X-CEPT ALL:
AN EXPLORATION OF PRIVACY AWARENESS

GROUP REPORT – DESIGN WITH DATA

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INTRODUCING THE ARTEFACT

X-cept all is an open interaction design installation, using narrative-led graphic and spatial synthesis of live data to apprehend oft-dismissed online decisions and their adverse consequences. We aim to rekindle the dialog about privacy online.

Initially we invite the audience to first step into the shoes of a fictional user on the "user" side, where they, in a playful way, toggle physical privacy settings reminiscent of cookie settings on your everyday website.

They can then step over to the "company" side of the installation, where they can view the detailed stories inferred by the company about the user, on multiple small screens, through the data linked to the privacy settings. The juxtaposition between the friendly front of the installation and the dark and secretive back, eliciting a sense of discomfort and uncertainty about the viewer's own habits online.

We are not trying to convince people of anything or teach them exactly how cookies work but ideally what they would walk away with, is that they stop and think for a moment before clicking "accept all" next time it pops up on their browser.

PART 1: THEORY

CONCEPTUAL FRAMING

"PEOPLE KNOW WHAT THEY DO; FREQUENTLY THEY KNOW WHY THEY DO WHAT THEY DO; BUT WHAT THEY DON'T KNOW IS WHAT WHAT THEY DO DOES."

– Michel Foucault, Madness and Civilization[1]

An almost a one-to-one metaphor for people's understanding of giving away their data online. When a person accepts cookies for example, they know what they are doing, they are giving away data. They give the data away because they know it will change their experience somehow. What we have discovered though, is that people don't know what happens with their data and how much of it really is collected [2].

Our research reviews how people understand personal data online and demonstrates that although people are aware of online privacy, there is less focus on personal data protection due to unclear data collection and exchange processes. This is not surprising as, in Human-Data Interaction terms, this lack of "legibility" is often because the algorithms used in processing the data are core intellectual property of the companies that use them, so this information cannot easily be made public [3].

Inspired by Nissen et al's Trustball installation where visitors are encouraged to explore alternative models of consent in relation to accepting terms and conditions [4]we wondered whether turning digital interactions into physical acts might reframe certain choices around privacy.

The importance of data privacy literacy cannot be understated. Only when people achieve a greater understanding of how their data is being used by other entities, will they be able to make informed decisions around giving their data away. Increasing this literacy must first come from creating awareness and curiosity. "First and foremost, consumers cannot protect themselves from risks they do not understand. We find a gap between the knowledge users currently have and the knowledge they would need to possess in order to make effective decisions about their online privacy." [5]

While it has been argued that raising awareness doesn't necessarily change behavior and potentially further entrenches previously held beliefs [6], data privacy online remains an interesting and important topic that is worth exploring in thought provoking and interactive environments.

UNDERSTANDING COOKIES HIGH-LEVEL

Due to our interest in the matter of how our data is being used online, we chose to investigate the perhaps most ubiquitous form of data gathering: cookies.

People generally understand that accepting cookies and consuming ads will give away some sort of data. The accepting of cookies, however, often happens due to concerns about functionality of the service they are using [7]. Some people even feel that they have no choice but to accept cookies as they believe they will not have access to the website if they reject cookies [5].

Defining types of cookies is complex as they get classified according to various categories. As a single cookie can contain a variety of the functionalities and aspects, there appear to be endless combinations and thus, endless types of cookies [8]. In short however, cookies can track user behavior, not just on the page of origin, but across multiple webpages, for extended periods of time [9].

We decided to focus on the *purposes* of cookies, as these were easier to translate into understandable narratives. We decided to focus on the follow purposes:

• essential
• authentication
• advertising
• site features
• performance
• analytics

Image source: Pexels

DATA EXCHANGE AS AN ACT IN TWO PARTS

AN INVITING INSTALLATION

Open interaction design can stimulate creativity and allow visitors to scaffold experience, knowledge and encourage conversation, resulting in meaningful and playful engagement [10]. This inspired us to hide all familiar technology away and forgo instructions to create a more open-ended experience.

Convincing visitors to interact with public installations is challenging, as people often fear social embarrassment [11]. To this end, we aimed to keep the engagement process subtle and intimate, avoiding the generation of sound or anything else that might draw attention to the visitor upon interaction.

This could turn out to be a double-edged sword however, as a subtle installation might easily be overlooked due to surrounding stimuli, also known as "display blindness [12]." To avoid being completely ignored we aimed to make the installation large and tactile, with a touch of mystery, inviting interaction primarily through curiosity.

PARTICIPATING IN TWO ROLES

To represent the concept of Human-Data Interaction (HDI) [13] most literally, we propose exposing our audience to two sides of the data flow within the same installation. The first side, and perhaps most familiar, is that of giving away the data as the "user." The second is that of receiving and processing data as a "company."

By giving our audience the opportunity to play both the role of the data giver and data receiver, we aim to start a dialog about personal data and the need for its negotiability. This happens by physicalizing digital actions with simulated data and presenting the consequences of those actions. This experience will request more participation from the user as they are not only required to read the consequences of their actions in the form of stories, but to reach these stories, they must physically move themselves to the other side of the installation. If increased participation is achieved, it will drive them to think or discuss critically.

We were inspired by the concept of 'hot and cool' media from Marshall McLuhan's 'Understanding Media: The Extensions of Man' and 'Convergence Culture' by Henry Jenkins. Both point out that experiences such as reading books provide less sensory data and consequently demand more participation by the audience. While more difficult to understand, these mediums offer deeper engagement for the viewer, resulting in the work staying in the user's memory and having a more significant impact [14] [15].

Unlike the more expected format of interactable installations, where people stay in one place, we've designed an artefact for the visitor to walk around and explore. Movement and a more in-depth consumption of text will require mental and physical participation from the visitors, driving them to consider or discuss our topic critically, and potentially, remember our concept next time they are presented with the option to "Accept All."

Along with the audience's participatory role, typography is the central medium in this installation. The words sending messages both in the sense of what has been written and how, as well as stylistically, using different type treatments to convey the energy of the role the visitor finds themselves in.

PART 2: RESEARCH

PLANNING AND BUILDING

Users

Obser
vation
notes

Family

Young kids (blow 10?)

usually with many belonging such as bags and baby carriage

usually read the info while the kids are playing and explain what happens to the kids

School group(teacher with students)

the students may interact with the artefacts by groups

parents sometime 'scaffold' the interactive experience for their kids.

they usually dont read the intro or info next to the artefacts. They just see gaint buttons and presh it.

Parents (sometime they need to carry their children) only on hand is avalilable

people cares about the hand sanitizer position before or after the interact with the artefacts

Artefacts

Extremely hands on, jas simple strcuture. Usually use buttons. The Touch screen get less interaction. Button feels like a 'reward' for the users

Robust, simple structure, easy to clean. Right high for the kids.

create two installations. one is a game that requires you to accept cookies with an easy "accept all" and then you can do the game.

the other installation makes the user aware that it's linked to the game installation and shows you what the game user is doing on the other side

data — Live data: Generate through people's decision with the installation.

audience — Mostly familiies with young kids. international visitors

Message — This concept explores negotiability within Human-Data interaction beyond the sheer volume and complexity of text and 2D screen.
Inspired by Bettina's Trustball installation, we want to deepen the awareness of the consequences and repercussions of clicking "accept all" when browsing websites. Through physicalisation, we aim to materialise the experience of accepting cookies. By physically handing over their data, visitors might reconsider what it means to click "accept all" the next time they are prompted to do so online.

Criticism — The increasing generation and collection of personal data are becoming more complex yet mundane. User Agreement, cookies inform, which were originally designed for data collection transparency, are losing their purpose due to the difficult words and awful experience.

Sketch

Interaction

cookie consent interface... → shows what info also included in the consent → make personal decision on the physical problem → physical information trail

Obstacles —
1. How to aviod interaction blindness?
2. How to make sure we only collect datas about user behaviour?
3. How can the installations be children friendly?
4.

Research —
1. The theory of Dark UX design is common in designing cookies consent request:
• misdirection
Dark patterns are user interfaces that push consumers to make decisions such as accepting a policy or agreeing to the installation of cookies on their devices that they might not otherwise make.
Davide M. Parrilli, Cookie consent is (still) broken, 2020, https://uxdesign.cc/cookie-consent-is-still-broken-a4257f8249b9
2. works of 'Trust Ball' explore this moment and interaction of digital consent further and question how we might agree to ToS in the future.
(bettinanissen, 2018, , Trustball, http://data-things.com/trustball/)
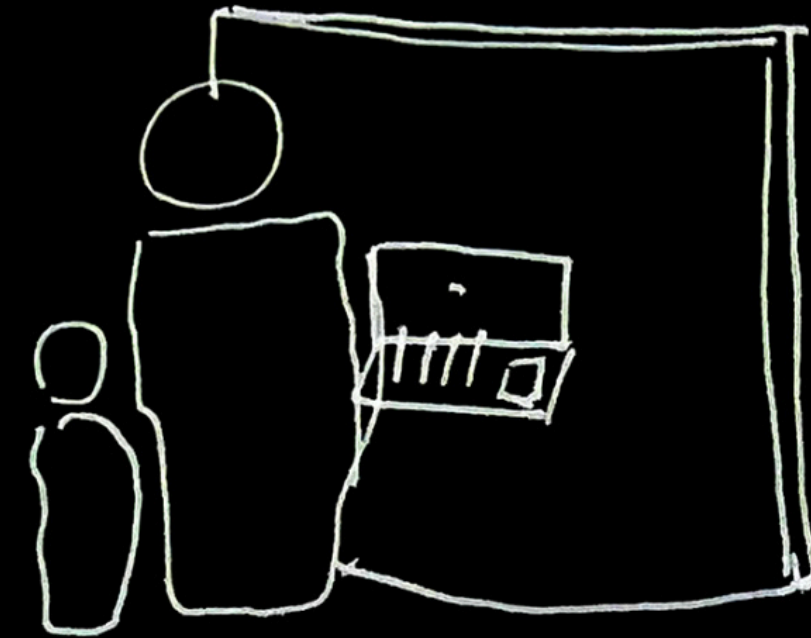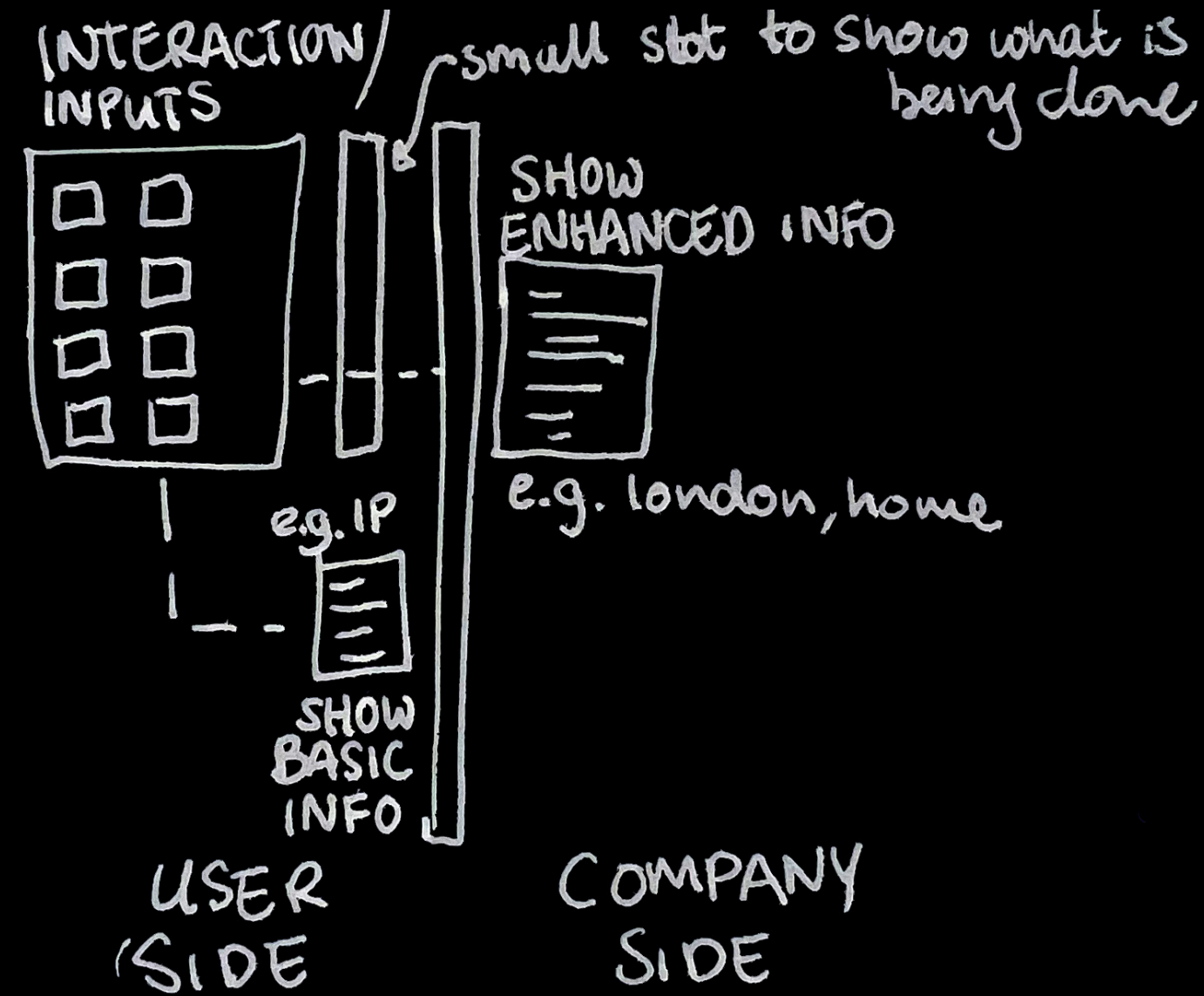
CONCEPT
After an initial period of coming up with, and subsequently, rejecting concepts, we decided to pursue the topic of personal data in the context of cookies. Included in this initial concept was the idea to create two separate sides within the data exchange. We didn't have an exact idea of how we would execute this idea though.

This is where our project split into two parallel streams of work, with each stream coming up with answers for their respective open questions. This method not only played into each team member's particular set of skills, but also gave us the space and opportunity to work on developing new skills we were interested in. The two streams consisted of designing and building the physical structure and designing and developing the digital program, meeting in the middle through the wires.

PLANNING AND BUILDING

INTERACTION INPUTS

small slot to show what is being done

SHOW ENHANCED INFO

e.g. IP

e.g. london, home

SHOW BASIC INFO

USER SIDE

COMPANY SIDE

2. On the control panel they use a card to decide what character they want to play as.
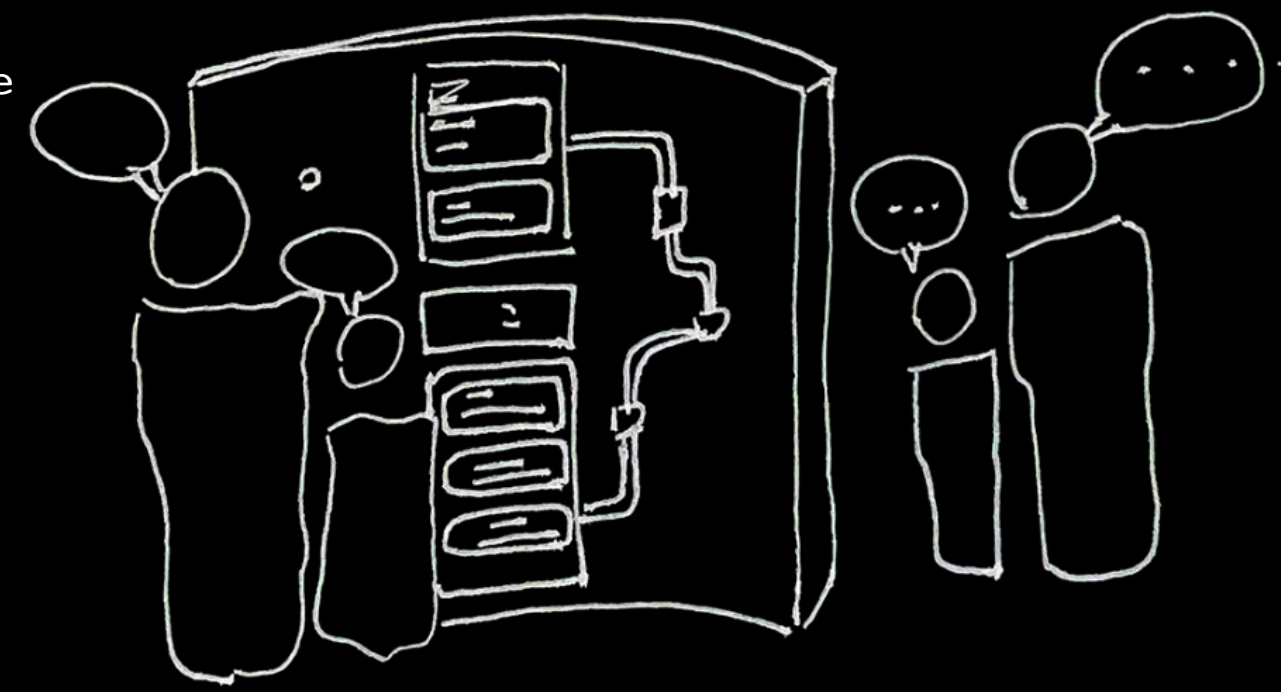
3. With their persona selected, the audience uses tactile controls to change their privacy settings.

When they do this, they will receive feedback in the form of high level, raw, data.

1. Audience approaches from the "user" side. The side of the data "giver." They see a wall with a display and a control panel.

"Company side"

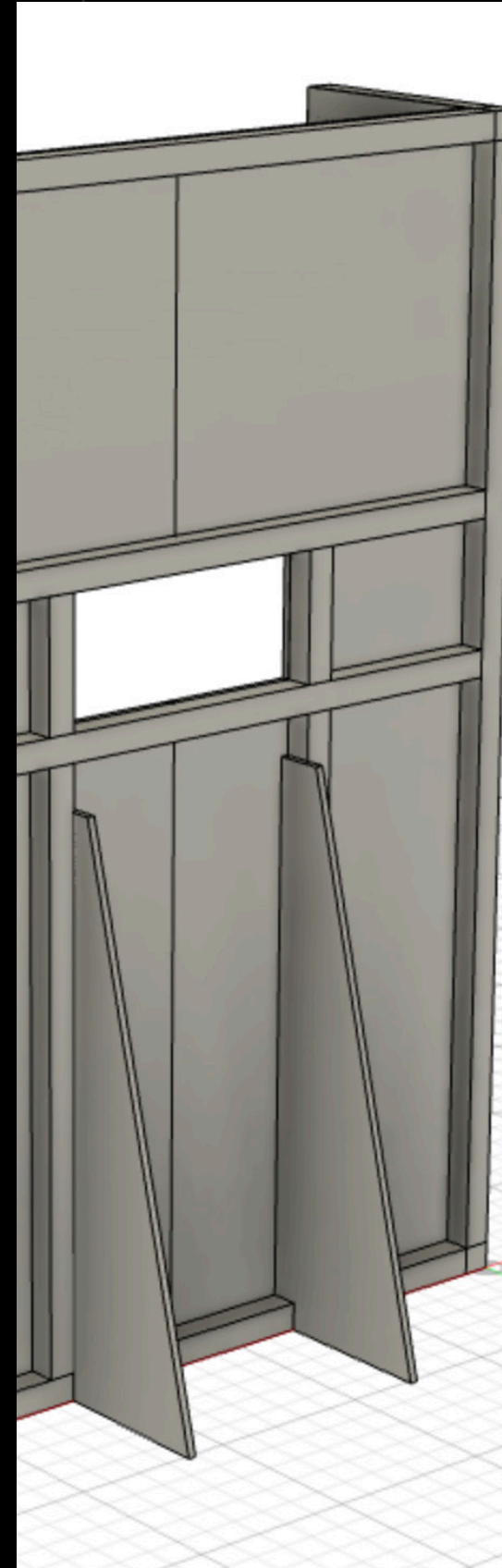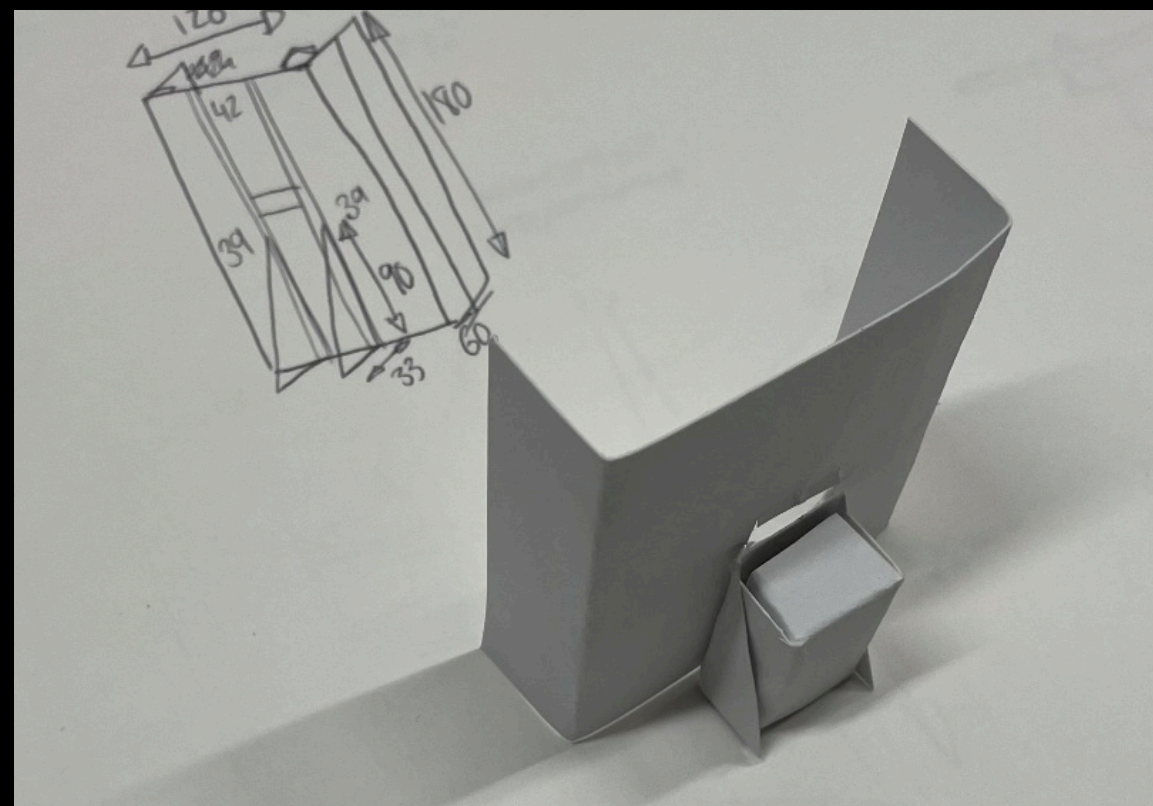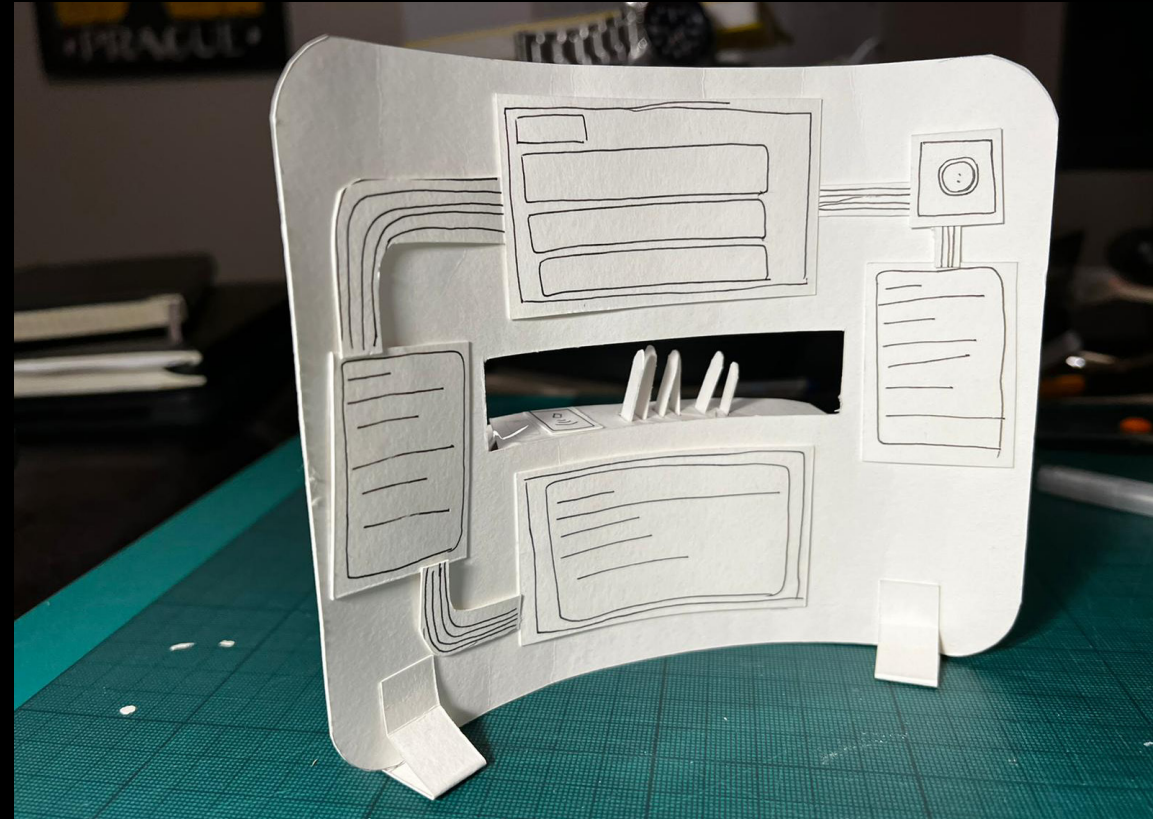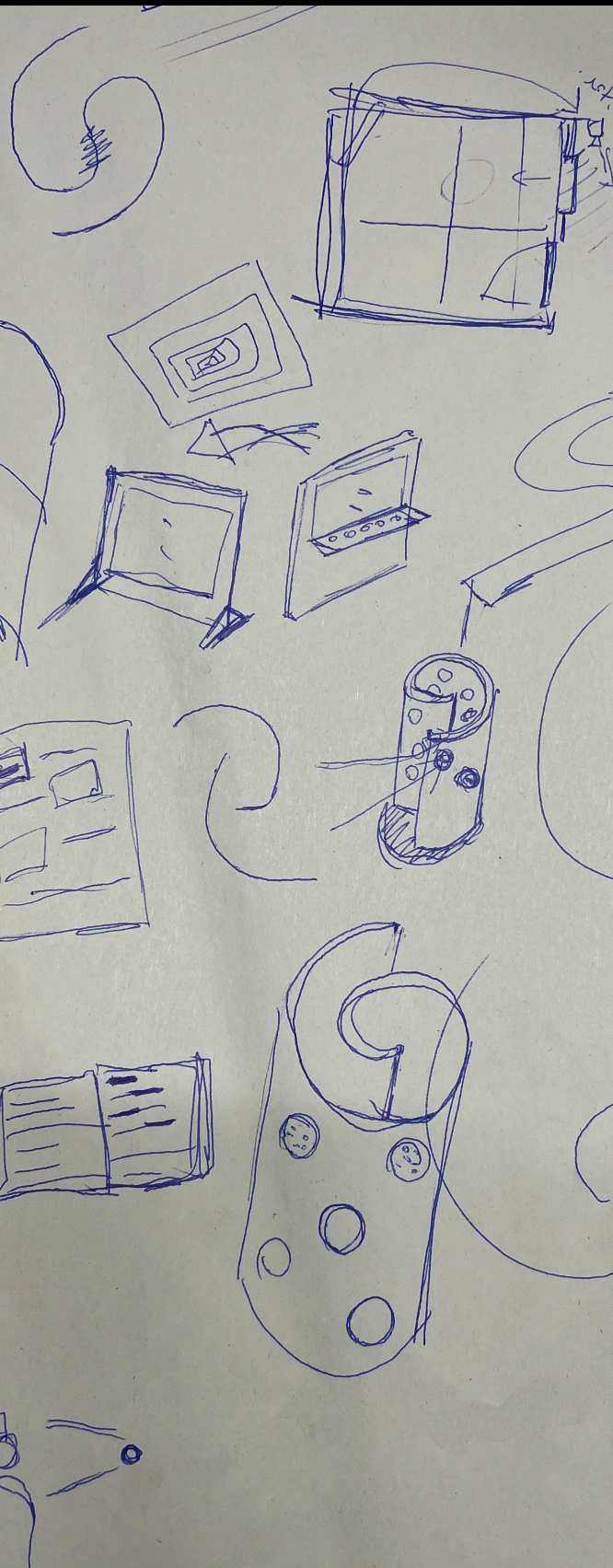5. On this side the audience will be able to read the story that has been formed by the company based on the data received.

4. The audience moves to the other side of the display where they assume the role of the "company" or, the "receiver" of data.

"User side"

PLANNING AND BUILDING
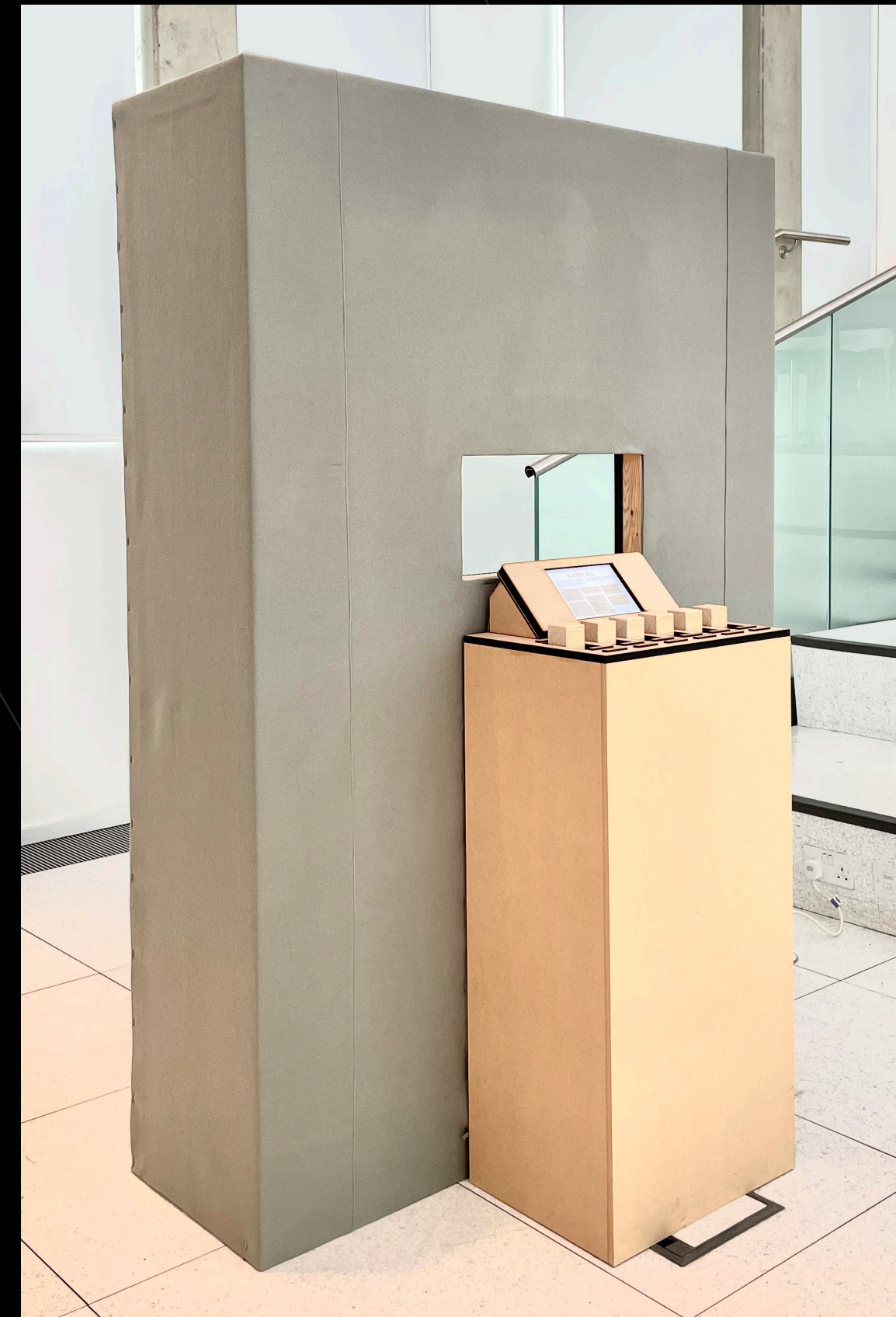
PHYSICAL

The physical structure needed to be designed in a way that would give a sense of secrecy on one side and accessibility on the other. When considering the way we might convey our story on the company side of the artefact, we soon decided that using multiple small screens would work better than one large one, especially when it came to building the structure in a way to be able to bear the weight of the screen(s).

We went through multiple sketches, paper prototypes and 3D renders. As the most important task was to create a structurally sound installation within the time and resource constraints, we settled on a 3-sided box with two triangular supports that would prevent the structure from tipping forward. To hide the supports we designed them so they would slide into the plinth that contained the hardware and control panel.

The design of the control panel went through multiple iterations also, with levers, knobs, dials, toggles, and buttons all making an appearance. In the end, we opted for toggles as they not only represented a common Ui element, but also dissuaded the audience (children in particular) pull or climb them in a way that would be unsafe. Toggles were also easier to realize out of wood. We created six toggles, one for each of the purposes that cookies have.

PLANNING AND BUILDING
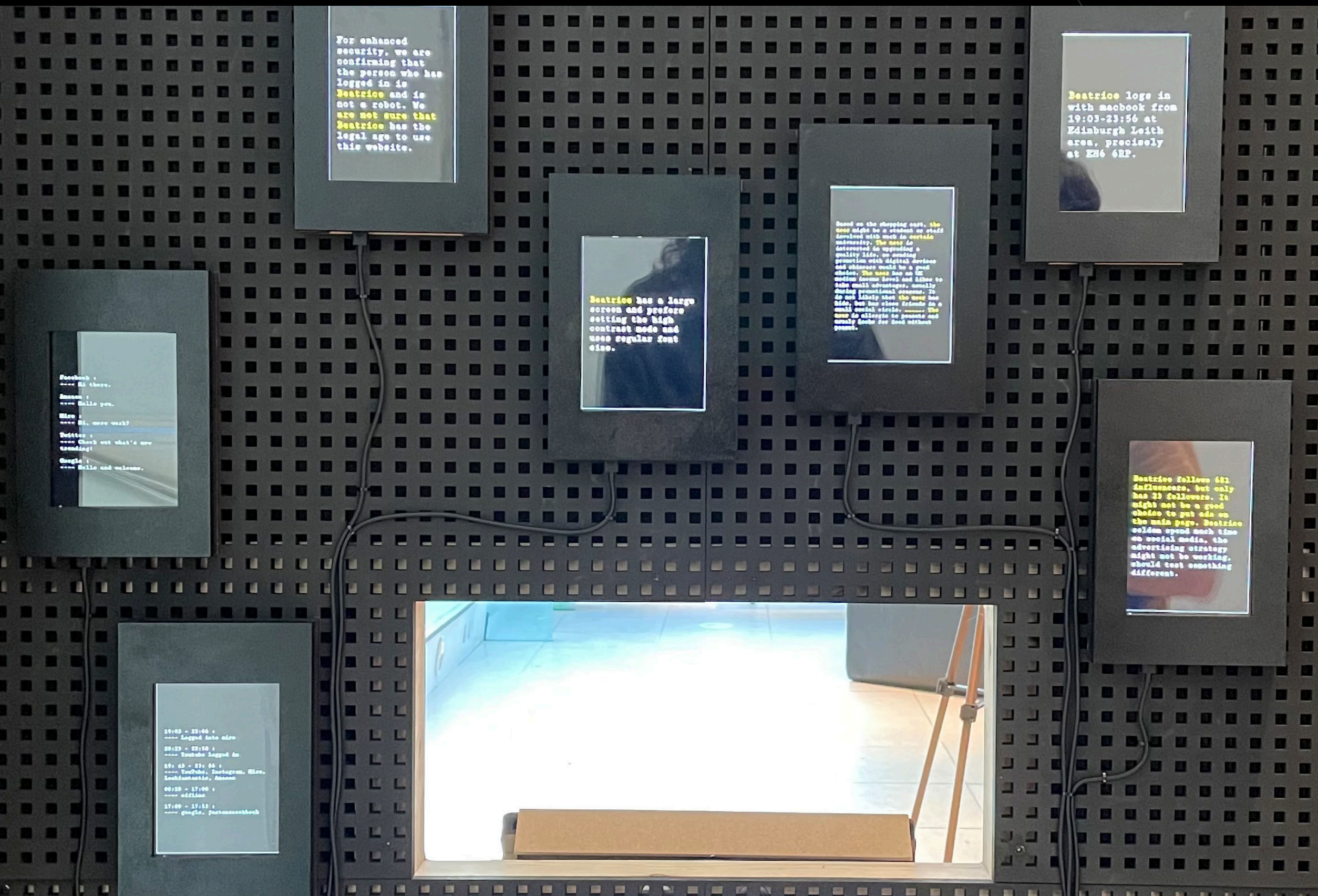
SEVEN SCREENS

We used seven tablets to symbolize the six purposes of cookies along with an extra tablet for third party cookies. Third party cookies do not show up on the front of the installation as they are cookies that are associated with a different site from the one the user is visiting currently.

PLANNING AND BUILDING

DIGITAL

To display the stories inferred from physical actions, we used a Raspberry Pi to run our program, but it wouldn't work with multiple standalone screens due to the amount of processing power they would require. To circumvent this problem, opted for seven Kindle Fires. These were WIFI enabled tablets that were affordable enough to buy in multiples. This way we would have the Raspberry Pi control a server instead of plugging into each screen (also eliminating the need for seven additional HDMI cables).

Since we were creating a local network and didn't need to have access to the internet, we used one of our own routers to create an offline network. This worked and allowed all tablets and computers to communicate with ease.

The installation uses physical toggles to translate physical inputs, into digital outputs. When a toggle reaches either of the sides, the corresponding part of the circuit is closed, and the connection pin reads the voltage as an input. Each time the pins sense voltage, a python file detects it as an event and calls the functions to replace part of the strings of related files with other words, changing the stories available on the screens.
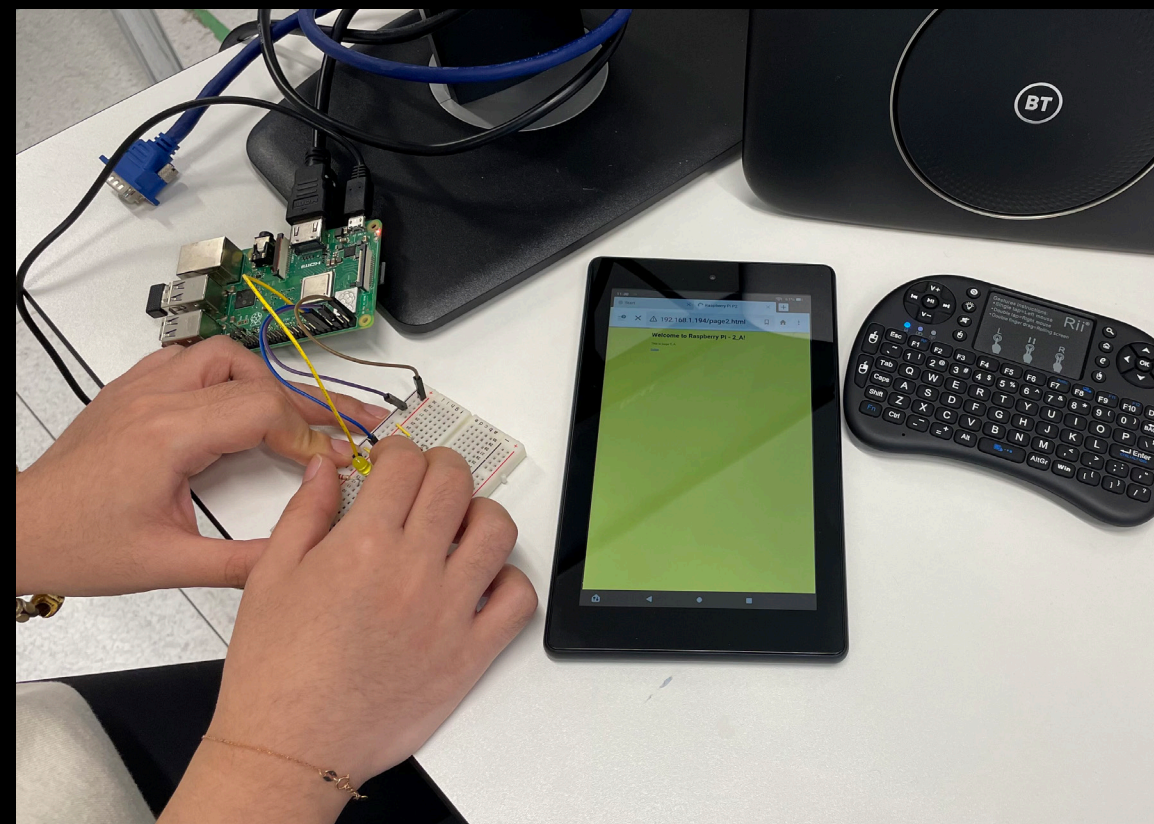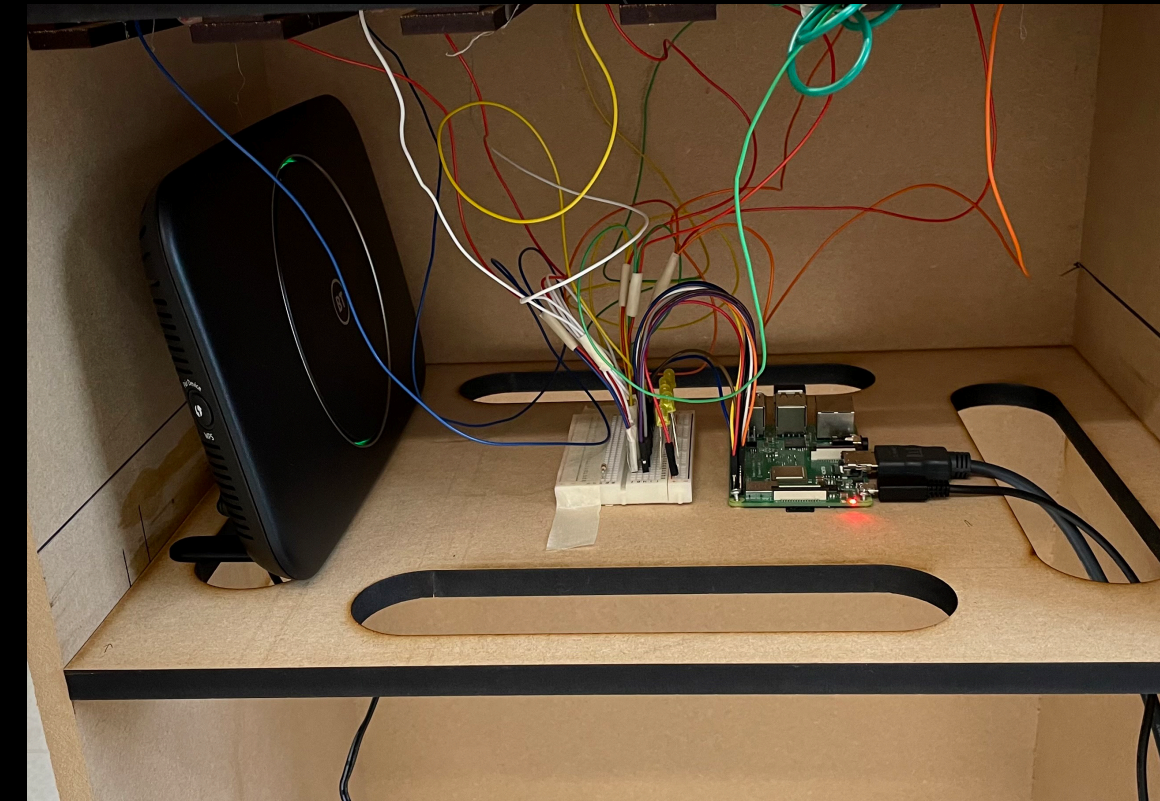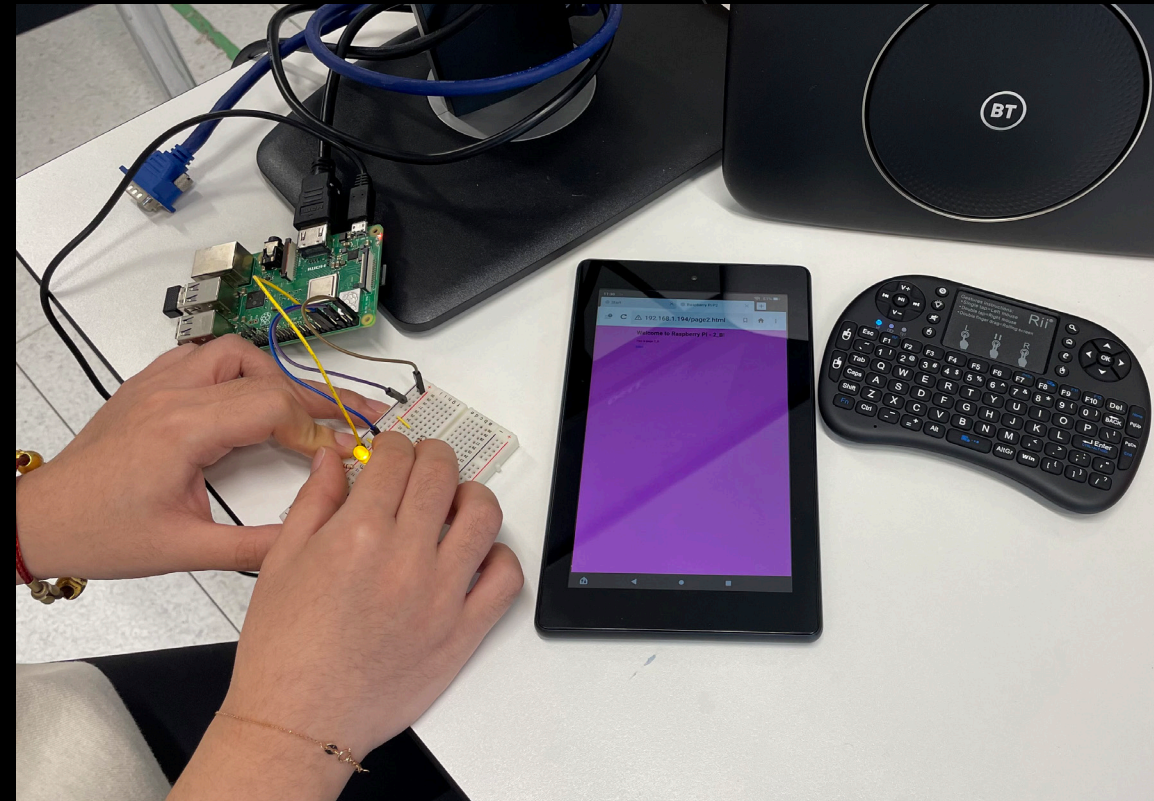
ANONYMIZED SIMULATED DATA

Due to the secrecy surrounding corporate data collection we extensively reviewed literature, cookie policies, and sources like Google Analytics to piece together a realistic overview of the data we would need to collect. We then created a fictional character named Beatrice based on an anonymized amalgamation of our own data.

Beatrice has a large screen and prefers setting the high contrast mode and uses regular font size.

Based on the shopping cart, **Beatrice** might be a student or staff involved with work in **Edinburgh** university. **Beatrice** is interested in upgrading a quality life, so sending promotion with digital devices and skincare would be a good choice. **Beatrice** has an UK medium income level and likes to take small advantages, usually during promotional seasons. It is not likely that **Beatrice** has kids, but has close friends in a small social circle. **There are two logged in devices, one is personal device (frequently used),and another one is a public PC (occasionaly used). Most of the shopping behaviors happen during nighttime before log out.** **Beatrice** is allergic to peanuts and usualy looks for food without peanut.

Beatrice follows 681 influencers, but only has 23 followers. It might not be a good choice to put ads on the main page. Beatrice seldom spend much time on social media, the advertising strategy might not be working, should test something different.

TRIALS AND TRIBULATIONS
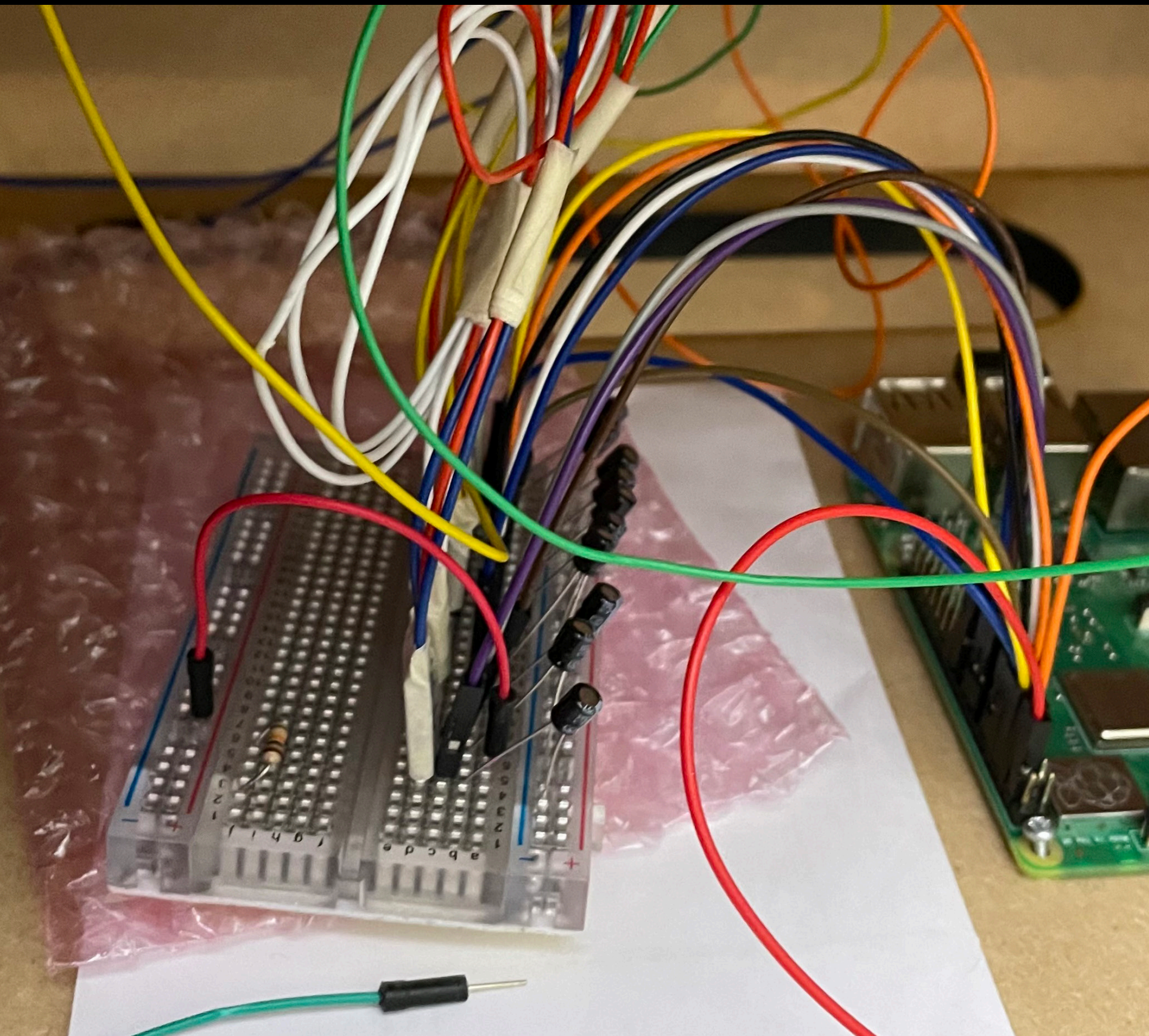

```html
1   <!DOCTYPE html>
2   <html>
3     <head>
4       <title>ads</title>
5       <!-- <meta http-equiv="refresh" content="0.5"> -->
6       <style>
7         body{
8           margin:0;
9           background-color: ■black;
10        }
11      </style>
12    </head>
13
14    <body>
15      <iframe name="test" src="./Ads.html"  width="975px"
        height="1365px" scrolling = no frameboarder = "0">
16
17      </iframe>
18
19    </body>
20  </html>
21
22
```

REWRITING WEBPAGE CONTENT

The event detection of the circuit was not accurate due to the quality of the soldering, this created a conflict between the HTML file contents being rewritten and the tablet browsers refreshing, causing frequent glitching. To reduce glitching, we added capacitors to each switch, smoothing the instantaneous power outputs and preventing signal reading errors.

On the webpage side, we embedded the changing content in a shell HTML file, this prevented the pages from being rewritten, significantly lowering the required processing power.

TRIALS AND TRIBULATIONS
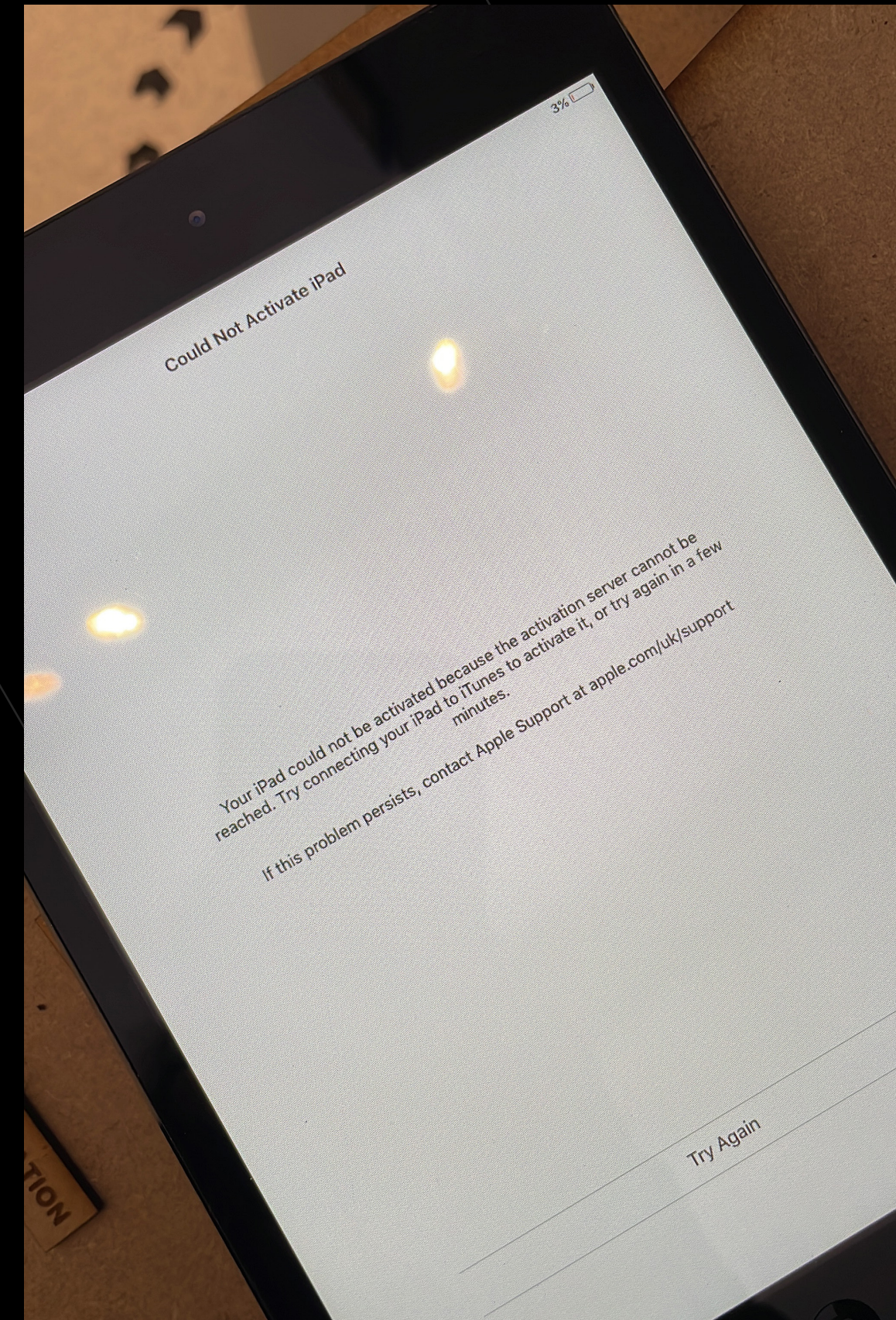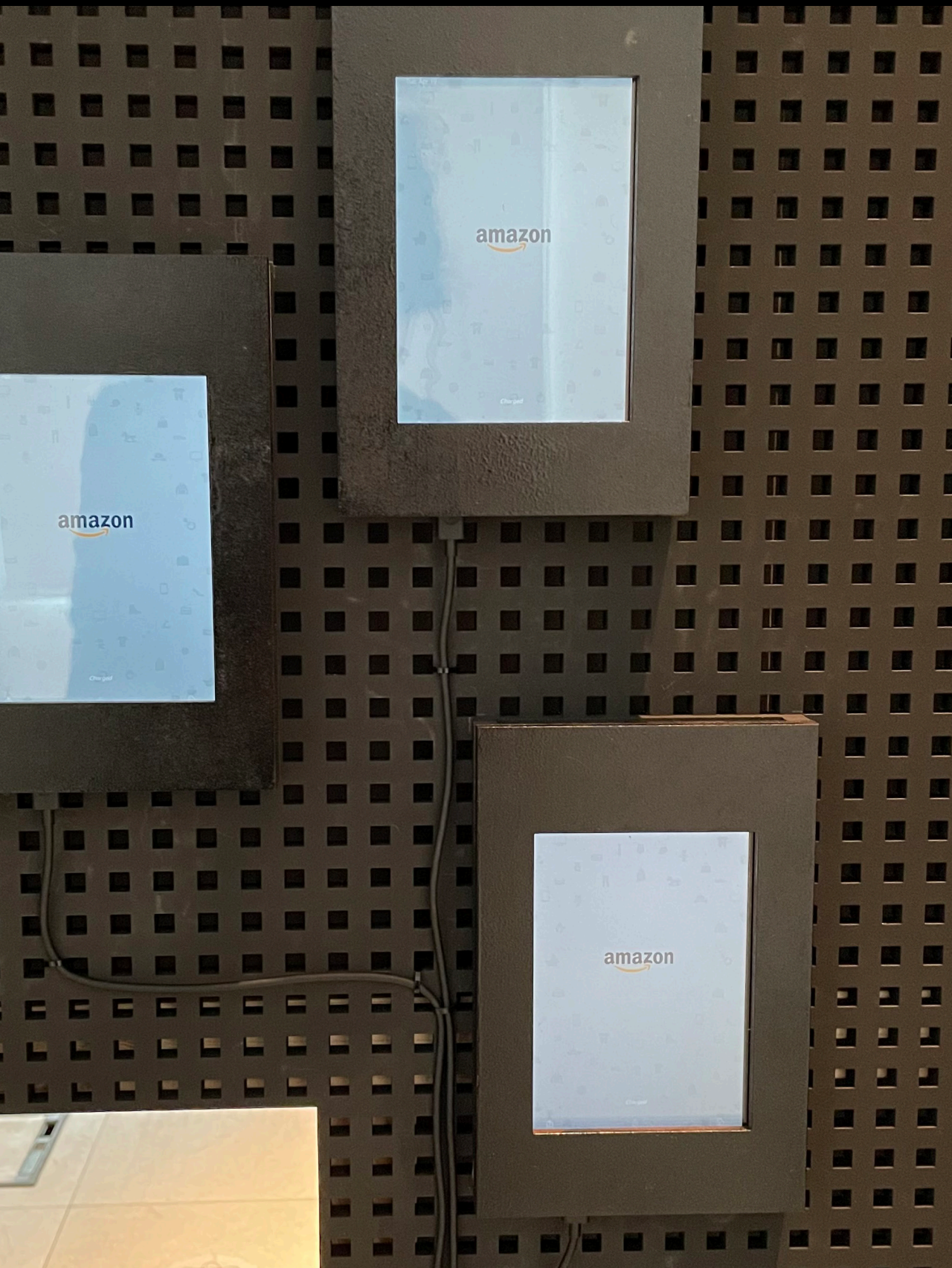
SCREENS

While using tablets greatly reduced the cost of creating the piece, they caused quite the headache. The tablets on the "company" side of the installation had to be individually turned on and refreshed at the start of each day. This meant turning on the installation, waiting for the Raspberry Pi and network to boot up, remove each individual tablet from its holder to unlock it and navigate to the website, and then proceed to return them and plug them in.

On the "user" side, we used an iPad. Due to the uncertainty of what size and make we would have available; we left the creation of the holder for this tablet till last. This resulted in the holder not being the ideal size as well as not being able to secure the tablet to the desired standard.

In addition to this, midway through the exhibition, the iPad went through an update that locked us out of the device, leaving us unable to display the text in the front.

DESIGN ELEMENTS

FRONT

To embody the familiar "accept all" prompt, the "user" side of the installation was designed with soft, warm materials suggesting comfort and friendliness, reminiscent of a home.

The materials such as felt and wood, are inviting to touch. The colors on the screen, pale yellows and browns, unassuming and safe.

The typography and graphical elements or both the screen and the labels under the toggles; rounded, bolded, childlike.

All to give the audience, now in the shoes of the "data giver" a false sense of security, as if to say, "your data is safe with us."
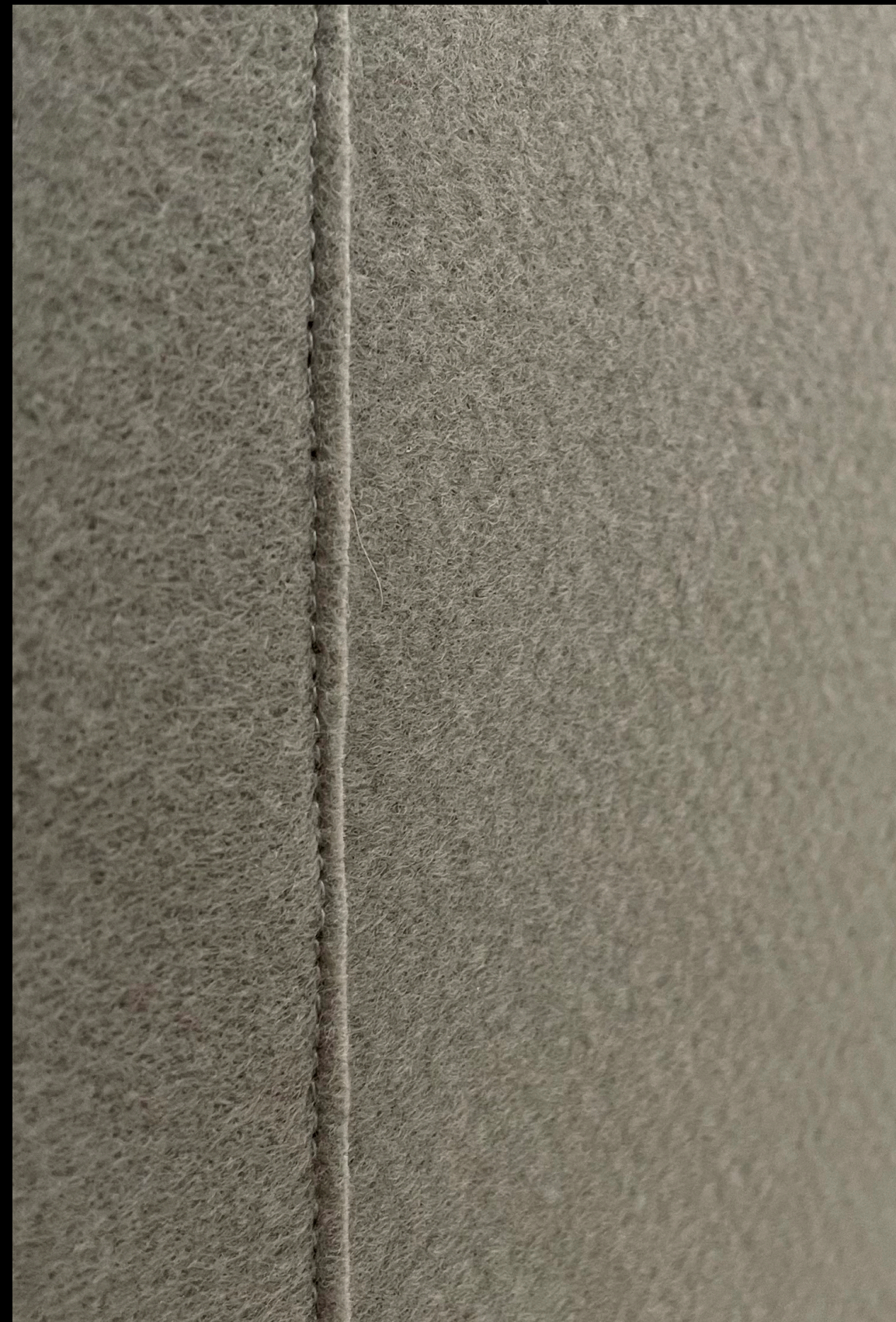
X-CEPT ALL

...ebsite, it may store or retrieve
...browser, mostly in the form
...rmation might be about you,
...your device.

You can choose not to allow
cookies by accepting or rejec...
what the company learns ba...

...YS ON)

SITE FEATURES
- Actions on the website

PERFORM...
- Screen siz...
- Traffic bet...
- Display m...

ADVERTISEMENTS & RECOMMENDATIONS
- Shopping cart contents
- Purchase history
- Recommended products
- Campaign performance
- Ad impression
- Purchases after impression
- Multiple devices identify
- Interaction with ads
- Behavior

ANALYTIC...
- Frequency...
- Preference...

DESIGN ELEMENTS

BACK

When stepping into the role of the "data taker" or "the company", the audience is immediately confronted with the sharp contrast between the two sides.

Where one was soft, bright, and inviting, the other is hard, rough, dark, and uncomfortable. The screens flicker.

The text, white on black, with yellow glitching on certain key words. All the screens emerge from the same point, evoking the mythological Hydra and replaceability of individual components.

The black waffle structure, while initially designed to facilitate fixing the screens to the wall, took on a life and narrative of its own, conjuring imagery of the Judeo-Christian confessional. A pertinent comparison, as companies collecting data, are effectively privy to people's desires and habits.

DESIGN ELEMENTS

WINDOW

The window enters the story last, as it is overlooked when the viewer is in front of the installation and is secondary to the screens in the back.

The window is the connection between both sides. Someone standing on the company side of the artefact can easily observe someone who might be interacting on the user side. The person on the user side can see that there is someone on the company side, but due to the distraction from the interaction, might overlook this feature.

This is once again symbolic for the relationship between users and companies. Companies observe users easily, but users are too busy chasing the carrot to understand that they might be being watched.

From an alternative standpoint, the window functions as a portal of sorts. On the one hand a group of people might use it to communicate, turning the installation into a group experience, on the other hand, individuals can use the window to explore the settings and their consequences by simply reaching through and moving the toggles.

PART 3: PRACTICE

OBSERVING THE OBSERVERS

During the exhibition, we were able to observe our artefacts being used, taking detailed notes of the encounters, and discussing the experiences with some visitors.

When observing the visitors, we discovered that there were two distinct ways people experience our artefact. Some visitors interact with the front and leave shortly thereafter. In their feedback they that the work is text-heavy; the 'wall' in between makes the experience less straightforward. The discoverability of the full experience of the piece is not apparent.

Other visitors look to immerse themselves in the experience. Their curiosity and desire to explore allows them to discover the full piece as well as keeps them going back and forth between the sides, or even reaching through the opening, to change the settings. When having discovered something new they elicit sounds of excitement; one visitor even started a discussion with a total stranger about what they just found. Conversations with these people indicated that the installation creatively offers the concept of privacy online in a physical way by encouraging visitors to explore within a three-dimensional space, critically reflecting on their own experience.

One visitor said the essential toggle, designed to be "always on," really reminded them of their own experience online: "The installation feels more like a mirror to me. I learned so much by linking my physical behaviors to my online behaviors."

Besides individuals, visitors who explored as groups appeared more likely have a positive experience. Most of them turn the experience into a game of cooperation. Using the small opening meant for observation as a portal to communicate what they found. People visiting with children often spent more time interacting with the piece. Observations show that the sturdy appearance allowed the supervising adults to feel more comfortable letting the children play with the artwork.

Summarizing, people with curious minds and visitors in groups appeared to enjoy the experience more. When appropriately engaged, the high level of participation allows the users to reflect and think more about the privacy issues within their everyday lives. This did start conversations, achieving our goal of encouraging critical thinking about data privacy online.

CONCEPT REVISITED

When considering how we might tackle this project with more resources some changes come to mind immediately:

• Use standalone screens connected through HDMI facilitate powering the installation on and off.
• Use different sized screens to embody the different avenues through which people give away their data (phones, tablets, computers).
• Use more processing power to reduce lag.
• Make the structure larger, and more enveloping.
• Indicate the cookie purposes linked to their respective stories on the "company" side.
• Use light strips going from the front of the installation to the back to entice the user to "follow" the data.
• Remove the screen at the front and use the light strips to indicate on/off.
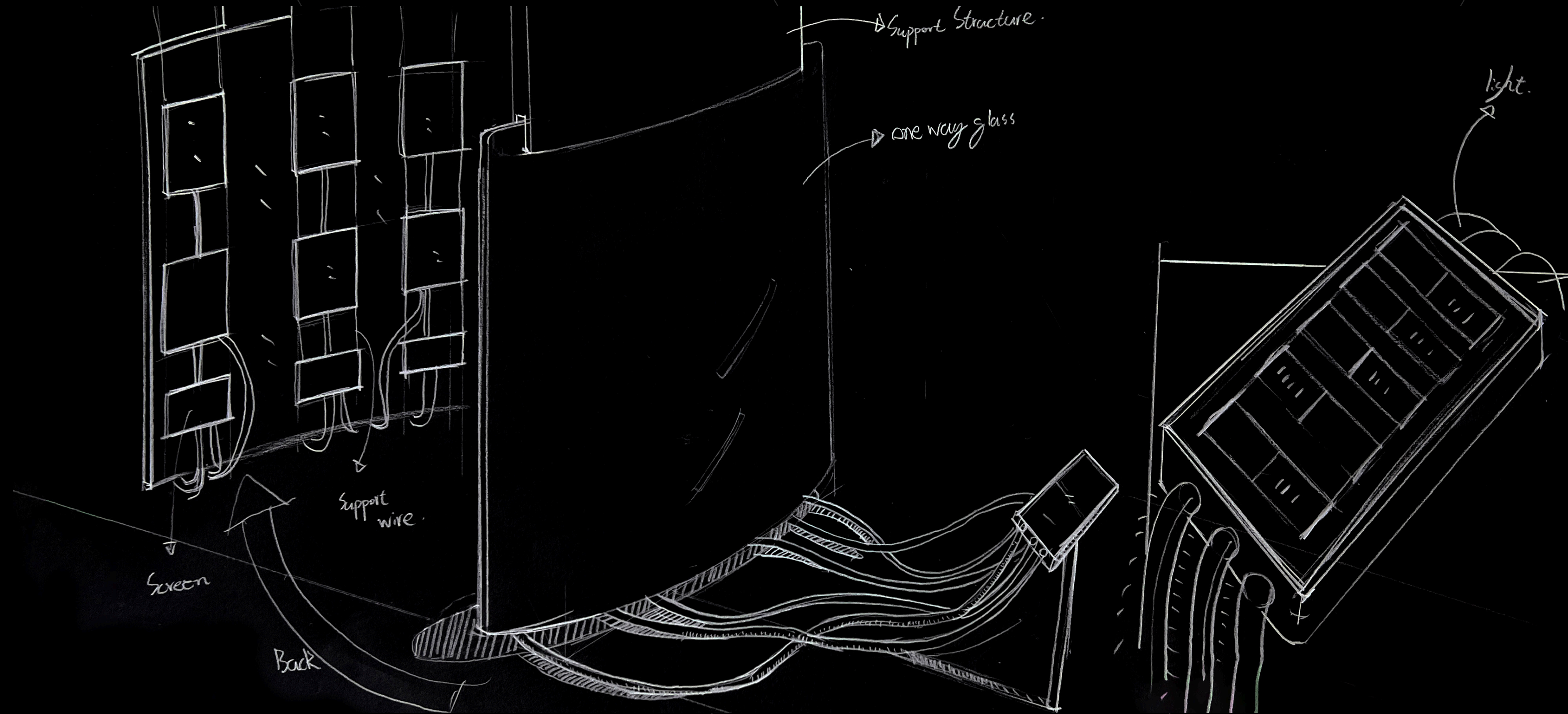
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AN EXPLORATION OF PRIVACY AWARENESS

THANK YOU

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