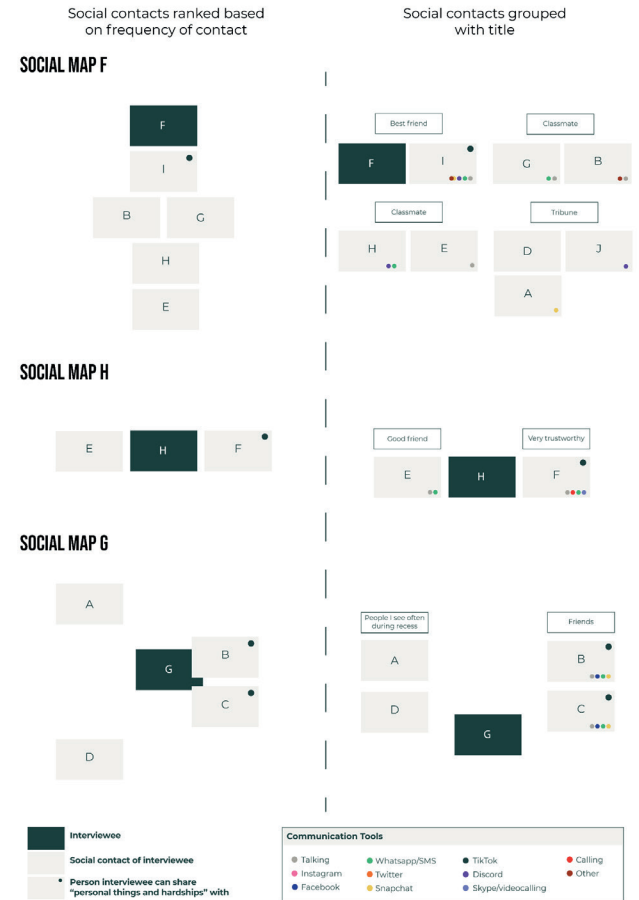


Figure 5: Social Mapping results

Shift

However, during this project the COVID-19 pandemic struck and social distancing measures meant that high school students do not have shared breaks anymore. Students get online classes and have recess in isolation. Placing a physical artefact into Luzac was not an option anymore, so we shifted our focus.

Our focus was first mainly on social inclusion during recess but since we saw there is almost no social interaction with school peers during recess we decided to focus on how we can bring that social interaction back. The COVID-19 measures brought a different problem statement: students are in isolation and therefore do not have recess with each other. Resulting in that they only have contact with friends they feel comfortable calling or texting directly, while they would normally have a lot more contact with students from school by just walking around at school. We made this assumption based on the experiences of high school students within our own social circle, but this assumption was later confirmed in our baseline survey (Appendix D2). Our new concept aims to facilitate the approachable nature of communication they experience during conventional recess and allow for more spontaneous conversations.

An important aspect to consider when trying to do this is to make sure the threshold for initiating communication is as low as possible, ideally as low as e.g. walking up to a classmate two meters away during recess.

Before further developing our concept, we needed to do benchmark research to understand and gather inspiration from design research papers that attempted to tackle a similar problem: enabling remote communication. There was a wide range of studies with research artefacts that all tackled communication in a variety of ways. The benchmark research can be read in full in the related work. The benchmark research resulted in four main findings:

1. Mainstream communication services hardly replicate the approachable nature of communication we experience when sharing a physical space with others.
2. Design research studies that study new forms of remote communication most often only tackle one-on-one communication.
3. Habbo, an online social networking service, is able to facilitate remote communication with up to 100 people simultaneously by making communication location-

based, instead of call-based.

4. We defined 6 parameters to define the approachable nature of communication of a product by comparing communication via these products with face-to-face communication.

These findings helped us further develop our concept. Since we are interested in facilitating social interaction with multiple people, creating a digital artefact enabled us to conduct research with a large amount of people while abiding to the current COVID-19 measures. However, because of the added value a physical product can have over a digital product - as explained in the related work - we only want to use this digital artefact as a way to gather information that can then be applied to a physical product.

Concept survey

To measure whether the concept Kompassie would simulate the approachable nature of communication and if it has the right functionalities and appearance we created a concept survey (methodology in Appendix C1). We used the mid-term video (Appendix F) and the storyboard to illustrate the concept Kompassie and asked questions afterwards. The methodology can be read in Appendix B2. The results of this survey (Appendix D1) are used to assess our design concept and see if it actually adds the value we think it will add. This survey is mostly used to improve Kompassie and see which aspects need to be reconsidered. Our main findings from this survey:

Since a lot of people misunderstood that you could use Kompassie with random people. 14 respondents expressed they would find it awkward to talk to people you do not know through Kompassie. On top of that, question twelve also shows a lot of disagree when it comes to communicating with people you do not know well. This gives a strong base for us why having rooms is so important in order for Kompassie to work. Two quotes about if Kompassie would be to randomly meet new people:

"I think it will be weird/awkward to talk to people i dont or barely know through such a device" Participant 31

"Joining a conversation may seem easier but if you don't know who is there it may be a little hard for introverted people. The same goes for communicating with people you don't know." Participant 32

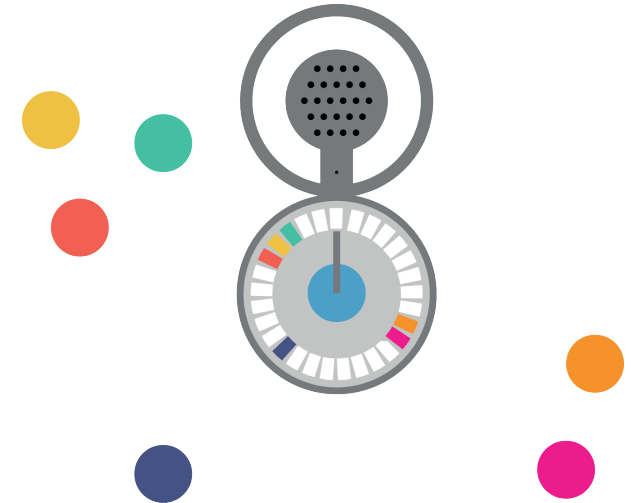


Figure 6: First visualization of the Kompassie concept

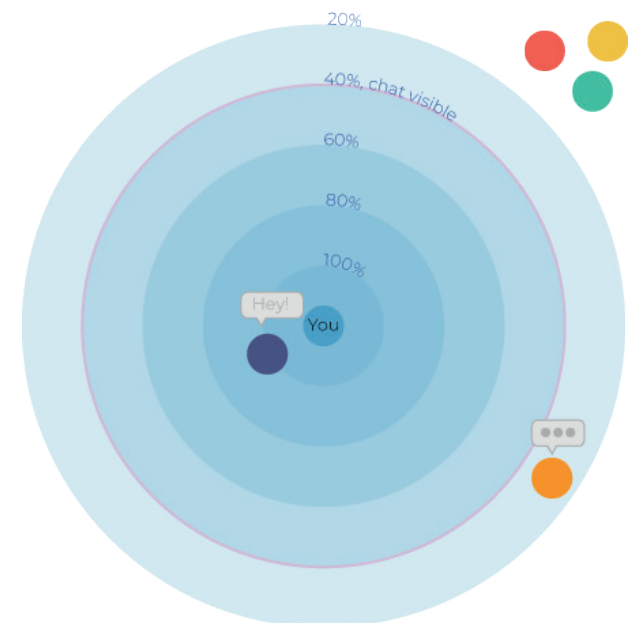


Figure 7: First visualization of spatial dependent voice chat

The response to the approachable nature of communication likert scales is slightly positive (figure 8). However, the respondents are still a bit skeptical if it would be easy to switch between people and conversations and have meaningful social interactions with. Also communicating with people you don't know well scores a bit lower.

When comparing Kompassie with video calling participants expressed Kompassie feels less personal since you cannot see the faces of who you are talking to. When comparing Kompassie to chatting, Kompassie felt more personal and interactive.

"i would like for Kompassie to also have video option, as I prefer talking to people when I see them as body language is also a big part of communication. Also close friend mode doesn't seem very useful to me as i already communicate to them in different ways" Participant 12

We decided to leave out "close friend mode" and focussed on making the Kompassie interface as clear as possible so people would not be afraid to start talking.

The digital artefact

The digital artefact we developed consists of a virtual space where users - represented by an avatar in the shape of a circle with their name on it - can move around with the arrow keys on a pc or laptop. They can see the avatars of other online users and where they move as well. The platform facilitates communication via audio by allowing users to hear each other depending on the distance from each other. The smaller the distance, the louder they hear each other and vice-versa. Ideally, there is no limit to the amount of people that can enter the virtual space.

We focussed on first making a digital research vehicle since this would allow us to perform research on students from home. Our new concept is an online platform with spatial dependent voice chat that imitates the approachable nature of communication.

Our first digital prototype was made using Processing (figure 9, code in Appendix E1). It allowed us to get a quick impression of how location-based communication platform could be experienced. The prototype used

audio-recordings of speeches of political figures as a placeholder for a real conversation. The user can move a circle in the prototype by moving their mouse. The distance between this circle and other circles on screen would influence the volume of the speech. Each circle correlated to one speech. The circles would adjust its radius according to the distance where a larger distance correlates to a smaller radius.

Since the digital artefact contains features that resemble those present in a lot of video games, we started developing our artefact in Unity. Unity is a C++ and C# based game development platform. A big advantage of Unity is the available documentation online. This allowed us to develop what we wanted and bypassing an otherwise very steep learning curve. The artefact is divided into three "scenes". In the first, the user can enter their name, log in and join the virtual room. The second scene is the virtual room, where users can see each others avatars and communicate via voice chat. The avatars display the name that the users entered in the first scene. When they leave the second scene, they enter the third scene where the user is to respond to a

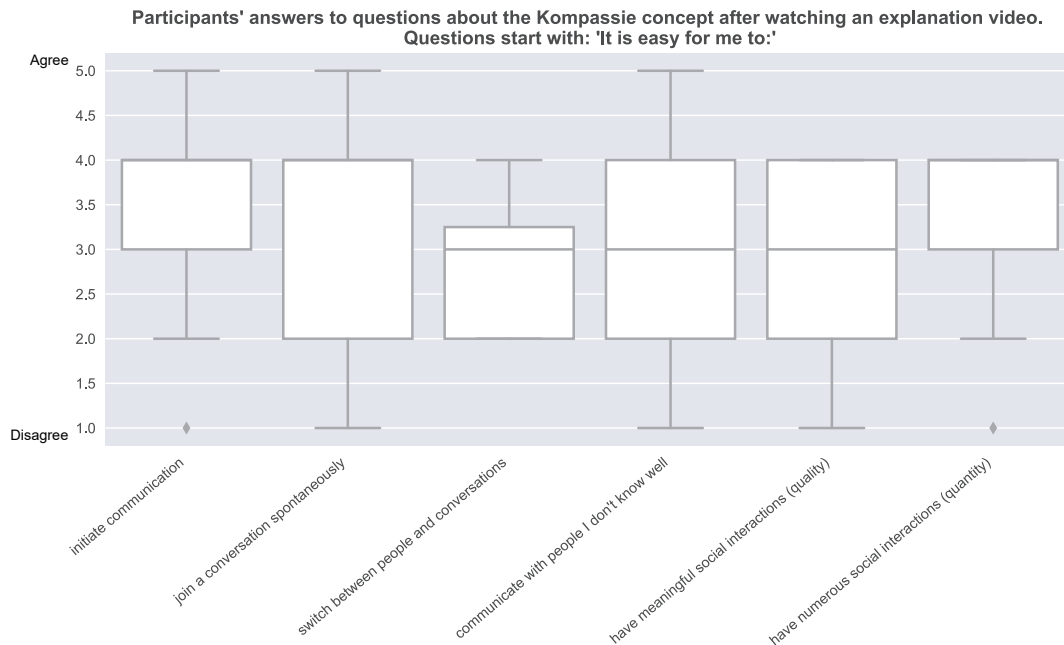


Figure 8: Answers to the approachable nature of communication Likert scales made in Python

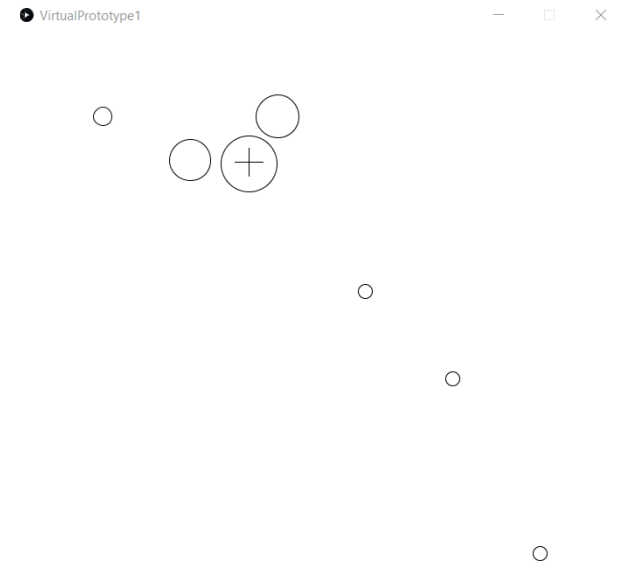


Figure 9: Virtual prototype in Processing

survey embedded in the platform about their experience (Appendix G5). This survey is part of our research. Their responses are sent to an Excel spreadsheet. After doing so, the platform closes itself. The first two scenes are made with the help of two “assets” (additions to Unity published by third party developers. These are Photon Unity Networking 2, and Photon Voice. These allowed us to include multiplayer and voice chat to our artefact.

Since we want to record the locations of the users in the platform during recess, the first person to enter the room is made spectator. This means they will not have an avatar nor hear the other users, but they will be able to see the room and everyone’s avatar in it. This allows us to record the users’ locations by making a screen recording while in spectator mode. Because the asset only allows for 20 consecutive users at once, and the spectator takes up one of those spaces, a maximum of 19 students can partake in the research at once.

Writing code in C# is also a part of developing in Unity. For the first scene, we used code from the Photon Unity Network 2 asset demos and altered it to our specific needs. The code written for the second and third scene is written largely by us ourselves. It was a first time for all of us to work with Unity and with coding in C# (the programming language of Unity projects), which resulted in us having to learn how to work in Unity and develop the platform simultaneously. This resulted in it taking a bit more time than expected. Since Unity can be used for vastly different projects and gives access to thousand of different assets, it was relatively difficult for us to ask effective questions about our development to coaches with more experience in this field. Luckily Unity is supported by a large online community providing needed documentation and tutorials, helping us greatly in our proces.

While working on the platform we made an analysis of every event that happens during conventional high school recess. We followed the paper by Hassenzahl [4] in order to design from an (high school) experience. Full analysis can be read in Appendix A3. By writing an autobiographical story about a high school recess based on personal experience, we constructed a pattern. This pattern can then be used to transfer the experience into a context and design a novel experience based on the knowledge about feelings and events during a high school break captured by the pattern. The most important thing that came from this is that in a conventional recess you have reference points in space

and you value your own spot. At first the background of our virtual platform was just one solid color. Now we changed it to abstract shapes so users have a reference point.

How are we going to research this new concept?

We slightly redefined our research question to: how does an artefact that simulates the approachable nature of communication between high school students during conventional recess affect the social interaction during isolation? Mostly because freedom of communication was often associated with (political) censorship which is not what we intended. In this research question we see an artefact as a solution that is continuously evaluated against a set of criteria [3] and can, trough successive iterations adapt and evolve through implementations and evaluations. Our research question compares A to B; A Social interaction during isolation without intervention B Social interaction during isolation with intervention Further elaboration on how our research question is defined can be read in Appendix A2.

Pilot test

As soon as we finished developing the research methodology, we did a small pilot test by inviting a group of friends to run the platform on their laptop and chat with each other for an evening. We did this two times with at most eight people simultaneously online (figure 10). Since we were all new to the platform, the first few minutes were spent moving around the avatar for no other reason than to see how the platform works. But afterwards, we were positively surprised by how the interactions met our expectations. At first, we were all close together, hearing everyone simultaneously. But soon after, groups of two split off to have a private conversation, then rejoined, then another three split off, dividing the group into two, then the group of three later became a group of four, than two again etc. All in all, the platform facilitated a communication pattern more closely resembling a face-to-face conversation, far from conventional online communication tools. The participants also responded to the second survey. They responded mostly positive on the questions regarding the approachable nature of communication, but when asked about the overall experience, some users did mention the lack of video as negative, describing it as less intimate or more suitable for casual talking.

While setting up our research and developing our research artefact, we worked on a physical product. The

goal of this product is to illustrate how our research can be used for designing a physical product and how the value of having a physical product instead of a digital product relates to our concept.

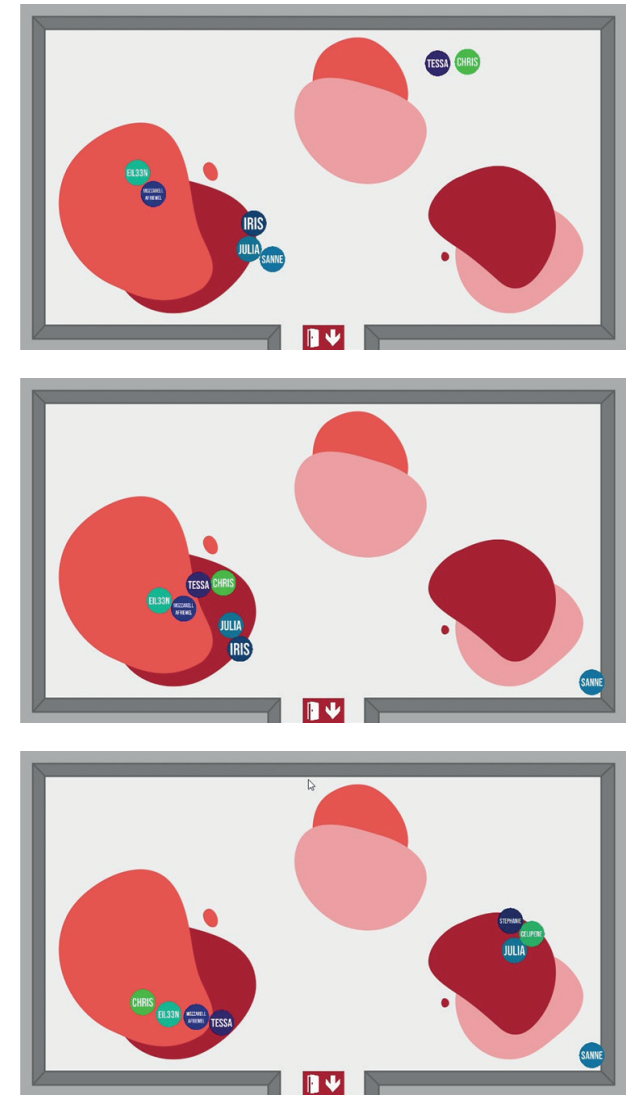


Figure 10: Participants using the virtual prototype in the pilot test

DESIGN PROCESS

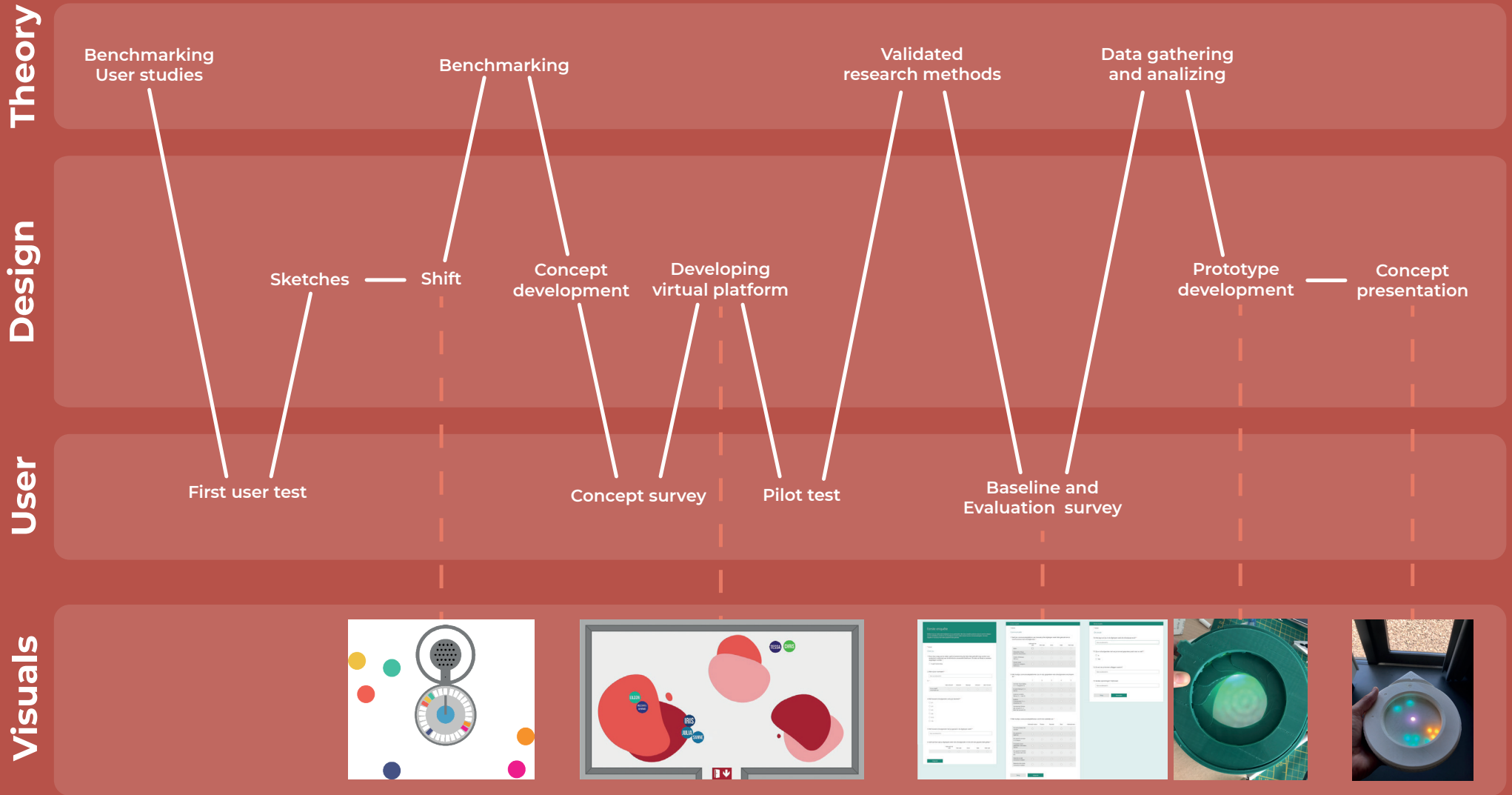


Figure 11: representation of the design process

KOMPASSIE

Kompassie is a tool that allows users to communicate freely with large groups of people with the help of location-based communication. Users of Kompassie enter a virtual room with as many people as they want. They move through this virtual room by physically walking through for example their own bedroom. Doing so they move closer or farther away from their peers. While being always able to see everyone present in the room, they can only hear and be heard by the people closest to them. This prevents the overcrowding and allows the users to choose with who they want to talk, while always being able to approach, or be approached by others without having to end a call.

Since it is a result of research focussing on high school students, the main target audience of this product is high school students, but it could be useful to many different people outside of this target group. It is to be used mainly during recess, for students who cannot be physically present at school during recess, but do not want to miss out on the social interactions with their peers. Our final design exists in two different form factors: a physical handheld device and an app.

Physical handheld device

The physical Kompassie product consists a plastic body, encasing a circular LED matrix, a gyroscope, accelerometer and magnetometer, a speaker, a

microphone, a bluetooth module and a microprocessor. For the product to work, the user connects it with their phone or computer that is connected to the internet. On top of the plastic body is a circular ring that when turned, opens a mechanical iris, uncovering the circular LED matrix underneath. The iris gives a fluent movement, just like how switching between and entering conversations should be.

The LED matrix consists of a centre LED, surrounded by 4 rings, of 8, 12, 16 and 24 LEDs respectively. The centre LED represents the users location in the virtual room. Each other LED represents the location of a different online user. The user can only hear and be heard. The code of arduino can be found in Appendix E2.

The product has three modes; either fully closed, fully open or in between (figure 12).

When the iris is fully closed, the centre LED is still visible to the user. This light functions as a notification light, signalling both when recess starts and ends during school hours, and signalling when people are online outside of school hours. This way, the notification light does not distract its target audience when they are to focus their attention to class.

When the iris is fully opened, the entire LED matrix is visible and the user is able to walk around. By walking, they decide who they want to talk to.

When the iris is opened halfway, the user's physical movement does not impact their location in the virtual room, functioning as a 'lock', where they are able to speak to the same people, while moving around.

The speaker is located in the top corner of the product. The volume of the speaker is controlled by the direction the product is facing. When the corner is pointing up, where the speaker points to the user, the volume is turned up and when it is facing down, away from the user, the volume is turned down. The microphone is located on the bottom edge of the body, where it is closest to the users voice.

The product resembles the needle of a compass, and is held with the point facing forwards. This resemblance reminds the user that the product is used for moving around, switching directions and exploring.

The products round curves give it a streamlined and finished look – while also making it more comfortable to handle – and together with its plastic components, giving it a modern look that blends in with other electronic devices. The colour of the ring – being the main interaction component – starkly contrasts the white body and also allows for some personal expression.

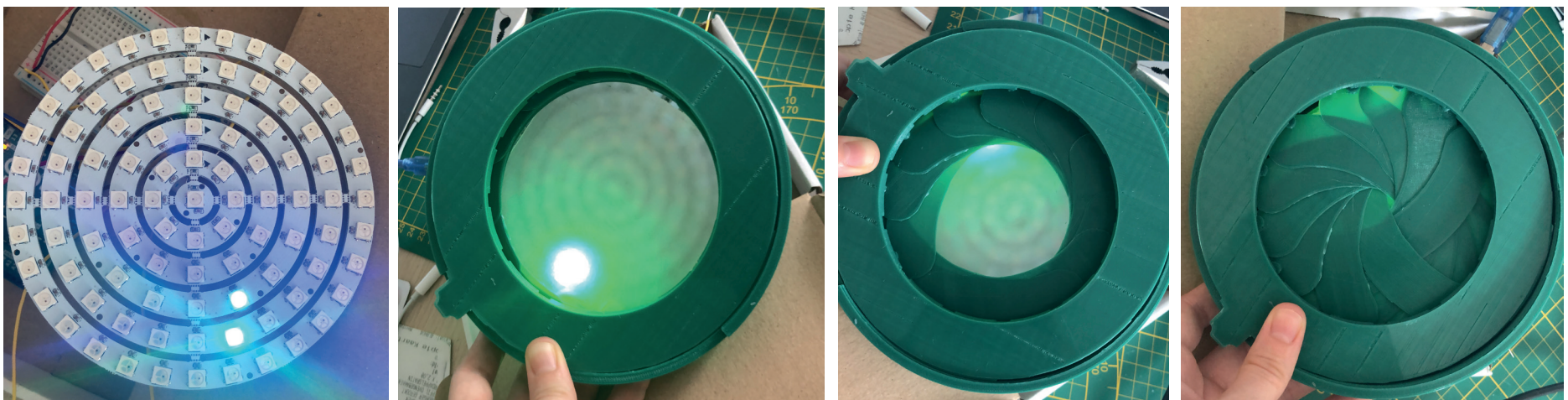


Figure 12: Pictures of the LED matrix and first 3D printed casing with the iris mechanism

The body of the product demonstrator is made with a 3D printer (figure 13, 14). Its 3D model is made using SolidWorks (figure 17). The printed demonstrator did not contain a working mechanical iris, which was included in the final 3D model used for the product renders and video (Appendix F). These renders (figure 18) were made using Keyshot. The current demonstrators functions are: showing the notification light, turning the display according to the products direction and showing an animation of the user moving through the virtual room. This is done using a circular LED matrix, which is powered by an Arduino with a gyroscope, accelerometer and magnetometer (figure 15, 16).



Figure 13: 3D printed Kompassie

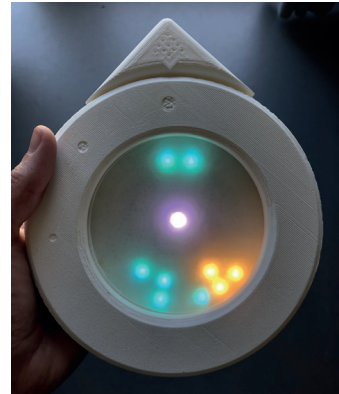


Figure 14: Kompassie with LEDs on

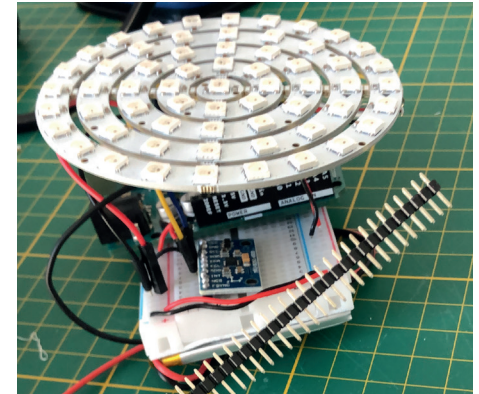


Figure 15: Electronics in Kompassie

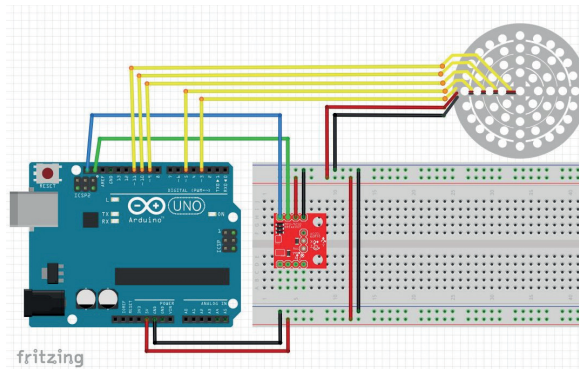


Figure 16: Schematic of circuit

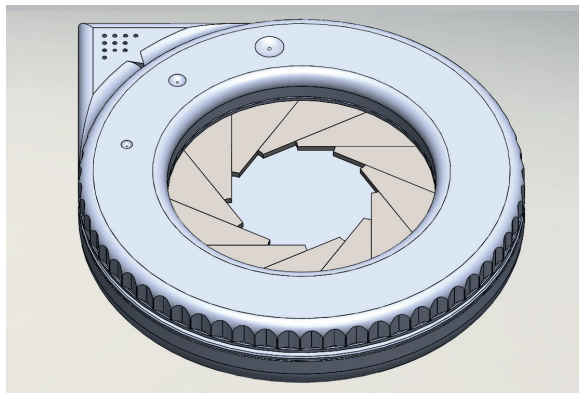


Figure 17: 3D model in SolidWorks



Figure 18: A render of Kompassie

To achieve an approachable nature of communication Kompassie should be easily accessible for everyone. Although we see more value in having a physical artefact, the app gives everyone the opportunity to use Kompassie which is necessary in order for the concept to work. Kompassie is meant for communication with larger groups so if little people use the platform Kompassie will not be a success.

At the homescreen you get an overview of all your rooms and can join a new one by entering the room code. Each classroom or each school can have its own room code for example. Simply select a room and type your name to enter a room. Once in a room you see a compass kind of layout. Seeing a compass affords to start moving, switching directions and exploring the room around you. The people around you move based on your movements and directions. By tapping on the screen you can see the names of all the people around you. Orange circles are your indicated best friends. The rest of the people in the room are green. The more you talk to them the darker the green. This is done to be able to quickly see who is around you without always having to read the names. If you wish to create a new room you enter a room name and get a new room code after that. You can share this code with your friends and they will be able to join. This way you control who has access to a certain room.

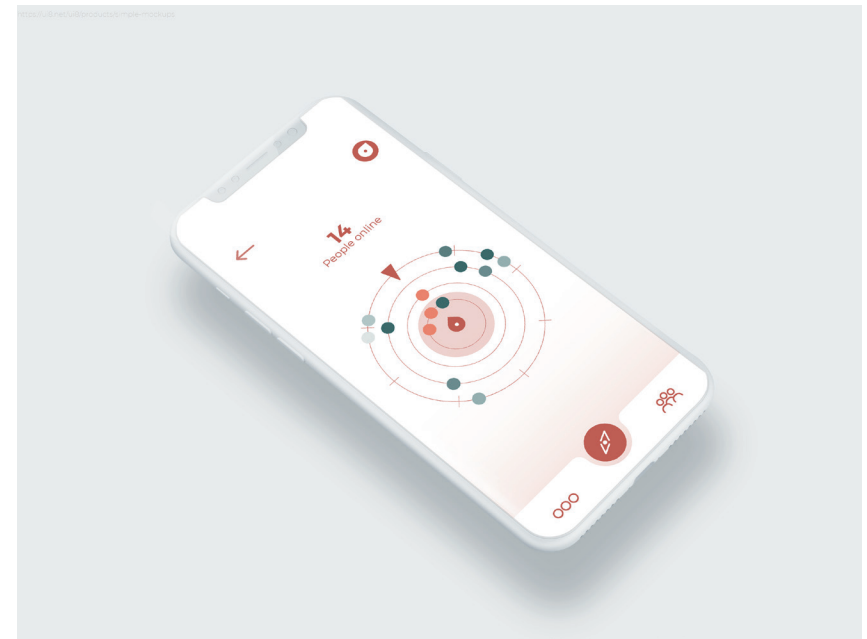


Figure 19: App mock-up

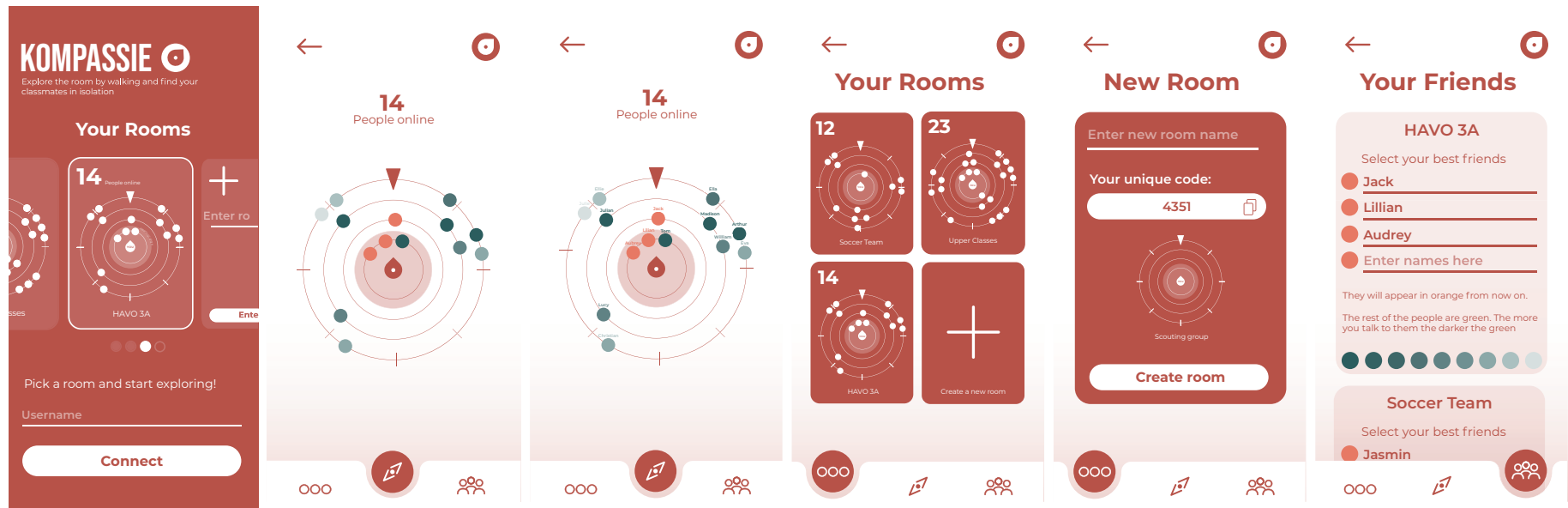


Figure 20: The app screens

VALUE PROPOSITION

Our product gives value by providing students with a new way of communicating remotely that is more suitable for large group communication than conventional remote communication tools. Students feel incentivised to use this product to keep in touch with their classmates. Consequently, the more people - most notably, the more people within the users social circle - use Kompassie, the more value it brings to the user. Thus, it is important that Kompassie is very accessible to reach a large enough amount of users. This, and the fact that students often do not have a large budget to spend, and are comfortable using a smartphone a free Kompassie app is most suitable for this task.

Customers can use our app for free and have up to two rooms. Advertisements can be employed to increase revenue when costs might be too high. It also gives customers a reason to buy a premium version or buy the physical product, in which case advertisements and limitations are removed.

Another type of customer of Kompassie are those who like the service but do not like the app form factor and its limitations. For them, the physical product provides more value.

Though students are seen as the prime consumer of Kompassie, they do not necessarily have to be the buyers of the product. Parents of students could feel incentivised to buy the product for them if they see the added value of their child having more social contacts. A more probable example could also be schools that see this value for their students and buy a large amount of physical products to hand out. Since students then loan the product temporarily, instead of taking ownership, the costs for the students are negated and costs per student for the school is reduced. Kompassie can embrace this by providing schools with a subscription service, providing the school with sufficient units, access to active customer service and replacing broken or dated units.

To make an estimation about the price for which a physical product could be sold, we looked at current products on the market that share a certain resemblance to the Kompassie, scale-wise and functionality-wise. For this, we looked at prices of walkie-talkies on the market

Walkie-talkies are similar to Kompassie in the sense that it is also a tool often used met kids to communicate with

each other over large distances. The main differences regarding hardware is the use of bluetooth connection and gyroscope, accelerometer and magnetometer with Kompassie and radio connection for a walkie-talkie. We assume this difference to be too small to cause Kompassie to be sold at a different price-range. With this in mind, we expect that 40 euros is a reasonable assumption as a price for the physical Kompassie product.

ETHICAL CONSIDERATIONS

We want to change the social interactions dutch highschool students have during recess while at home because of current COVID-19 measures. Our intention is to lower the threshold for highschool students to communicate with each other during recess and make changes to what this social interaction looks like, compared to current mainstream remote communication services. Users could benefit from our design by feeling less isolated from peers and by keeping in contact.

Since users can enter whichever name they want, users can enter names of different people and pose as others.

This could potentially cause defamation to the person being imposterd, in which case a moral norm among users not to enter other people's names might arise.

Bullying is an aspect of high school students' social environment that is important to mention for our product. Kompassie does not limit users in their ability to bully others verbally. It does give an opportunity for those bullied to distance themselves from it by turning off the device. Since they might miss out on social interaction with their friends, a dilemma emerges where those enduring bullying have to choose between not being bullied and missing out on social activity, or staying with their friends and experiencing bullying.

Since our product contains a microphone, someone hacking the device could potentially listen to a user while the device is on. To do this, someone would first have to get access to the users phone, then access the device via bluetooth and then send the microphone data to another device somehow. When the device is off and it does not connect to another device via bluetooth, this is not possible anymore.



Figure 21: Kompassie in the hands of users

METHODOLOGY

Overall we performed four studies. The first two, the User Study and the Concept survey (Appendix B1, B2 and D1), had the main purpose to help us in our design process. The second two, the baseline survey and the evaluation survey, had the goal to test if Kompassie would solve our problem statement and help us find an answer to our research question.

In order to see if Kompassie would have solve our problem statement and influence the social interaction of high school students during recess, we need to understand how they experience research before using the platform. We do this with a baseline survey. Here we ask them about the experiences and interactions that the students have had during the isolation during corona in addition to some general questions about their profile, like whether they identify themselves as introverted or extraverted and with how many people they feel befriended. By doing this we can see if there is a difference between this baseline results and the results of the user survey.

Participants

Our sample group consisted of four highschool students which already know each other before participating in our research. The participants were all girls of the ages between 15-17 with different level of schooling. Three of the four girls regularly had recess together before the isolation period due to COVID-19.

Material

The participants were provided first with a link with a consent form and the baseline survey. When they finished this survey they received an explanation on how to download the virtual platform (Appendix B3) and a link from were they could download it. The participants are asked to fill in two surveys, one before using the platform (Appendix C2) and one after (Appendix C3)

Procedure

In order to get a better view on the problem statement we asked four extra students to participate in the baseline survey. In this way we have more validation to do assumptions.

Via the benchmark we established six qualities for the approachable nature of communication. We ask about five qualities by using Likert scales: a five point scale which is used to allow the individual to express

how much they agree or disagree with a particular statement [8]. The sixth likert scale is about what kind of communication tool is used and because this variable doesn't change throughout the research this quality is not included or tested.

After performing this baseline survey the four participating students in received a link to download Kompassie to their computers. They were asked to use the platform together.

When a student leaves the platform, the evaluation survey appears in the platform. In this survey they are asked about the experiences and interactions that the students have had while using the research artefact. This survey has the same questions as in the baseline survey, so the two can be effectively compared. On top of that, they are also asked about the audio quality of the session and whether this could have an influence on their answers. To measure how the high school students experienced the conversations within the research artefact the Rochester Interaction Record (RIR) [12] was used as an inspiration. The RIR is designed to be a tool for providing information about various features of social interaction. They can be objective or subjective and are measured by using a 5 point Likert scales. The answers to this survey are sent to an Excel file that only we as the researchers have access to.

Data Analysis

With both these results of the baseline and the user survey, we can investigate what role Kompassie can play to promote social interaction during recess between students in times of isolation. When analyzing the data we make use of Microsoft Excel and Microsoft Forms. For analyzing we used Python for making the boxplot visualizations. The Python code can be seen in Appendix E4. For the qualitative data we looked at general themes that could be deducted and drew conclusions from that. We also used the Microsoft forms graphs and Excel to analyze the data.

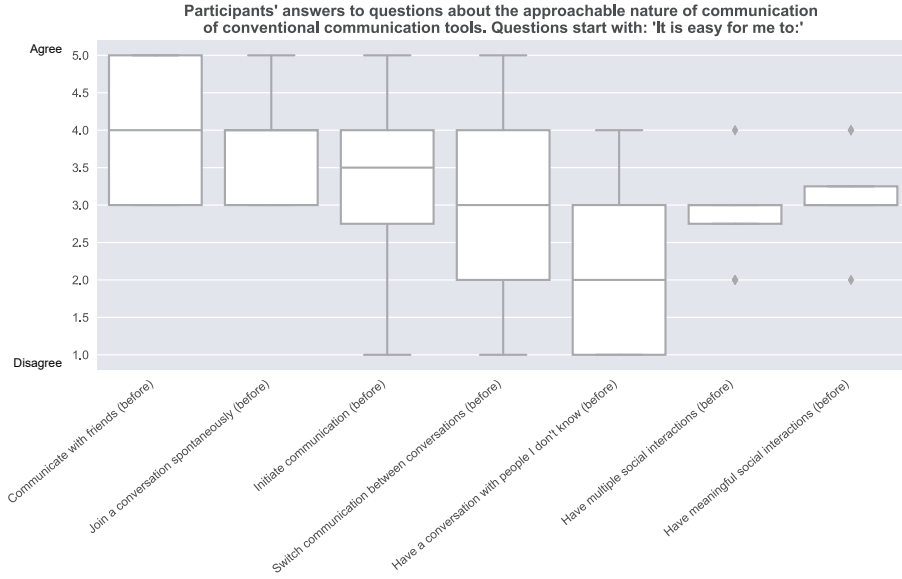


Figure 22: Approachable nature of communication baseline survey

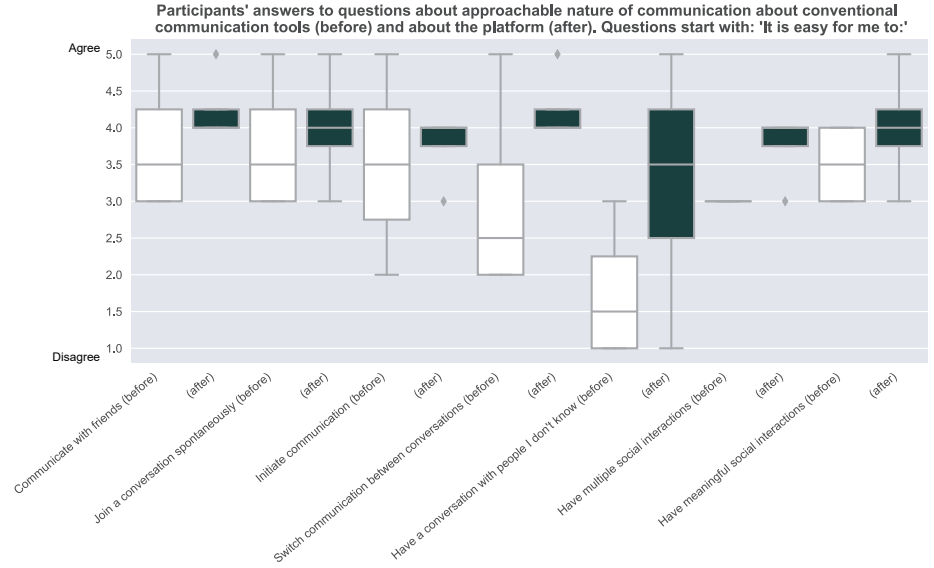


Figure 23: Approachable nature of communication evaluation survey

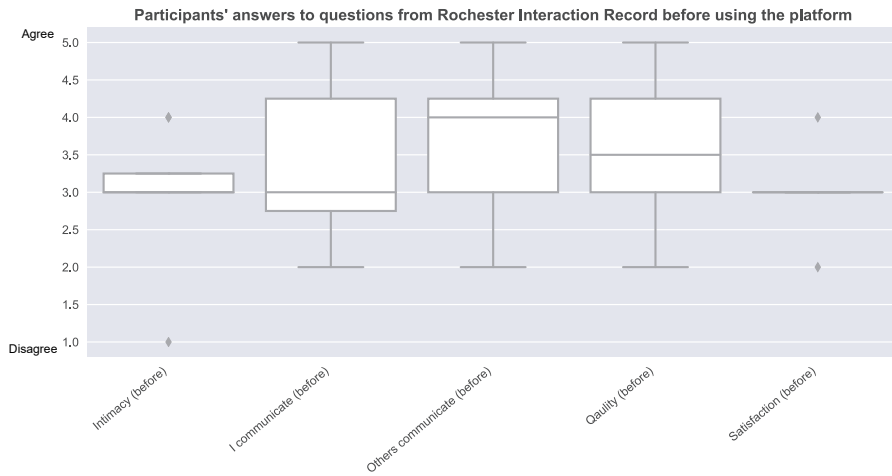


Figure 24: RIR baseline survey

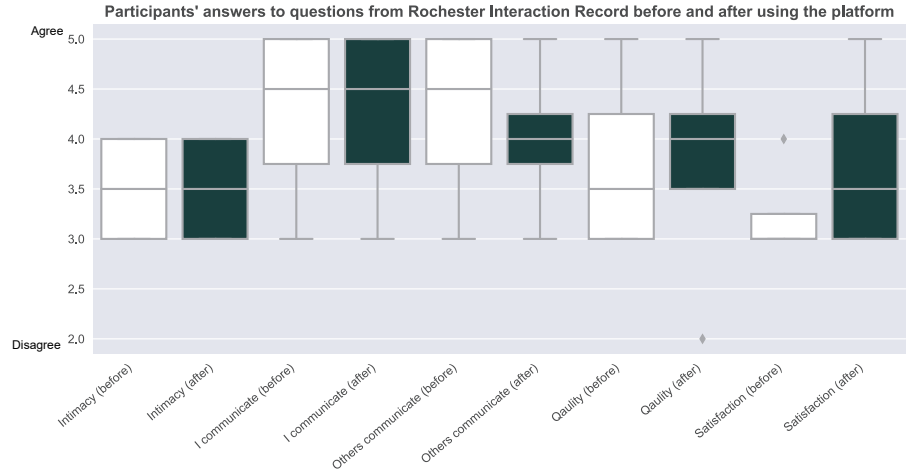


Figure 25: RIR evaluation survey

RESULTS

By performing a baseline survey and an evaluation survey, we can compare the social interaction of a participant before, and after the use of the virtual platform. In these two surveys ask similar questions based on validated research methods. The raw data can be found in Appendix D2.

Demographics

On average the respondents talked to eight peers from their school, with three being the lowest and twenty or more being the highest. Video calling and calling especially are communication channels that are not used often by the respondents. Chatting and social media are however often used.

Communication with friends and starting a conversation spontaneously is rated quite high when doing this with existing communication tools. However, communicating with people you do not know well is seen as not easy with the current communication tools.

Observations of the virtual platform

When the participants first entered the platform, they all started moving their avatars to and from the others, actively experiencing the platform's location-based voice chat. After they seemed accustomed to the platform, the four participants moved their avatars close to each other to start communicating with each other simultaneously. While they were in this position most of the time, from time to time, two participants would move away for a moment to talk to each other privately before rejoining some time later.

Baseline survey

All respondents answered yes to the question whether there are peers they would talk to normally but have not during current recess. When asked why, two responded with the lack of running into each other at school as a factor: Participant 2: "Normally I see them at school and then start a conversation spontaneously, but now you don't often start a conversation out of nowhere." Two others mention that they do not speak to peers anymore that they are less befriended with: Participant 3: "They are not really friends, but more 'school friends' ". One person mentioned the need to call someone as the primary factor: Participant 1: "you have to call someone to talk to them". The last respondent mentioned having less need for social contact.

Of all respondents, only one person described their current recess as sociable. Two described it as boring or alone, while two others mention spending their time on their phone or playing a video game. The last three respondents answered that they would not identify it as recess at all.

Processing of results

The graphs (figure 22, 23, 24 & 25) show the answers to the first and second survey and how they compare to each other. Only the

data of the participants who used the platform, and thus filled in both surveys is included. Adding the data of the participants who did not use the platform would not make for a fair comparison between the two results.

DISCUSSION

Our study focuses on the problem that many high school students during times like these spend their recess at home and on their own, instead of socializing with their peers like they could do beforehand. By conducting a baseline survey before the virtual platform and an evaluation survey afterwards we try to answer our research question. Within these surveys we test the approachable nature of communication and social interaction according to the Rochester Interaction Record (RIR) [12]. On top of that we verify the current recess situation for high school students.

Approachable nature of communication (figure 22, 23)

Comparing the answers of the participants that partook in the experiment before and after using the platform, an increase in approachability can be seen on all parameters, though with some more than others. The answers to the some questions only saw a small increase, making it hard to draw any conclusions about the increase given the small sample size. The answers to "it is easy for me to switch communication between conversation", "It is easy for me to have a conversation with people I don't know" and "it easy for me to have multiple social interactions" grew the most, with almost all participants answering with a higher value after using the platform than before. Regarding all of these questions, all but one participant responded higher after than before. Overall, these results look promising about the positive effect of the research artefact on the approachable nature of communication compared to conventional communication tools. However, since the artefact is intended to be used for a large group of people, the sample size is too small to draw real conclusions. Additionally, since the participants only used the platform during only one day, the results can be influenced by the fact that they were new to using this platform.

Rochester Interaction Records (figure 25, 26)

To measure how the high school students experienced the conversations before and after using the research artefact the RIR [12] was used as an inspiration. The RIR is designed to be a tool for providing information about various features of social interaction. They can be objective or subjective and are measured by using a five point Likert scales.

Also in this second part of our research we see a positive effect on the interactions. If we compare the median of the boxplots before and after using Kompassie with each other we see that all of the five tested qualities scored higher when having social interactions with Kompassie. However we have to consider that the number of participants was very

low. This causes that the boxplots show that the data is very diverse and spread out, and conclusions are hard to draw.

Only the quality “others communicate” didn’t score higher after the participants used Kompassie. This could be because it maybe is hard for the participants to concentrate on who is talking if multiple people talk at the same time.

Observation

The observation is promising given that the participants used the platform in a way that could not be replicated by conventional communication tools and more closely resembles face-to-face talking. However, given the small sample size, no real conclusions can be made about how participants would behave in the platform with around twenty people online simultaneously. Additionally, since the participants were all befriended, they might feel more comfortable approaching each other than students who are not. This might have skewed the observation to look more positive compared to when it is used with twenty students of different levels of acquaintance.

Future work

We see a lot of potential in further developing Kompassie. For future research, both the baseline and evaluation survey could be performed with a much higher number of participants. We propose letting multiple classrooms of the same high school experience the platform for a full week. This way, you would be able to answer the research question with a higher degree of reliability. These results can then be used to further develop the tangible handheld device. Publicly released spatial dependent voice chat platforms have already been developed [17] and Spatial.chat [2]) and could be used to conduct our proposed research. These findings can then be translated from virtual to physical. Ultimately, research that abandons the digital research artefact for a tangible artefact would be the most valuable, in the sense that the results are immediately applicable for other physical products.

The gap between our virtual platform and the tangible prototype is still big. It is important to test how people feel about hearing voices through Kompassie, and how to interact with them by walking around.

For future developments of Kompassie, it should be taken into account that it could have the potential not only to give value to high school students. Other organisations and companies could benefit from Kompassie by facilitating a social break experience to employees working from home. Elaborating on that, the use of Kompassie does not need to be tied to a school, company or organisation. Any group of people interested in keeping in touch as a group could potentially see value in using Kompassie. Research with these demographics and contexts should be done to confirm these assumptions.

CONCLUSION

With Kompassie is an artifact aims to simulate the approachable nature of communication between high school students during conventional recess affect the social interaction during isolation. This has been tested by using a virtual platform with spatial voice chat in which students can communicate with each other. No valid conclusions can be drawn due to small sample sizes using the virtual platform. However, we do see a lot of potential in applying the approachable nature of communication in new communication tools since the responses we have collected so far were mainly positive. These positive effects are especially notable concerning the ability for users to switch conversations, talk to people they do not know and to have multiple interactions. However, further research is needed upon this topic to increase reliability and more ecologically valid.

Kompassie could prove to be useful for a broader target group and contexts other than high school and its students since it is not necessarily bound to recess. It originated as a reaction to a problem statement concerning high school students, but the communication tool arising from it could be applied to the break in for instance an office environment as well.

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CONTRIBUTION OF TEAM MEMBERS

Chis

Developing the virtual platform in Unity

Making 3D models in SolidWorks
Making renders of the 3D models in Keyshot

Related work section and benchmark

Julia

Video shooting and editing in Adobe Premiere Pro

Hardware and finalization of the physical prototype

Animation of the mockup

Tessa

Analyzing & visualizing the first user study and concept survey plus writing the methodology

App design in Adobe Illustrator

Developing the survey integrated in Unity

INDIVIDUAL REFLECTIONS

Reflection Chris

Going into the project, I knew of a range of skills that I wanted to develop myself in. These being: setting up user studies and research, writing code and making 3D models. Looking back at my efforts this semester, I am glad to see that all of these are included in this project.

Since we had already decided on which target group to focus on at the beginning of the project, we got to conduct user studies at a relatively early stage in the project. For me this was the first time seeing how user studies can be used as an exploratory tool aiding the design process. From it, I have learned how to use user testing and its results to get relevant information about a target audience and to progress the design process, and choose which user study can be suitable for this task. This is something that can help me in future design projects to discover the values of a target group to be used when designing a product.

The decision to make a digital research artefact opened up a great opportunity for me to develop my coding skills during the project. Writing a simple program in Processing showed me how useful lofi experience prototypes can be, even for digital concepts. Afterwards, I got to work in Unity and write code in C# which were both a first time for me. While working on a program for a few weeks and relying on online documentation were things I had done before, making this program did serve as great source of experience to further develop my coding skills and reassures me regarding my decision to take on a Programming minor for the following semester. My goal for this minor is to become more acquainted with informatics and IT, gain more experience in coding to make more extensive experience prototypes and more sophisticated end-products.

Towards the end of the project, I got to work on the physical prototype by making 3D models in SolidWorks and making renders of them in Keyshot. I was amazed with how easily I could turn a 3D model into very professional looking renders and animations. The renders proved to be very useful for the presentation of our concept by giving spectators a realistic and professional image of what the final product looks like.

Though I do not feel like I have developed any notable skills regarding the expertise area Business and Entrepreneurship, I did get a valuable insight from my coach about Business and Entrepreneurship. Namely that is not so much a question of how much production of a product will cost and how it will be distributed, but of getting an overview of your stakeholders and how to provide value to them. This insight can help me in future design projects since it lets me see Business and Entrepreneurship as something to pay close attention to even in the early stage of the design process.

Due to COVID-19 measures, we did not get to come together anymore and were forced to work on the project remotely. Though it took some time to get used to, I do not feel like it hindered my ability to work together with the other group members. By not stepping away from the tri-weekly meetings - be it online - and with the right tools, we could work together on nearly every task. With the help of remote mouse controls for example, I even got to work live on the code for the Arduino plugged into Julia's laptop and test the code immediately.

Working in this group has confirmed for me how much I value close communication, working non-hierarchically and listening to each other's ideas while remaining critical. Regarding my role as a team member, I am someone who values close communication, has a relaxed but hard-working attitude, does not take the lead but does like to keep an overview of everything that is happening in the project. Since I also feel comfortable presenting, this meant that during this project I often got to represent my group when showing our work during weekly coach meeting or for the whole squad. Though I see this as a quality of mine, I should take into consideration the fact that I can overshadow my team members by doing so.

Overall, I am very glad with the overall design process and with what I have learned from it. My main learning points that I can use for future design projects are:

-The value of early user studies to understand a target group's values

-Using Business and Entrepreneurship principles early on in the design process to effectively create value with your product

-How to use experience prototypes to get an early understanding of a potential final product's experience

-The value of professional looking renders to communicate a product and its functions to others.

Reflection Julia

Creativity and Aesthetics

This semester was not easy for us due to the emerge of COVID-19. A lot of the design process changed and me and my team members had to be flexible and adapt ourselves. In the beginning I only saw the struggle coming with this and not the opportunities of working from home. It was very hard to communicate only digitally especially with the iteration process. But later on, we as a team managed to turn this around by using online tools in a better and more efficient way. An example of this was giving away mouse control in Zoom. In this way we could work and discuss for example poster layouts or write together on the arduino code over video calls. I learned how easy it can be to turn problems around when you have the right attitude and the right team members.

I learned how a high quality of the overall aesthetics of this project can be achieved more easily.. Choosing a house style early on in the design process helped us to have a coherent theme in all of our visuals. By doing this I learned that even smaller visuals become more a part of the overall look and have therefore more added value in the end. But also how renders and animations can contribute to giving the explanation of a project. In my previous project we chose not to make animations or renders at all. But after applying it in this project I see how much the presentation of the concepts benefits from it.

Technology and Realization

Because we had to work on our prototypes from home I had to buy more tools to work with. This made it convenient to take on the prototype tasks and helped me to gain more technical skills in for example soldering. I can see more value now in quick and low fidelity prototyping. A cardboard prototype can still inspire to other functions or different iterations. I used to go out to the work space in vertigo to make high quality prototypes instead of these low fidelity ones. I did this because i thought the best way to go was to not waste time on a ugly looking prototype and instead

make something better right away. I know now it is not about the quality or time it takes to build a prototype, but it is about its contribution to the design process.

User and Society

In this project we did a lot of validated user studies. It was learningfull for me to not just test a product in a user test but now with methods based on already existing research. In this way we didn't have to speculate as much as in previous projects and had founded conclusions. I learned how important it is to look for this in literature in a early stage. Also it was helpful to look more into literature to early on find an research direction and question. In this way I knew what the end goal was and what we had to achieve to get there.

Math, Data and Computing

I hoped to have grown more in the expertise area of Math, Data and Computing because I expected to work more with larger numbers of data in this research project. We did everything that we could to gather more data but due to all the circumstances this was not possible. In the future I do want to learn how to deal with larger numbers of data in courses like Making sense of sensors.

Business and Entrepreneurship

The lecture of Rhys about business strategies was really useful for me personally. I am starting a startup at the moment with team members from my project one and I took a lot of the presentation into practise. Also for our project at first I thought business and entrepreneurship was something which was supposed to not really come back in a research process. Now I see that only by taking on a business view oppon a product it can help to shape it. How the app and the tangible prototype work together for example is the result of doing this. We looked at how the tengible prototype could have an added value to only using a digital platform for the user.

Reflection Tessa

For my research project I have been working within the Vitality squad, on the topic of "Meet-up rituals". Focusing on designing a ritual for people with similar values to come together on a regular basis. Within a group I have been researching the approachable nature of communication through a functional research artefact on our target group: high-school students.

By conducting four user studies this semester I learned a lot about different user studies. Usually I would go for a questionnaire or do interviews with questions I set up myself. During this project we have used validated user evaluation methods or did a literature study to come to appropriate questions. I have also learned to look beyond the questionnaire and did things like open card sorting and social mapping. This was more fun for the participants and gave knowledge that could not have been gained through using a questionnaire. In the future I will definitely keep these user evaluation methods in mind a pick the most appropriate one.

This project gave me a new perspective on the design research process. I used to think it would involve a lot less designing, however this was not the case. It was actually really cool to see how user studies influenced the final design and how they can be used to develop an artefact. I used to see design research papers as something you look at in the end to see if you can validate your design. This project however, papers were used from the beginning and had a major influence on the process. They were used as an inspiration for sketching, benchmarking and applied in our process. This is something I am going to continue doing during upcoming projects since it gives a structured literary base to make your design on. This knowledge combined with user studies is enough to base decisions on

I felt like business and entrepreneurship would not be relevant during a design research project since the main goal is generating knowledge. Our coach, Rhys, stimulated us early on to look at how Kompassie would actually work in the real world and ask yourself if people would buy it. This at first felt irrelevant but it was actually making sure that we provide the value we want to our users while keeping in mind all the stakeholders. In the future I am going to put concepts in the "real" world throughout the project to see if it actually fulfills customer needs.

In this team I was most of the time the one who kept an overview of the process and different tasks that needed to be executed. We were all very passionate about this project and I am glad to see that COVID-19 did not have a huge influence on the quality of the outcome. We developed a project identity in the first week of the project by choosing colors and fonts. This resulted in coherence between all of our visuals and thus a more professional look. I am very proud of how we presented our concept during demo day and it has

taught me the importance of presenting a concept professionally. I had never made a mock-up before for instance but seeing the end result, it adds a lot of value in terms of giving a realistic professional image.

In hindsight, I should have been more active during coaching meetings and pitches. It felt easier to just let Chris do the talking since I believe it comes more natural to him. This is a pity since I did not improve my pitching skill during this project. Unfortunately, there was no physical demo day.. On this day I could have practiced pitching and talking to people about the project. In the future I want to practice presenting by talking more during coaching sessions and explaining my designs to everyone who is interested.

I mainly focussed on aesthetics during project 2 and had set the goal for myself to focus on math data and computing for project 3. I coded a functioning survey in unity, the Arduino code and Python analysis together with Chris. So I am glad I achieved this goal and I am planning on further developing this skill upcoming academic year.

What I am going to take with me from project 3 during my future design projects:

- Numerous user evaluation methods
- Integrating design research papers into the process
- Coding skills
- Business is not something to integrate solely at the end
- How to make a high quality presentation of your project

APPENDICES

Appendix A Literature

- A1 Benchmark table
- A2 Elaboration on research question
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- C1 Question concept survey
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- D1 Concept survey results
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- E1 Processing spatial chat prototype
- E2 Arduino code
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- F link to videos

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- G1 100 sketches challenge
- G2 Solidworks screenshots
- G3 Persona
- G4 Value proposition
- G5 Survey in Unity

Appendix A1 Benchmark table

Communication tool	Parameter 1.	2.	3.	4.	5.	6.
Phone	Call and wait for answer	No	Yes	Hang up call and start other	1	Audio
Whatsapp	Send text	No	No	Initiate communication while keeping chat with someone else.	1 directly, or up to 256 in a group chat.	Chat, audio, video (with audio and video, same answers as Skype apply)
Skype	Call and wait for answer	No	Yes	Hang up call and start other, or let someone join current call	4-5	Audio, video
Discord	Join channel	Yes	No	Leave one channel and enter other	4-5 in one channel	Chat, audio, video
Twitch	Join stream	Yes	No	Leave stream and enter other. Communicating	1 streamer, up to millions amount of viewers.	Streamer: audio, video Viewers: chat
E-mail	Send email online	No	No	Send email while keeping conversation with other. Add someone to CC	No limit	Text
Mail	Send mail to one person via postbox	No	No	Send mail while keeping conversation with other	1	Text
Sharetable	Open door and wait for answer	No	Yes	Not possible	1	Audio, video
Gustbowl	Continuous communication	No	No	Not possible	1	Images sent periodically
Buddywall	Continuous communication	No	No	Communication is constant between multiple people chosen beforehand	6	Lights signalling availability
Playpals	Use toy and wait for answer	No	Yes	Not possible	1	Sending movement of toys' limbs.
Habbo Hotel	Send text	Yes	No	Leave room and join other. Or move avatar to other people to communicate with them.	Up to 99 in one room	Chat, limited amount or pre-programmed gestures

Appendix A2 Elaboration on research question

How does
an artifact
that simulates the approachable nature of communication between high school
students during conventional recess
affect the social interaction during isolation?

Comparing A to B:

A: Social interaction during isolation without **intervention**

B: Social interaction during isolation with **intervention**

Artifact definition:

Due to the iterative nature of the DSR process, an artifact, as solution or innovation, is emergent and opportunities exist for it to evolve. The artifact as solution is continuously evaluated against a set of criteria or “an explicit theory” (Funnell and Rogers, 2011) and can, through successive iterations, adapt and evolve through implementations and evaluations.

Simulate

Simulate means to imitate the appearance or character of, to pretend to have or feel (an emotion) or to produce a computer model of (Lexico, 2020).

Approachable nature of communication

The nature of approachability can be based on multiple aspects. Communication is more approachable if:

- It is easier to communicate with someone without knowing anything about them (e.g. phone number)
- The user can easily switch between people or conversations.
- if the user can start communicating right away, instead of having to wait for a reaction of another person (e.g. picking up the phone)
- It is easy to initiate communication
- Contextual information triggers communication

Conventional

Based on or in accordance with what is generally done or believed (Lexico, 2020).

Social interaction

Interaction was defined as any encounter with another person(s) in which the participants attended to one another and adjusted their behavior in response to one another (Reis, Wheeler, Kernis, Spiegel & Nezlek, 1985, p.458).

Quality of social interaction: Refers to intimacy, self- and other-disclosure, pleasantness, satisfaction, initiation, and influence (Reis et al., 1985, p.457).

Quantity of social interaction: Includes such factors as number of different partners, frequency of contact, time spent socializing, and the average length of contacts (Reis et al., 1985, p.457).

Isolation

The definition of isolation is the state of being alone or away from others (Isolation, n.d.)

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Appendix A3 Design from an experience

Design from an experience

Following the paper by Hassenzahl et al., 2013; Designing moments of meaning and pleasure. Experience design and happiness. International journal of design

How to design an experience?

We start with an individual experience of having a high-school break with friends. This autobiographical story has a layer underneath all these details that show a more general structure, a pattern. All these details embody crucial aspects in a high-school break and suggests certain feelings during this experience. We should distill the essence of such an experience into a pattern. This pattern can then be used to transfer the experience into a context and design a novel experience based on the knowledge about feelings during a high-school break captured by the pattern. We then take this a step further by discussing how to create and shape this experience through material.

High-school break experience

A story created based on personal experience (n=3) of a Dutch high-school break and later discussed with teenagers (n=2) that are currently in the Dutch high-school education system. The extracted pattern is written in orange.

Before the bell

Michael has physics but lost his attention and is bored. He is sitting behind his desk on his phone. He is on social media and sees that it is 7 minutes before his break. He slowly starts to pack his back in order to quickly get out of the class. The teacher gets irritated and says it is still 3 minutes before the break. Michael wants to have a nice spot to sit in the break on his regular table. He slowly packs his back so the teacher won't notice. When the teacher says it is time to have a break everyone puts the last stuff in his or her bag and walks quickly to the door in order to leave the classroom as soon as the bell rings. He waits in great anticipation before the door and is ready to start walking as fast as possible. The bell rings.

All events are situated in the same institution but not in the same exact location.

First event

The students engage in shared consumption; they live through an event with others and feel related to each other. The communication and interaction during the event is limited. The student needs to obey the teacher so it has little autonomy on when it may communicate or move. Still some room is left to bend the rules a bit so interaction and communication can still happen to some extent. Usually, people use gestures, eye contact, mimics or short words to comment on the ongoing event. Since the restricted communication and interaction during the first event, students shift communication and interaction mostly to after the first event. All possessions need to be taken outside the first event. Movements need to be quick in order to accomplish the desired goal. A feeling of excitement and adrenaline comes right before the bell rings.

Walking to the auditorium

When his classmates and Michael leave the classroom, he is confronted with dozens of students chitchatting in the hall and heading to the auditorium. He makes his way through the crowd, looking around for his friends whom he usually spends his recess with. Once he has found a friend of his, they walk together to the auditorium, while catching up about their previous classes.

Between events

Once outside the first event an overwhelming feeling comes since there are a lot of stimuli from the environment. Quickly trying to recognize familiar faces in order to find the desired people to have the main event with. Feeling a bit lost before finding the

people and relieved when finding the people. Communication and interaction is now freely. Usually previous shared moments during other events is talked about. Then walking as fast as possible to the main event has become the main goal. While doing this possessions are transferred by the student to the main event.

Finding your spot

He walks through the doors and sees that there are other students walking towards his standard table. He worms himself through the mass of people to be there faster. When he arrives at his table he places his backpack besides him to save up sitting space for his friends.

Starting eating

The rest of his friends arrive and take a seat at the table. Michael gets his 'broodtrommel' and water bottle from his backpack and looks what he still has left to eat. He puts his backpack under the table and starts eating. Some people leave their stuff and walk to the desk to get a sandwich.

Chatting

Isabel tells Michael about what crazy thing his teacher did. Another friend Daniël, sitting at the other end of the table, reacts to the story of Isabel sitting next to Michael. Michael turns his head towards the end of the table since more friends join the conversation and react on his story.

Being bored / waiting

Michael is not necessarily socializing during every moment of recess. At times, his friends are in a conversation he does not feel like taking part in, or maybe is actively not included in. At other times, he and/ or everyone around him is on their phone, browsing social- or entertainment media. At these times, he wishes the recess could be shorter, so he would have something to do again.

Leaving

The break is still 5 min left so everybody is packing their things. Some are already leaving to go to the toilet before the lessons are starting again. Others leave early to avoid the commotion on the halls. When the school bell rings everyone that is still left on the table leaves the table and finds his way to the lessons.

Main event

After arriving at the main event and scanning the surroundings stress can be felt. The desired goal is in danger and needs to be secured. Fast actions are necessary and relief is felt when accomplishing the desired goal. Possessions are used to claim a spot for other friends. The primary purpose of the main event is nutrition. Nutrition is brought by the student itself or bought somewhere. Possessions are placed on the floor.

Communication and interaction is often about events related to the institution. Not being often at the institution will influence a person's ability to be a part of the conversation about the institution. The more demanding, interesting, confusing or impressive the experience, the larger the necessity to talk it through. The communication and interaction has an approachable nature of communication (Appendix ...).

A sense of boredom and tiredness of socializing comes. To push these feelings away an escape can be found in using media. Sitting out the main event. Right before the end of the main event all possessions get collected again. Once the possessions are collect most students start walking to the first event again.

Back to design

"An experience designer is foremost an author of experience. Only after having outlined the desired emotional and cognitive content of an experience, the action involved, its context and temporal structure, [she] may start designing the 'product.' And then, each

and every detail (content, functionality, presentation, interaction) has to be scrutinized according to its potential to create or destroy the desired experience” (Hassenzahl, 2010, p. 68).

The experience designer may now transfer this pattern to a different context to author a new experience. In our case, the context is not recess at the institution but recess in a student's home. While designing we rely on knowledge captured by the pattern but nevertheless create a new interpretation of this general theme. The definition of an artifact; creating a material representation able to constrain context and shape, action, emotion, and cognition in line with the envisioned experience.

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Appendix B Methodology first user study

Methodology first user test

Open card sorting (Spencer & Warfel 2004)

Five participants

For the card sorting, cards were made with a question on top of it. Participants could write down their answers individually on separate cards. Now the whole group was asked to sort the cards in any way they want. Doing this in a group evoked valuable discussion about what cards go together. After the grouping they could give each group a label and write that down on the theme cards. Within each theme participants were asked to rank it from most important (at the top) to least important. When this was done the themes were also ranked on the amount of importance.

During open card sorting we asked three questions:

1. What would be the ideal recess for you?
 - The ranking showed that food, time and being able to go outside are the most important things during recess for the participants. The answers to this question also showed that high schoolers see being on your phone as anti social and that they value a calm break as well.
2. What would be your ideal recess spot?
 - The ranking showed that the participants ideally sit outside if there is enough place to do that. The participants clearly show they like to sit on benches. Food is again a theme here.
3. What would be your worst recess ever?
 - At the top of the ranking is: no food or drinks. Then comes bad weather and not enough seating spots. Also a lot of noise and dispute is mentioned.

Having food during recess and being able to go outside are very important for the participants based on the card sorting. The card sorting shows that the tribune is a meeting spot at Luzac. Benches/the tribune are recurring answers and is a place where they come together. Enough space for everyone during recess is also important for the participants.

Social mapping (Kuniavsky, 2003)

Three participants

A participant was taken out of the classroom into another room with a researcher. The setting was private and beforehand it was stated explicitly that all information gathered would remain anonymous. Participants were also aware of the fact that they could add new names during every part of the research. Participants were asked to make a social map based on a protocol the researcher followed (appendix...). At the beginning it was made clear that we were interested in their social environment within Luzac college. These social maps help us to understand the dynamics we are designing for, making it easier for us to design a product or service for social interaction.

For the social mapping squared pieces of white paper were used, for the participants to write names on. On top of that, markers were present for the participants to color dots with regarding communication channels.

The participants grouped all the students they frequently speak at their high school. While grouping the researcher asked how they got to know these people or where they know them from. From these questions we found that the participant met these people during a class or on the tribune during recess. Friendships did expand outside high school sometimes, gaming together for instance. Students also expressed they do not see their classmates necessarily as friends.

The social maps show the amount people the students interact frequently with is rather small. This is also due to the fact that Luzac has small class sizes.

Selective transcript during social mapping

H: I can say everything to F because he does not tell it to other people. If I say anything to E I know that everyone gets to know it instantly in that case. But they are both good friends of mine.

R: Why did you put these communication dots?

H: I talk to almost everyone. I use WhatsApp to ask how someone is doing or to ask about homework. I have done calling and video calling with F to collaborate and I have not done that with Olivier.

R: Why did you give this group this title and how do you know them?

G: Well on the benches they usually sit next to me and then I see them

R: Why do these people not have communication tools, no color?

G: Because I have no affinity with them

Protocol social mapping

1. Start audio recording
2. Ask the participant to write down their name en place it on the table
3. Ask the participant to write down people they are in frequent contact with at school
4. Let the participant rank the cards based on how frequent they have contact with those people
5. Ask the participant to place a big black dot at the people they would share personal successes or difficulties with
6. Make a picture of what is currently on the table
7. Ask the participant to group the names based on whatever they want
8. Ask the participant to give each group a name
9. Ask why the participant grouped in that way and how he got in contact with these people
10. Ask participants to choose their main communication channels and give them the markers with the correct color corresponding to the communication channels
11. Let the participant set dots whenever he frequently has contact with a person via this communication channel
12. Ask why someone has a lot of dots and others less
13. Ask whether the participant would like to add something to the research

Design exercise

Four participants

We gave four of the five students the task of designing something which could improve their recess. The ideas they came up with were:

- Adding a petting zoo to the school yard,
- Installing a supermarket to the school cafeteria, so students don't have to walk to the nearby supermarket for the food items that are available there.
- Installing cover for the outside bicycle stands - to prevent the seats from getting wet
- Two additions to the tribune - namely hooks for hanging their bags, and tables on which students could put their food while sitting there.

The bicycle cover, the bag hooks, the food tables and the supermarket can be seen as convenience products, since they try to solve a small but recurring problem that in itself does not have any consequences. When asked why the student would want to add a petting zoo to the school yard, they mentioned liking the interaction with animals during recess.

Appendix B2 Methodology concept survey

Methodology Concept Survey

To measure whether Kompassie would simulate the approachable nature of communication and if it has the right functionalities and appearance we created a survey. We used the mid-term video and the storyboard to illustrate the concept Kompassie and asked questions afterwards. The results of this survey are used to assess our design concept and see if it actually adds the value we think it will add. This survey will mostly be used to improve Kompassie and see which aspects need to be reconsidered.

Participants

39 students from Eindhoven University of Technology participating in the bachelor course "User Evaluation Methods" ranging from 18-25 years old have filled in the questionnaire. 1 participant is a design researcher. 20 respondents were male and 20 respondents were female.

	Number of close friends	Introvert <> extrovert	Size friend circle
mean	5	-	-
mode	3	extravert	15+
median	4	neutral	10-12

Material

The survey was created in Microsoft forms.

Procedure

The first sections asks about demographics. Since our product is about social interaction we also asked questions about people's social life. Then we explained the concept Kompassie by showing the midterm video and a storyboard. The next section was the AttrakDiff survey. This is a questionnaire measuring how attractive a product is in terms of usability and appearance. AttrakDiff consists of 28 7-point bipolar items that represent opposites (e.g. good - bad). The 28 items measure the following four UX dimensions (Hassenzahl, Burmester, & Koller, 2003; Hassenzahl, 2004):

Pragmatic Quality (PQ)

PQ attributes measure how easy the user finds it to manipulate the product or software. It is about how easy can the user fulfill goals. There is no beauty or design needed to make a product pragmatic. A high PQ score primarily implies high usability.

The Hedonic Quality Identification (HQI)

HQI attributes are the ones that make us identify with the product in a social context. What message are we communicating to other socially by using this product? These attributes are connected to the fact that all persons communicate their identity through things they use and own. A high HQI score implies a high perceived capability of communicating identity to others.

The Hedonic Stimulation (HQS)

HQS attributes are the ones that encourage personal growth of the user. People want to develop their skills and knowledge further and these are the attributes of the product that allow for that to happen. A high HQS score implies a high degree of perceived novelty, stimulation and challenge.

The scale for overall appeal or attraction (ATT)

ATT attributes are used to measure the global appeal of a product and to see how the other attribute affect this global judgment. When we talk about something as being attractive to us, we are usually summarizing the whole experience of the product. (Isleifsdottir & Larusdottir, 2008)

After the AttrakDiff scale we tested whether our concept simulates the approachable nature of communication we established in the benchmark. We ask about five qualities by using a likert scale. The sixth quality in the benchmark is about what kind of communication tool is used and because this variable doesn't change throughout the research this quality is not included or tested.

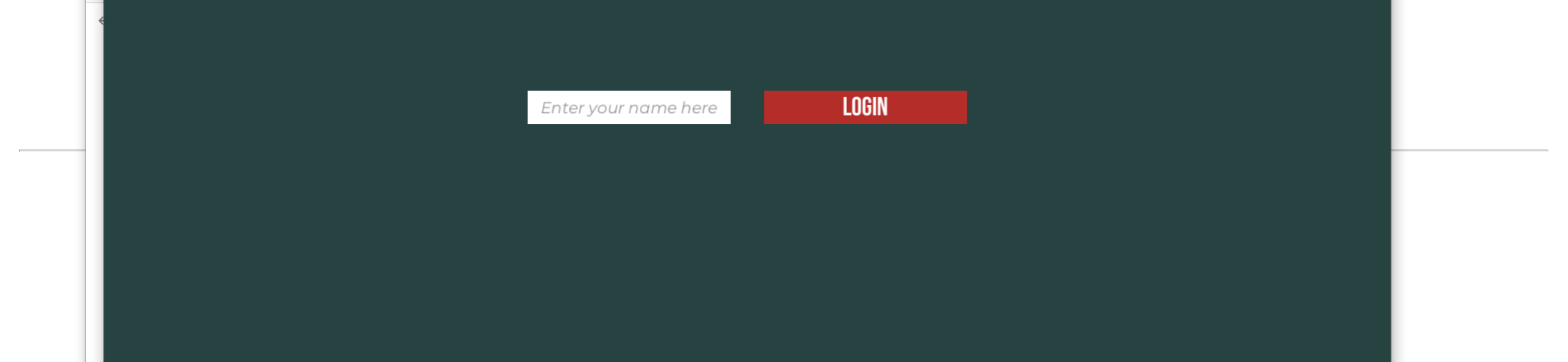
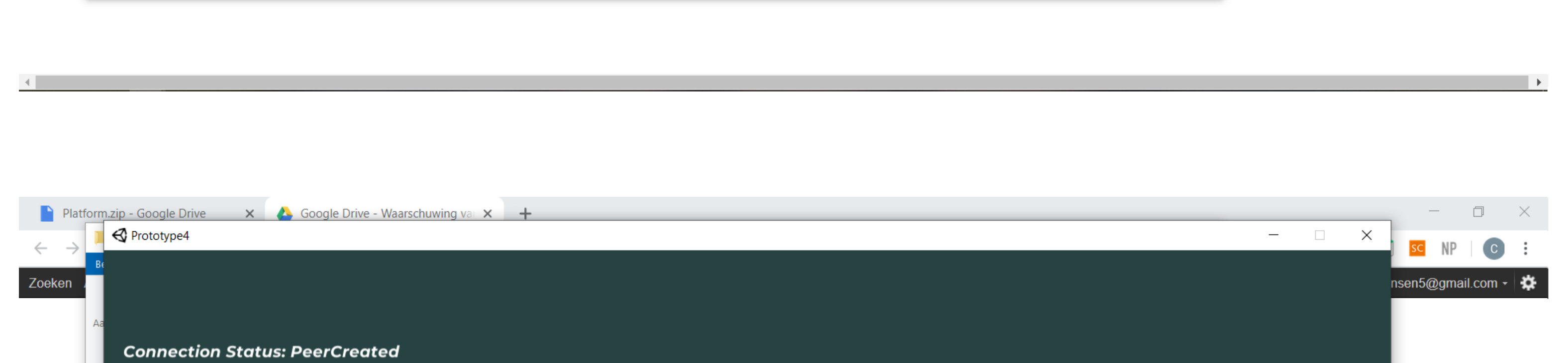
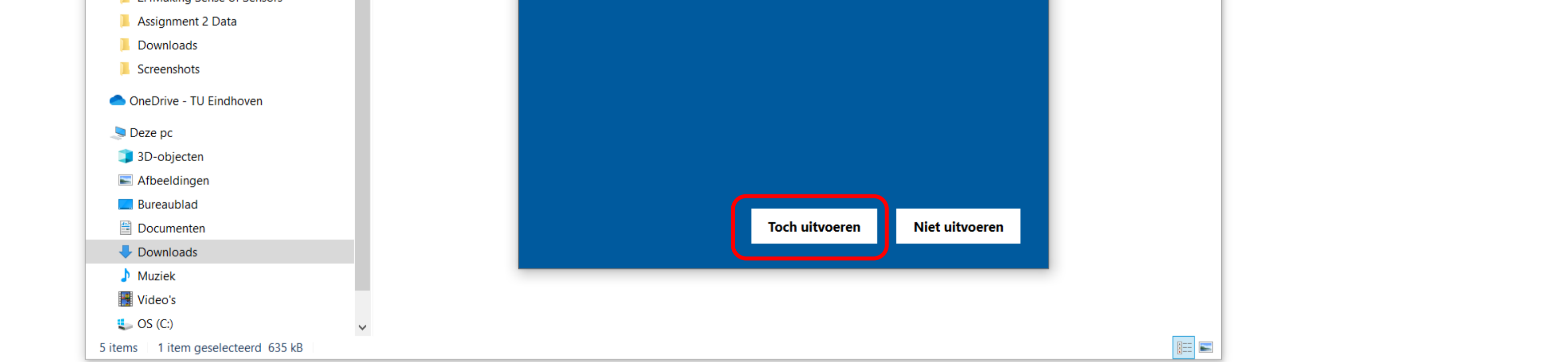
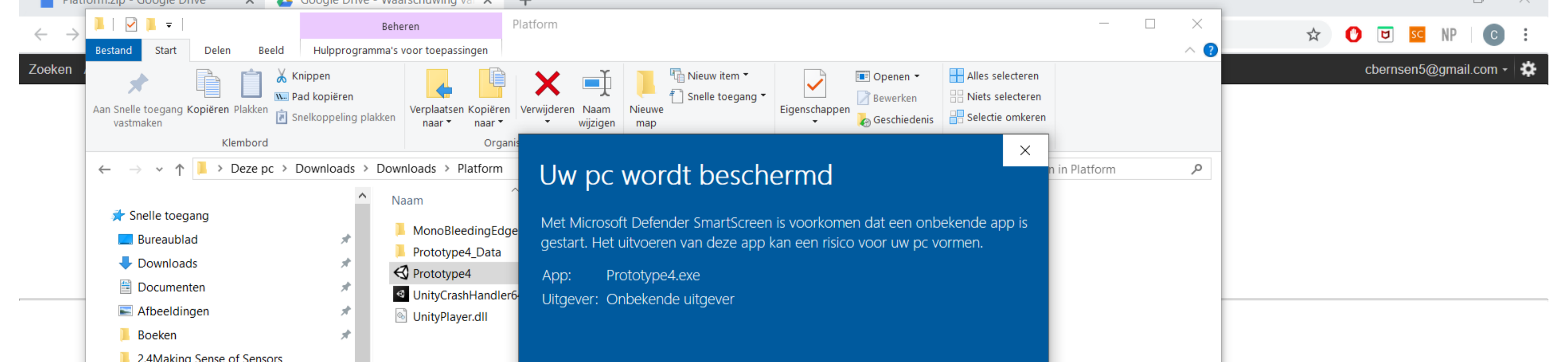
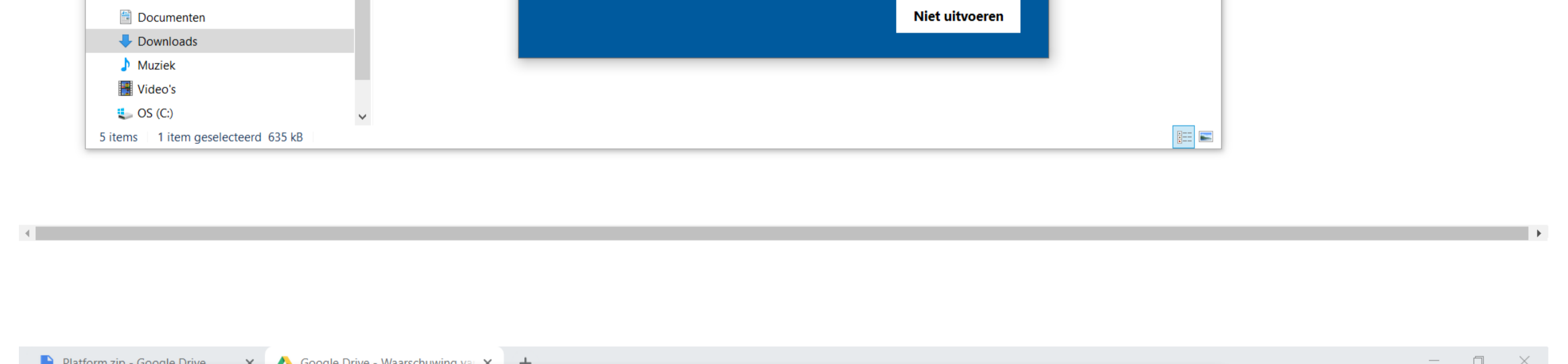
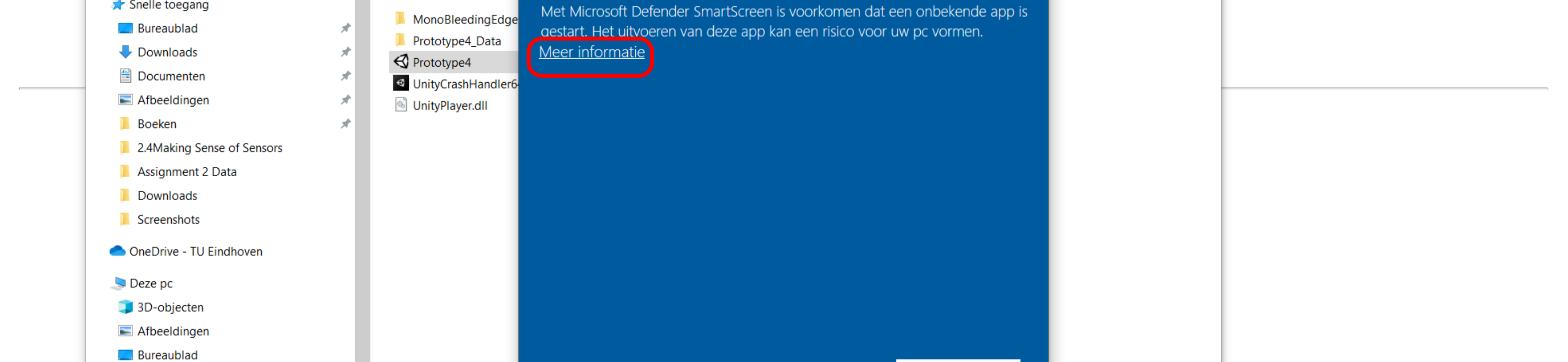
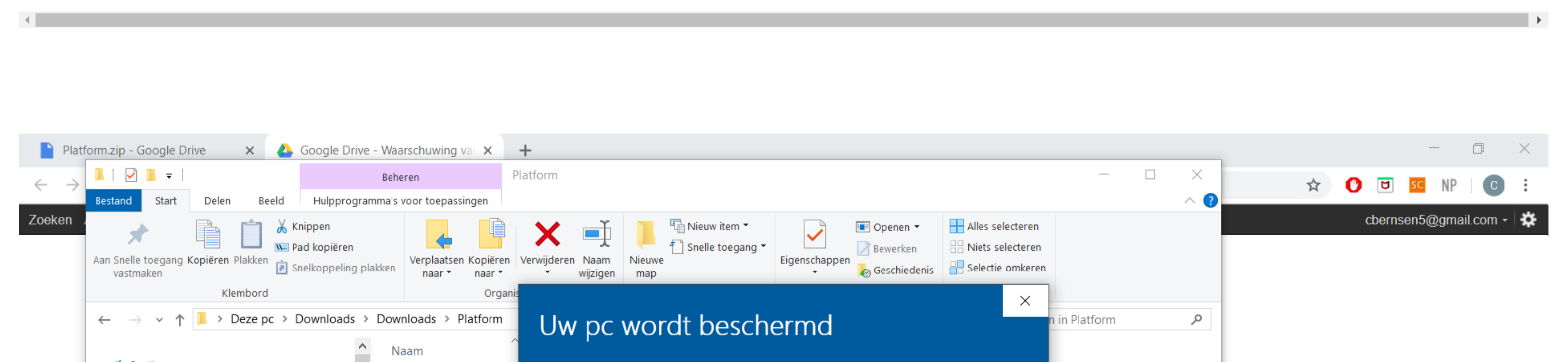
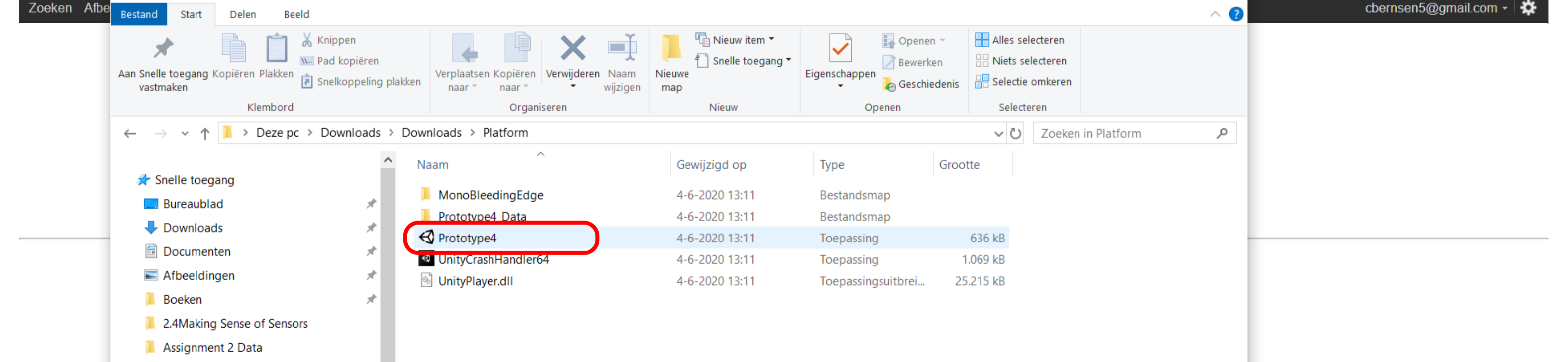
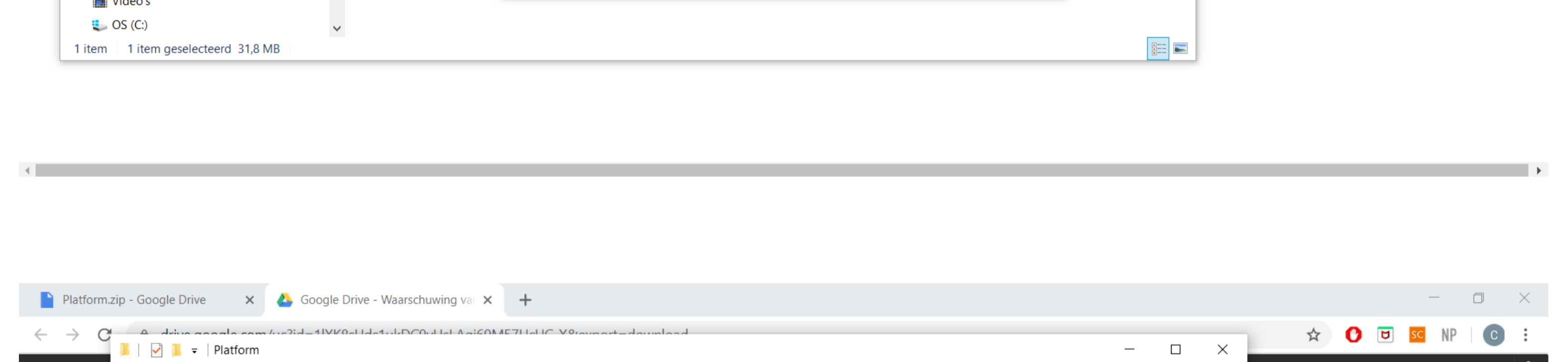
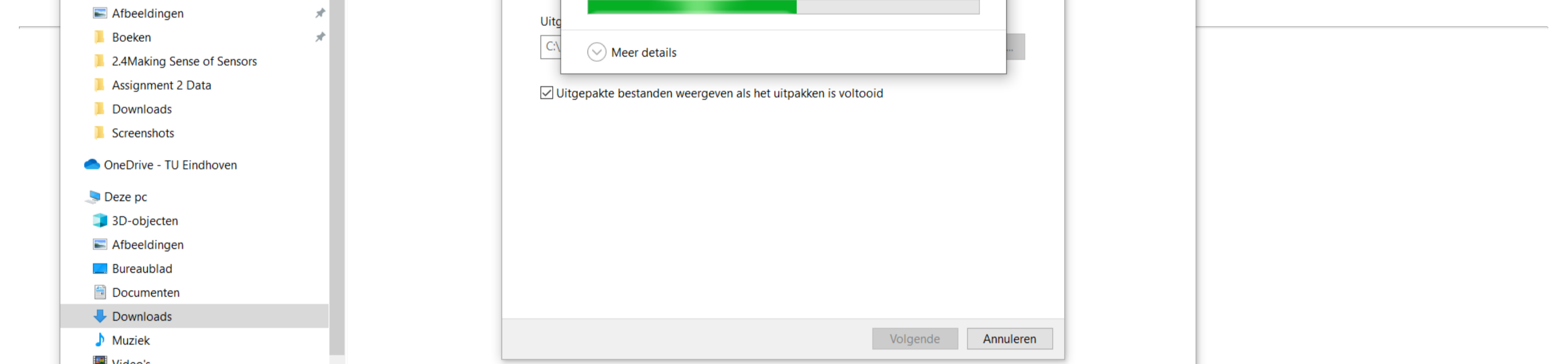
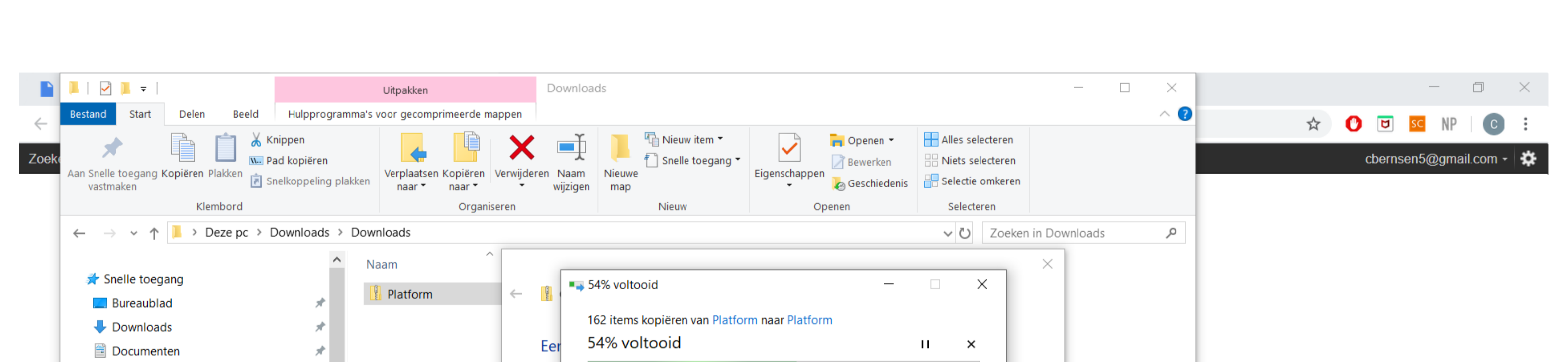
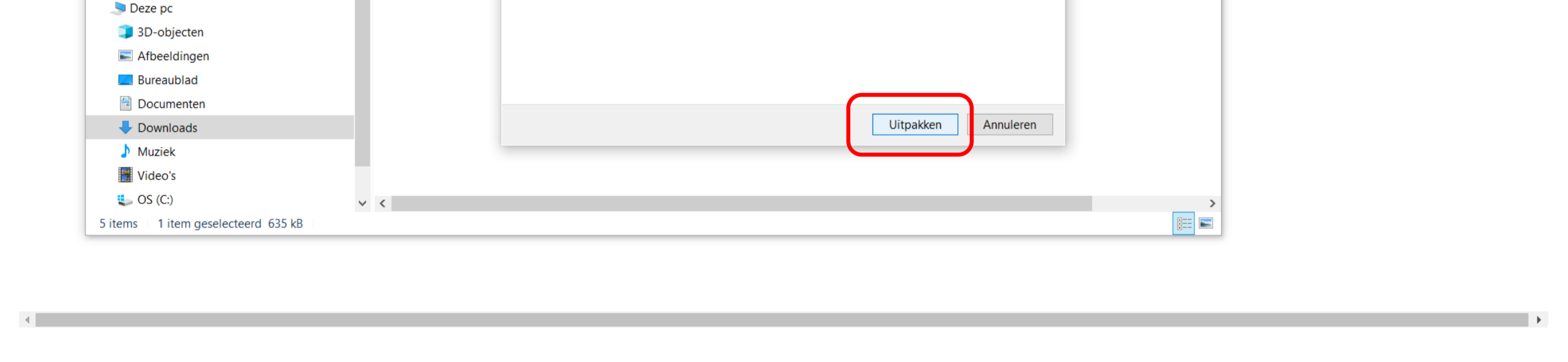
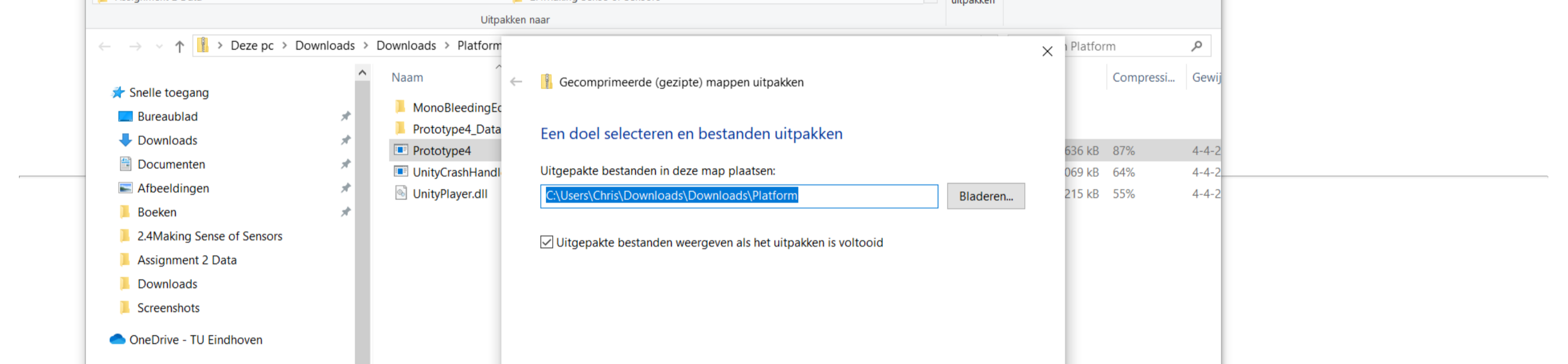
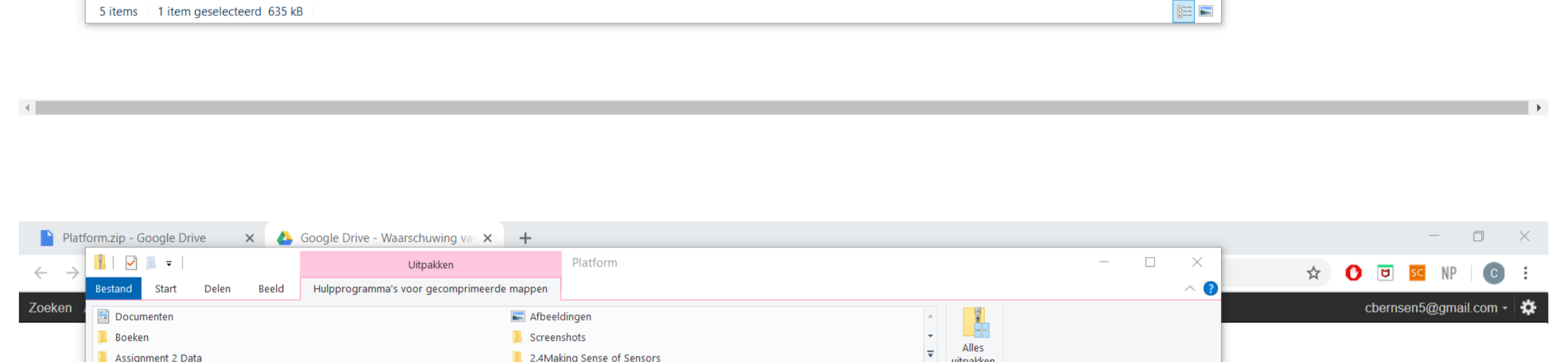
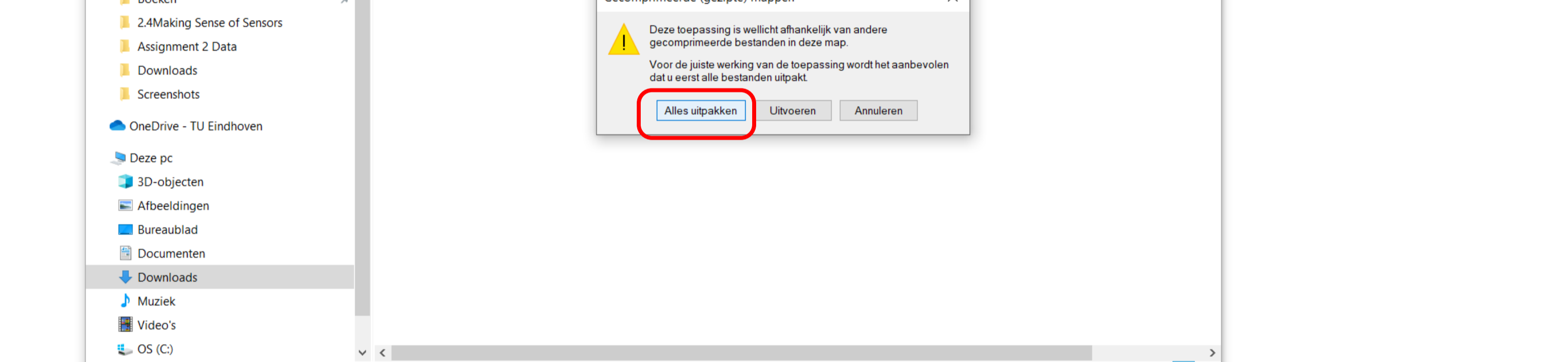
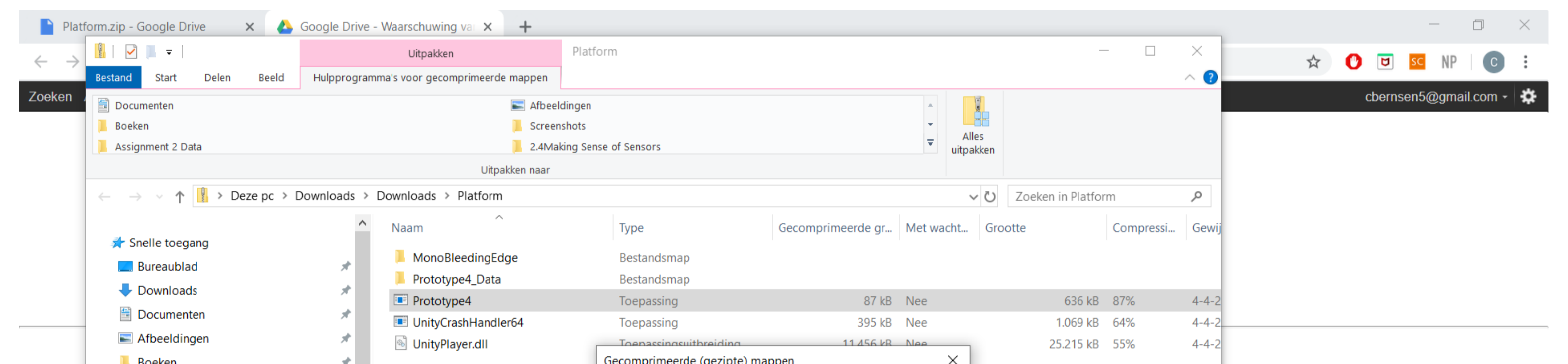
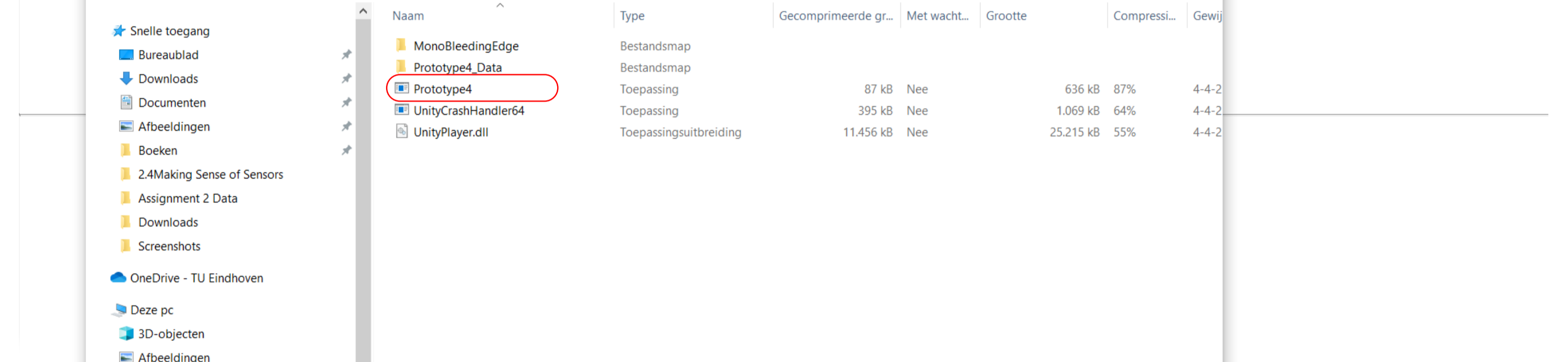
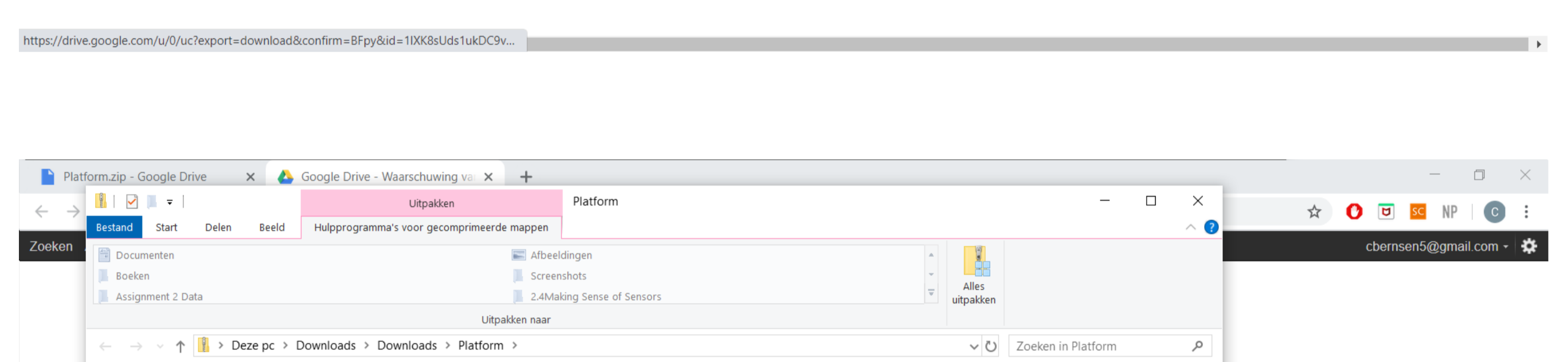
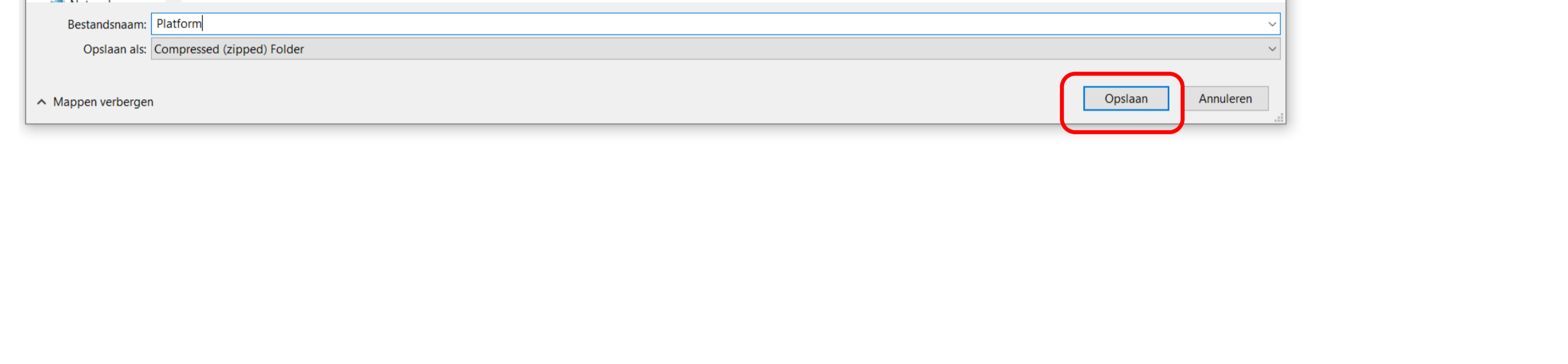
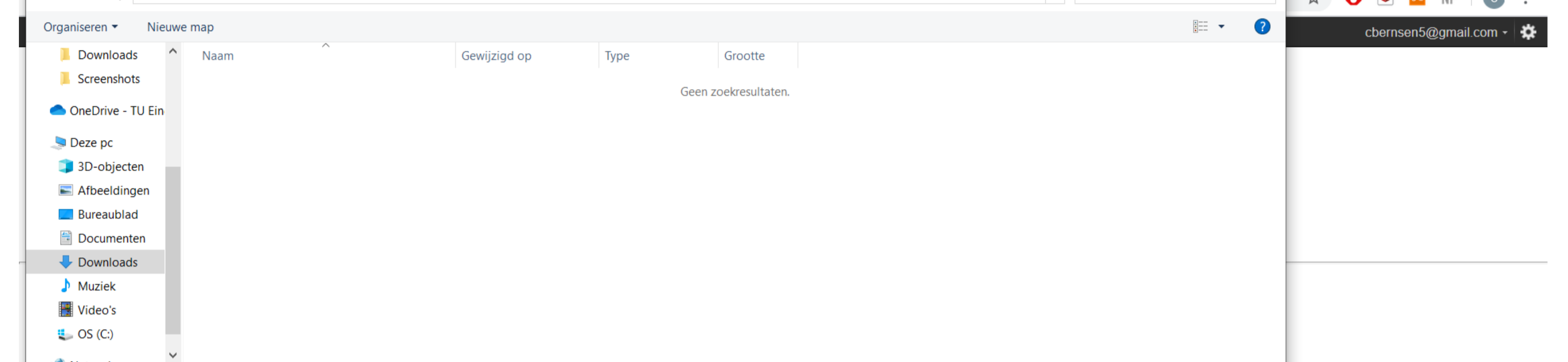
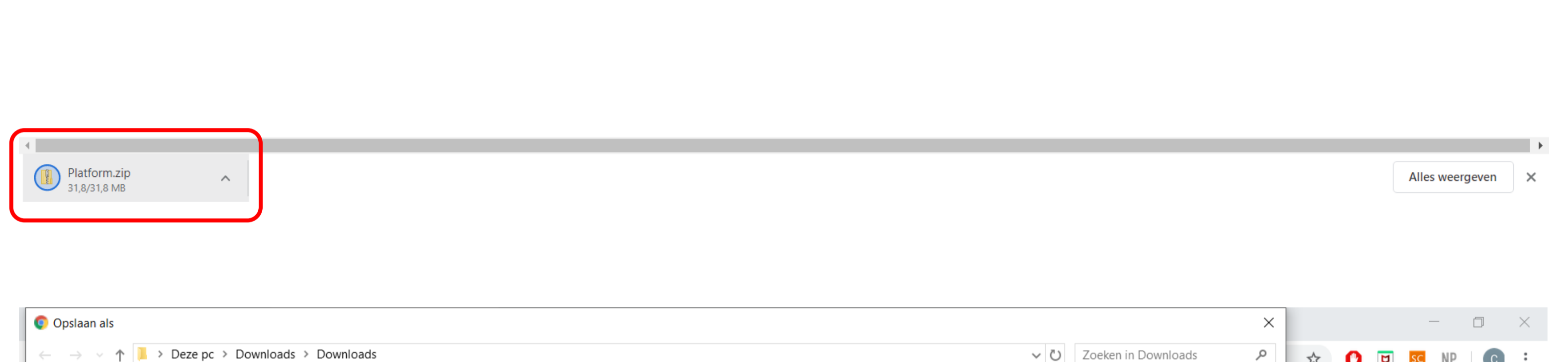
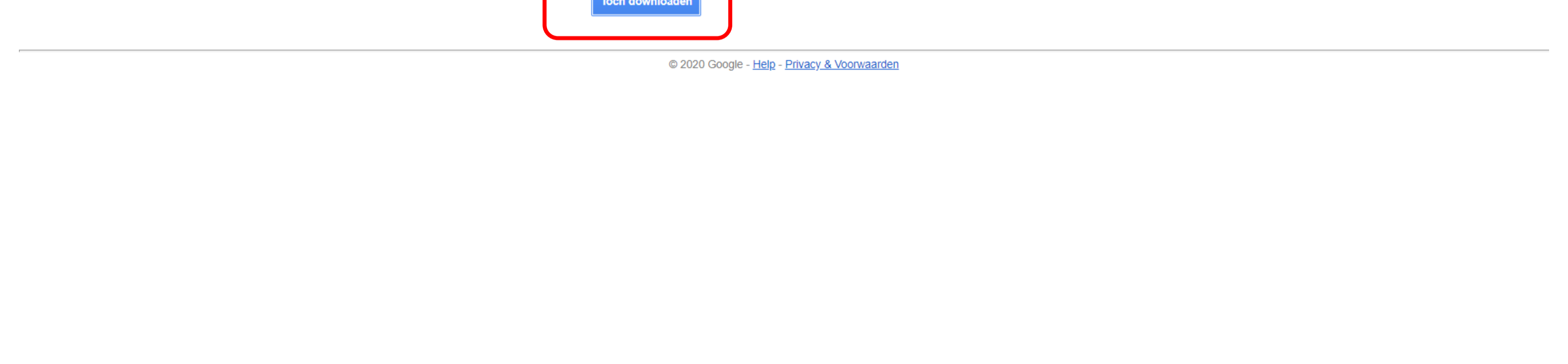
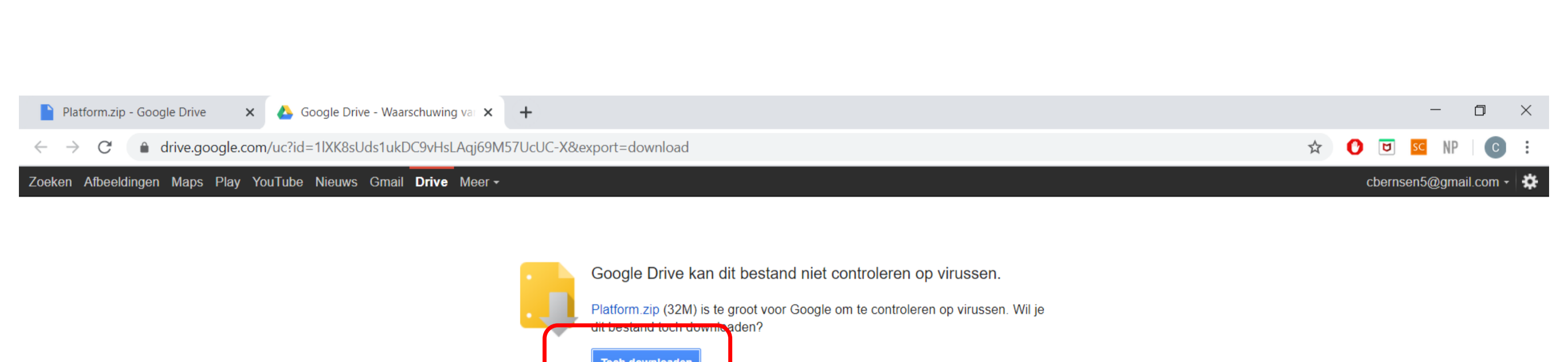
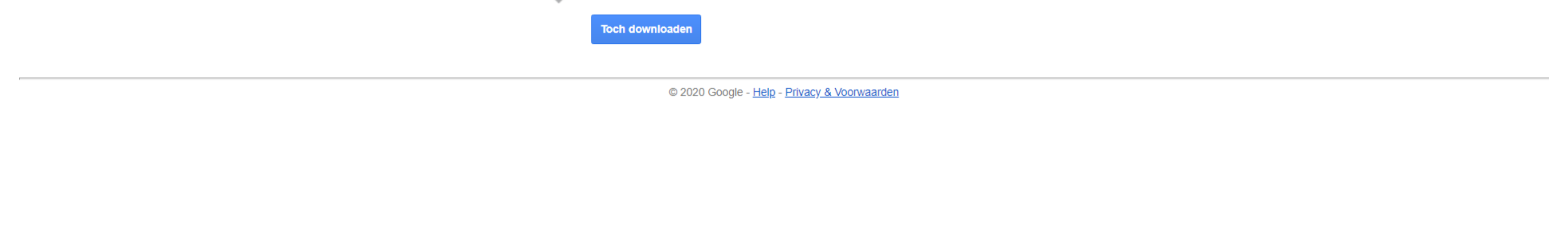
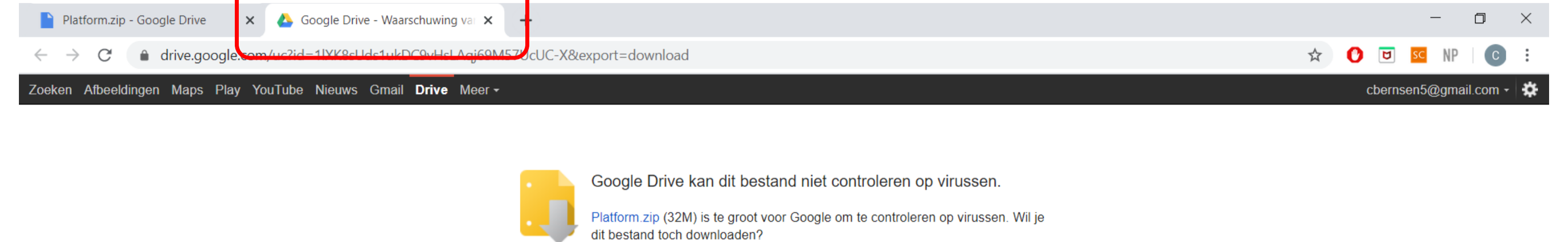
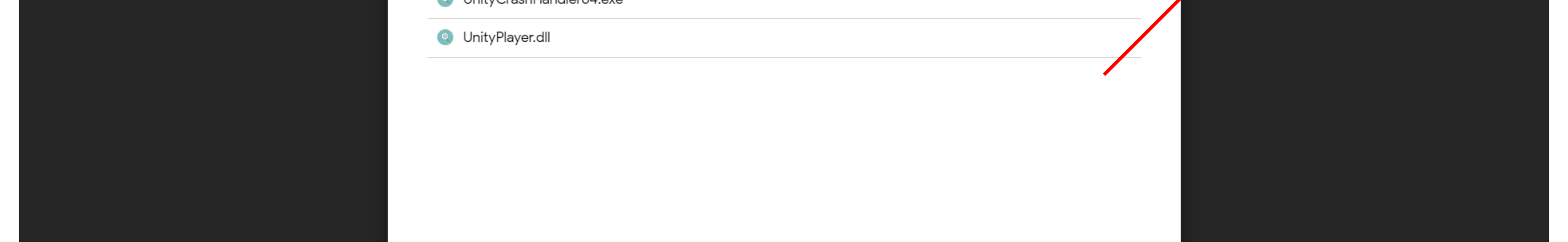
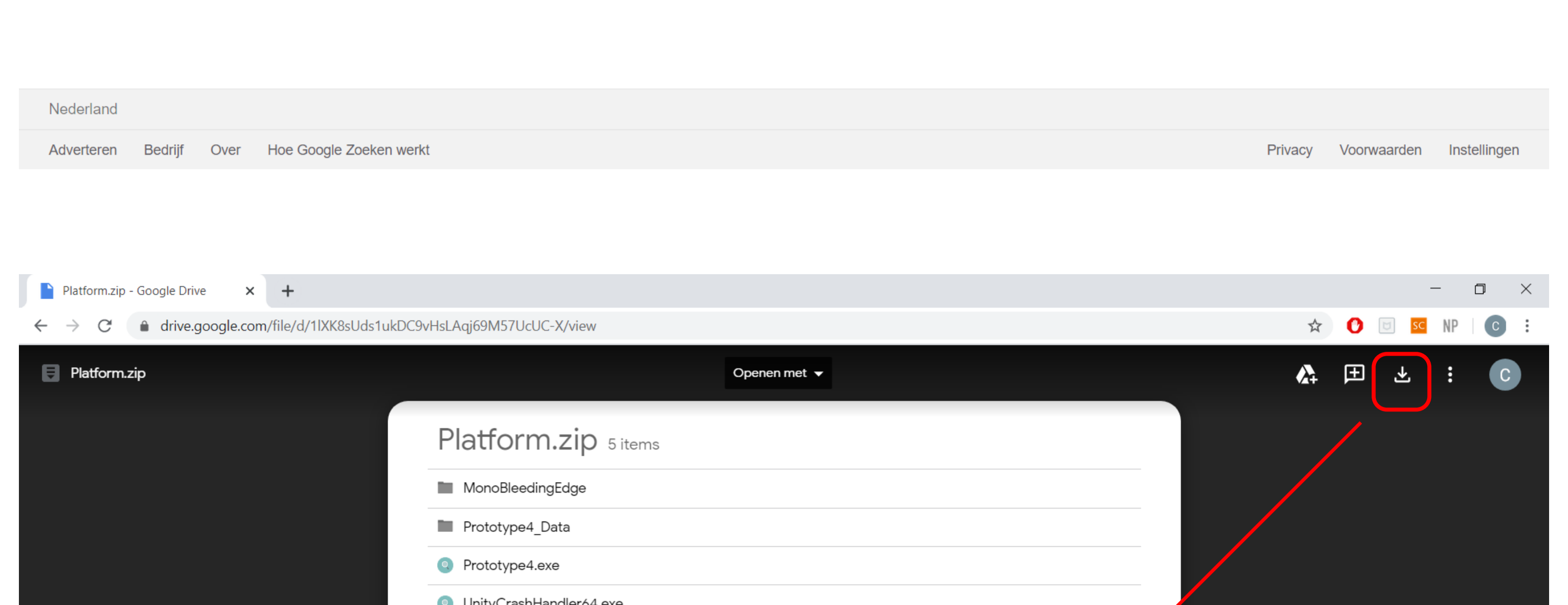
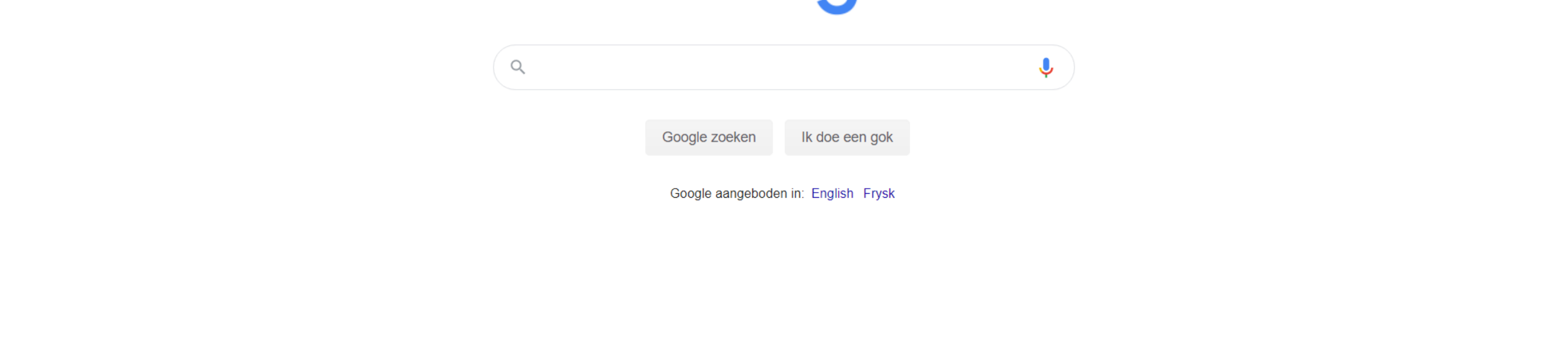
We end the survey with a sentence completion task. We compare our product with current communication channels and test the difference by asked this completion task.

Material: describe the materials, measures, equipment used. It may include testing instruments, technical equipment, artefacts, design probes, images, evaluation scales etc. Interview guides, observation grids or survey questions also fall in this section. Usually, the full material is then added as an Appendix.

Data Analysis

The data was analyzed by using Microsoft forms graphs and Excel. The mean, mode and median are often used to draw conclusions from quantitative or ordinal data. The Microsoft forms graphs have also been an analyzing tool. To analyze the qualitative results we looked at general themes that we saw in the answers and drew conclusions from this.

Appendix B3 Explanation for downloading the virtual platform



Vragen

Antwoorden 40

Kompassie

This survey is focused on a design concept named Kompassie.

Kompassie is a handheld device that shows students the location of their classmates in a virtual auditorium on a circular interface. By moving around with Kompassie, you can move towards or away from your friends or peers. While doing so, the call volume between you and that person gradually increase or decrease. Kompassie enables users to see who is up to talk and freely talk to them, without having to call them or even needing their phone number. It also enables users to switch between or join other conversations, without the need for leaving or joining calls.

We thank you very much for your time!

Sectie 1

Informed consent to participate in this study

1

This project is part of a research project at the Eindhoven University of Technology. All the data will be securely stored and will be used for research purposes only. All information will be handled anonymously and confidential, in accordance with the ethical guidelines defined by the University. If you agree please tick the box and continue to the survey. *

I agree to participate in this study

Sectie 2

About you

Before we introduce our concept, we would like to know a few things about you.

2

What is your age? *

Voer uw antwoord in

3

What is your gender? *

- Female
- Male
- Other / Prefer to self-describe

4

What is your primary occupation? *

Voer uw antwoord in

5

Very extraverted Extraverted Neutral Introverted Very introverted

I identify myself as :

6

How many close friends do you have? *

Voer uw antwoord in

7

What is the (approximate) size of your friend circle? *

- 0
- 1-3
- 4-6
- 7-9
- 10-12
- 13-15
- 15+

Sectie 3

The Kompassie concept

In this section, we will present the Kompassie concept and invite you to evaluate it on several dimensions. There is no right or wrong answer, only your impression matters.

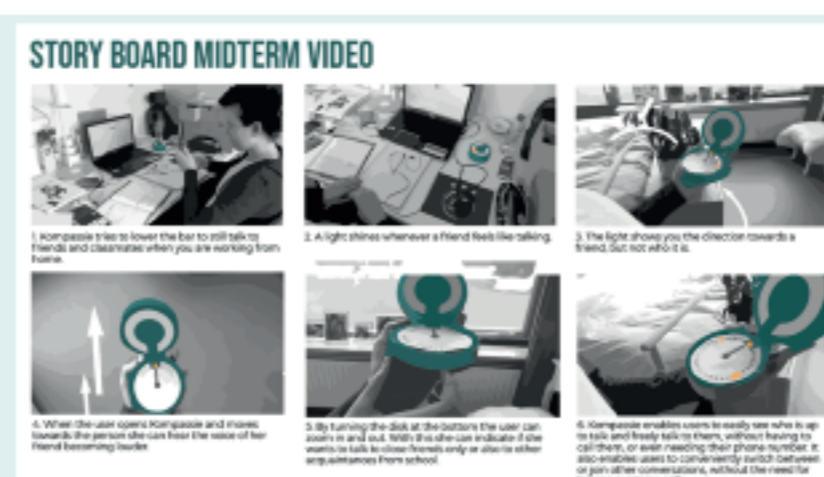
8

Please carefully watch this video about our concept Kompassie. If you want you can leave a comment below.



Voer uw antwoord in

9



Please take a look at our storyboard (<https://bit.ly/kompassie>) to make sure you understand the concept of Kompassie. If you want, you can leave a comment below.

Voer uw antwoord in

10

With the help of the word pairs please enter what you consider the most appropriate description for Kompassie. Note that the format is not ideal, yet each question is a continuum going from the left word to the right word (as shown on the example picture) Please click one item in every line. *

	-3	-2	-1	0	1	2	3
Technical <> Human	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complicated <> Simple	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Impactical <> Practical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cumbersome <> Straightforward	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unpredictable <> Predictable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confusing <> Clearly structured	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unruly <> Manageable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Isolating <> Connective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unprofessional <> Professional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tacky <> Stylish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheap <> Premium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alienating <> Integating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Separates me <> Brings me closer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unrepresentable <> Presentable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11

With the help of the word pairs please enter what you consider the most appropriate description for Kompassie. Note that the format is not ideal, yet each question is a continuum going from the left word to the right word (as shown on the example picture) Please click one item in every line. *

Example:	Technical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Human
	Complicated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Simple
		-3	-2	-1	0	1	2	3
Conventional <> Inventive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unimaginative <> Creative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cautious <> Bold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conservative <> Innovative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dull <> Captivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Undemanding <> Challenging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ordinary <> Novel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unpleasant <> Pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ugly <> Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disagreeable <> Likeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rejecting <> Inviting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bad <> Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Repelling <> Appealing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discouraging <> Motivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12

With this product, it is easy for me to: *

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
communicate with close friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
initiate communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
join a conversation spontaneously	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
switch between people and conversations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
communicate with people I don't know well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
have meaningful social interactions (quality)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
have numerous social interactions (quantity)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13

(Optional) If you answered with disagree or strongly disagree on any of the previous subquestions, please elaborate on your answer.

Voer uw antwoord in

Sectie 4

Comparison with other communication channels

14

As compared to a face-to-face conversation, the Kompassie concept feels more ... *

Voer uw antwoord in

15

As compared to a face-to-face conversation, the Kompassie concept feels less ... *

Voer uw antwoord in

16

As compared to a WhatsApp chat, the Kompassie concept feels more ... *

Voer uw antwoord in

17

As compared to a WhatsApp chat, the Kompassie concept feels less ... *

Voer uw antwoord in

18

As compared to a Skype / videocall, the Kompassie concept feels more ... *

Voer uw antwoord in

19

As compared to a Skype / videocall, the Kompassie concept feels less ... *

Voer uw antwoord in

20

Do you have any additional comments or suggestions?

Voer uw antwoord in

+ Nieuwe toevoegen

Eerste enquête

Welkom bij ons onderzoek! Dankjewel voor je participatie. Met deze enquête proberen wij een inzicht te krijgen op hoe middelbare scholieren de schoolpauze ervaren onder invloed van de coronamaatregelen. Vul deze enquête in voordat je het online platform hebt gebruikt.

* Vereist

Over jou

1. Door deze vraag aan te vinken, geef je toestemming dat deze data gebruikt mag worden voor academisch onderzoek aan de technische universiteit Eindhoven. De data zal lokaal en anoniem opgeslagen worden. *

 Ik geef toestemming

2. Wat is jouw voornaam? *

3. *

Zeer extravert Extravert Neutraal Introvert Zeer introvert

Ik zou mijzelf omschrijven als:

4. Met hoeveel schoolgenoten voel jij je bevriend? *

- 0-1
 2-3
 4-5
 6-8
 9-12
 13+

5. Met hoeveel schoolgenoten heb je gepraat in de afgelopen week? *

6. Geef aan hoe vaak je afgelopen week met schoolgenoten in het echt een gesprek hebt gehad: *

Helemaal niet vaak Niet vaak Soms Vaak Heel vaak

* Vereist

Communicatie

7. Geef per communicatieplatform aan hoe vaak je het afgelopen week hebt gebruikt om te communiceren met schoolgenoten: *

	Helemaal niet vaak	Niet vaak	Soms	Vaak	Heel vaak
Bellen	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Videobellen (Skype, FaceTime, Discord etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chatten (Whatsapp, SMS etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sociale media (Snapchat, Instagram, TikTok etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Met huidige communicatieplatformen zou ik mijn gesprekken met schoolgenoten omschrijven als: *

	1	2	3	4	5
Intimiteit: Oppervlakkig (1) <> Diepgaand (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vertel: Weinig (1) <> Veel (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ander(en) vertellen: Weinig (1) <> Veel (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kwaliteit: Onaangenaam (1) <> Aangenaam (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tevredenheid: Minder dan verwacht (1) <> Meer dan verwacht (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Met huidige communicatieplatformen vind ik het makkelijk om: *

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Te communiceren met vrienden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Een gesprek te beginnen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Een gesprek spontaan in te stappen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Te wisselen tussen gesprekken met andere mensen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Een gesprek te hebben met mensen die ik niet ken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meerdere sociale interacties te hebben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Betekenisvolle sociale interacties te hebben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Vereist

De pauze

10. Hoe zag voor jou in de afgelopen week de schoolpauze eruit? *

11. Zijn er schoolgenoten met wie je normaal gesproken praat maar nu niet? *

- Ja
 Nee

12. Zo wel, zou je kunnen uitleggen waarom?

13. Verdere opmerkingen? (Optioneel)

Platform survey

* Vereist

Over jou

1. Wat is jouw voornaam? *

Voer uw antwoord in

2. Met hoeveel schoolgenoten heb je gepraat tijdens deze pauze? *

Voer uw antwoord in

3. Kun je de namen van deze schoolgenoten geven? *

Voer uw antwoord in

Volgende

* Vereist

Over het platform

4. Beoordeel de geluidskwaliteit op een schaal van 1 tot 5 *



5. Indien je dit laag hebt ingevuld, denk je dat dit invloed heeft gehad op de gesprekken die je hebt gevoerd? *

 Ja Nee

6. Met dit platform vind ik het makkelijk om: *

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Te communiceren met vrienden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Een gesprek te beginnen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Een gesprek spontaan in te stappen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Te wisselen tussen gesprekken met andere mensen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Een gesprek te hebben met mensen die ik niet ken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meerdere sociale interacties te hebben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Betekenisvolle sociale interacties te hebben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Indien je negatief hebt geantwoord op een van deze vragen, zou je dit kunnen uitleggen?

Voer uw antwoord in

8. Met dit platform zou ik mijn gesprekken omschrijven als:

	1	2	3	4	5
Intimiteit: Oppervlakkig (1) <> Diepgaand (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vertel: Weinig (1) <> Veel (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ander(en) vertellen: Weinig (1) <> Veel (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kwaliteit: Onaangenaam (1) <> Aangenaam (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tevredenheid: Minder dan verwacht (1) <> Meer dan verwacht (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Terug

Verzenden

Appendix D1 Concept survey results

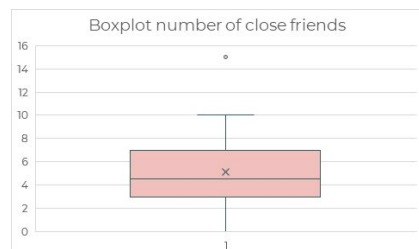
Concept survey results

Number of close friends

Boxplot created after removing one outlier of 50

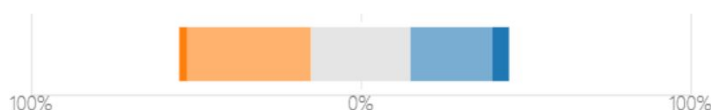
Mean: around 5

Median: around 4



Very extraverted Extraverted Neutral Introverted Very introverted

I identify myself as :



Size of friend circle

Median: 10-12

Mode: 15+

Numerous people expressed they did not understand the concept fully and that this could create some bias to their answers. This was mostly since for some reason they could not see the storyboard in the questionnaire.

Result of the AttrakDiff questionnaire.

Pragmatic Quality (PQ)

PQ mean = -0,2

The Hedonic Quality Identification (HQI)

HQI mean = 0,385714

The Hedonic Stimulation (HQS)

HQS mean = 0,596428571

The scale for overall appeal or attraction (ATT)

ATT mean = 0,360714286

Based on our benchmark we created a likert scale to test if our concept would simulate the approachable nature of communication.

Communicate with close friends; mode=agree median=agree

Initiate communication; mode=agree median=agree

Join a conversations spontaneously; mode=agree median=agree

Switch between people and conversations; mode=disagree median=neutral

Communicate with people I don't know well; mode=disagree median=neutral

Have meaningful social interactions (quality); mode= neutral/agree median=neutral

Have numerous social interactions (quantity); mode=agree median=agree

Since a lot of people misunderstood that you could use Kompassie with random people. 14 respondents expressed they would find it awkward to talk to people you do not know through Kompassie. On top of that, question twelve also shows a lot of disagree when it comes to communicating with people you do not know well.

*"I think it will be weird/awkward to talk to people i dont or barely know through such a device"
"Joining a conversation may seem easier but if you don't know who is there it may be a little hard for introverted people. The same goes for communicating with people you don't know."*

The response overall is quite positive. However, the respondents did not really feel like it would be easy to switch between people and conversations and have meaningful social interactions with.

14. As compared to a face-to-face conversation, the Kompassie concept feels more ...
Only five responses were somewhat positive. The rest of the respondents rated Kompassie as more distant and a bit strange.

15. As compared to a face-to-face conversation, the Kompassie concept feels less ...
A lot of respondents (15) expressed it Kompassie feels less personal.

16. As compared to a WhatsApp chat, the Kompassie concept feels more ...
Most people expressed they would see Kompassie as more personal, interactive and connected.

17. As compared to a WhatsApp chat, the Kompassie concept feels less ...
Most respondents say Kompassie feels less efficient or easy to use than whatsapp.

18. As compared to a Skype / videocall, the Kompassie concept feels more ...
Participants described Kompassie as spontaneous, free and explorative

19. As compared to a Skype / videocall, the Kompassie concept feels less ...
Participants saw Kompassie as less personal since you cannot see the faces of the people you talk to.

"i would like for Kompassie to also have video option, as I prefer talking to people when I see them as body language is also a big part of communication. Also close friend mode doesn't seem very useful to me as i already communicate to them in different ways"

References

Hassenzahl, M., Burmester, M., and Koller, F. AttrakDiff: Ein Fragebogen zur Messung wahrgenommener hedonischer und pragmatischer Qualität. *Mensch & Computer*, (2003), 187--196.

Hassenzahl, M. The interplay of beauty, goodness, and usability in interactive products. *Human-Computer Interaction* 19, 4 (2004), 319–349.

Isleifsdottir, J., & Larusdottir, M. (2008, June). Measuring the user experience of a task oriented software. In *Proceedings of the international workshop on meaningful measures: valid useful user experience measurement* (Vol. 8, pp. 97-101).

ID	Heure de début	Heure de fin	Adresse de messagerie	Nom	This project is part of a	What is your age?	What is your gender?	What is your primary or I identify myself as :
1	4/19/20 21:05:56	4/19/20 21:16:14	anonymous		I agree to participate in 24		Male	Design researcher Extraverted
2	4/21/20 20:44:01	4/21/20 20:54:06	anonymous		I agree to participate in 22		Male	Student Introverted
3	4/22/20 20:30:13	4/22/20 21:15:30	anonymous		I agree to participate in 21		Male	student Extraverted
4	4/24/20 11:44:21	4/24/20 11:57:39	anonymous		I agree to participate in 26		Male	student Neutral
5	4/25/20 14:19:51	4/25/20 14:36:14	anonymous		I agree to participate in 24		Male	Student Extraverted
6	4/25/20 19:32:28	4/25/20 19:40:32	anonymous		I agree to participate in 23		Female	Student Introverted
7	4/25/20 18:29:14	4/25/20 20:49:01	anonymous		I agree to participate in 21		Female	Industrial Design Student Introverted
8	4/26/20 5:13:42	4/26/20 6:37:32	anonymous		I agree to participate in 21		Male	student Extraverted
9	4/27/20 11:09:18	4/27/20 11:20:11	anonymous		I agree to participate in 21		Male	Student Neutral
10	4/27/20 11:31:31	4/27/20 11:38:36	anonymous		I agree to participate in 23		Female	Student at TU/e ID dep: Very introverted
11	4/27/20 14:12:06	4/27/20 14:29:11	anonymous		I agree to participate in 21		Female	Student Industrial Design Very introverted
12	4/27/20 16:32:10	4/27/20 16:46:13	anonymous		I agree to participate in 24		Male	Student Extraverted
13	4/27/20 20:48:19	4/27/20 20:55:52	anonymous		I agree to participate in 21		Female	Student Extraverted
14	4/28/20 11:50:38	4/28/20 11:59:58	anonymous		I agree to participate in 20		Male	Student Extraverted
15	4/29/20 17:03:12	4/29/20 17:16:52	anonymous		I agree to participate in 23		Female	Student Introverted
16	4/29/20 17:29:12	4/29/20 17:38:19	anonymous		I agree to participate in 22		Female	Study Neutral
17	4/29/20 23:09:35	4/29/20 23:23:32	anonymous		I agree to participate in 20		Female	student Extraverted
18	4/30/20 11:31:42	4/30/20 11:42:00	anonymous		I agree to participate in 19		Male	Student Industrial Design Extraverted
19	4/30/20 11:42:09	4/30/20 11:51:15	anonymous		I agree to participate in 23		Female	Student Introverted
20	4/30/20 11:41:15	4/30/20 11:53:33	anonymous		I agree to participate in 23		Female	ID student Neutral
21	4/30/20 13:13:21	4/30/20 13:55:58	anonymous		I agree to participate in 23		Male	Student Neutral
22	4/30/20 13:52:21	4/30/20 13:59:09	anonymous		I agree to participate in 21		Male	Student Neutral
23	4/30/20 14:01:38	4/30/20 14:10:21	anonymous		I agree to participate in 20		Male	Student Introverted
24	4/30/20 14:14:32	4/30/20 14:26:26	anonymous		I agree to participate in 23		Male	Studying Introverted
25	4/30/20 14:28:33	4/30/20 14:41:43	anonymous		I agree to participate in 22		Female	student Neutral
26	4/30/20 14:41:17	4/30/20 14:55:17	anonymous		I agree to participate in 20		Female	ID student (2nd year bachelor) Neutral
27	5/1/20 17:09:19	5/1/20 17:20:09	anonymous		I agree to participate in 22		Female	student and jr. designer Extraverted
28	5/2/20 13:34:31	5/2/20 13:46:17	anonymous		I agree to participate in 25		Male	Student Extraverted
29	5/2/20 15:39:00	5/2/20 15:48:41	anonymous		I agree to participate in 20		Female	Student Neutral
30	5/2/20 16:10:49	5/2/20 16:21:31	anonymous		I agree to participate in 18		Male	Student in industrial design Extraverted
31	5/2/20 17:48:51	5/2/20 18:01:20	anonymous		I agree to participate in 21		Male	Student Extraverted
32	5/2/20 18:49:09	5/2/20 21:20:29	anonymous		I agree to participate in 20		Male	Second year bachelor student Very extraverted
33	5/2/20 21:26:03	5/3/20 11:46:29	anonymous		I agree to participate in 22		Female	Student Extraverted
34	5/3/20 16:31:04	5/3/20 16:37:54	anonymous		I agree to participate in 21		Female	ID student Neutral
35	5/3/20 18:08:54	5/3/20 18:21:08	anonymous		I agree to participate in 23		Female	Student Introverted
36	5/3/20 21:05:08	5/3/20 23:42:48	anonymous		I agree to participate in 21		Male	Student Neutral
37	5/4/20 13:25:17	5/4/20 13:37:06	anonymous		I agree to participate in 22		Female	Student Introverted
38	5/4/20 15:53:11	5/4/20 16:06:48	anonymous		I agree to participate in 22		Female	student Extraverted
39	5/4/20 16:02:31	5/4/20 16:13:06	anonymous		I agree to participate in 20		Female	University Neutral
40	5/4/20 17:30:47	5/4/20 18:37:52	anonymous		I agree to participate in 21		Male	Student Extraverted

be 'open' for calls to multiple people depending on the range. However, due to the unclear prototype my responses may be biased somewhat.

Left concept

Right concept

Right concept
Right concept

Right concept

Left concept

Right concept

Left concept

Right concept

Right concept

Right concept

Right concept
Right concept

Right concept

Right concept

Right concept
Right concept

Right concept

Right concept

Cautious <> Bold Conservative <> Innovative <> Dull <> Captivating Undemanding <> Challenging <> Ordinary <> Novel Unpleasant <> Pleasant Ugly <> Attractive Disagreeable <> Likeable Rejecting <> Inviting Bad <> Good

Right concept

Right concept

Right concept

Right concept

Right concept

	As compared to a face-to-face	As compared to a face-to-face	As compared to a face-to-face	As compared to a face-to-face	As compared to a face-to-face	As compared to a face-to-face	Do you have any additional comments?
playful	personal	engaging	structured	fun	professional		Learn how to program a
Arbitrary	Personal	Personal	Efficient	Gimmicky	Reliable		Also think about how yo
the same	the same	personal, hearing some	distant	vague	clear		
reaching	connecting with person	human , demanding , u	easy	handy	in social communication		
Like a tube you talk thro	Intimidating if you want	Old fashioned and tech	Superficial	Focused on listening an	Right for showing examples		
fake	empathetic	open to conversation	restricting to only typin	Personal, as you have to	meaningful, as you cannot see the face of other		
abstract.	private	spontaneous	private	entertaining and confus	overwhelming when talking to a lot of people.		
Isolating and confusing.	Exciting	complicated	simple	lonely	worthwhile		Maybe somehow link to
A bit forced, however, z	Still distanced more, i.e	inviting to start a conve	ordinary to use	spontaneous	1 to 1, less connected		
Distanced	Personal	Personal	Quick	Engaging	Practical		Very nice concept! This
scary, itis weird to start	Personal	Lke actually having a co	handy. It ieasier to talk	explorative, you can ex	perosnal, you can't see		i would like for compes
Like a phone call.	Engaging, makes it hard	Scary to use	Pressured to use and re	I believe these to be pr	I believe these to be pr		Lets hope the Covid-19
technical	intimate	spontaneous	easy	comfortable	awkward		
Distant and hard to rea	Real and satisfactory	as a conversation since	clear who you are talkir	vague, you could meet	personal since there is no video		
Digital	Personal	Intrusive	Easy to understand	Spontaneous	Easy to use		
.	.	/		
far away	personal, interactive	personal, responsive, fc	voluntary	spontaneous	visual		
inpersonal	like you need to know p	open for conversations	Personal	uncomfortable	teadies		
Distanced	Direct	Personal	Static	Distanced	Direct		
easy to initiate convers	personal	personal	easier	random to talk with oth	forced		
accessible, less of a thr	personal, intimate	compasionate	reliable	Spontaneous	Personal, intimate		
Strange	personal	interactive	straightforward	free	structured		
Like a gimmick or chore	Real	Unreliable	personal and manageabl	free	Intuitive		
like speaking to someor	connected	connected	in control	natural	directly		
impersonal	social	face to face	trusted	pushy	chosen		
Distancing	like you are talking to a	integrating/intuitive	as a way to be able to h	intuitive in starting a co	clear		-
detached	personal	real	easy	low key	personal		
Distant	Personal	Interactive	Useful, effective, close	Distant	Formal		
forced	Avoidable	Spontaneous	User friendly	Spontaneous	Connecting		
distant	intimate, real	personal	practical	distant	close		
Distant, it's like a video	Spontaneous, because th	Commuicative, talking i	Disruptive. If notication	like a phone call. As sai	work intensive. If the K		Maybe add video, and c
Distant and demanding	Genuine	Personal	Low-key	Informal	Conventional		
Individual	Personal	Personal	M	A	A		
Digital	Personal	Spontaneous	Forced	Low threshold	awkward		
Distance, because you c	Meaningful	Special, and surprising	Direct	Surprising	Handy		
distanced	connected	connected	plain and more context	spontaneous	connecting because of the missing visual elem		
like a phone call	inviting	fun	straightforwards	spontaneous	serious		
a limited option	attractive	connected	effective	for close friends only	study related		
unnecessarily compical	personal	personal	efficient	talking to thin air	directed		
awkward	Real	Conecting to new peopl	clear who talking to	.	.		

Appendix D2 baseline and evaluation survey results

Baseline survey

Table 1: Social interactions during recess.

<i>Participant</i>	<i>I would describe myself as:</i>	<i>With how many peers do you feel befriended?</i>	<i>How many peers have you spoken to the past seven days?</i>	<i>What did recess look like for you the past seven days?</i>	<i>Are the peers you would normally talk to but do not now?</i>	<i>If so, could you explain why?</i>
1	Introverted	6-8	4	animal crossing spelen	Ja	je moet elkaar bellen om te praten
2	Very extraverted	13+	6	Saai, weinig contact met andere	Ja	Normaal zie ik ze spontaan op school en dan begin je een gesprek maar vanuit het niks begin je niet snel een gesprek
3	Extraverted	9-12	6	Geen?	Ja	Minder behoefte aan contact
4	Introverted	6-8	7	Heel kort en alleen	Ja	Je komt ze nu niet meer zomaar tegen in de gang of klas
5	Neutral	6-8	3	Niet	Ja	
6	Very extraverted	13+	20+	Veel op me telefoon	Ja	Het zijn niet echt vrienden maar schoolvrienden
7	Neutral	6-8	8	Gezellig	Ja	Ze mensen die wat verder weg staan spreek ik minder
8	Neutral	13+	10	Niet	Ja	

Table 2: Use of other communication tools.

<i>Participant</i>	<i>Face-to-face conversation</i>	<i>Calling</i>	<i>Video-calling (Skype, FaceTime, Discord etc.)</i>	<i>Text messaging (Whatsapp, SMS etc.)</i>	<i>Sociale media (Snapchat, Instagram, TikTok etc.)</i>
1	Very rarely	Very rarely	Rarely	Frequently	Occasionally
2	Rarely	Occasionally	Rarely	Very frequently	Frequently
3	Occasionally	Rarely	Occasionally	Frequently	Occasionally
4	Rarely	Occasionally	Frequently	Very frequently	Very frequently
5	Rarely	Rarely	Very rarely	Rarely	Frequently
6	Occasionally	Rarely	Frequently	Very frequently	Very frequently
7	Frequently	Occasionally	Frequently	Very frequently	Very frequently
8	Occasionally	Very rarely	Very rarely	Frequently	Occasionally

Table 3: RIR from baseline survey.

<i>Participant</i>	<i>Intimacy: Superficial (1) <> Meaningful(5)</i>	<i>I disclose: Very little (1) <> A lot(5)</i>	<i>Others disclose: Very little (1) <> A lot (5)</i>	<i>Quality: Unpleasant (1) <> Pleasant (5)</i>	<i>Satisfaction: Less than expected (1) <> More than expected(5)</i>
1	3	2	4	3	3
2	1	2	2	2	2
3	3	3	3	4	3
4	3	3	4	5	3
5	4	5	5	4	4
6	3	5	5	3	3
7	4	4	4	3	3
8	3	3	3	5	3

Legend: Completely disagree < 1 2 3 4 5 > Completely agree

Table 4: Approachable nature of communication from baseline survey. Questions start with: "It is easy for me to".

<i>Participant</i>	<i>Communicate with friends</i>	<i>Join a conversation spontaneously</i>	<i>Initiate communication</i>	<i>Switch communicating between different people and conversations</i>	<i>Have a conversation with people I don't know</i>	<i>Have multiple social interactions</i>	<i>Have meaningful social interactions</i>
1	5	4	3	3	3	3	3
2	3	4	4	4	4	2	2
3	4	4	4	4	2	4	3
4	5	3	1	1	1	2	3
5	4	4	3	2	2	3	4
6	3	3	4	3	1	3	3
7	3	3	2	2	1	3	3
8	5	5	5	5	3	3	4

Legend: Completely disagree < 1 2 3 4 5 > Completely agree

Evaluation survey

Table 5: RIR from evaluation survey.

Participant	Intimacy: Superficial (1) <> Meaningful(5)	I disclose: Very little (1) <> A lot(5)	Others disclose: Very little (1) <> A lot (5)	Quality: Unpleasant (1) <> Pleasant (5)	Satisfaction: Less than expected (1) <> More than expected(5)
5	4	4	4	5	5
6	4	5	4	4	3
7	3	5	5	2	3
8	3	3	3	4	4

Legend: Completely disagree < 1 2 3 4 5 > Completely agree

Table 6: Approachable nature of communication from evaluation survey. Questions start with: "It is easy for me to".

Participant	Comm unicate with friends	Join a conversation spontaneousl y	Initiate commun ication	Switch communicating between different people and conversations	Have a conversation with people I don't know	Have multiple social interactions	Have meaningful social interactions
5	4	3	4	4	3	3	3
6	5	5	4	4	4	4	5
7	4	4	4	4	1	4	4
8	4	4	3	5	5	4	4

Legend: Completely disagree < 1 2 3 4 5 > Completely agree

Table 7: Evaluation of the sound quality in the platform.

Participant	Please rate the audio quality on a scale from 1 to 5.	Did the audio quality have an influence on the quality of communication?
5	5	
6	4	no
7	2	yes
8	4	

Table 8: Comments about the platform.

Participant	Comments
5	
6	Easy to talk to people you don't know very well
7	Some people I hear loudly and others not while sitting close together.
8	

Appendix E1 Processing spatial chatprototype

```
import processing.sound.*;

SoundFile[] file;

float myX;
float myY;
int mySize = 64;

int userAmount = 6;
float[] userSize = new float[userAmount];
int[] userX = new int[userAmount];
int[] userY = new int[userAmount];
float[] userDistance = new float[userAmount];
String[] userAudio = {"KoninginBeatrix.mp3",
"KoningWillemAlexander.mp3",
"PremierRutte.mp3", "MartinLutherKing.mp3",
"QueenOfEngland.mp3",
"PresidentObama.mp3"};
float[] userVolume = new float[userAmount];

boolean collision = false;
int iHold;

void setup() {
    size(700, 700);

    userX[0] = 100;
    userX[1] = 200;
    userX[2] = 300;
    userX[3] = 400;
    userX[4] = 500;
    userX[5] = 600;

    userY[0] = 100;
    userY[1] = 150;
    userY[2] = 100;
    userY[3] = 300;
    userY[4] = 400;
    userY[5] = 600;

    file = new SoundFile[userAmount];

    // Load 5 soundfiles from a folder in a for loop.
    for (int i = 0; i < userAmount; i++) {
        file[i] = new SoundFile(this, userAudio[i]);
        file[i].loop();
    }
}

void draw() {
    background(255);

    if (userDistance[iHold] > 64) {
        collision = false;
    }

    if (!collision) {
        myX = mouseX;
        myY = mouseY;
    }

    for (int i = 0; i < userAmount; i++) {

        userDistance[i] = (sqrt(sq(userX[i] - mouseX) +
sq(userY[i] - mouseY)));

        userSize[i] = 64 - userDistance[i] / 4;

        if (userDistance[i] > 191) file[i].amp(0.001);
        if (userDistance[i] < 192) file[i].amp(0.2);
        if (userDistance[i] < 160) file[i].amp(0.4);
        if (userDistance[i] < 128) file[i].amp(0.6);
        if (userDistance[i] < 96) file[i].amp(0.8);
        if (userDistance[i] < 64) file[i].amp(1.0);

        if (userSize[i] < 16) {
            userSize[i] = 16;
        }
        ellipse(userX[i], userY[i], userSize[i],
userSize[i]);

        if (userDistance[i] < 64) {
            collision = true;
            iHold = i;
        }
    }
    ellipse(myX, myY, mySize, mySize);
    line(mouseX + 16, mouseY, mouseX - 16,
mouseY);
    line(mouseX, mouseY - 16, mouseX, mouseY +
16);
}
```

Appendix E2 Arduino codes

Arduino code Kompassie

```
#include <FastLED.h>

#include <Wire.h>
#include <FaBo9Axis MPU9250.h>

FaBo9Axis fabo_9axis;

#define Magnetometer_mX0 0x03
#define Magnetometer_mX1 0x04
#define Magnetometer_mZ0 0x05
#define Magnetometer_mZ1 0x06
#define Magnetometer_mY0 0x07
#define Magnetometer_mY1 0x08

int mX0, mX1, mX_out;
int mY0, mY1, mY_out;
int mZ0, mZ1, mZ_out;

float heading, headingDegrees, headingFiltered, declination;

float Xm, Ym, Zm;

#define NUM_LEDS24 24
#define NUM_LEDS16 16
#define NUM_LEDS12 12
#define NUM_LEDS8 8
#define NUM_LEDS1 1

// Data pin that led data will be written out over
#define DATA_PIN3 3
#define DATA_PIN5 5
#define DATA_PIN6 6
#define DATA_PIN9 9
#define DATA_PIN11 11

// This is an array of leds. One item for each led in your strip.
CRGB leds24[NUM_LEDS24];
CRGB leds16[NUM_LEDS16];
CRGB leds12[NUM_LEDS12];
CRGB leds8[NUM_LEDS8];
CRGB leds1[NUM_LEDS1];

int x = 0;
bool ascending = true;
int count = 0;

#define Magnetometer 0x1E //I2C 7bit address of HMC5883

void setup() {
  //Initialize Serial and I2C communications
  Serial.begin(115200);
  Wire.begin();
  delay(100);

  Serial.println("configuring device.");

  if (fabo_9axis.begin()) {
    Serial.println("configured FaBo 9Axis I2C Brick");
  } else {
    Serial.println("device error");
    while (1);
  }

  Wire.beginTransmission(Magnetometer);
  Wire.write(0x02); // Select mode register
  Wire.write(0x00); // Continuous measurement mode
  Wire.endTransmission();

  FastLED.addLeds<SK6812, DATA_PIN3, RGB>(leds24, NUM_LEDS24);
  FastLED.addLeds<SK6812, DATA_PIN5, RGB>(leds16, NUM_LEDS16);

  FastLED.addLeds<SK6812, DATA_PIN6, RGB>(leds12, NUM_LEDS12);
  FastLED.addLeds<SK6812, DATA_PIN9, RGB>(leds8, NUM_LEDS8);

  FastLED.addLeds<SK6812, DATA_PIN11, RGB>(leds1, NUM_LEDS1);
}

void loop() {
  float mx, my, mz;
```



```

fabo_9axis.readMagnetXYZ(&mx, &my, &mz);

Xm = mx;
Ym = my;
Zm = mz;

//---- X-Axis
Wire.beginTransaction(Magnetometer); // transmit to device
Wire.write(Magnetometer_mX1);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
  mX0 = Wire.read();
}
Wire.beginTransaction(Magnetometer); // transmit to device
Wire.write(Magnetometer_mX0);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
  mX1 = Wire.read();
}

//---- Y-Axis
Wire.beginTransaction(Magnetometer); // transmit to device
Wire.write(Magnetometer_mY1);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
  mY0 = Wire.read();
}
Wire.beginTransaction(Magnetometer); // transmit to device
Wire.write(Magnetometer_mY0);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
  mY1 = Wire.read();
}

//---- Z-Axis
Wire.beginTransaction(Magnetometer); // transmit to device
Wire.write(Magnetometer_mZ1);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
  mZ0 = Wire.read();
}
Wire.beginTransaction(Magnetometer); // transmit to device
Wire.write(Magnetometer_mZ0);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
  mZ1 = Wire.read();
}

heading = atan2(Ym, Xm);

// Correcting the heading with the declination angle depending on your location
// You can find your declination angle at: https://www.ngdc.noaa.gov/geomag-web/
// At my location it's 4.2 degrees => 0.073 rad
declination = 0.01745329252;
heading += declination;

// Correcting when signs are reversed
if (heading < 0) heading += 2 * PI;

// Correcting due to the addition of the declination angle
if (heading > 2 * PI) heading -= 2 * PI;

headingDegrees = heading * 180 / PI; // The heading in Degrees unit

// Smoothing the output angle / Low pass filter
headingFiltered = headingFiltered * 0.85 + headingDegrees * 0.15;

//Sending the heading value through the Serial Port to Processing IDE
Serial.println(headingFiltered);

if (count < 3) {
  leds1[0].setRGB(x, x, x);
  FastLED.show();

  if (ascending == true) {
    x = x + 10;
  }
}

```

```

    }
    if (x >= 255) {
        ascending = false;
    }
    if (ascending == false) {
        x = x - 10;
    }
    if (x <= 0) {
        ascending = true;
        count = count + 1;
    }

    Serial.println(x);

    leds1[0] = CRGB::Black;
}

if (count == 3)
{
    int Ring24 = map(-headingDegrees, 0, -80, 23, 0);
    int Ring16 = map(-headingDegrees, 0, -80, 15, 0);
    int Ring12 = map(-headingDegrees, 0, -80, 11, 0);
    int Ring8 = map(-headingDegrees, 0, -80, 7, 0);

    leds24[VnR(0, Ring24, 24)].setRGB(165, 255, 0);
    leds24[VnR(1, Ring24, 24)].setRGB(165, 255, 0);
    leds24[VnR(2, Ring24, 24)].setRGB(100, 0, 50);
    leds24[VnR(4, Ring24, 24)].setRGB(100, 0, 50);
    leds16[VnR(1, Ring16, 16)].setRGB(165, 255, 0);
    leds16[VnR(3, Ring16, 16)].setRGB(100, 0, 50);
    leds16[VnR(4, Ring16, 16)].setRGB(100, 0, 50);
    leds16[VnR(9, Ring16, 16)].setRGB(100, 0, 50);
    leds16[VnR(10, Ring16, 16)].setRGB(100, 0, 50);

    leds1[0] = CRGB::White;

    FastLED.show();

    leds24[VnR(0, Ring24, 24)] = CRGB::Black;
    leds24[VnR(1, Ring24, 24)] = CRGB::Black;
    leds24[VnR(2, Ring24, 24)] = CRGB::Black;
    leds24[VnR(4, Ring24, 24)] = CRGB::Black;
    leds16[VnR(1, Ring16, 16)] = CRGB::Black;
    leds16[VnR(3, Ring16, 16)] = CRGB::Black;
    leds16[VnR(4, Ring16, 16)] = CRGB::Black;
    leds16[VnR(9, Ring16, 16)] = CRGB::Black;
    leds16[VnR(10, Ring16, 16)] = CRGB::Black;
}
delay(50);
}

int VnR(int value, int rotation, int ring)
{
    int x = value;
    int y = rotation;
    int z = ring;
    int result = x + y;
    if (result > z - 1) {
        result -= z - 1;
    }
    return result;
}

```

Arduino code walking with Kompassie

```

#include <FastLED.h>

#include <Wire.h>
#include <FaBo9Axis_MPU9250.h>

FaBo9Axis fabo_9axis;

#define Magnetometer_mX0 0x03
#define Magnetometer_mX1 0x04
#define Magnetometer_mZ0 0x05
#define Magnetometer_mZ1 0x06
#define Magnetometer_mY0 0x07
#define Magnetometer_mY1 0x08

int mX0, mX1, mX_out;
int mY0, mY1, mY_out;
int mZ0, mZ1, mZ_out;

```

```

float heading, headingDegrees, headingFiltered, declination;

float Xm, Ym, Zm;

#define NUM_LEDS24 24
#define NUM_LEDS16 16
#define NUM_LEDS12 12
#define NUM_LEDS8 8
#define NUM_LEDS1 1

// Data pin that led data will be written out over
#define DATA_PIN3 3
#define DATA_PIN5 5
#define DATA_PIN6 6
#define DATA_PIN9 9
#define DATA_PIN11 11

// This is an array of leds. One item for each led in your strip.
CRGB leds24[NUM_LEDS24];
CRGB leds16[NUM_LEDS16];
CRGB leds12[NUM_LEDS12];
CRGB leds8[NUM_LEDS8];
CRGB leds1[NUM_LEDS1];

#define Magnetometer 0x1E //I2C 7bit address of HMC5883

int time = 0;

int interval = 30;

void setup() {
  //Initialize Serial and I2C communications
  Serial.begin(115200);
  Wire.begin();
  delay(100);

  Serial.println("configuring device.");

  if (fabo_9axis.begin()) {
    Serial.println("configured FaBo 9Axis I2C Brick");
  } else {
    Serial.println("device error");
    while (1);
  }

  Wire.beginTransmission(Magnetometer);
  Wire.write(0x02); // Select mode register
  Wire.write(0x00); // Continuous measurement mode
  Wire.endTransmission();

  FastLED.addLeds<SK6812, DATA_PIN3, RGB>(leds24, NUM_LEDS24);
  FastLED.addLeds<SK6812, DATA_PIN5, RGB>(leds16, NUM_LEDS16);

  FastLED.addLeds<SK6812, DATA_PIN6, RGB>(leds12, NUM_LEDS12);
  FastLED.addLeds<SK6812, DATA_PIN9, RGB>(leds8, NUM_LEDS8);

  FastLED.addLeds<SK6812, DATA_PIN11, RGB>(leds1, NUM_LEDS1);
}

void loop() {

  float mx, my, mz;

  fabo_9axis.readMagnetXYZ(&mx, &my, &mz);

  Xm = mx;
  Ym = my;
  Zm = mz;

  //---- X-Axis
  Wire.beginTransmission(Magnetometer); // transmit to device
  Wire.write(Magnetometer_mX1);
  Wire.endTransmission();
  Wire.requestFrom(Magnetometer, 1);
  if (Wire.available() <= 1)
  {
    mX0 = Wire.read();
  }
  Wire.beginTransmission(Magnetometer); // transmit to device
  Wire.write(Magnetometer_mX0);
  Wire.endTransmission();
  Wire.requestFrom(Magnetometer, 1);
  if (Wire.available() <= 1)
  {

```

```

    mX1 = Wire.read();
}

//---- Y-Axis
Wire.beginTransmission(Magnetometer); // transmit to device
Wire.write(Magnetometer_mY1);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
    mY0 = Wire.read();
}
Wire.beginTransmission(Magnetometer); // transmit to device
Wire.write(Magnetometer_mY0);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
    mY1 = Wire.read();
}

//---- Z-Axis
Wire.beginTransmission(Magnetometer); // transmit to device
Wire.write(Magnetometer_mZ1);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
    mZ0 = Wire.read();
}
Wire.beginTransmission(Magnetometer); // transmit to device
Wire.write(Magnetometer_mZ0);
Wire.endTransmission();
Wire.requestFrom(Magnetometer, 1);
if (Wire.available() <= 1)
{
    mZ1 = Wire.read();
}

heading = atan2(Ym, Xm);

// Correcting the heading with the declination angle depending on your location
// You can find your declination angle at: https://www.ngdc.noaa.gov/geomag-web/
// At my location it's 4.2 degrees => 0.073 rad
declination = 0.01745329252;
heading += declination;

// Correcting when signs are reversed
if (heading < 0) heading += 2 * PI;

// Correcting due to the addition of the declination angle
if (heading > 2 * PI) heading -= 2 * PI;

headingDegrees = heading * 180 / PI; // The heading in Degrees unit

// Smoothing the output angle / Low pass filter
headingFiltered = headingFiltered * 0.85 + headingDegrees * 0.15;

//Sending the heading value through the Serial Port to Processing IDE
Serial.println(headingFiltered);

int Ring24 = map(-headingDegrees, 0, -80, 23, 0);
int Ring16 = map(-headingDegrees, 0, -80, 15, 0);
int Ring12 = map(-headingDegrees, 0, -80, 11, 0);
int Ring8 = map(-headingDegrees, 0, -80, 7, 0);

time += 1;

if(time < interval){

leds24[VnR(0, Ring24, 24)].setRGB(165,255,0);
leds24[VnR(1, Ring24, 24)].setRGB(165,255,0);
leds24[VnR(2, Ring24, 24)].setRGB(100, 0, 50);
leds24[VnR(4, Ring24, 24)].setRGB(100, 0, 50);
leds16[VnR(1, Ring16, 16)].setRGB(165,255,0);
leds16[VnR(3, Ring16, 16)].setRGB(100, 0, 50);
leds16[VnR(4, Ring16, 16)].setRGB(100, 0, 50);
leds16[VnR(9, Ring16, 16)].setRGB(100, 0, 50);
leds16[VnR(10, Ring16, 16)].setRGB(100, 0, 50);

}

if(time >= interval && time < interval * 2) {
leds16[VnR(0, Ring16, 16)].setRGB(165,255,0);
leds16[VnR(1, Ring16, 16)].setRGB(165,255,0);
leds16[VnR(2, Ring16, 16)].setRGB(100, 0, 50);
leds12[VnR(1, Ring12, 12)].setRGB(165,255,0);
leds12[VnR(3, Ring12, 12)].setRGB(100, 0, 50);
}

```

```

leds16[VnR(5, Ring16, 16)].setRGB(100, 0, 50);
leds24[VnR(14, Ring24, 24)].setRGB(100, 0, 50);
leds24[VnR(15, Ring24, 24)].setRGB(100, 0, 50);
}

if(time >= interval * 2){
leds12[VnR(1, Ring12, 12)].setRGB(165,255,0);
leds12[VnR(2, Ring12, 12)].setRGB(100, 0, 50);
leds16[VnR(6, Ring16, 16)].setRGB(100, 0, 50);
leds24[VnR(10, Ring24, 24)].setRGB(100, 0, 50);
leds8[VnR(1, Ring8, 8)].setRGB(165,255,0);
leds8[VnR(0, Ring8, 8)].setRGB(165,255,0);
}

leds1[0] = CRGB::White;

FastLED.show();

if(time < interval){

leds24[VnR(0, Ring24, 24)] = CRGB::Black;
leds24[VnR(1, Ring24, 24)] = CRGB::Black;
leds24[VnR(2, Ring24, 24)] = CRGB::Black;
leds24[VnR(4, Ring24, 24)] = CRGB::Black;
leds16[VnR(1, Ring16, 16)] = CRGB::Black;
leds16[VnR(3, Ring16, 16)] = CRGB::Black;
leds16[VnR(4, Ring16, 16)] = CRGB::Black;
leds16[VnR(9, Ring16, 16)] = CRGB::Black;
leds16[VnR(10, Ring16, 16)] = CRGB::Black;

}

if(time >= interval && time < interval * 2) {
leds16[VnR(0, Ring16, 16)] = CRGB::Black;
leds16[VnR(1, Ring16, 16)] = CRGB::Black;
leds16[VnR(2, Ring16, 16)] = CRGB::Black;
leds12[VnR(1, Ring12, 12)] = CRGB::Black;
leds12[VnR(3, Ring12, 12)] = CRGB::Black;
leds16[VnR(5, Ring16, 16)] = CRGB::Black;
leds24[VnR(14, Ring24, 24)] = CRGB::Black;
leds24[VnR(15, Ring24, 24)] = CRGB::Black;
}

if(time >= interval * 2){
leds12[VnR(1, Ring12, 12)] = CRGB::Black;
leds12[VnR(2, Ring12, 12)] = CRGB::Black;
leds16[VnR(6, Ring16, 16)] = CRGB::Black;
leds24[VnR(10, Ring24, 24)] = CRGB::Black;
leds8[VnR(1, Ring8, 8)] = CRGB::Black;
leds8[VnR(0, Ring8, 8)] = CRGB::Black;
}

if(time > interval * 3){
time = 0;
}

delay(50);
}

int VnR(int value, int rotation, int ring)
{
int x = value;
int y = rotation;
int z = ring;
int result = x + y;
if (result > z - 1) {
result -= z - 1;
}
return result;
}

```

Appendix E4 Python code for data analysis

```
In [1]: import numpy as np
import pandas as pd
import datetime

# next command ensures that plots appear inside the notebook
%matplotlib inline
import matplotlib.pyplot as plt
import seaborn as sns
sns.set() # set Seaborn defaults
plt.rcParams['figure.figsize'] = 12, 5 # default hor./vert. size of plots, in inches
plt.rcParams['lines.markeredgewidth'] = 1 # to fix issue with seaborn box plots; needed after import seaborn

import warnings
warnings.filterwarnings('ignore')
```

```
In [2]: file_RIR = 'RIR.csv'
file_App = 'Approachable.csv'
```

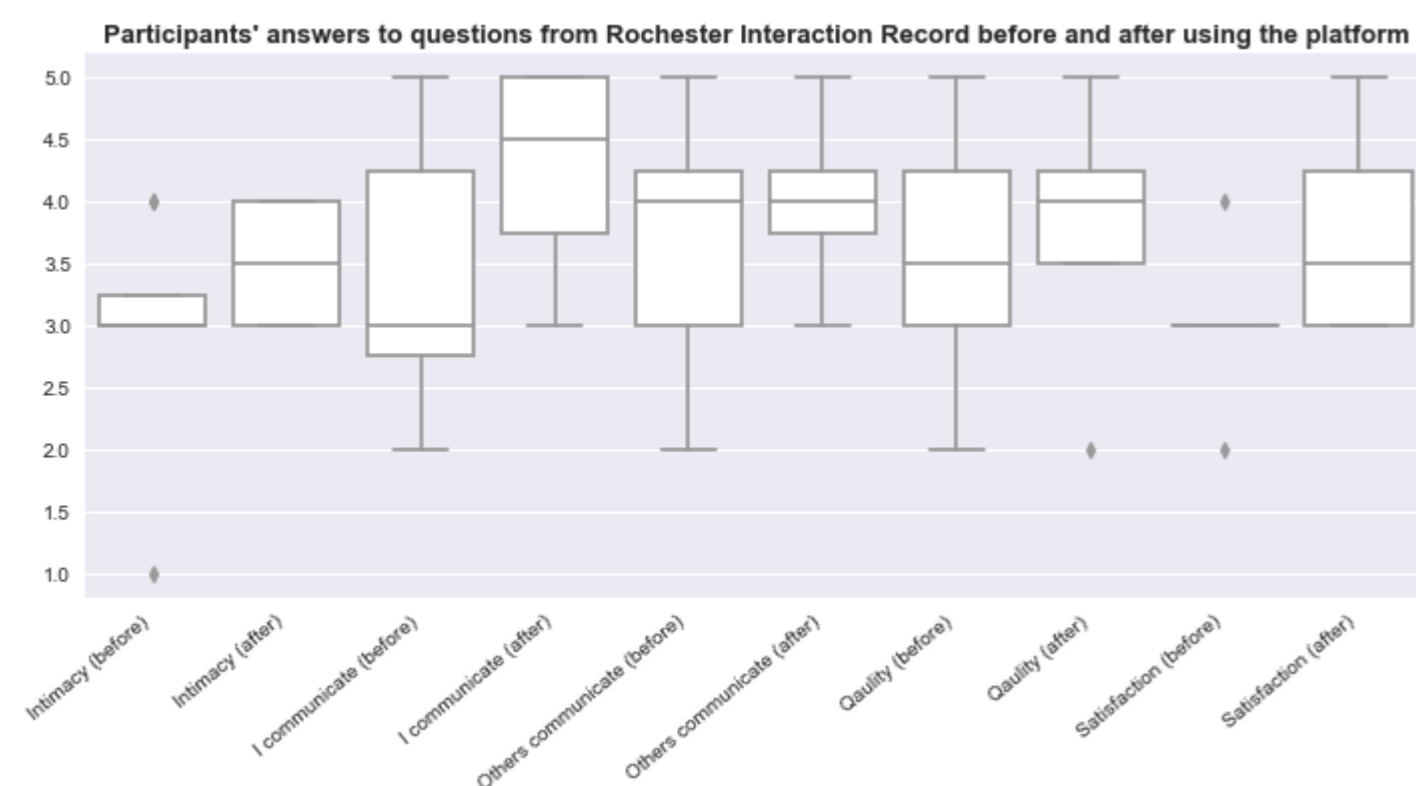
```
In [3]: df_RIR = pd.read_csv(file_RIR, sep=';')
df_RIR.head(8)
```

```
Out[3]:
```

	Intimacy (before)	Intimacy (after)	I communicate (before)	I communicate (after)	Others communicate (before)	Others communicate (after)	Quality (before)	Quality (after)	Satisfaction (before)	Satisfaction (after)
0	3	NaN	2	NaN	4	NaN	3	NaN	3	NaN
1	1	NaN	2	NaN	2	NaN	2	NaN	2	NaN
2	3	NaN	3	NaN	3	NaN	4	NaN	3	NaN
3	3	NaN	3	NaN	4	NaN	5	NaN	3	NaN
4	4	4.0	5	4.0	5	4.0	4	5.0	4	5.0
5	3	4.0	5	5.0	5	4.0	3	4.0	3	3.0
6	4	3.0	4	5.0	4	5.0	3	2.0	3	3.0
7	3	3.0	3	3.0	3	3.0	5	4.0	3	4.0

```
In [4]: rir = sns.boxplot(data=df_RIR, color='white');
rir.set_title("Participants' answers to questions from Rochester Interaction Record before and after using the platform", size=13, weight='bold')
plt.xticks(rotation=40, ha='right')
rir
```

```
Out[4]: <matplotlib.axes._subplots.AxesSubplot at 0x1fe95690278>
```



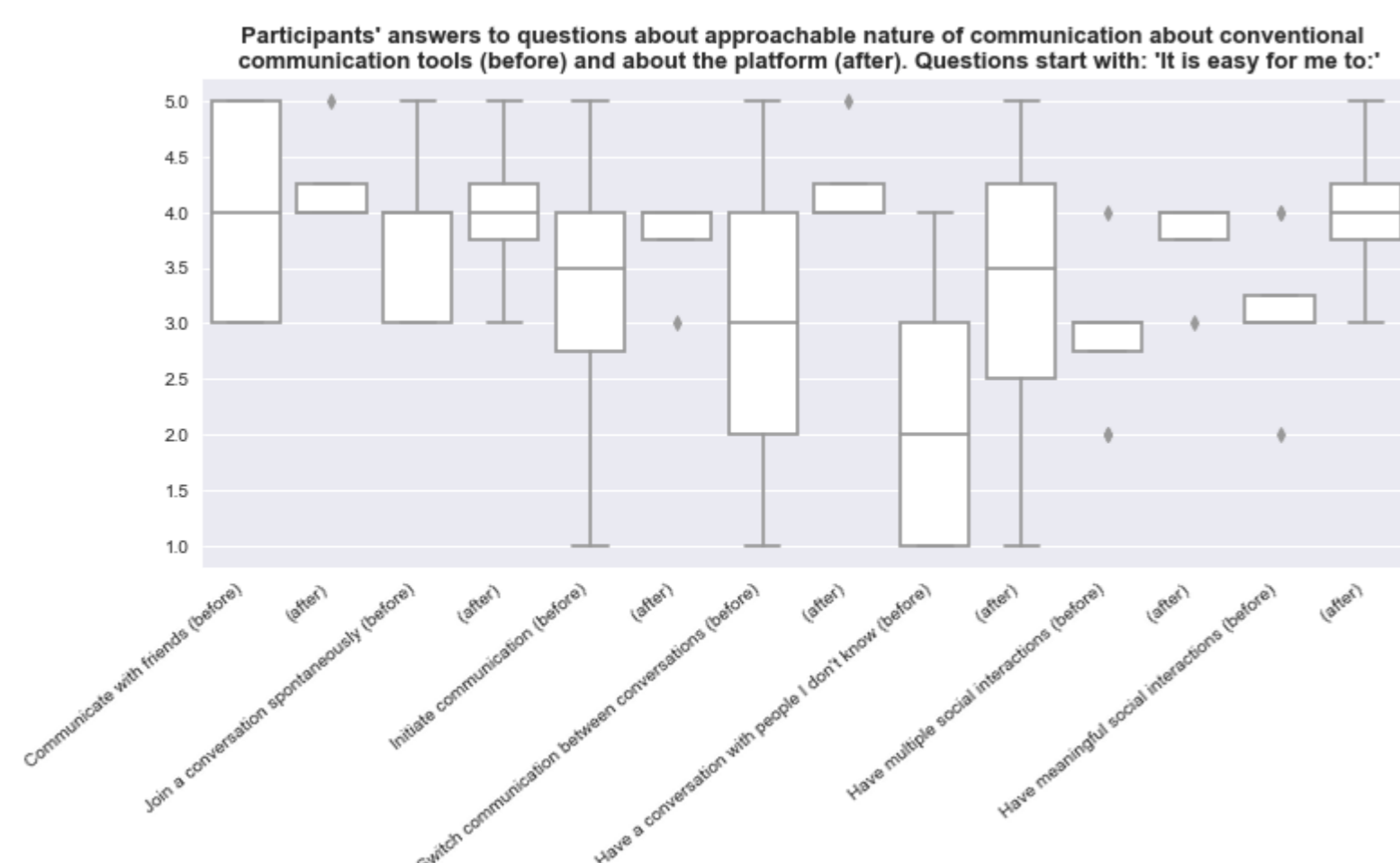
```
In [5]: df_App = pd.read_csv(file_App, sep=';')
df_App.head(8)
```

```
Out[5]:
```

	Communicate with friends (before)	(after)	Join a conversation spontaneously (before)	(after)	Initiate communication (before)	(after)	Switch communication between conversations (before)	(after)	Have a conversation with people I don't know (before)	(after)	Have multiple social interactions (before)	(after)	Have meaningful social interactions (before)	(after)
0	5	NaN	4	NaN	3	NaN	3	NaN	3	NaN	3	NaN	3	NaN
1	3	NaN	4	NaN	4	NaN	4	NaN	4	NaN	2	NaN	2	NaN
2	4	NaN	4	NaN	4	NaN	4	NaN	2	NaN	4	NaN	3	NaN
3	5	NaN	3	NaN	1	NaN	1	NaN	1	NaN	2	NaN	3	NaN
4	4	4.0	4	3.0	3	4.0	2	4.0	2	3.0	3	3.0	4	3.0
5	3	5.0	3	5.0	4	4.0	3	4.0	1	4.0	3	4.0	3	5.0
6	3	4.0	3	4.0	2	4.0	2	4.0	1	1.0	3	4.0	3	4.0
7	5	4.0	5	4.0	5	3.0	5	5.0	3	5.0	3	4.0	4	4.0

```
In [6]: app = sns.boxplot(data=df_App, color='white');
app.set_title("Participants' answers to questions about approachable nature of communication about conventional \n communication tools (before) and about the platform (after). Questions start with: 'It is easy for me to:'", size=13, weight='bold')
plt.xticks(rotation=40, ha='right')
app
```

```
Out[6]: <matplotlib.axes._subplots.AxesSubplot at 0x1fe95d5aeb8>
```



```
In [7]: rir.get_figure().savefig('RIR.pdf', bbox_inches='tight')
```

```
In [8]: app.get_figure().savefig('App.pdf', bbox_inches='tight')
```

Appendix F Videos

Link to the final video:

<https://youtu.be/FZRIJWzkkLo>

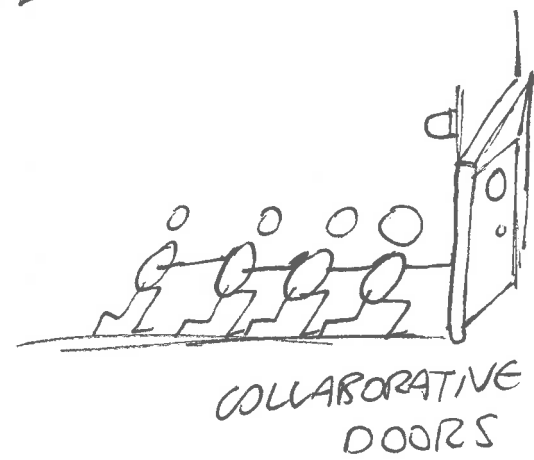
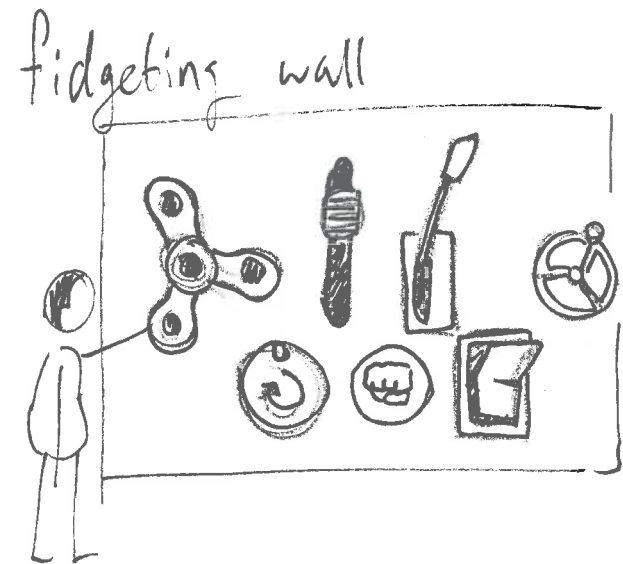
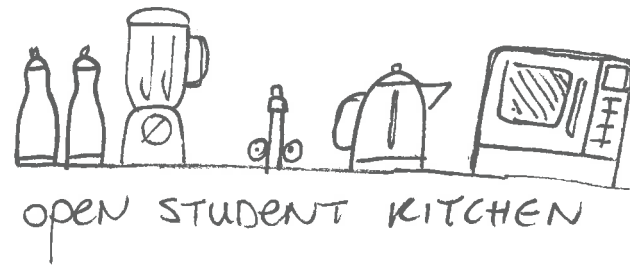
Render video:

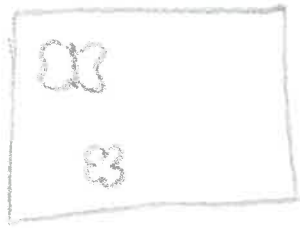
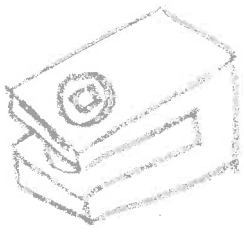
<https://imgur.com/a/HDk8zwc>

Link to the midterm video:

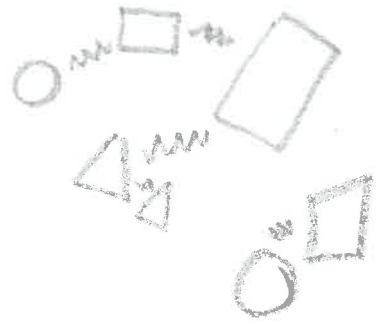
<https://youtu.be/A6-pLJ-HsgE>

Appendix G1 100 sketches challenge

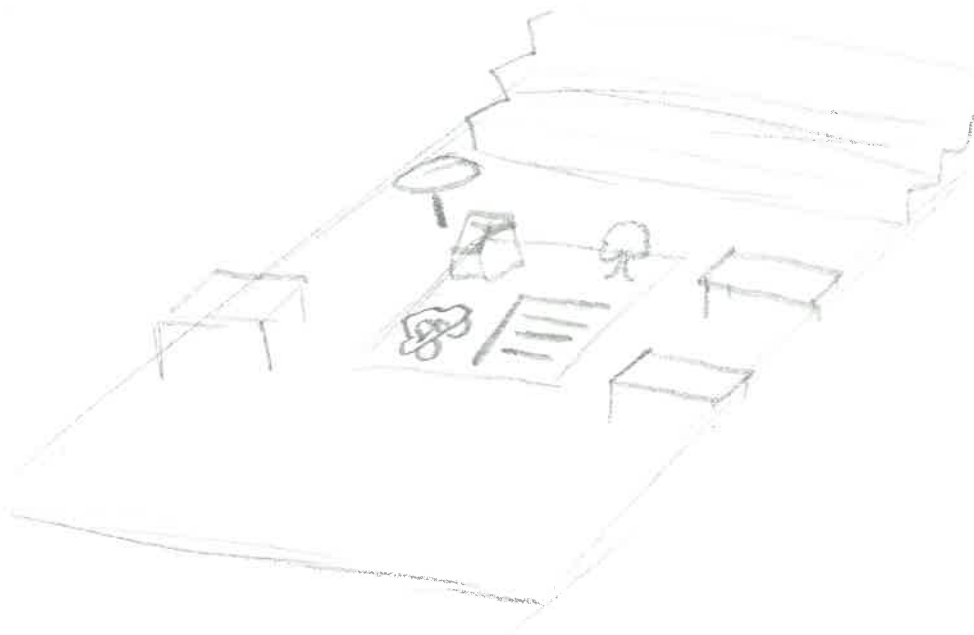




STAMP & DISPLAY



BUILD WITH
MAGNETS



AR SIMULATION

GROWTH
BEAM

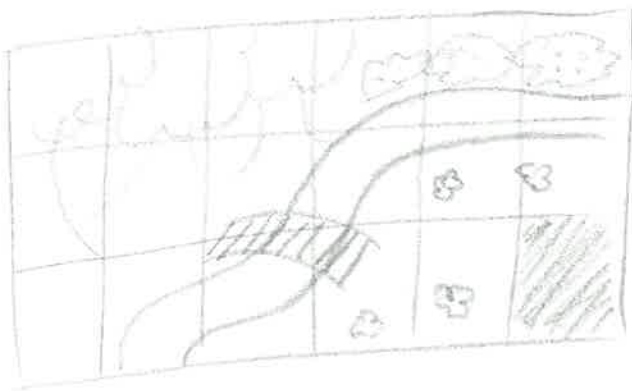




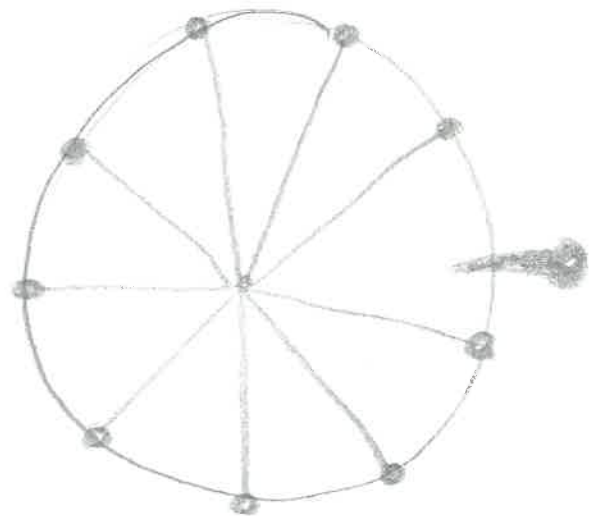
FOOTPRINT FLOOR



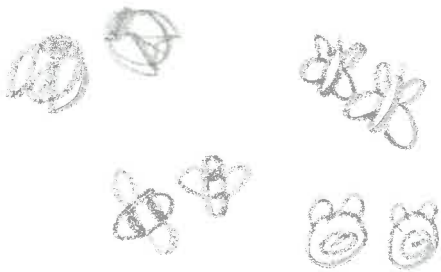
WHO IS THE SPY ?



SLIDING PUZZLE



WHEEL OF FORTUNE

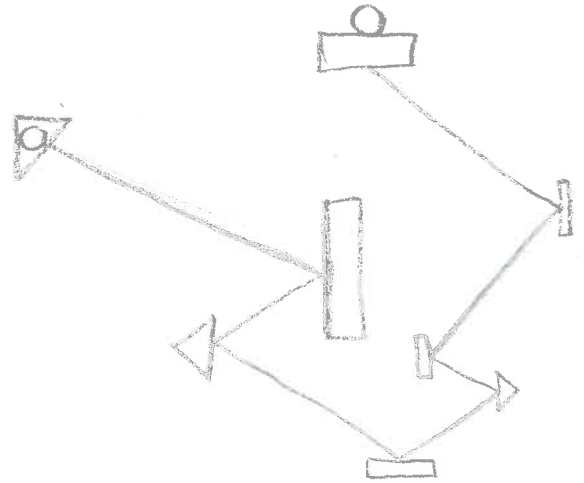


MATCH & FIND

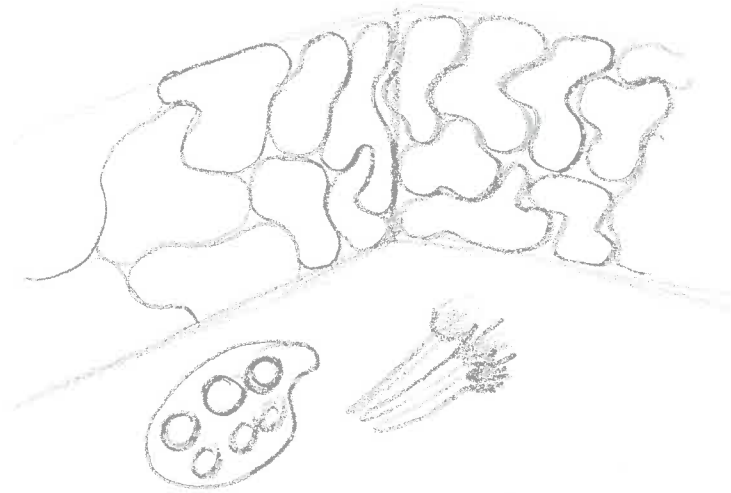


NAME SHUFFLE

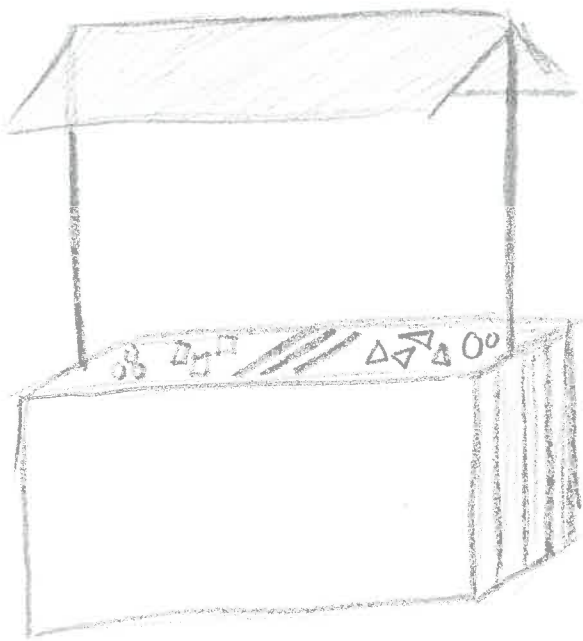
INGREDIENT EXCHANGE



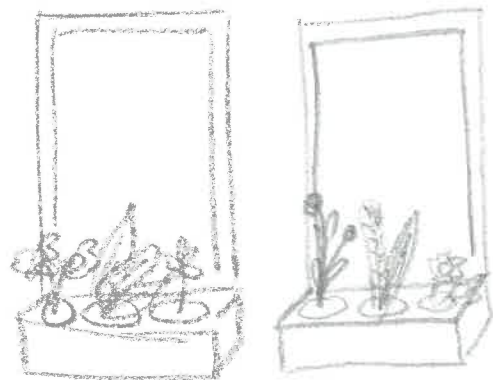
LASER & MIRRORS



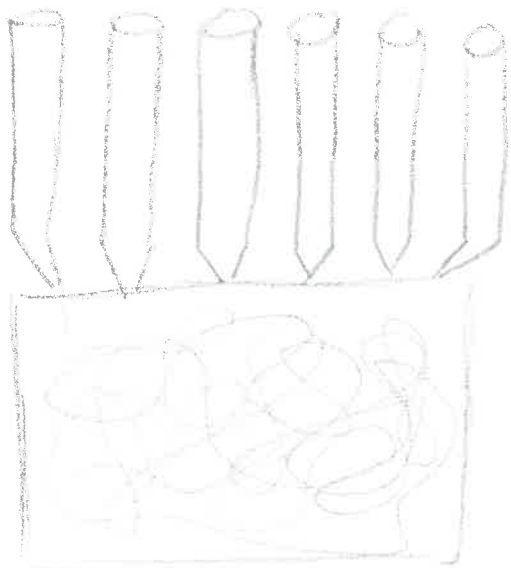
WALL PAINTING



EXCHANGE FAIR



WINDOW GARDEN



COLOUR MIX

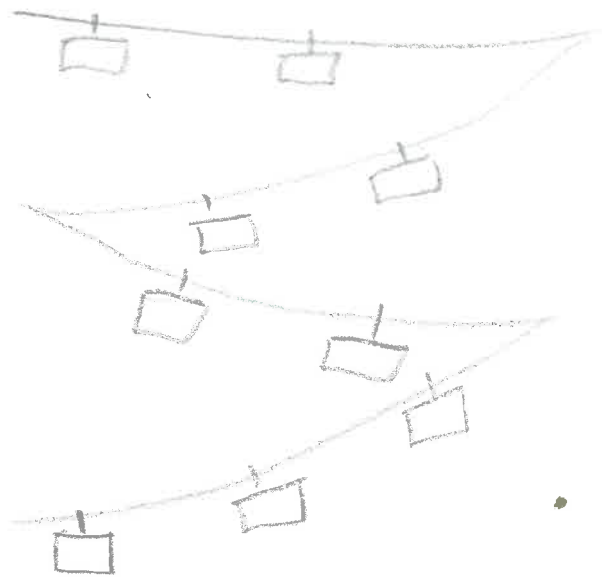


PHOTO LINE

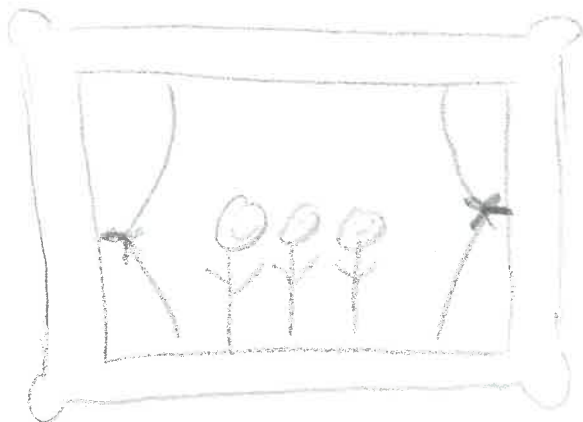


PHOTO BOOTH

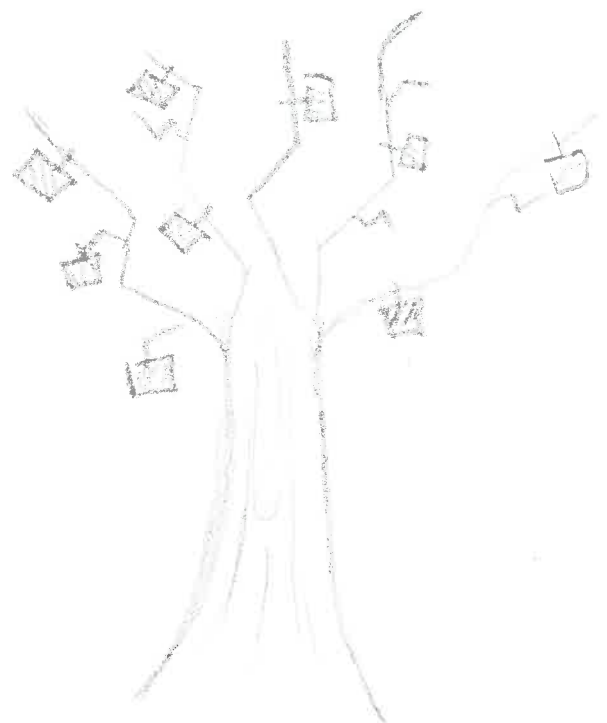
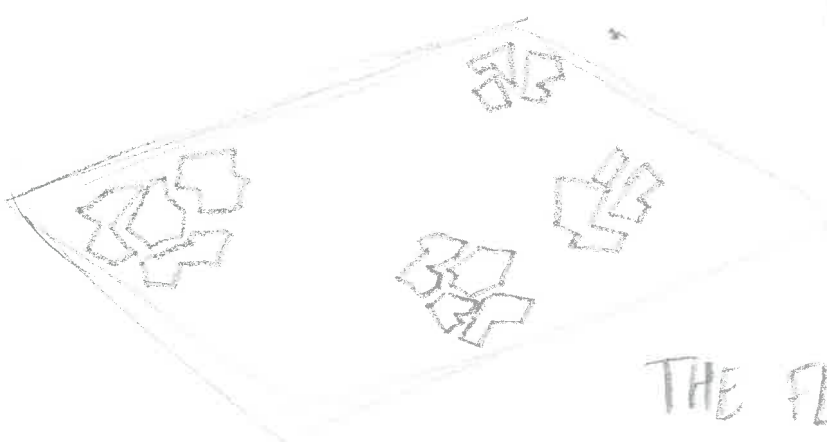


PHOTO TREE



THE FLOOR IS LAVA

cluedo
hint cards

DJ
tabel

laser
sturen
stoelen

water game
down

trivia
track
tables/
stairs

can never
alone

stem
vervomer

personalize

light
balls
combine

make
your
own
school
schedule

piano
tribune

balloon
through
the
room

leave
your hand

what's
doe's
on the
wall that
we'd to be that



speed
daten

shift
instruments



doei

Sims
dorp

avatar
personalise

onderhouden

meerdere
moleculis



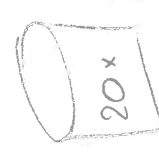
↑ = 0

together
against
the monster

waves

doe's door geef bom

music
tables



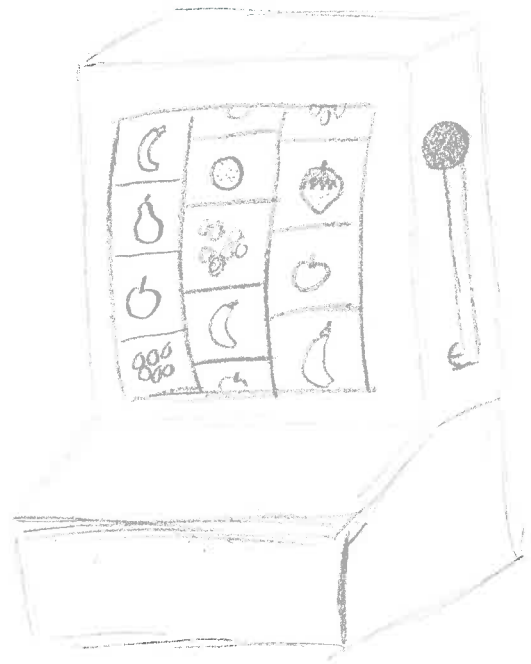
prullen
bakken
race



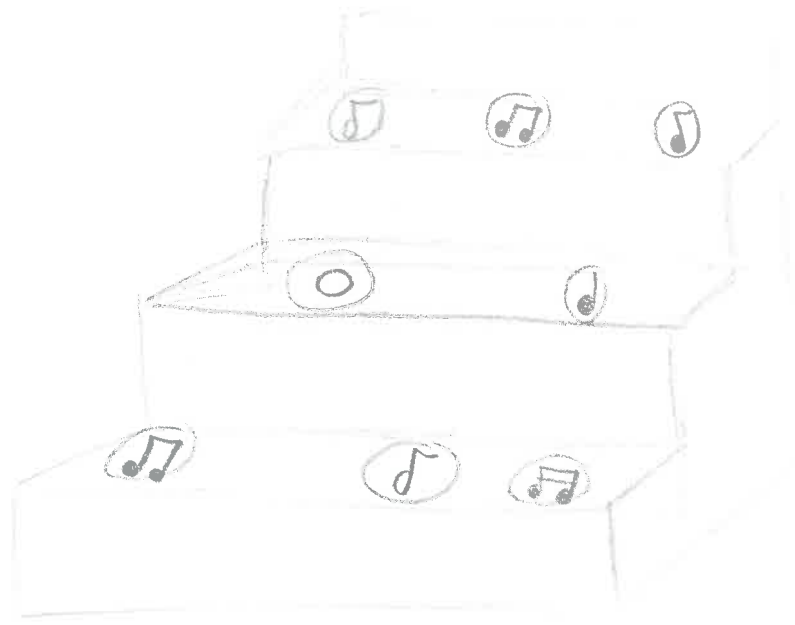
school
tamagochi



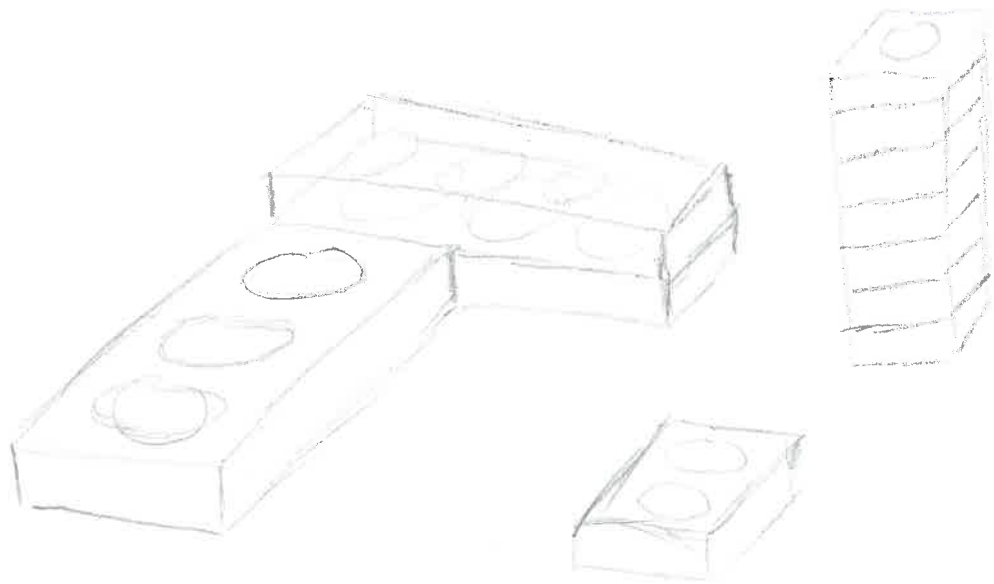
sending
messages



SMOOTHIE MAKER



MUSIC TRIBUNE



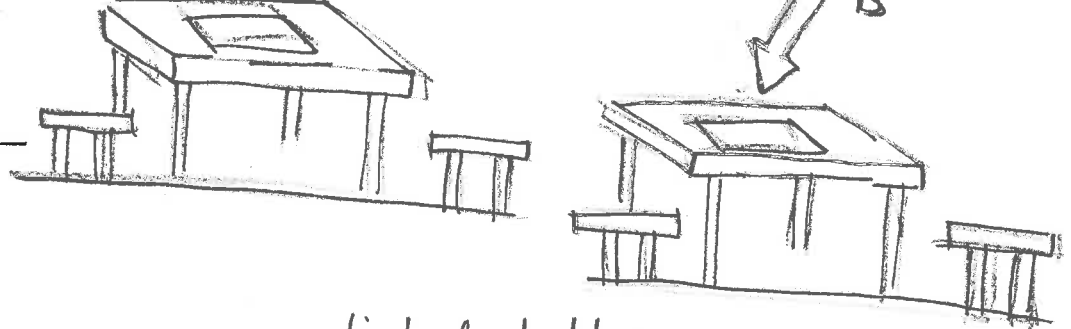
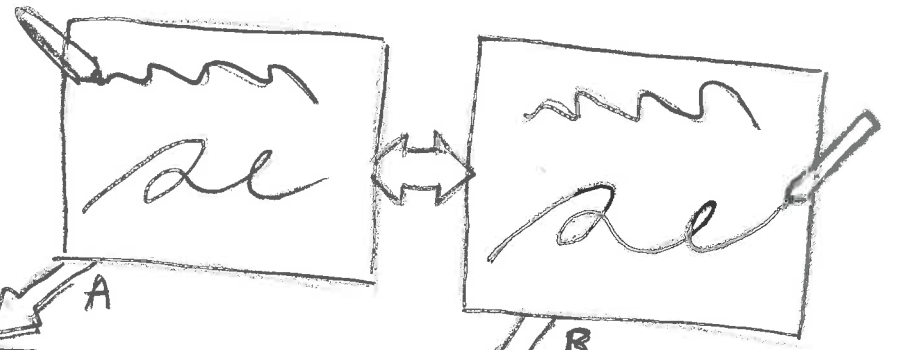
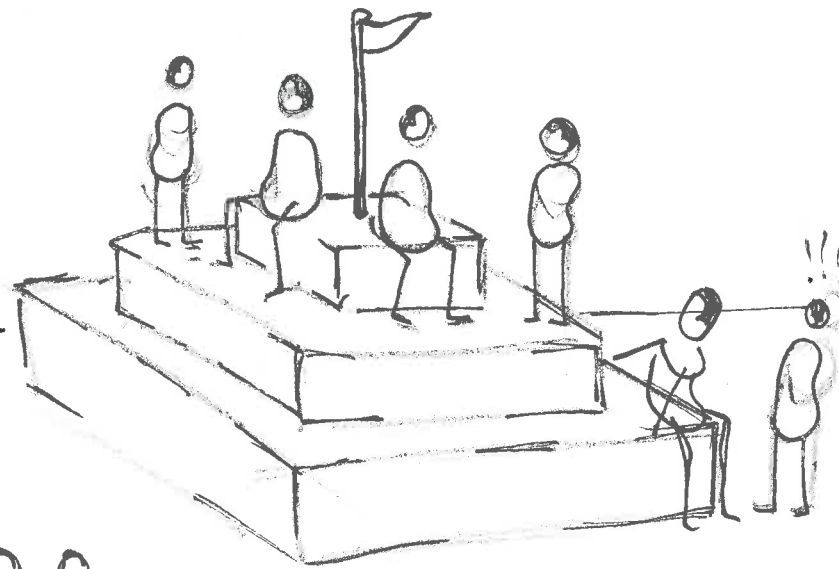
MODULAR SITTING
LEGO BLOCKS



SECRET GLASSES



pyramid bench.

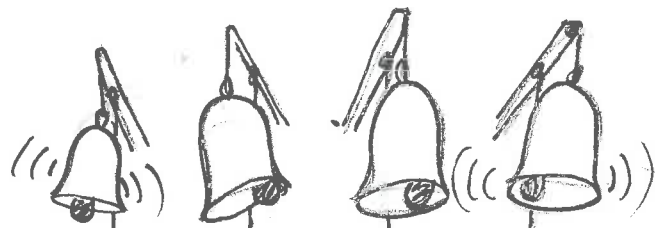


linked tables

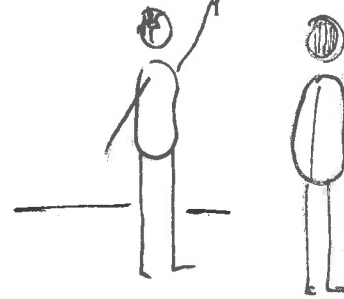
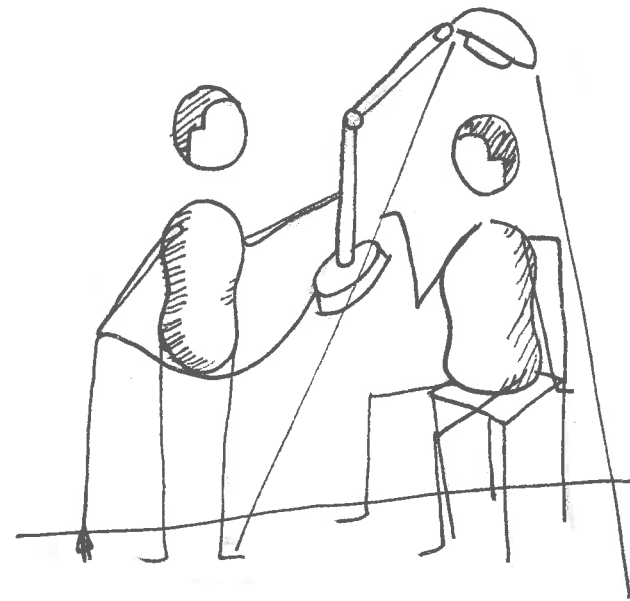
meetup data visualizer.



SCHOOL BELLS



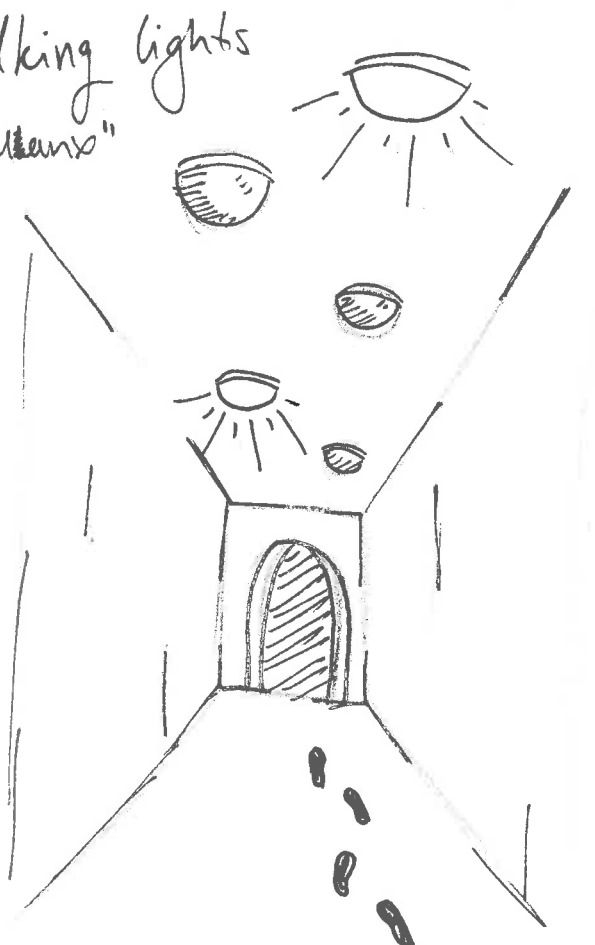
modular lighting



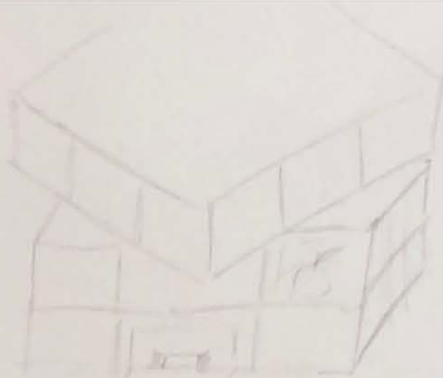
COLLABORATIVE FOUNTAIN



walking lights
"phantoms"

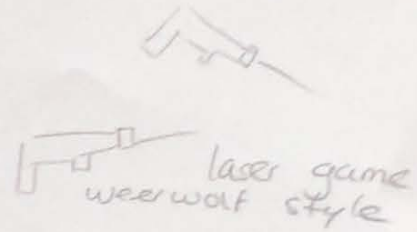
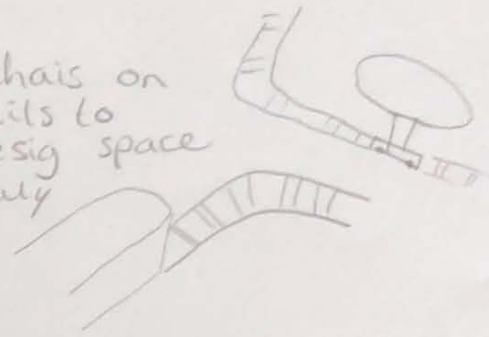


make your own
playlist
together



solve the
cube to get
food

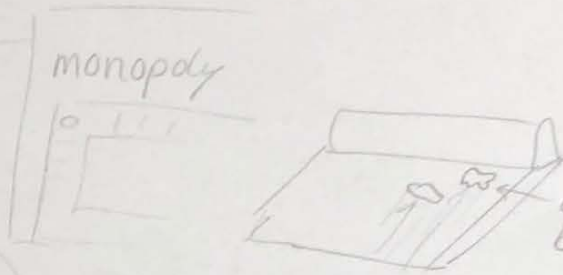
chairs on
rails to
redesign
space
easily



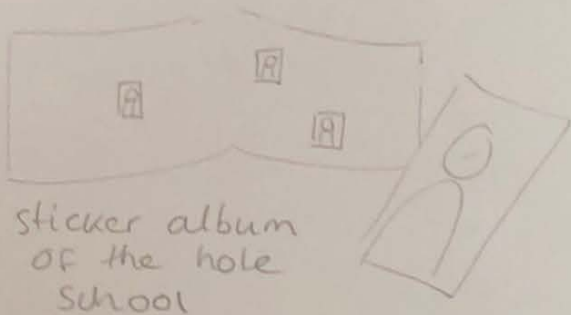
paint area only seeable
from the inside



board games digital
on lunch tables



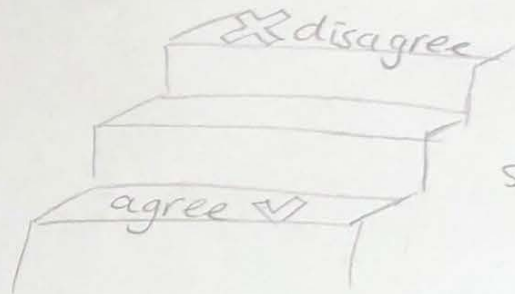
self designed
blocus/figures
to battle
winner gets
both



sticker album
of the hole
school



cloating
switch
station



"over de streep"
tribune
social issues
discussion



foto booth

magnet lamps



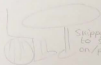
rad van lotuin
lotery switch
old toys/books



light system
app



video
outcome
we media



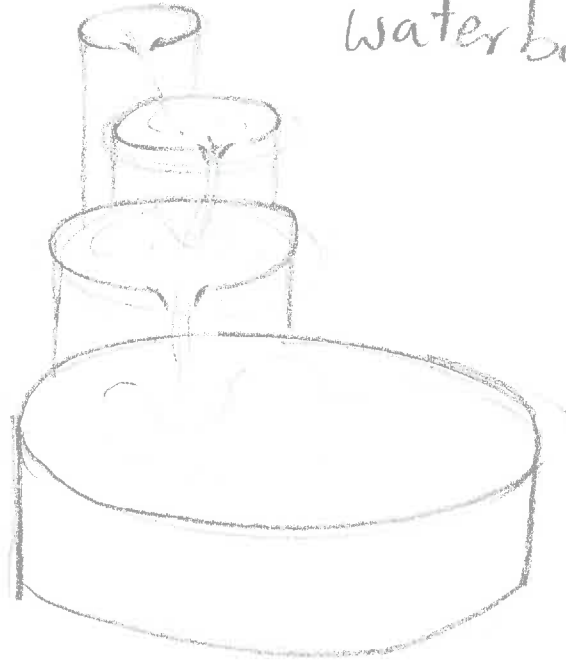
snippy balls
to sit
on/play with

heat response
paint on tube
→ don't hold phone

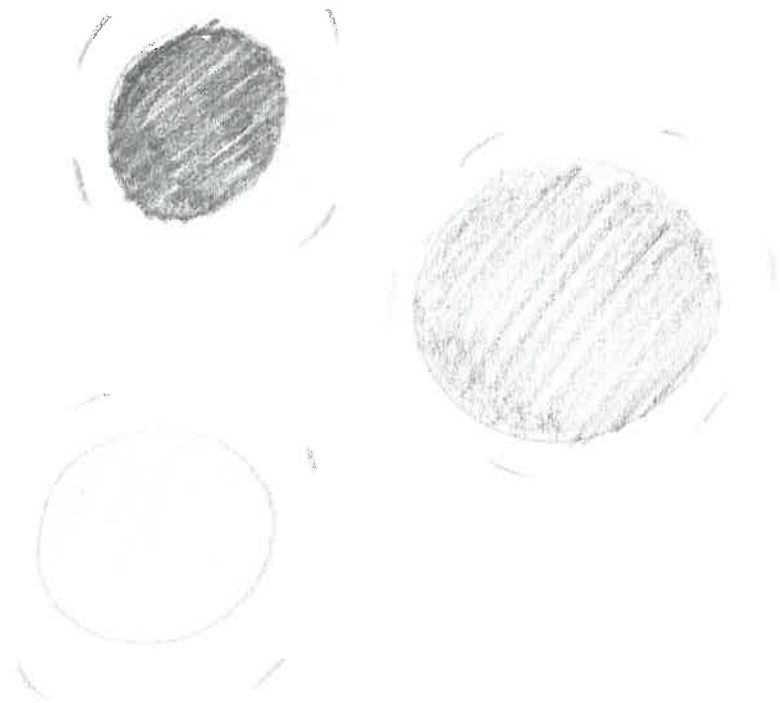


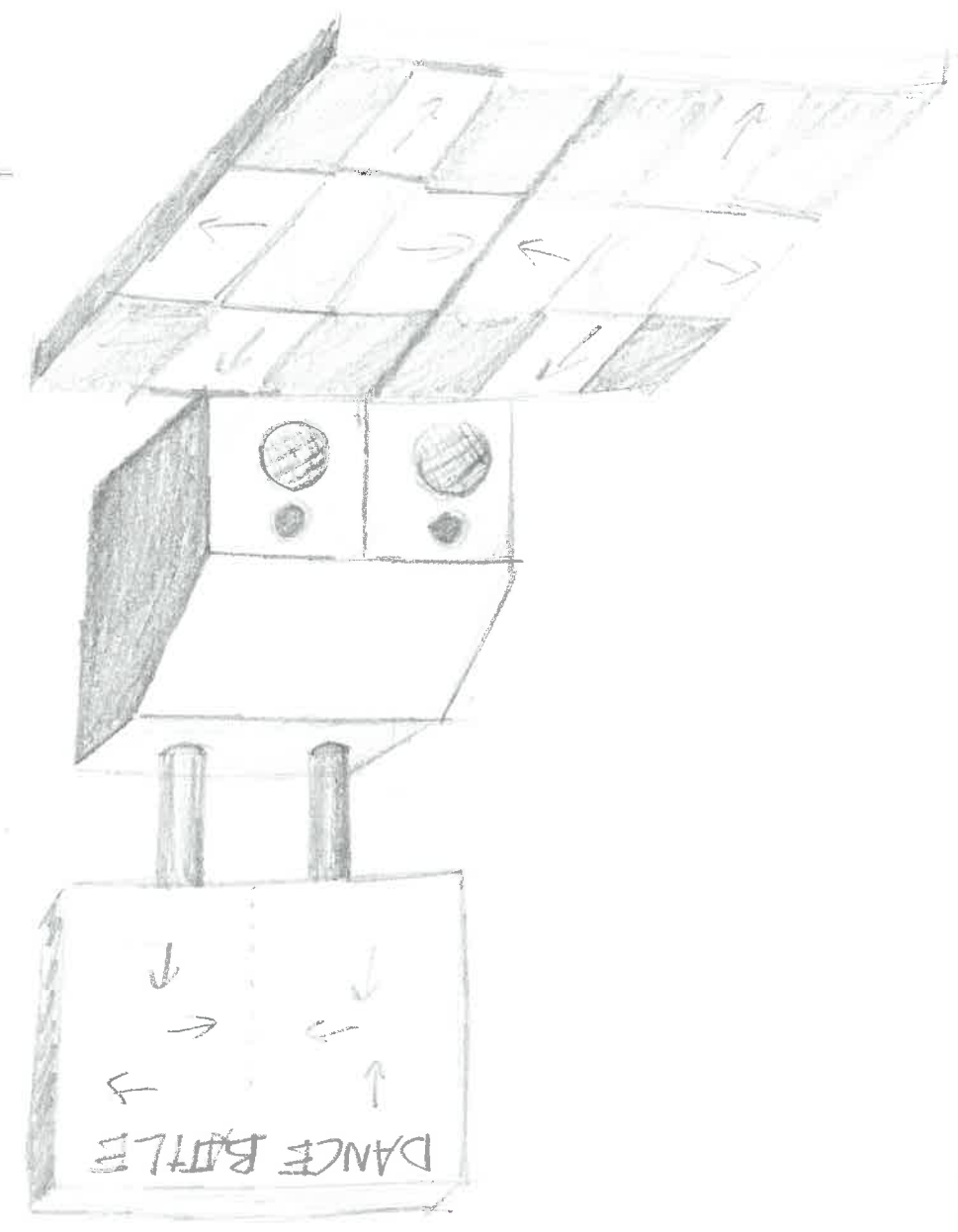
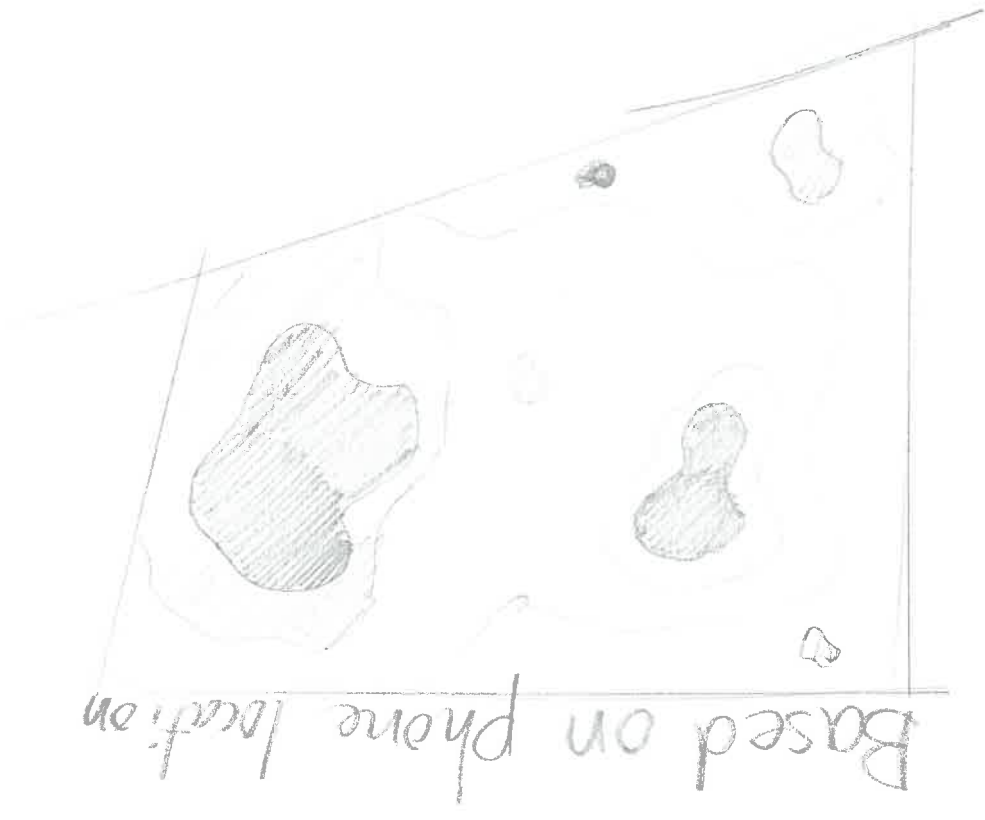
quiz on
phone to
find track
in building

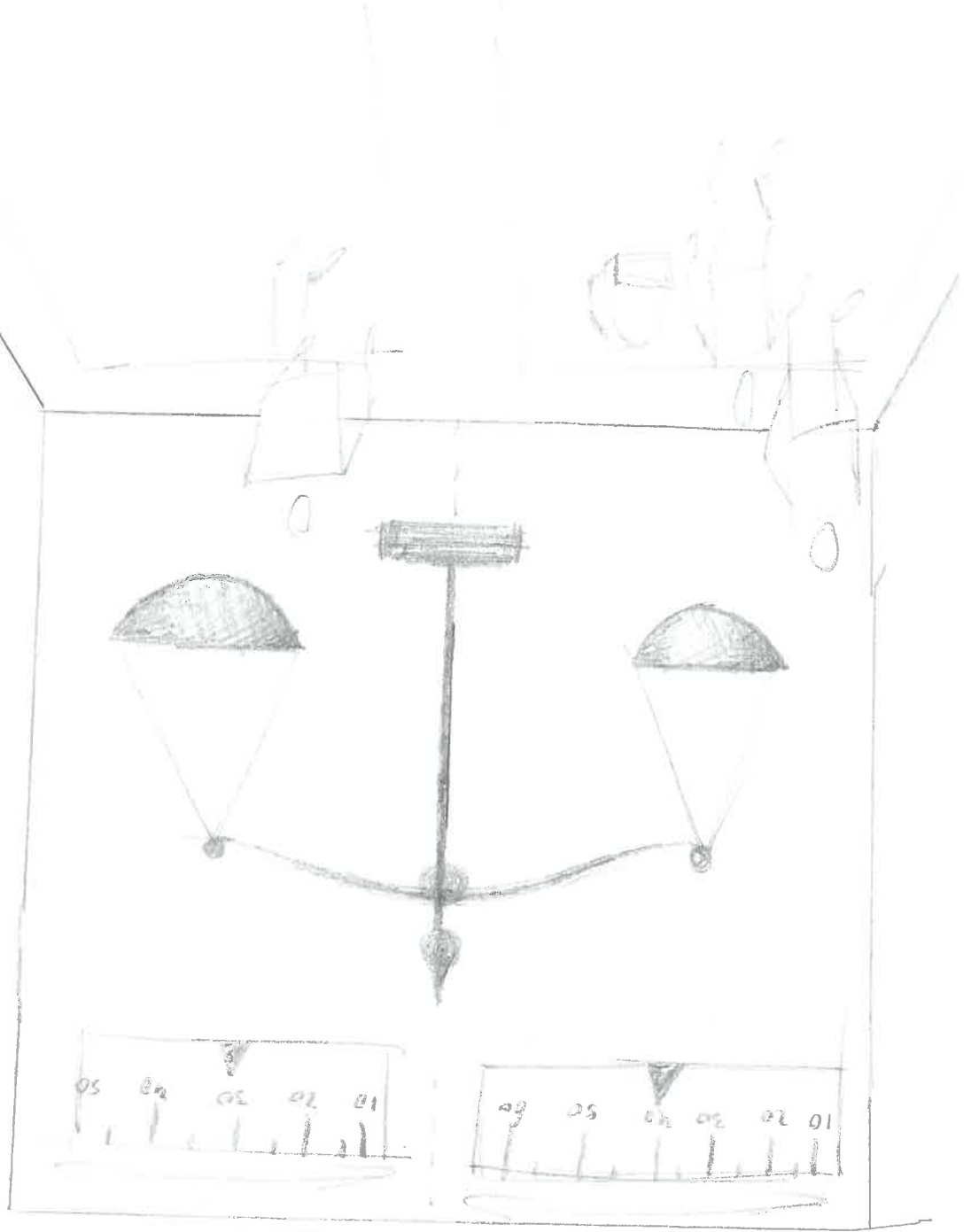
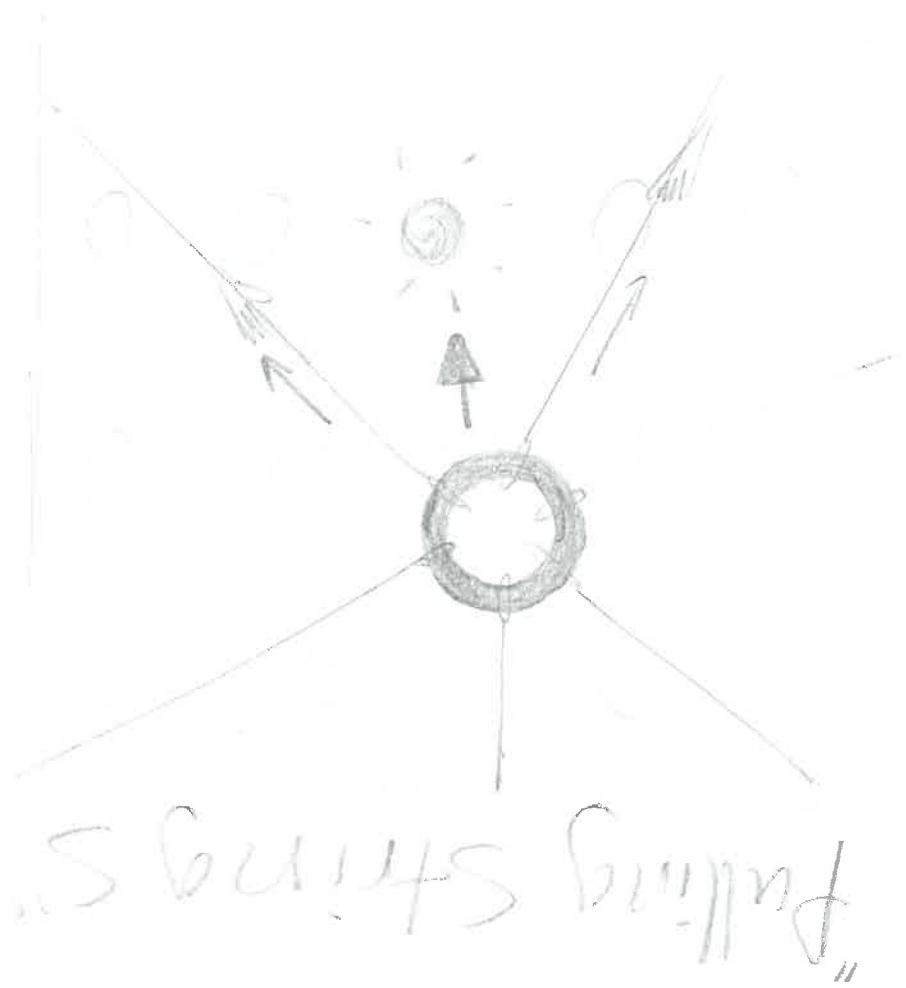
Fountain to fill your
waterbottles



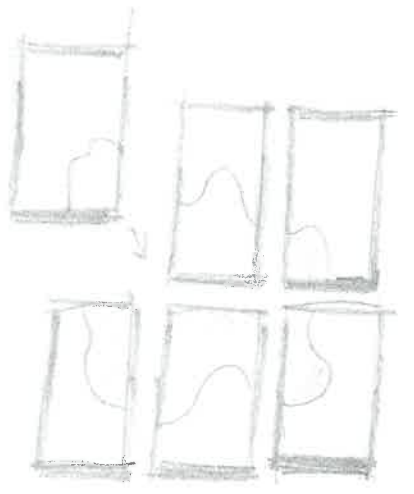
The darker the table the less open the group is for people joining



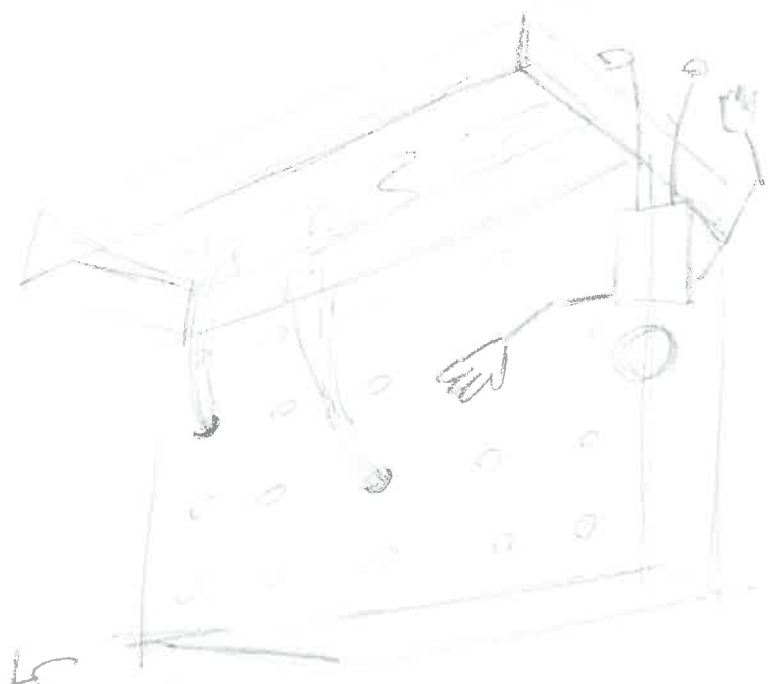




App that can only be played with multiple phones

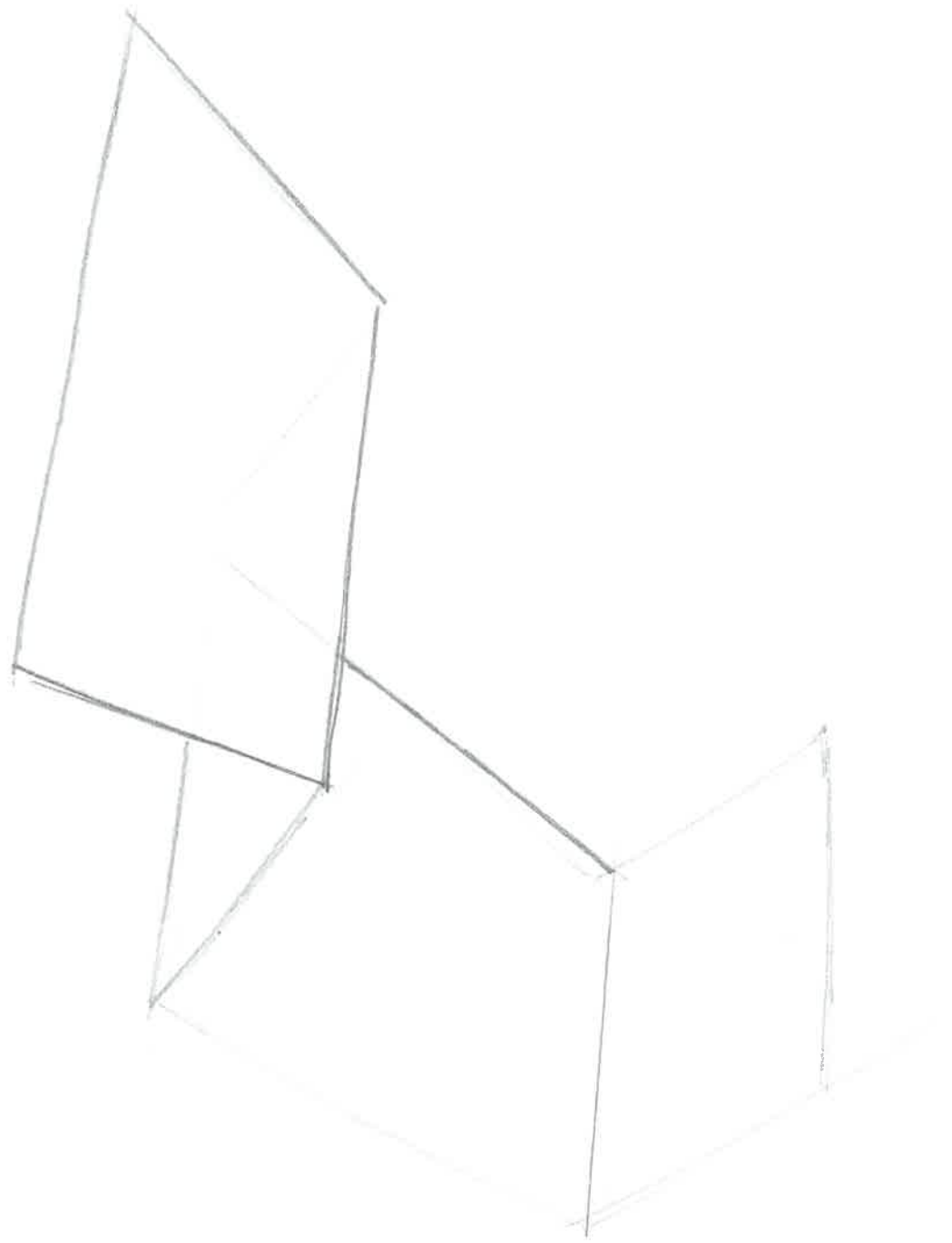


Stop the Flood



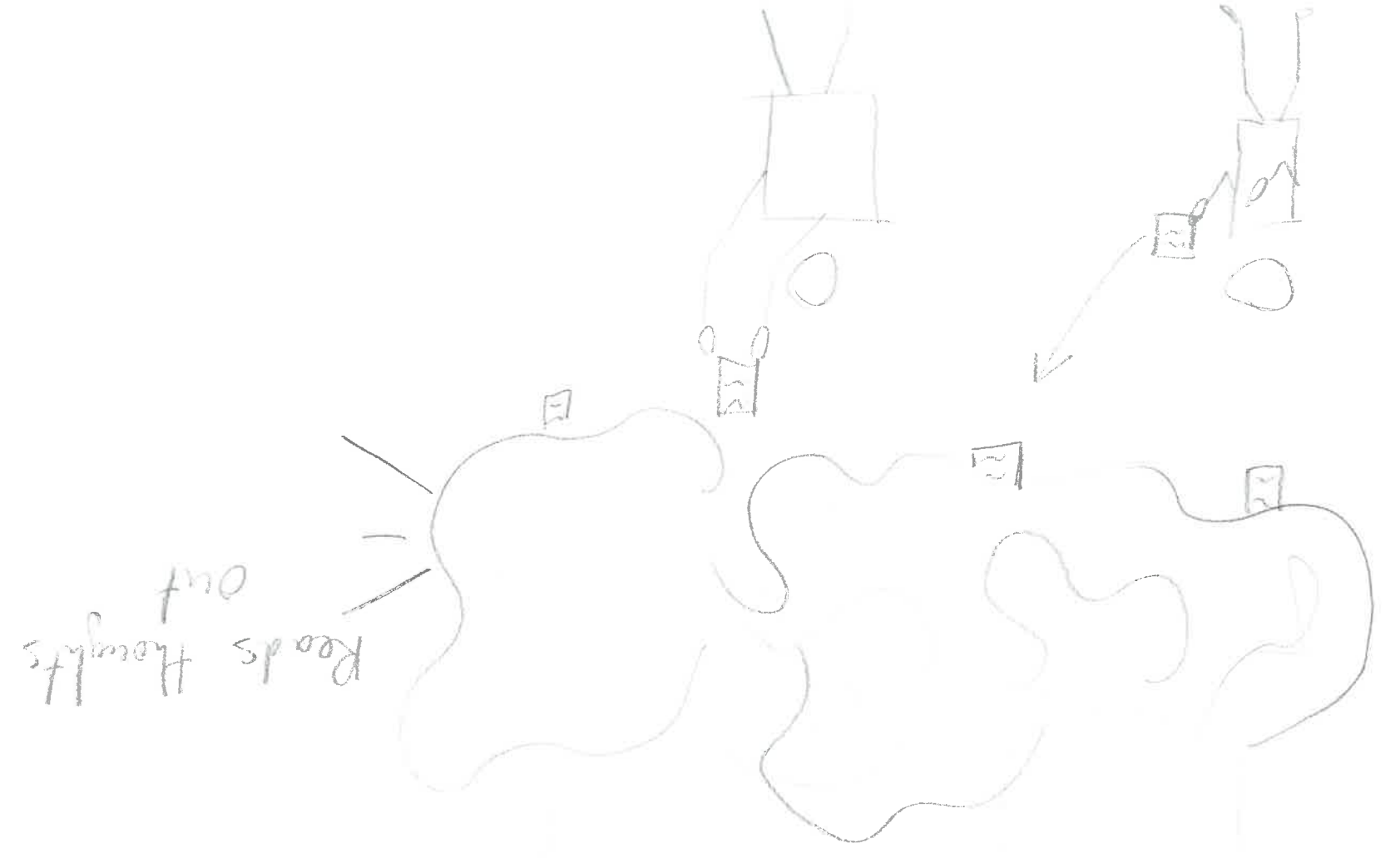
Wheat Straw Walls

What happens if you stimulate group farming with the environment?

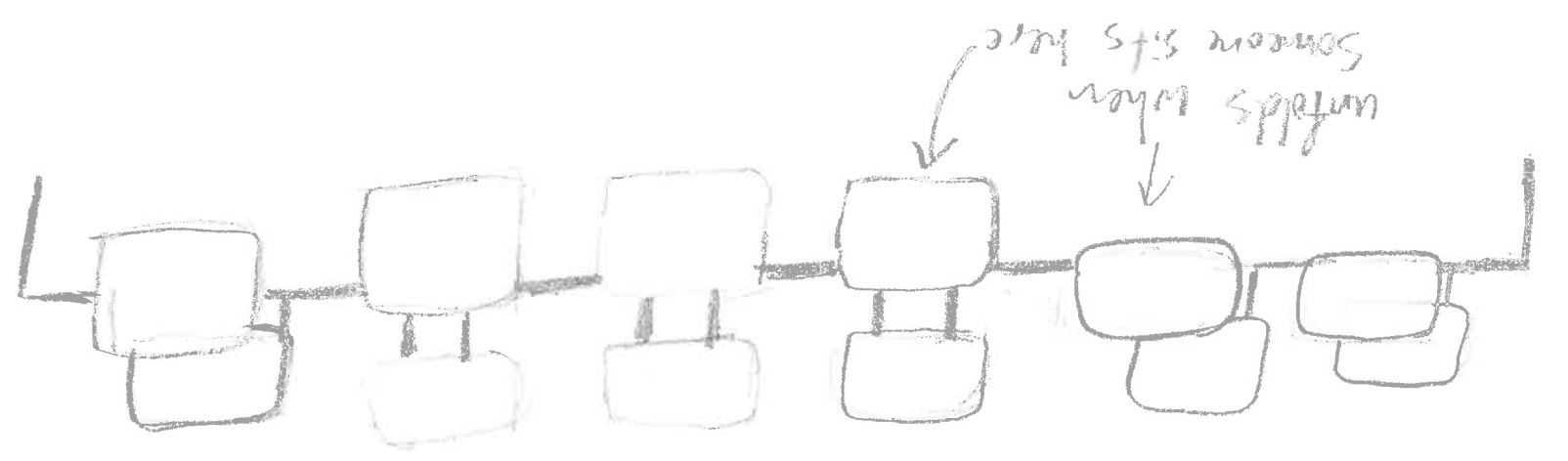


Circles on the floor





Word cloud

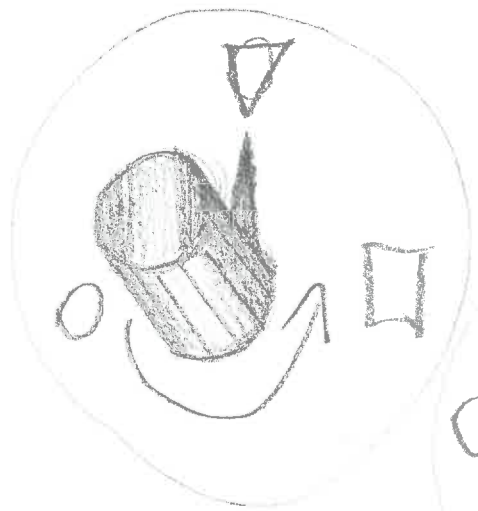
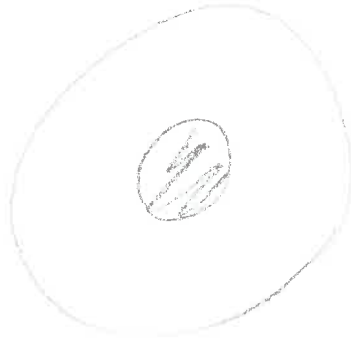
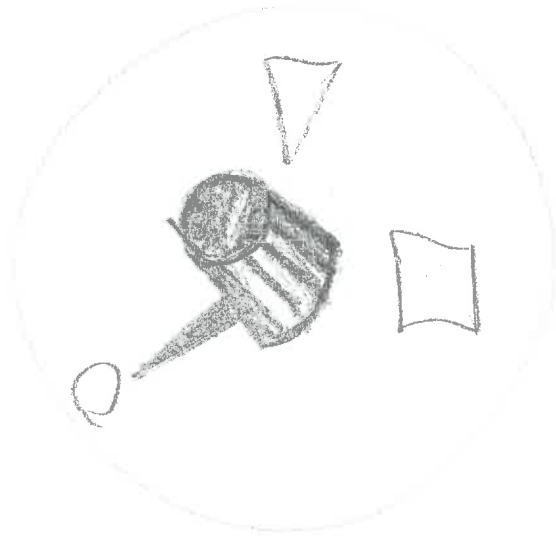
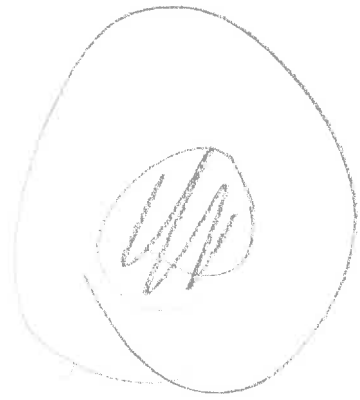
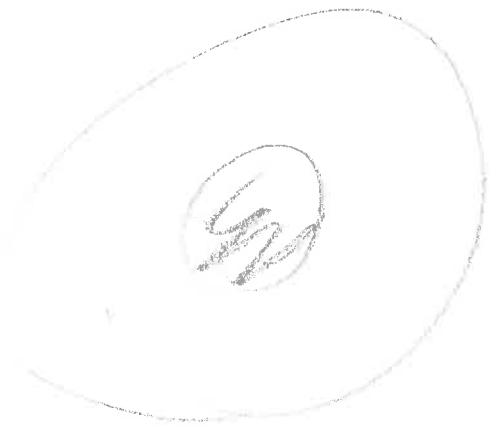


You have to sit next to each other

Collaborative controls

To play your song → put in the code: □△□□□□□□□□

The turning knobs Always turn back to their original position. Multiple people need to turn in order to get the song played



Clothespin game

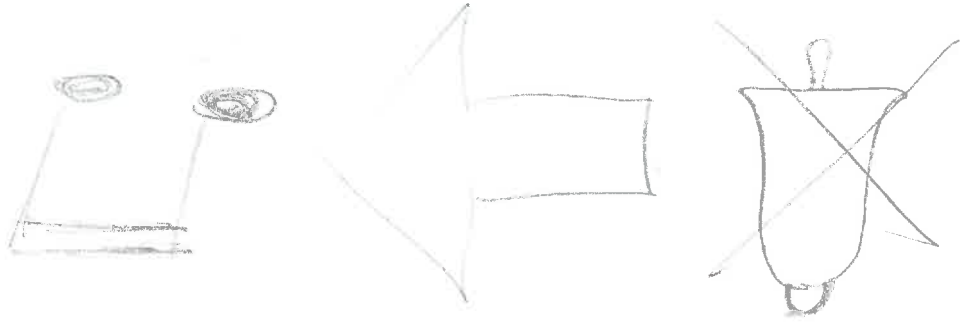
Everyone gets a clothespin with an assigned that needs to be done with someone

↳ Show assignments on phone?

↳ Keyboard visible in the confine



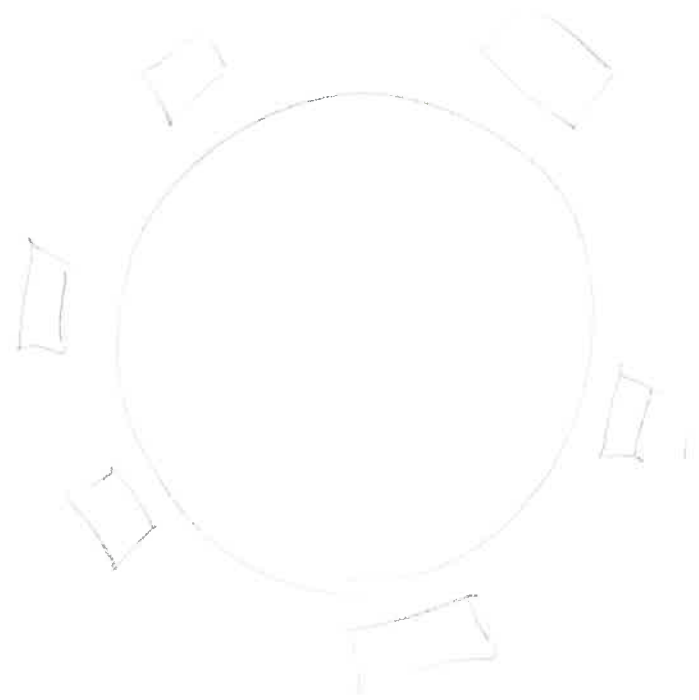
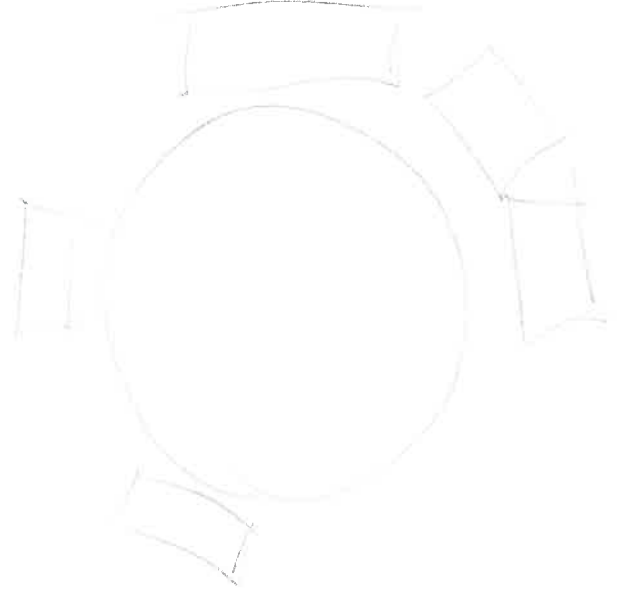
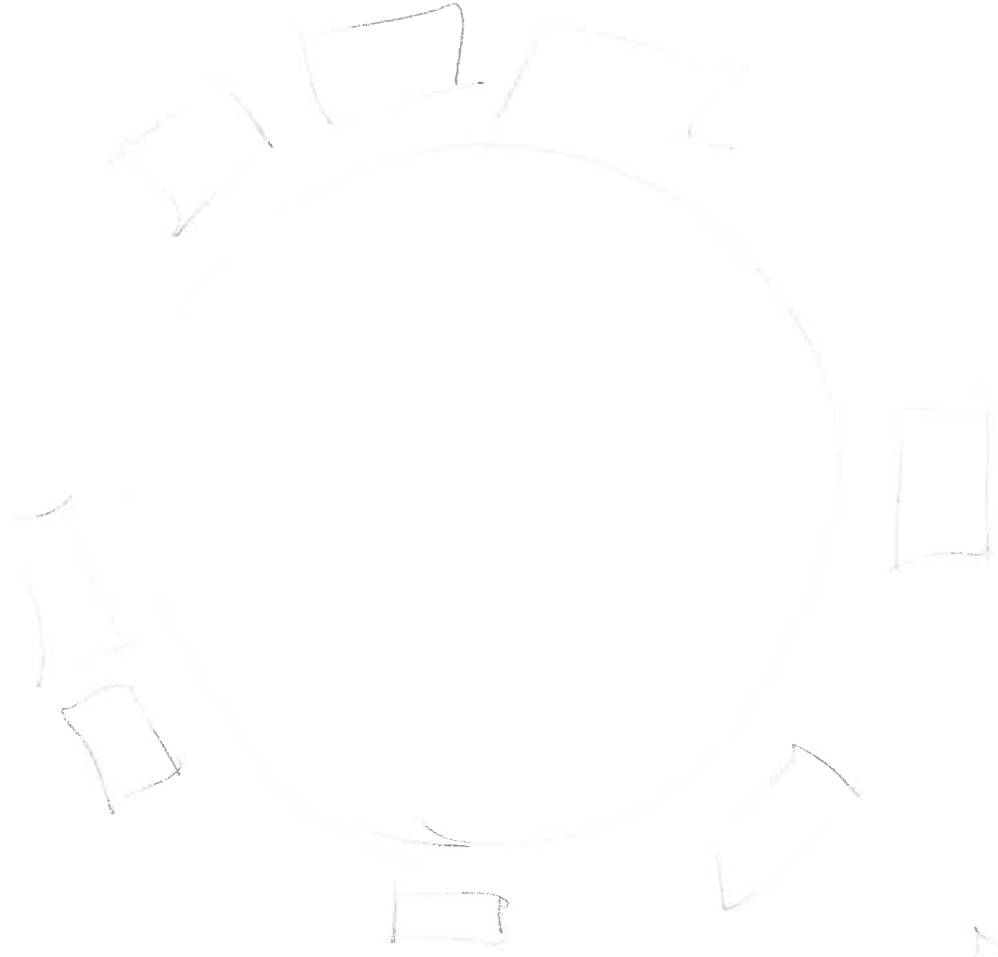
At the end you don't hear a bell but a track generated based on the inclusion of everyone



Sad smile
17

Happy smile
11

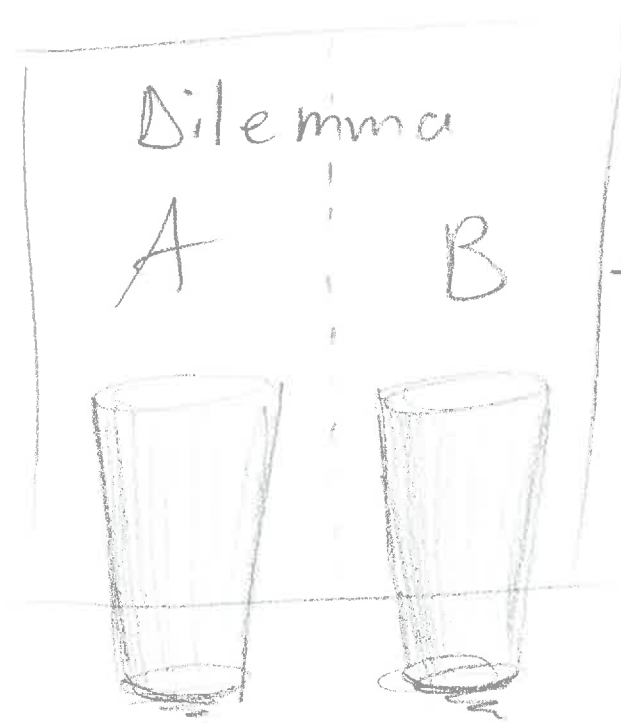
Projector in the lamps



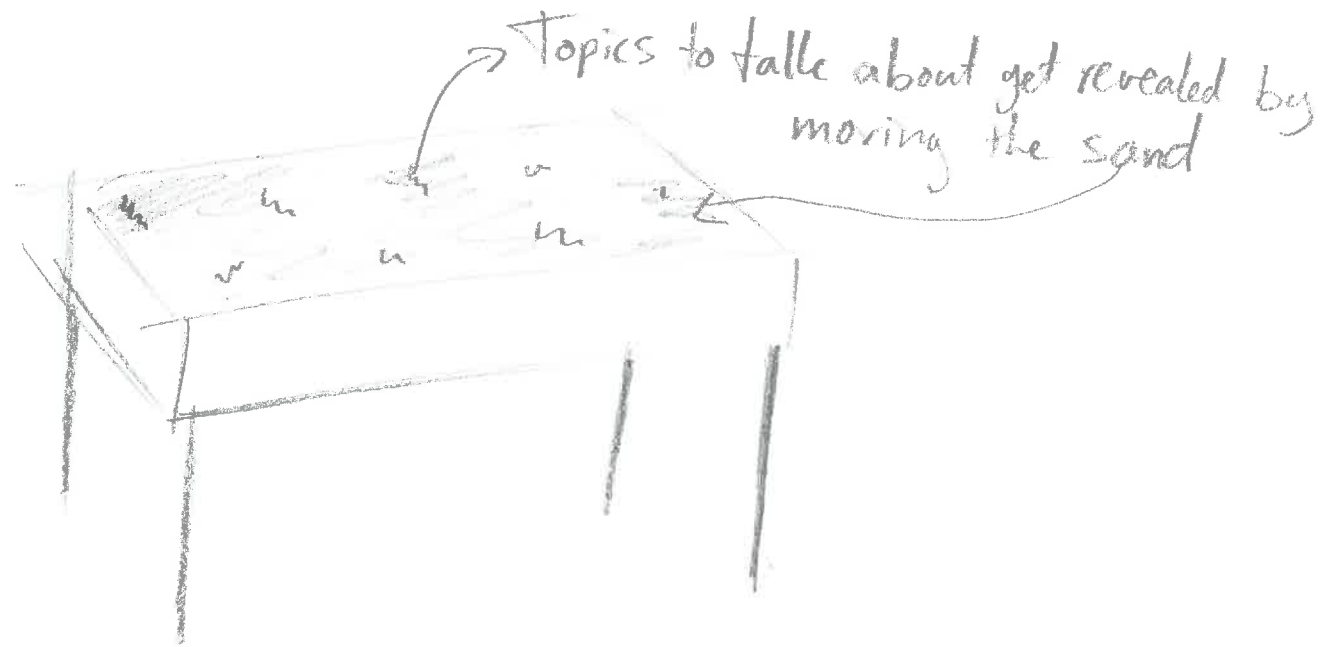
- Surprise element
- People joining another table

Every break ① of the tables gets a game

Discussion table



→ Vote for a dilemma by
throwing away trash





Shared
responsibility



- Rewards for high schoolers:
- Food
 - Money
 - Status increase

2 times per break

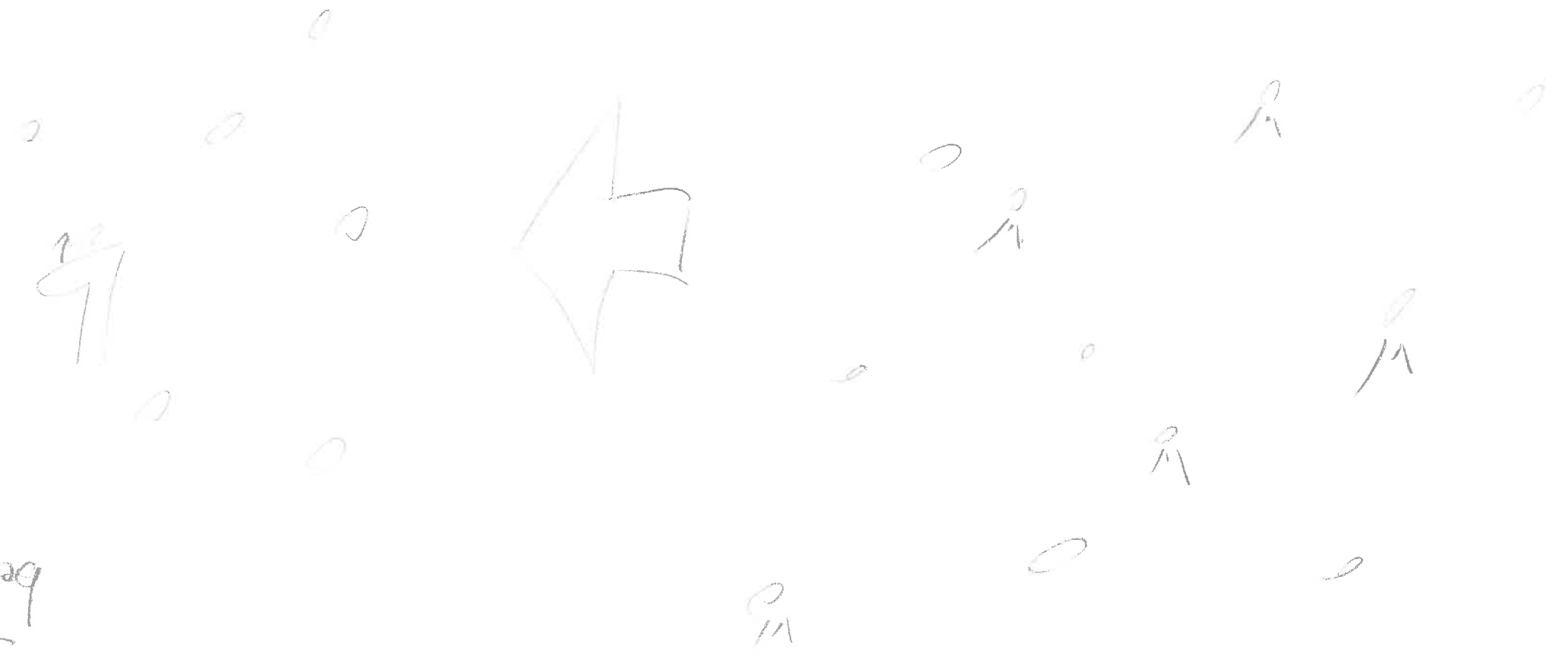
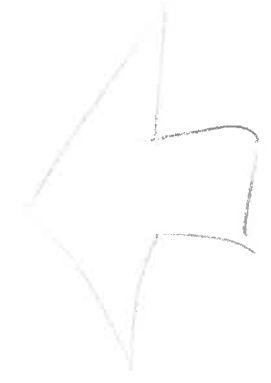
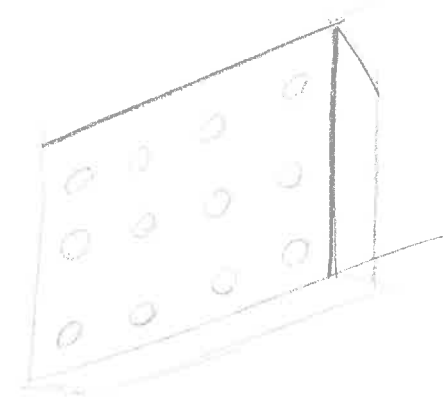
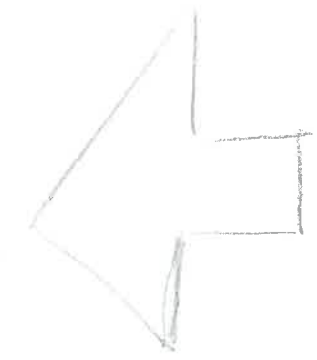
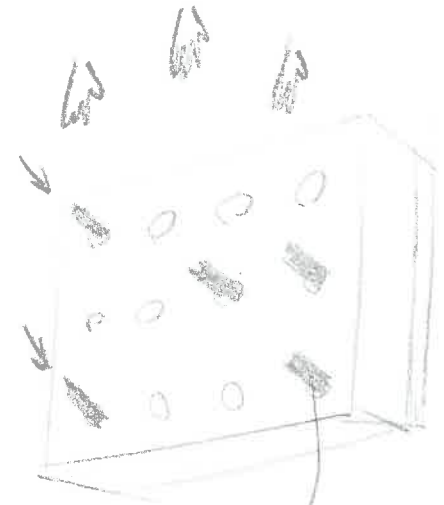
Attract attention by moving

Poles need to be pushed back for a surprise. Too many slides to press all at once alone so participation is needed

Song?

Beautiful lightshow

"kick out" all the light



creating compassion
empathy

gift giving

working together
(towards a
common goal)

samen
werken
resultaat

eigen
inbreng

spelvorm

experimentatie

creatie

verschillende
motivaties

competitie
tegen elkaar vs.
samen

variatie
in
rewards

losse leerlingen
betrekken

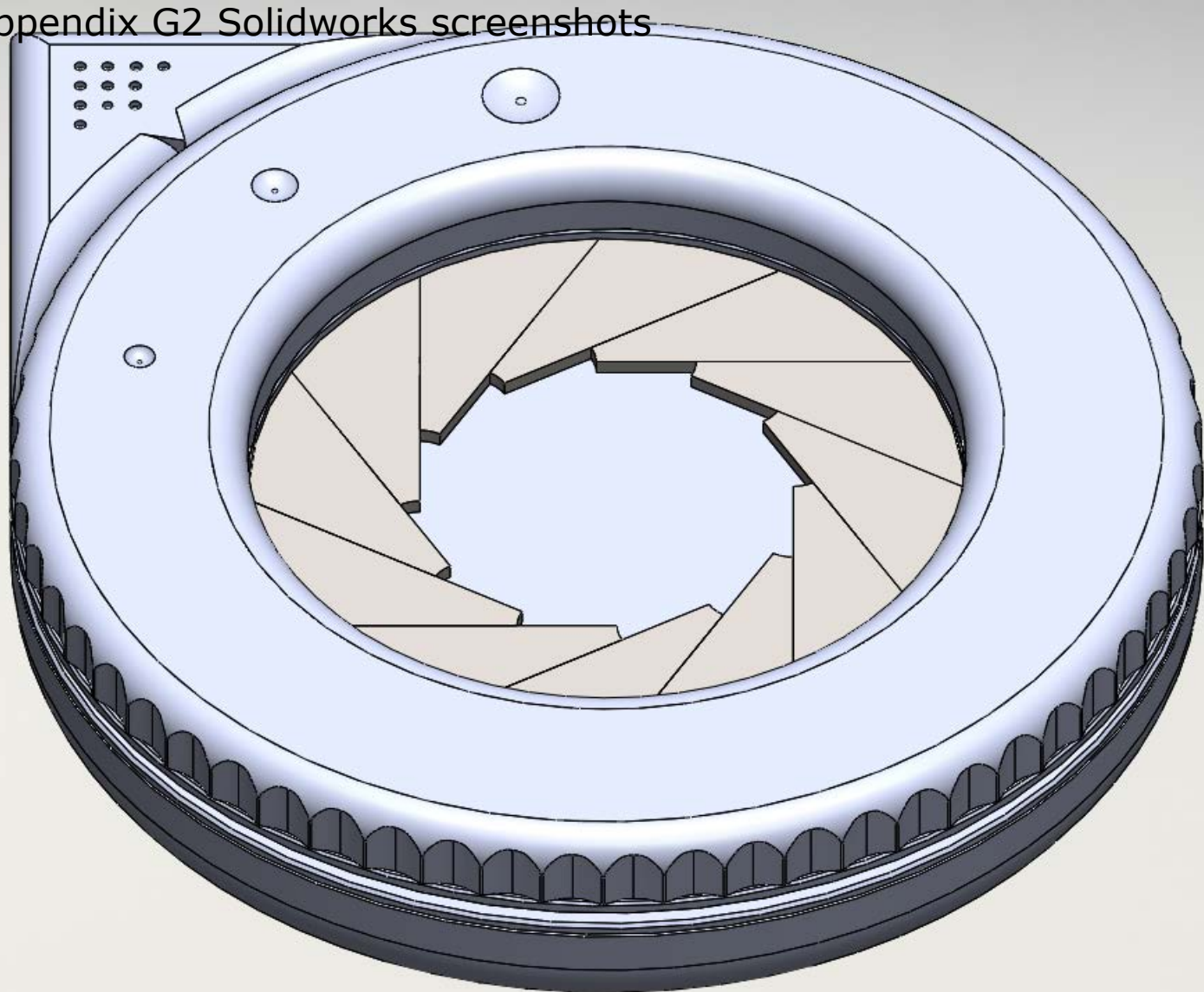
toekijken

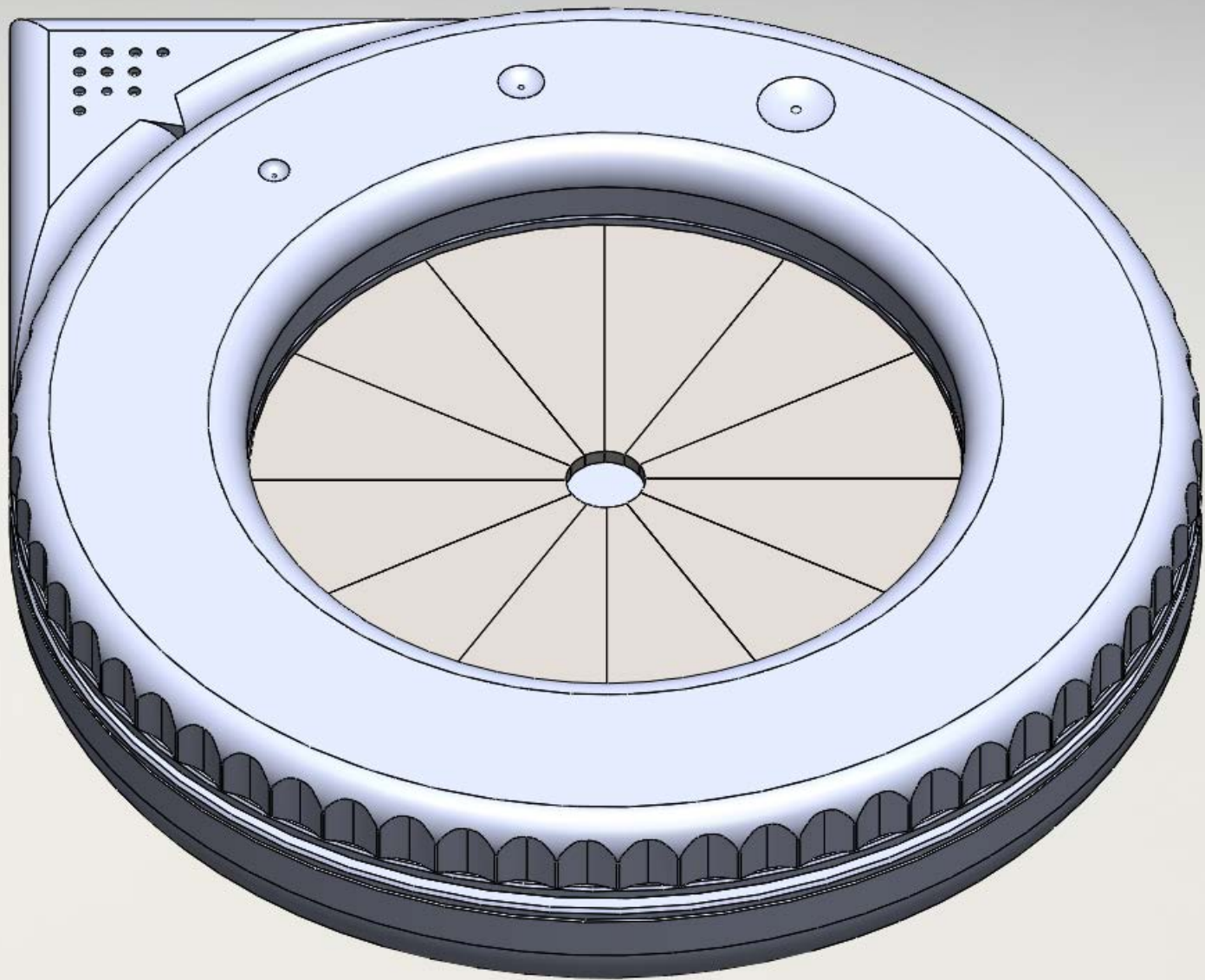
verrassings
element

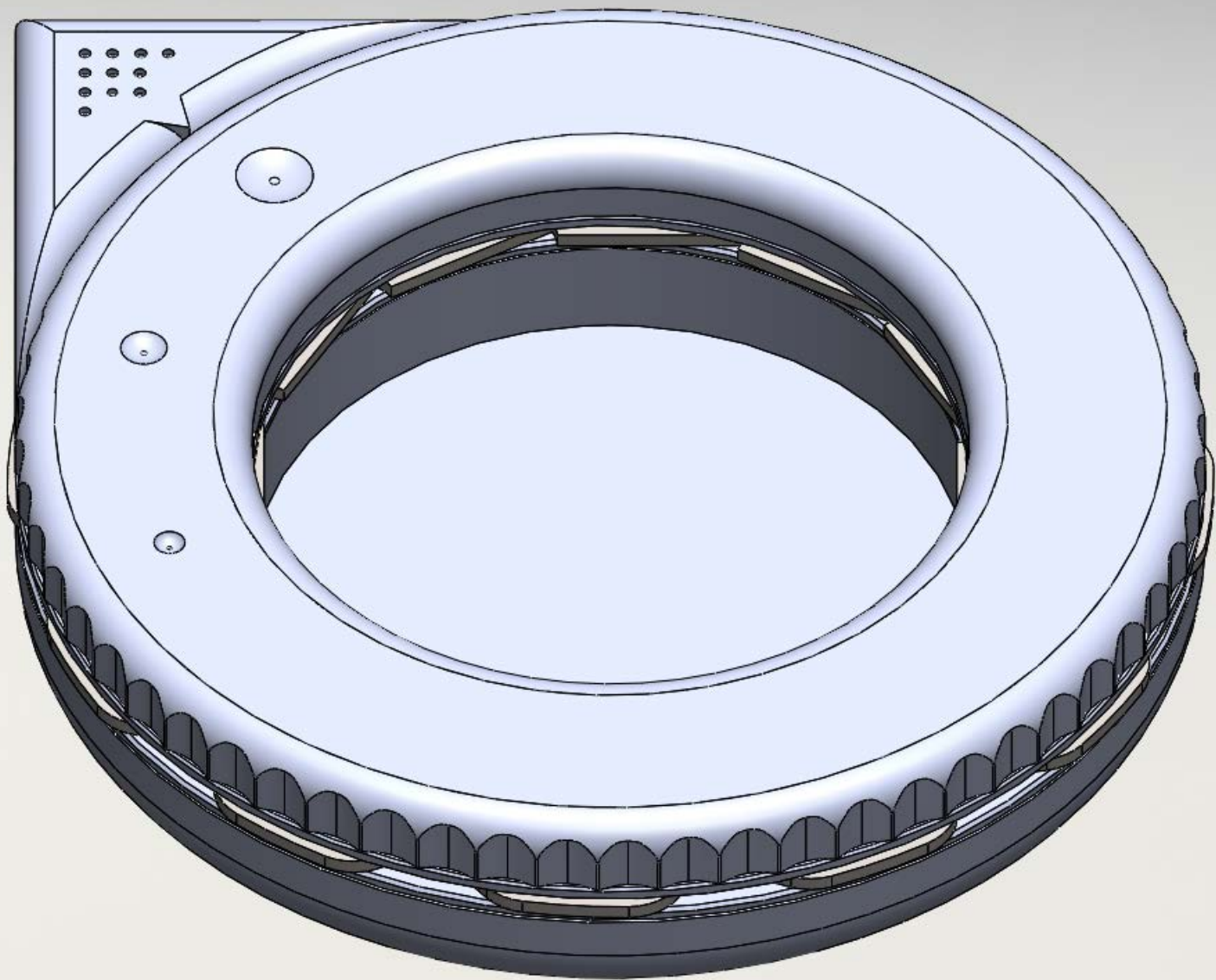
hoe
makkelijk is
nee zeggen

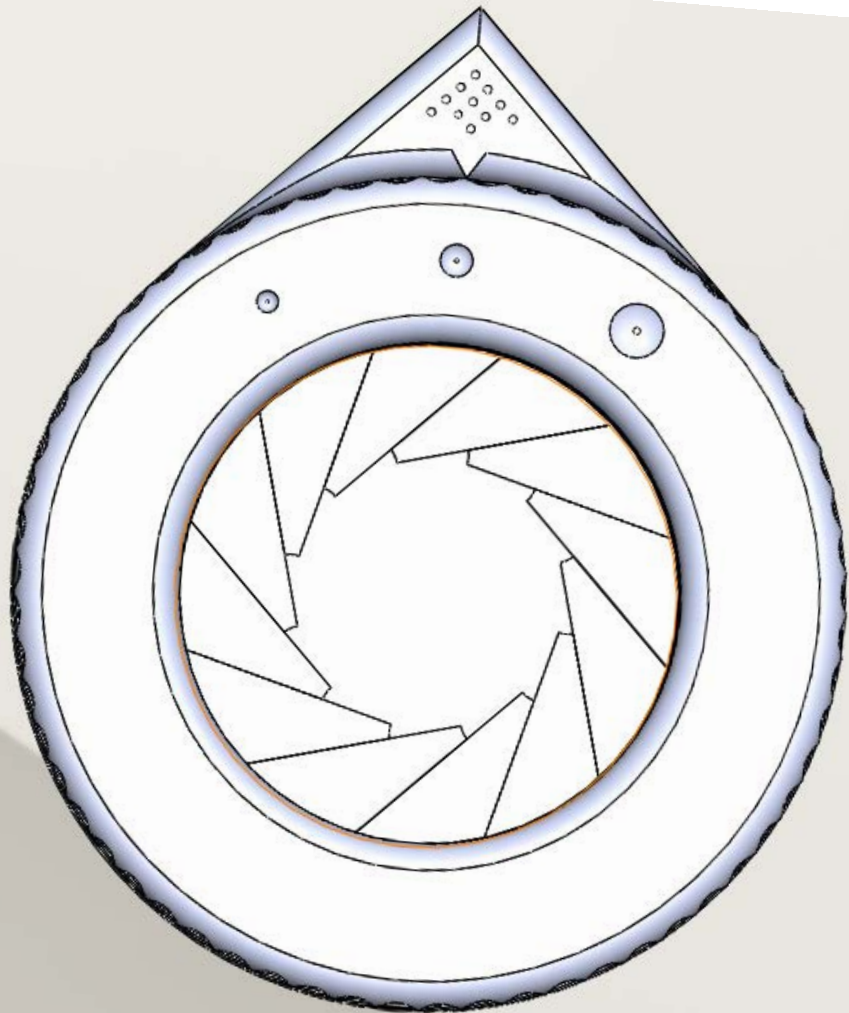
samenwerken
naar een gemeenschappelijk
doel

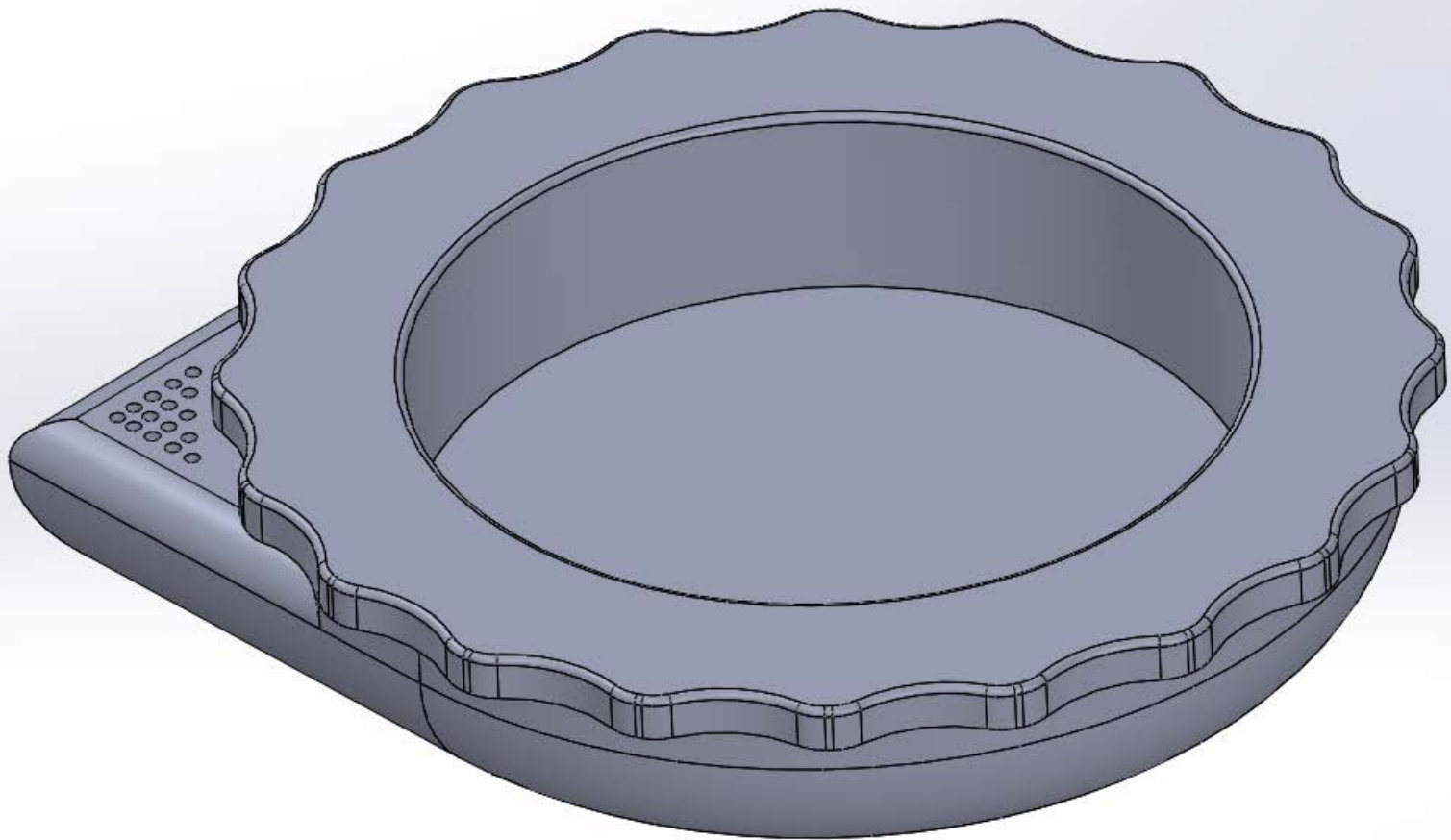
Appendix G2 Solidworks screenshots

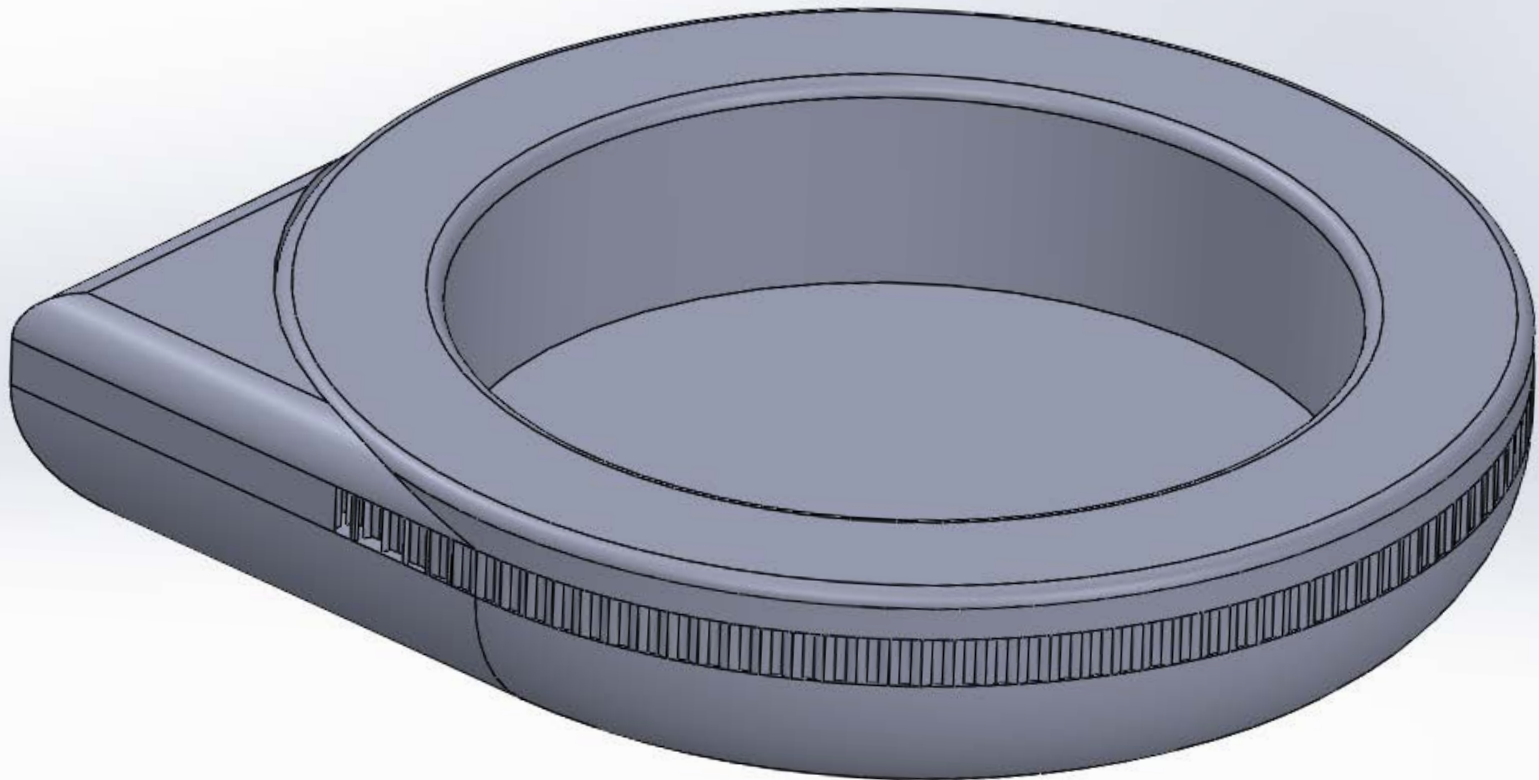














MICHAEL GRAHAM

"There is a first time for everything"

ABOUT

Michael is a second year highschool student with a lot of ambition. He is a paperboy to fund his playstation and games. Being captain of his soccer team makes him very proud. He always sits with his best friend Anthony and likes to play games with him as well.

AGE	14
OCCUPATION	Highschool student
INCOME	40 euros per month
STATUS	Single
LOCATION	Eindhoven

NEEDS

- Friends to make his highschool experience as pleasant as possible
- Good food from the canteen to get him through the day
- Being able to go outside and get fresh air

FRUSTRATIONS

- Often sits alone during the break
- Long waiting times at the canteen
- Feels intimidated by other friend groups and just sticks to sitting with his best friend Anthony

MOTIVATIONS

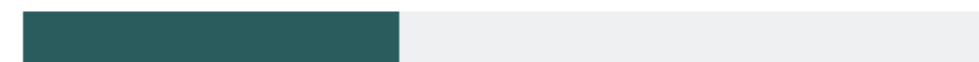
Finishing highschool



Relax



Friends



Food



PERSONALITY

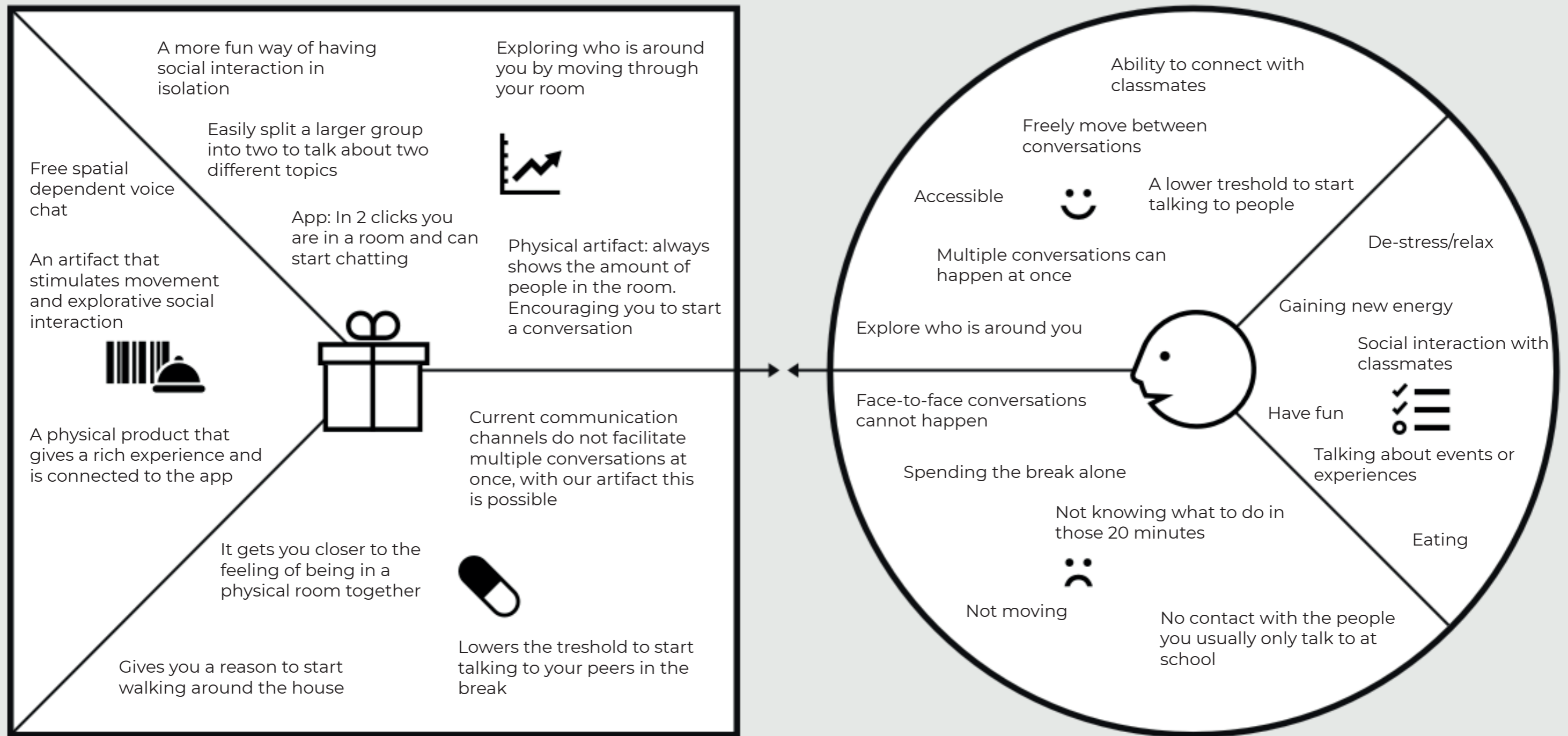
Intelligent	Sportive
Not so social	Passionate about gaming

BRANDS

dopper



The Value Proposition Canvas



Appendix G5 Survey in Unity

1. Wat is jouw naam?

2. Met hoeveel schoolgenoten heb je gepraat tijdens deze pauze?

3. Kun je de namen van deze schoolgenoten geven?

4. Met dit platform is het makkelijk voor mij om:

Voer de nummers in het witte vierkant in

Te communiceren met vrienden

Een gesprek spontaan in te stappen

Een gesprek te beginnen

Communicatie te wisselen tussen mensen en gesprekken

Een gesprek te hebben met mensen die ik niet ken

Meerdere sociale interacties te hebben

Betekenisvolle sociale interacties te hebben

Beoordeel de geluidskwaliteit op een schaal van 1 tot 5

Indien je laag hebt ingevuld, denk je dat dit invloed heeft gehad op de gesprekken die je hebt gevoerd?

7. Met dit platform zou ik mijn gesprekken omschrijven als:

Intimiteit:

Ik vertel:

Ander(en) vertellen

Kwaliteit van de gesprekken:

Tevredenheid

Nog verdere opmerkingen?