M1.1 Project:

Let it flow?

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Summary

The current society is running more and more on digital technologies. One of the main players in this field is Google. People 'pay' for the service by giving away their personal data. This allows Google to optimize their services and to create targeted ads, to make profit. In general, people know their data is being collected and consider this as an issue. However, it feels to complicated and abstract, so they deal with it by ignoring it. To tackle this issue, this project aimed to design something that allows people to understand the data flows of Google and act upon it by considering their settings. Four design iterations resulted in the final design: "Let it flow?". It is an experienceable and interactive installation placed in the city center, that allows people to explore, understand and consider their five main settings available in every Google account. The installation tries to grab people's attention first, inform them next and finally allow them to take action if wanted. This report describes the full design process.

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1. Introduction

When asking *"how do you experience digital technologies?"* in interviews to explore the relationship between an individual and digital technologies, one participant responded:

> *"what do you mean with 'experience', it is an integrated part of my life, I cannot really have an opinion about it" (p2).*

Their reaction illustrates the degree in which we rely on digital technologies in our daily life. Both our mental environment – being able to stay connected with friends or family, or Google helping us out whenever information or advice is needed – and our physical environment – being able to regulate the thermostat at home with our smartphone, or having smart lighting in cities – is constructed around it. On a higher level, societal systems such as education, healthcare or police authorities also rely more and more on digital systems (Accenture Digital Health Technology Vision, 2021; Sesay, Ramirez, & Oh, 2017; Marcum, 2014). In other words: our society will not live without digital technologies ever again.

Digital technologies often involve huge amounts of data collection. This brings opportunities for optimizing and personalizing services. Conversely, it can be exploited through manipulating and steering behavior, by showing users specific content based upon their activities.

The main problem lies in the way media platforms earn money (All Tech Is Human, 2021). Visitors 'pay' for their use of the platform by giving up information about themselves, such as their view and their behavior, without this being too clear. These platforms use their engagement patterns to determine what content the user sees (All Tech Is Human, 2021).

One of the main players in this field is Google. Of all internet users worldwide, more than 90% use Google (Georgiev, 2021). They collect huge amounts of personal data to create a personalized experience for their users (Google, 2021). However, for generic users it is unclear what data Google collects and for what reasons. One study states: "users have little insight into how or why they are served the content they receive, how it differs from what appears on someone else screen, or how their digital data is being used" (All Tech Is Human, 2021). This gives reason for concern of privacy issues. Next to the privacy sensitive information the collected data contains, it is questionable whether consumers can give informed consent if they do not understand what data is collected and for what reasons (Janssen, 2021).

In conclusion, people currently do not understand neither control their own data within Google services. This led to the design challenge:

Create a design that allows people to understand the data flows of Google and act upon it by considering their settings.

1.1 Research Questions

In order to address this design challenge, the following research questions were formulated:

1. What is the current situation? More specifically: what data does Google currently gather from users, what control do users have and what do Google users think about this?
2. What design trends can be identified that aim for creating awareness, understanding or action towards data collection by digital agencies? Subsequently: what design or research opportunities can be found?
3. What design can be developed, based upon those opportunities?

1.2 Approach

For this project, the double diamond model was applied (Design Council, 2019). It is a design framework constructed by four phases: discover, define, develop and deliver. 'Discover' and 'develop' are diverging phases, while 'define' and 'deliver' are converging phases. The first diamond investigates a problem and the second diamond investigates a solution. A theoretical visualization is given in figure 1.

Moreover, 1st, 2nd and 3rd PP were used in the design process (Smeenk et al., 2016). In first-person perspective, design decisions are based on the experience and intuition of designers themselves. Second-person perspective means involving other stakeholders into the design process and thirdperson perspective is investigating the bigger context of the design through already-existing knowledge.

How these methods were applied in the design process is described in detail chapter "3. Process".

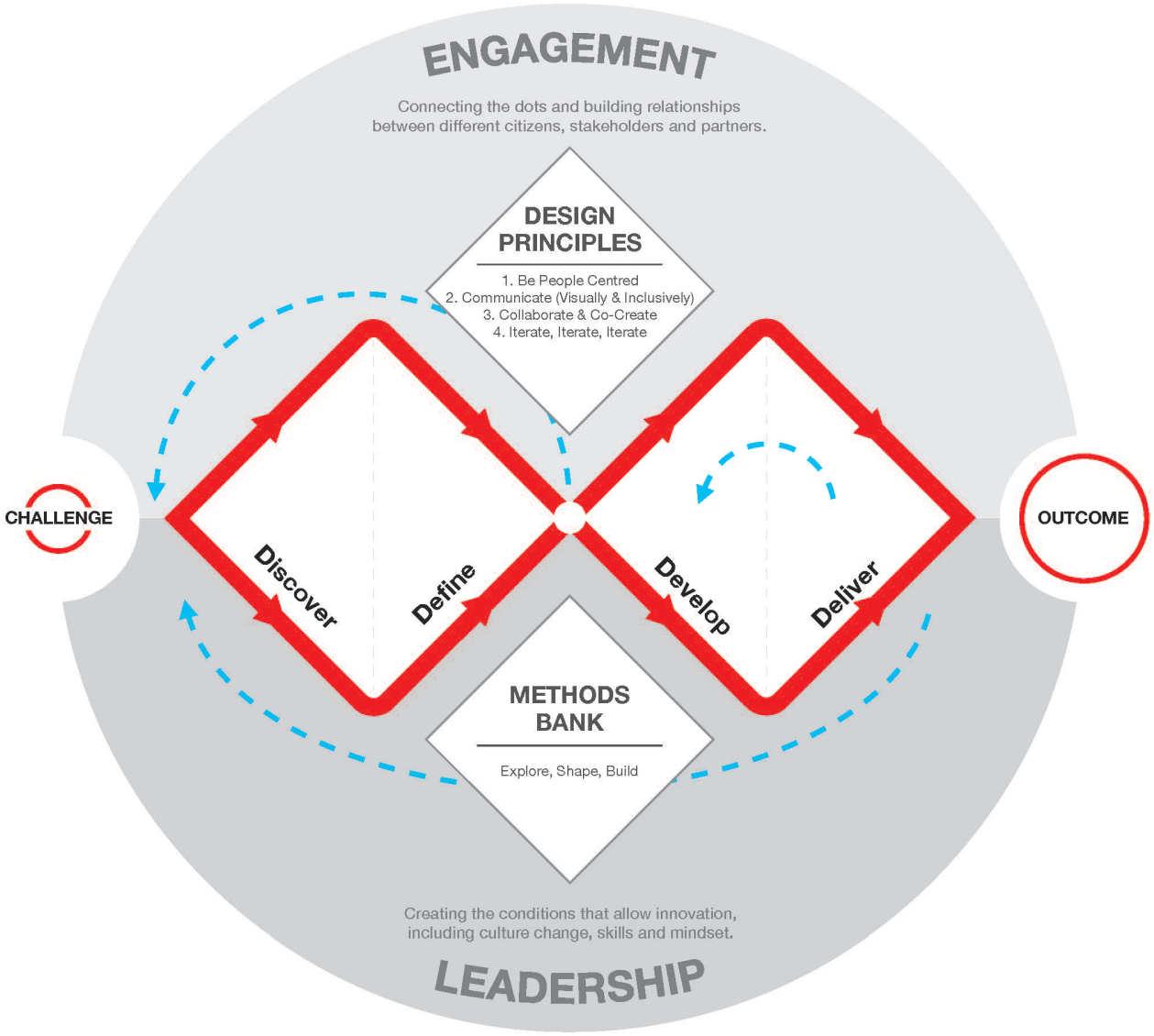


Figure 1. A theoretical visualisation of the Double Diamond design framework (Design Council, 2019).

1.3 Reading Guide

This document will continue with background information on Google and related work on the topic of data and autonomy. This chapter focusses on research question 1 and 2. Next, the report takes you through the design process after which the final design will be explained. This part is focused on research question 3. A discussion will follow in which our project will be discussed in relation to the background and related work, including the limitations and future work. The report ends with a conclusion on the overall project.

2. Background & Related Work

2.1 Background

2.1.1 Google

Google is an American search engine company, founded by Larry Page and Sergey Brin in 1998 (Hosch & Hall, 2020). It currently is the most visited website in the world and dominates the search engine market, holding 92.47% of the market share as of June 2021 (Neufeld, 2022; Statista, 2021b).

A big part of Google's success is due to collecting data of billions of users every day (Popken, 2018). In their privacy statement, Google says they collect information to "provide (...), maintain (...) and improve our services", "to develop new services", "to protect Google, our users and the public", and to "provide personalized services, including content and ads" (Google, 2021). The latter plays a big role in Google's business model: in 2020, Google's revenue amounted to 181.7 billion dollar, out of which 146.9 billion was due to its proprietary advertising service (Statista, 2021a).

To summarize the privacy statement, Google collects:

- "(...) content you create, upload, or receive from others when using our services. This includes things like email you write and receive, photos and videos you save, docs and spreadsheets you create, and comments you make on YouTube videos." (Google, 2021)
- "(...) information about the apps, browsers, and devices you use [emphasis added] to access Google services", including "information about the interaction (...) with our services. (...) This information includes things like your device type, carrier name, crash reports, and which apps you've installed." (Google, 2021)
- "(...) information about your activity [emphasis added] in our services", which "may include: terms you search for; videos you watch; views and interactions with content and ads; voice and audio information when you use audio features; purchase activity; people with whom you communicate or share content; activity on third-party sites and apps that use our services and Chrome browsing history you've synced with your Google Account." (Google, 2021)
- "(...) information about your location [emphasis added] when you use our services (...). Your location can be determined with varying degrees of accuracy by: GPS; IP address; sensor data from your device and information about things near your device (...)." (Google, 2021)

2.1.2 Technical Details

Data Collection Techniques

Google uses multiple technologies to collect and save all data from users. The most important ones are described below.

i. Cookies

When visiting a website, web servers generate small pieces of data called 'cookies'. These are stored by web browser on the device, either for the amount of time the user is visiting this website ('per-session cookies'), or for a predetermined period of time ('persistent cookies') (Cloudflare, n.d.). When a user visits a website again, the cookie allows the site to recognize the user's browser (Google, 2021).

Moreover, cookies stored by the domain (website) that the user is visiting, are called 'first-party cookies'. These are used to provide a good user experience (e.g. to remember the language settings, or to automatically fill in a username and/or password). On that same website, additional cookies might be stored from other domains than the one the user visits. These 'third-party cookies' are used for cross-site tracking and allow the advertiser (Google) to know which websites a user has visited, provided that the websites include a Google ad component (Kulche, 2021). Cookies can also gather additional information about the user's behavior on a webpage. Combining all this information, allows Google to create an accurate profile about this person. As the Google Display network "reaches 90% of Internet users worldwide, across millions of websites", lots of profiles are created, providing the possibility to sell targeted advertisements to companies (Google, n.d.-e).

ii. Local storage

Google stores part of the data on the physical device, rather than on local networks or the internet. This firstly includes browser web storage, to enable data storage across sessions. It means data is retrievable when closing and reopening the browser. Secondly, application data caches are used. Amongst other things, this data repository enables a web application to run when not being connected to the internet. Thirdly, data can be saved in datacenters. Google currently owns 23 datacenters, spread over the world (Google, n.d.-f). Lastly, Google servers automatically store details regarding each web request. These so called 'server logs' typically include "your web request, Internet Protocol address, browser type, browser language, the date and time of your request, and one or more cookies that may uniquely identify your browser" (Google, 2021).

User Settings and Possibilities

Within the Google account, a user can adjust several settings that influence what data Google can collect and store. The most important settings are described below. These can be divided into two types: (i) activity tracking and (ii) personalization.

i. Activity Tracking

On 'myactivity.google.com' (Google, n.d.-h), Google offers a dashboard showing all activities a user performed with Google services combined with the related settings. A screenshot can be seen in figure 2. The settings that can be controlled here are:

- Web and App Activity (WH) - allows Google to save **information about the user's activities** when using **any website or app** (Google, n.d.-g). This includes: (a) factual information like the user's location, IP-address, or language; (b) substantive information like the search terms that are being used, or the precise mail that is

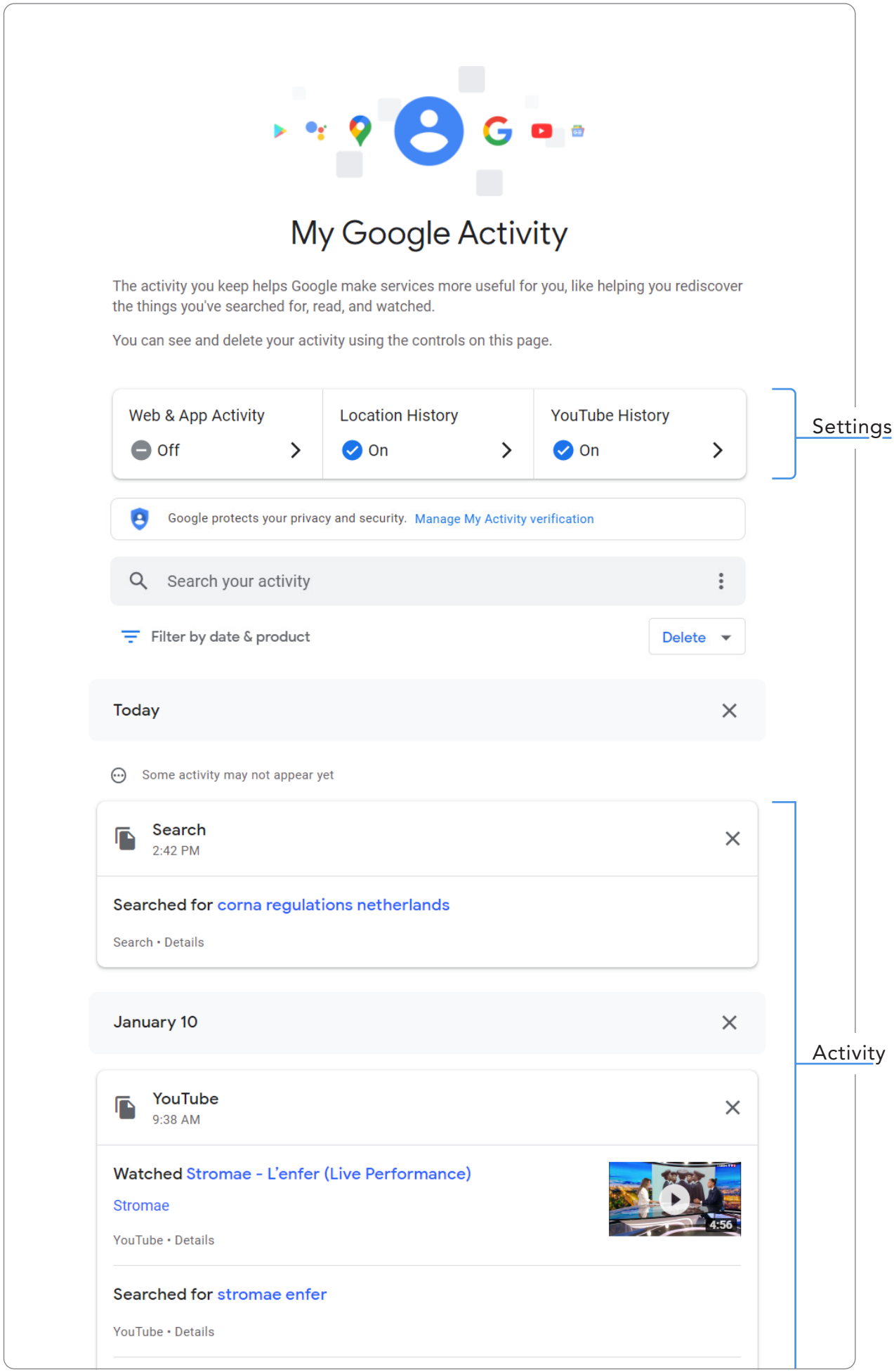


Figure 2. Screenshot of the Google activity dashboard (Google, n.d.-h).

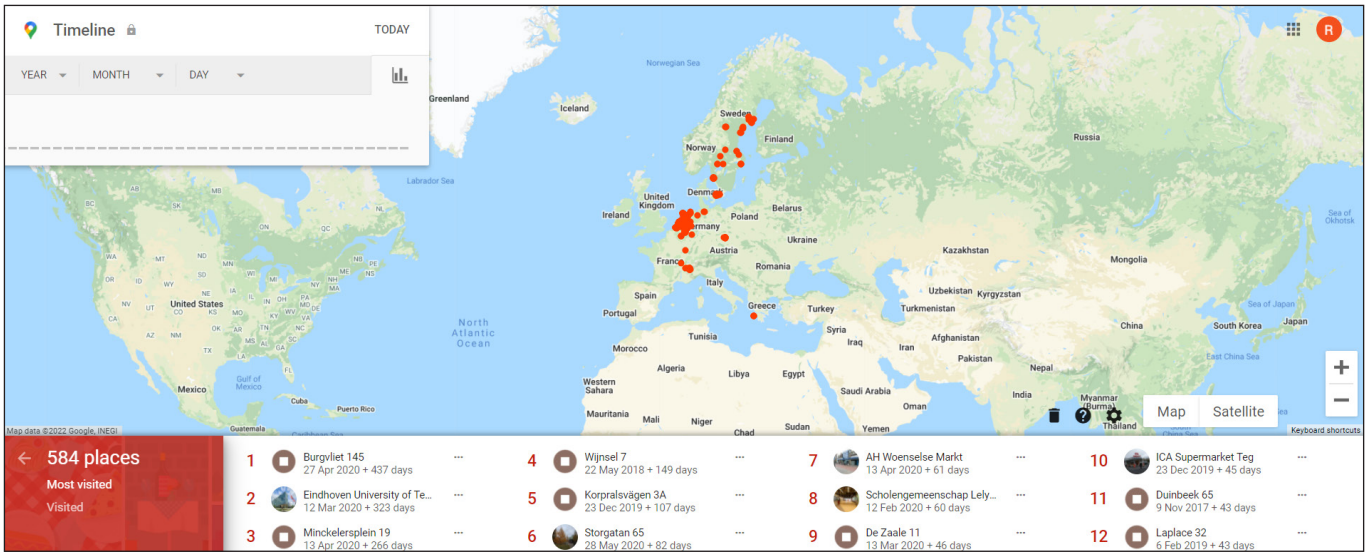


Figure 3. A screenshot of the map that is created when the location history is turned on (Google, n.d.-j).

typed; (c) behavioral information like advertisements being clicked on, or products of advertisers being bought; and (d) additional information on the device about the user like apps the user recently opened, or contacts that were searched for (Google, n.d.-g). It means that a data base can be created that combines data from all Google apps and websites, about the precise activities and properties of the user. According to Google, this is useful "to give you faster searches, better recommendations, and more personalized experiences in Maps, Search, and other Google services" (Google, n.d.-g).

- Location history (LH) – allows Google to **keep track and save the location constantly of every device** on which the user is logged into a Google account (Google, n.d.-b). It results in a timeline. On a map (see figure 3) the user can see exactly where their devices have ever been. The places visited most often are listed on the lower side of the screen. When selecting a specific day in the upper left corner, the user can see its location at every moment in history (as long as the setting was turned on), including the mode of transport and photos taken (see figure 4).
  The location is also saved by the Web and App-setting. However, this only saves the location at separate moments (when a service is used on a device), instead of tracking it constantly.

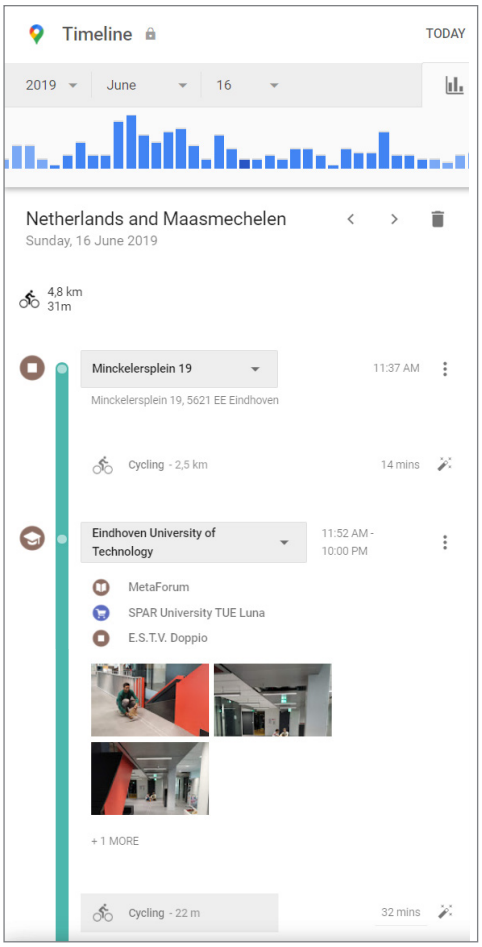


Figure 4. A screenshot of the timeline of one day (Google, n.d.-j).

- YouTube History (YH)– Allows google to **save information about all videos the user watches and the items that are searched for on YouTube** (Google, n.d.-c). It is used "to give you better recommendations, remember where you left off, and more" (Google, n.d.-c). Thus, this setting is purely focused on the user experience within YouTube itself.

Next to turning each setting on or off, the user can select the option to automatically delete all data within that setting, after a time interval of three, eighteen, or thirty-six months, or to never remove it. Finally, it is also possible to delete data manually.

i. Personalization

Based upon all information Google has about their users, they personalize the services according to the users' preferences and interests. Settings that can be controlled here, are:

- Personalized ads (PA)– Allows Google to **personalize advertisements on Google services, or other partner websites and apps that include a Google ad component**. The personalization is show "based on personal info you've added to your Google Account, data from advertisers that partner with Google, and Google's estimation of your interests" (Google, n.d.-d). This includes the data gathered by the 'activity tracking'-settings (discussed above on page 11). On "adssettings.google.com" (see a screenshot in figure 7), a user can find the profile Google created about them. It contains multiple labels in all kinds of categories, such as the age, gender, type of education, interests, and so on. It is possible to retrieve basic information about the origin of this label (see figure 5 and 6). Some labels can be adjusted and every label can be deleted manually. Moreover, a user can choose to turn off ad personalization.
- Personalized Search (PS) – Allows Google to **personalize search results on the Google Search engine**, based upon the information known about the user's account (Google, n.d.-i). Amongst other things, this enables Google to (a) autocomplete a search term based upon the user's search history, (b) include personal files in search outcomes, such as train tickets or routes to the user's home address, and (c) personal recommendations such as places where the user can eat dinner tonight (Google, n.d.-i).

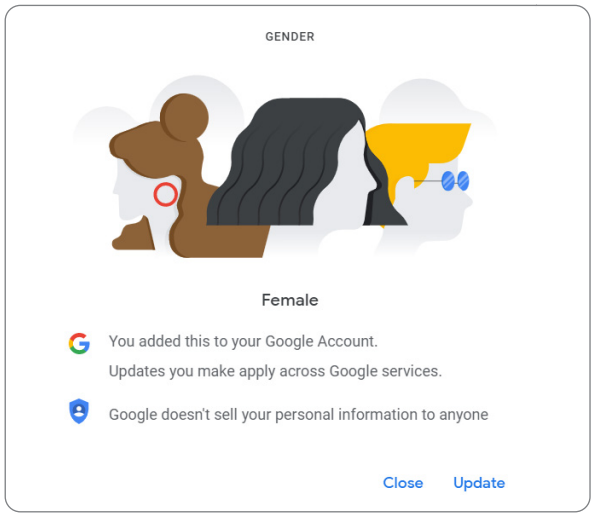


Figure 5. Basic information about the origin can be retrieved (Google, n.d.-d).

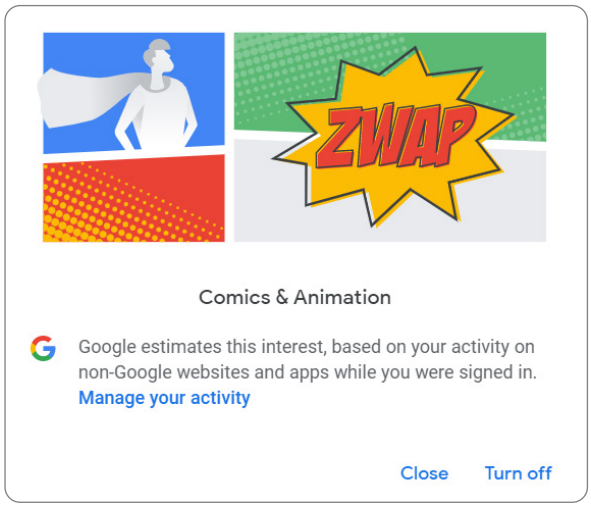


Figure 6. Basic information about the origin can be retrieved (Google, n.d.-d).

Ad personalization

Google makes your ads more useful on Google services (such as Search or YouTube), and on websites & apps that partner with Google to show ads. Learn why you're seeing an ad

Ad personalization is ON

Advanced

- 18-24 years old
- Female
- Language: Dutch and 1 more
- G-Star RAW
- Autos & Vehicles
- Books & Literature
- Business Services
- Casual Games
- Comics & Animation
- Computers & Electronics
- Fitness
- Mobile Phones
- Music & Audio
- Netherlands
- News
- Shopping
- Social Networks
- Travel & Transportation
- News
- Parental Status: Not A Parent

Figure 7. A screenshot of the created profile of a user (Google, n.d.-d).

2.1.3 Public Perception and Opinion

A variety of studies have done research towards the public perception and opinion towards data, privacy and big tech companies such as Google. Moreover, it has been researched how society views the influence these companies can have on a variety of topics, such as politics.

A study from the nonpartisan company Pew Research Center towards the views of Americans about data collection and security showed that 93% of American adults think being in control of who can get personal information is important, and 90% thinks that controlling what information is being collected is important (Madden & Rainie, 2015).

Roughly 80% of Americans feels they like have little to no control over the data that the government and companies collect about them (Auxier et al., 2019). In contrast, others mention they do not care nor worry (Madden & Rainie, 2015). This was also found in interviews conducted by the design team (described in iteration 0 at page 21).

The Verge polled Americans about which big tech companies they trust with their personal information. Even though 90% has favorable opinions about Google, only 69% trusts Google with their personal information. Facebook is entrusted with personal information by 41% (Newton, 2020). In addition, there is a collective feeling that data security is harder to achieve nowadays than in the past (Auxier et al., 2019).

During the COVID pandemic, the positive views on big tech companies dropped from 46% in August 2019 to 34% now, while negative views increased from 33% to 45% (Brenan, 2021). The percentage of Americans who think the government should increase its regulation of technology firms has risen from 48% to 57% (Brenan, 2021).

Another research published in October 2020 focused on Americans' view upon tech companies in relation to presidential elections (Auxier, 2020). It is an example of the role data can play in societal developments. It showed that 73% of the Americans is not confident that technology companies prevent misuse of their platforms to influence the 2020 presidential election. Additionally, 77% said it is not acceptable for social media companies to leverage users' data to show them ads from political campaigns. It implies dissatisfaction and mistrust, while simultaneously people do not stop using the platform and are not in the position in which they can change the platform's policies.

2.2 Design Trends Around Data Collection (from Google)

Multiple products and services have been developed that focus on changing people's perception, understanding or interaction with digital technologies regarding data collection. A variety of designs, design trends, online explanations, tools and alternatives will be described after which this section will be concluded with the design gap that holds opportunities for our project.

2.2.1 Creating awareness

A design trend that can be identified concerns designs focused on creating awareness around the issue of data collection. For example, LocalMist: an installation that creates a receipt with personal information based on a picture from a webcam. An algorithm gets this data

from an accessible database (de Bruijn, 2018). Another example is the manifestation of Annemiek Höcker on Dutch Design Week 2018 about the power relationship between Google and its users (Annemiek Höcker – The Search for Submission, n.d.). Thirdly, a more interactive design is the Deeply Personal Vending Machine (see figure 8), in which visitors could enter personal data in exchange for discount on a candy bar. It pointed out that a product might look for free, while instead the user pays with personal data (Schouw, n.d.). Lastly, a playful pinball machine designed by Felix Mollinga (see figure 9) aims to help young children who grow up in a digital world to understand the risk of sharing personal information online (Angelopoulou, 2018).

These designs or installations imply that there is a need to increase awareness around data collection. Physicality, interactivity and scenarios are used to communicate the message. However, the designs do not go further than awareness: no effects nor action points are explained.

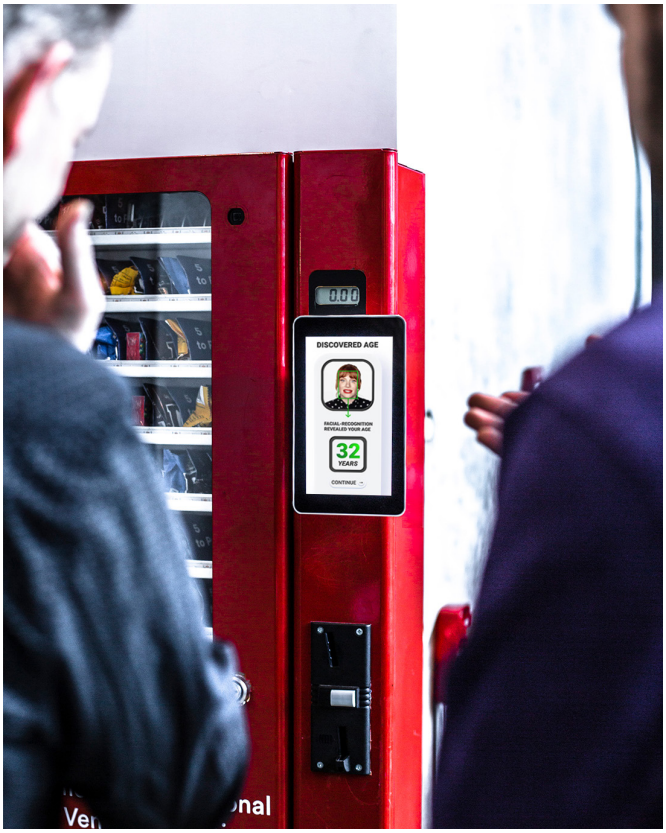


Figure 8. Photo of the deeply personal vending machine (Studio Tom Schouw, n.d.)

Figure 9. Photo of the playful pinball machine (Marnati & Mollinga, n.d.)

2.2.2 Designs blocking data collection

Several designs were found that block data collection by tech companies. Me.Ring for example, is a concept of a wearable that lets the wearer control to share their data - or not - by flipping the switch on the ring (Thukral, 2021). Another example is the Bracelet of Silence, which transmits ultrasonic sound that disable microphones from devices to prevent them from listening along to conversations (Sheth, 2020). In this way the wearer is not targeted anymore with advertisements based on subjects the microphones picked up from a conversation. A similar design, project Alias, is a cover for a smart speaker, which lets the smart speaker listen to white noise until the cover is activated by a custom wake up sound (Karmann & Knudsen, 2018).

These designs do either fully allow or block sharing data, which are limited options (as it

cannot be blocked partly). Moreover, users are dependent on a second product that solves the issue. It does not make them more capable of solving the issue themselves.

2.2.3 Explanations, Tools and Alternatives

A variety of websites can be found, that try to explain data collection. For example, https://myshadow.org/ explains what digital traces are, where you leave them, who are collecting them and how one can leave fewer traces behind. However, this and other explaining websites provide this merely via (long) texts that introduce lots of new terms. Therefore, for a generic user, the threshold to search for such a website and delve through these texts is relatively high.

In addition, multiple tools are offered that visualize data streams to make it easier to understand. For example, a Chrome extension called Lightbeam shows the relationships between third parties in a graph with connected triangles, as can be seen on the screenshot in figure 10 (Rachel_hxh, n.d.). Another example is the program Aeon (see figure 11). The user can insert an account (e.g. from Facebook, Google, or another organization), after which Aeon retrieves all data the organization has about them, visualizes it and allows the user to contact the organization when the user disagrees (Nelissen, n.d.). A third program called Portmaster shows an overview of all computer's network connections and enables users to control it (Safing ICS Technologies GmbH, n.d.). However, it is quite technical

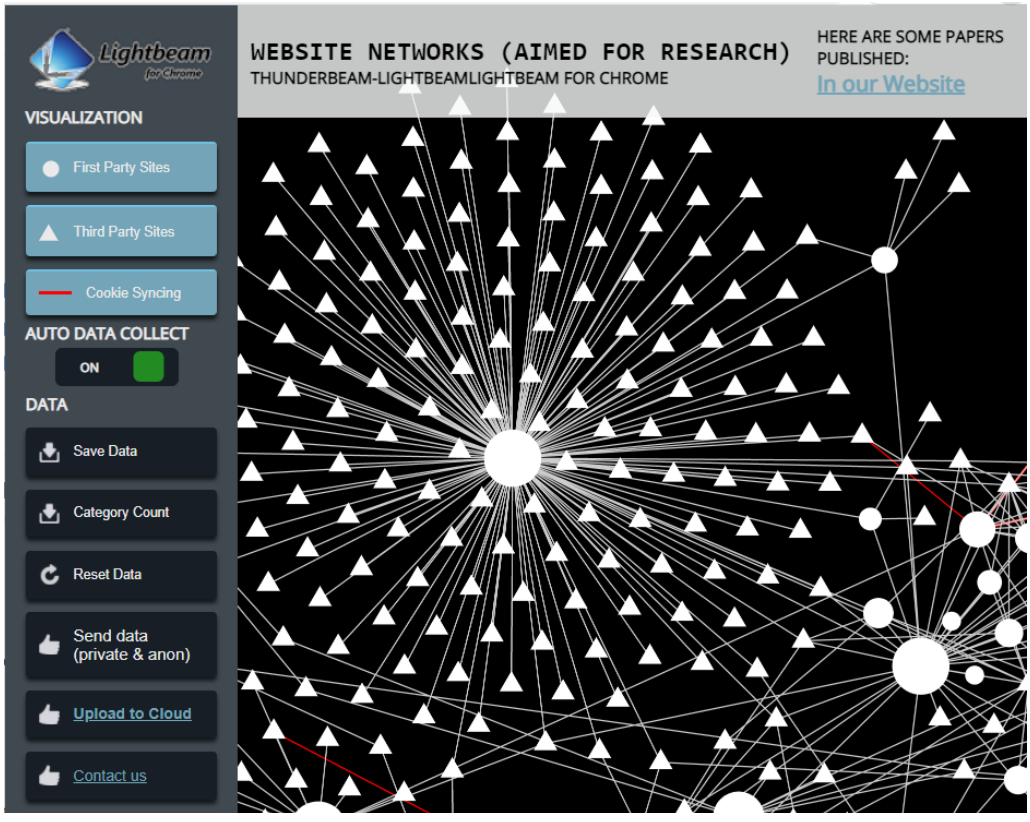


Figure 10. Screenshot of the Chrome extension 'Lightbeam' (Hu & Sastry, 2021).

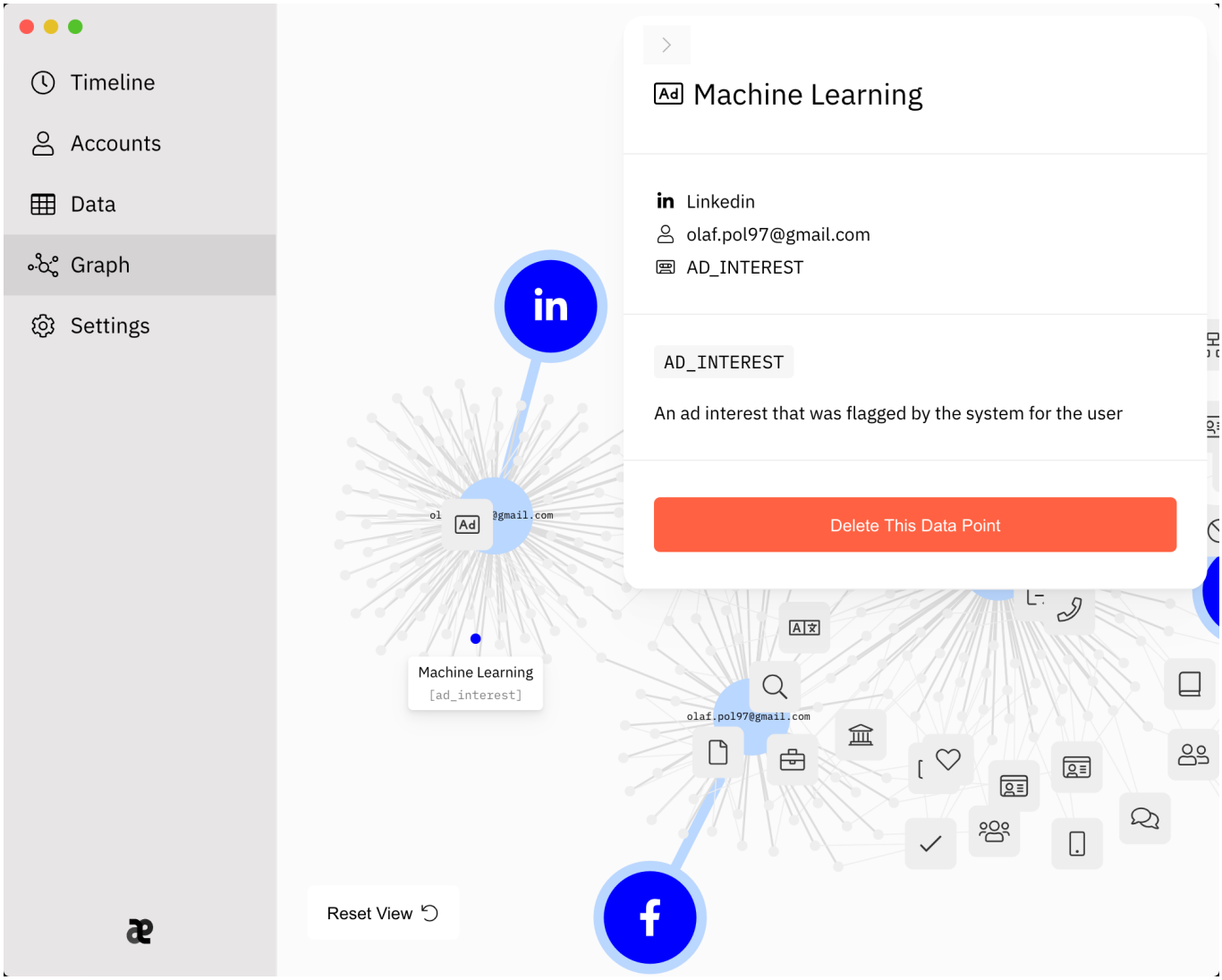


Figure 11. Screenshot of the program 'Aeon' (Aeon, 2021).

and complicated to use. All in all, these visualizations try to create transparency. A visualization on itself however, does not allow any action to take. Besides, it easily gets too complicated to understand. The latter two examples also aim to give the user more control over their personal data, but this requires quite some effort and knowledge, which results in a high threshold.

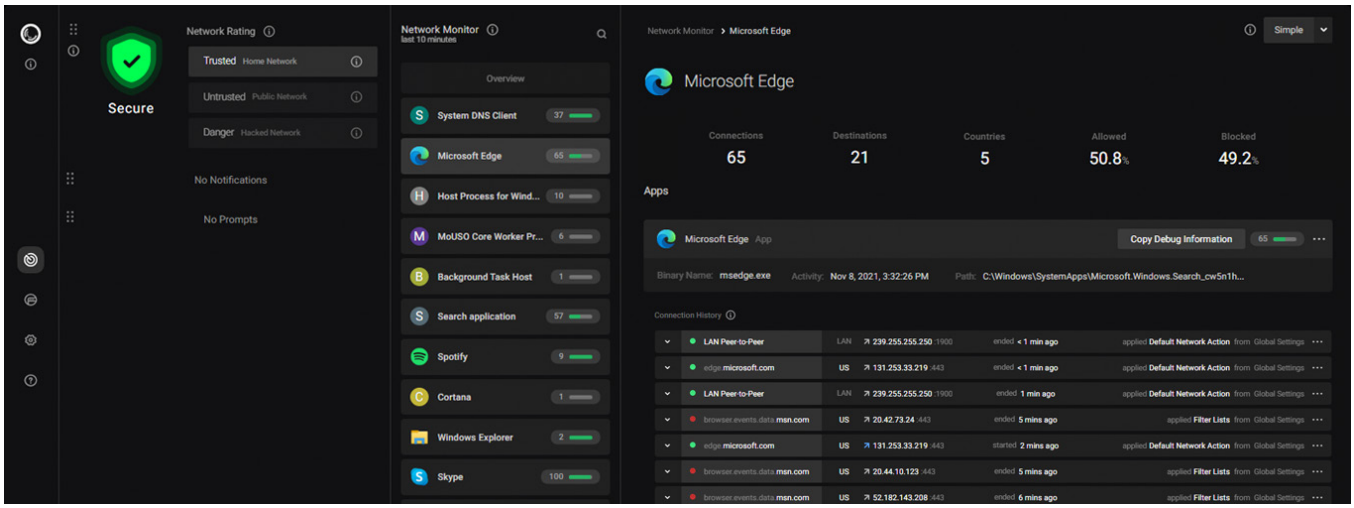


Figure 12. Screenshot of the program 'Portmaster' (Safing ICS Technologies GmbH, n.d.).

Lastly, several alternatives are offered that are more privacy friendly. For example, the search engine DuckDuckGo, the web browser Firefox or the open-source browser Tor (DuckDuckGo, n.d.; Mozilla Corporation, n.d.; Tor Project, Inc, n.d.).

2.2.4 Design gap

When analyzing these design trends, it is remarkable that the solutions focused on awareness are mostly physical, while the others are online tools, visualizations or texts. The designs that block data are physical again, but do not provide any explanation nor teach any skills. Thus, a design gap was found for physical designs that help people to actually gain autonomy over their personal data, rather than only making them conscious of the importance. Moreover, solutions that do explain the situation are often complicated or include long texts. This increases the threshold to look into it. A gap is found in designs that shortly and to the point explain the situation and address action points. Lastly, no solutions are found that is focused on creating awareness at people who are not interested in the topic yet and steers them towards certain action points. This also covers a design opportunity.

3. Design Process

This chapter describes in four iterations the process towards the final design. A visualisation of the complete process can be found in figure 14 and 15. When reading the text, the sub-headings indicate what phase (from figure 14 and 15) is described.

Iteratie 0. Groundwork and Exploration

GOAL: Define a project scope and goal.

WHEN: 08/09/2021 – 12/10/2021

PHASE A & B: Re-define Design Brief

In short, the initial design brief given for this project stated:

> *"How to help people to have a healthier relationship with their smartphones and digital systems?"* (IDTT Squad, n.d.)

A lot of freedom was given to the design team to define their own direction within this brief. In order to identify a well-founded and interesting design challenge, the design context was investigated by adopting a 1st, 2nd and 3rd PP. These explorations were done simultaneously. Their separate findings are described below, followed by an overall conclusion.

1st PP: Experiments

In fact, the designers lived in their own design context. Several experiments (see figure 13, 16, 17 and 18) were conducted to push their own thoughts and feelings forward in relation to the design brief. For instance, the baby in figure 18 was thought of as a metaphor for a phone. It continuously screams for attention. Its caretaker hates the sound but cannot resist. But when the annoying attention seeker is absent, the caretaker is continuously wondering how it is doing.

A paradoxical relationship was found between the designers and their phone: they feel intrigued, but also deeply hate it. Moreover, they felt like being played like puppets, controlled by the content and push notifications companies show them, based upon their online behavior.

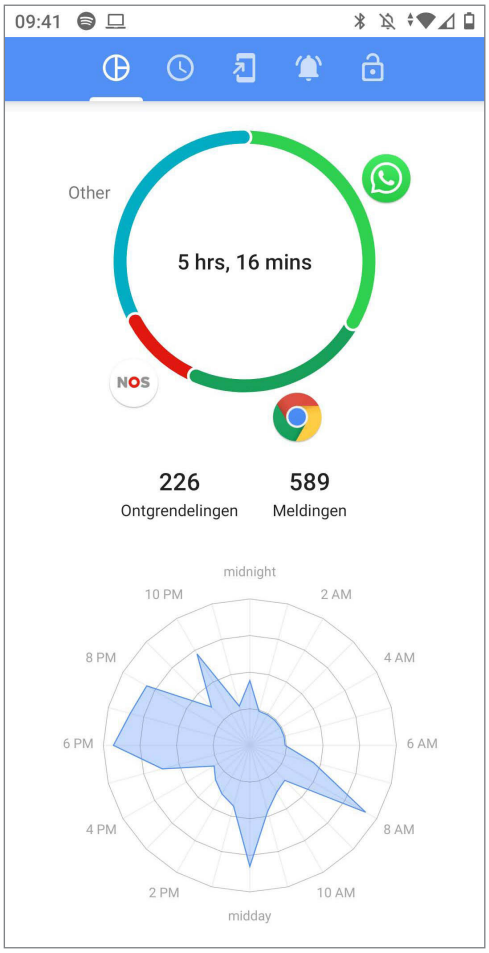
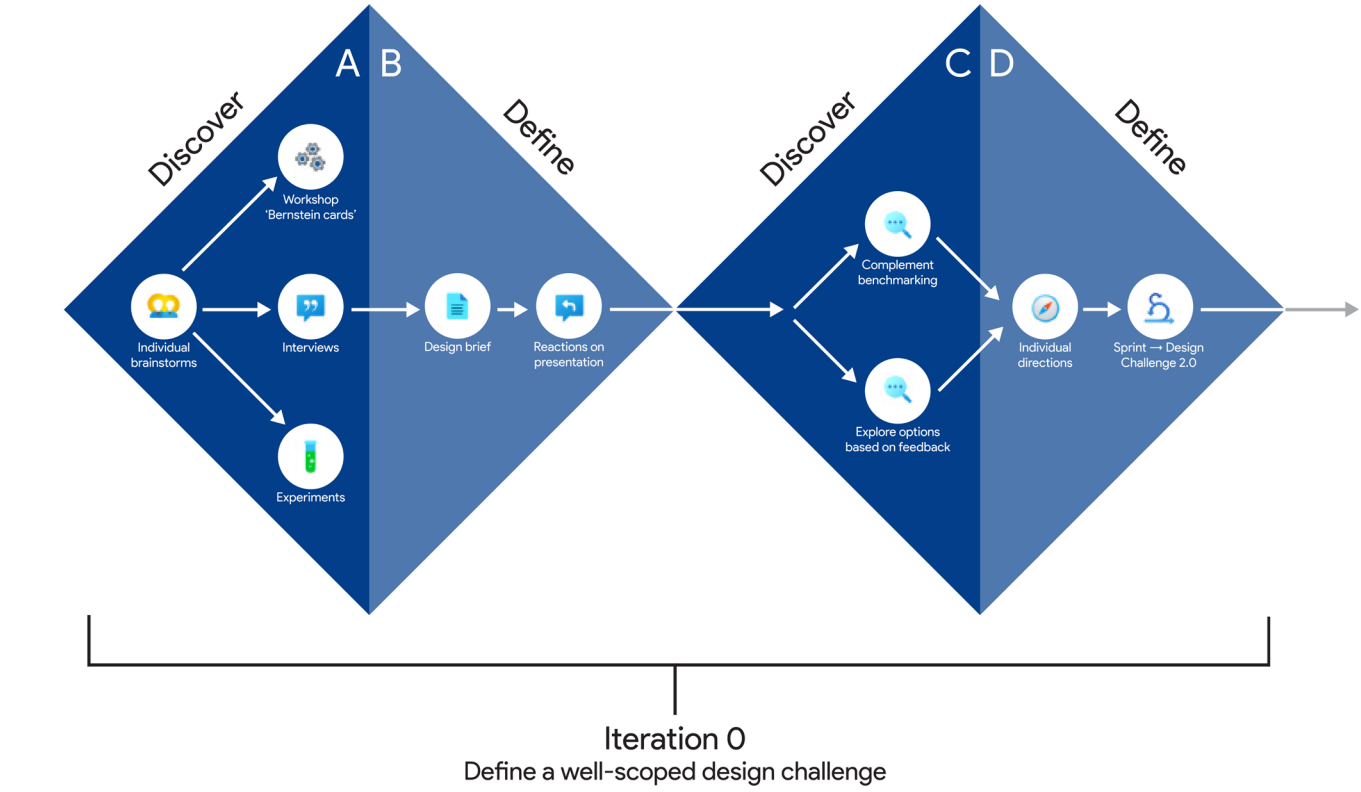


Figure 13. Screenshot of the app 'ActionDash' that was installed on everyone's phone to track the amount of time spent on their phone combined with the type of activity.



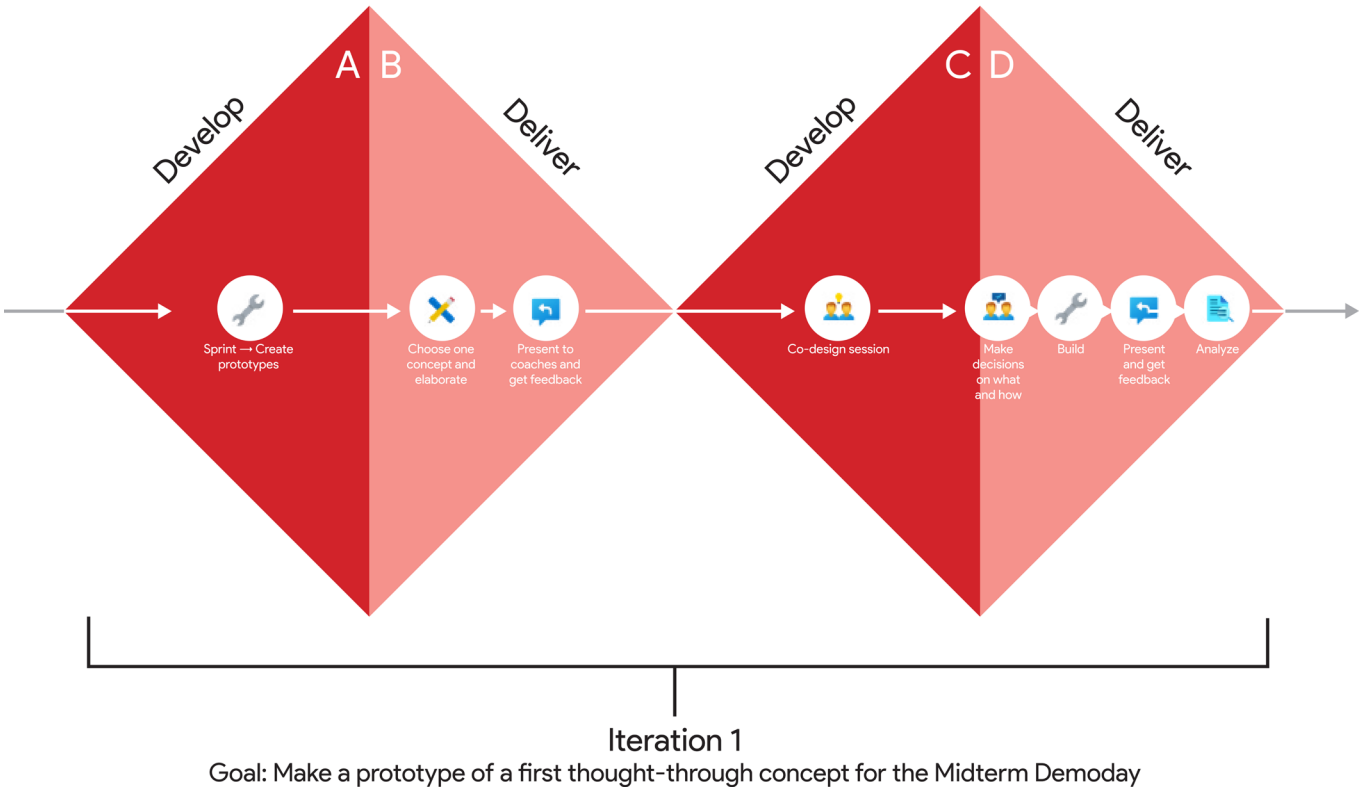


Figure 14. Visualisation of the process (part 1 of 2).

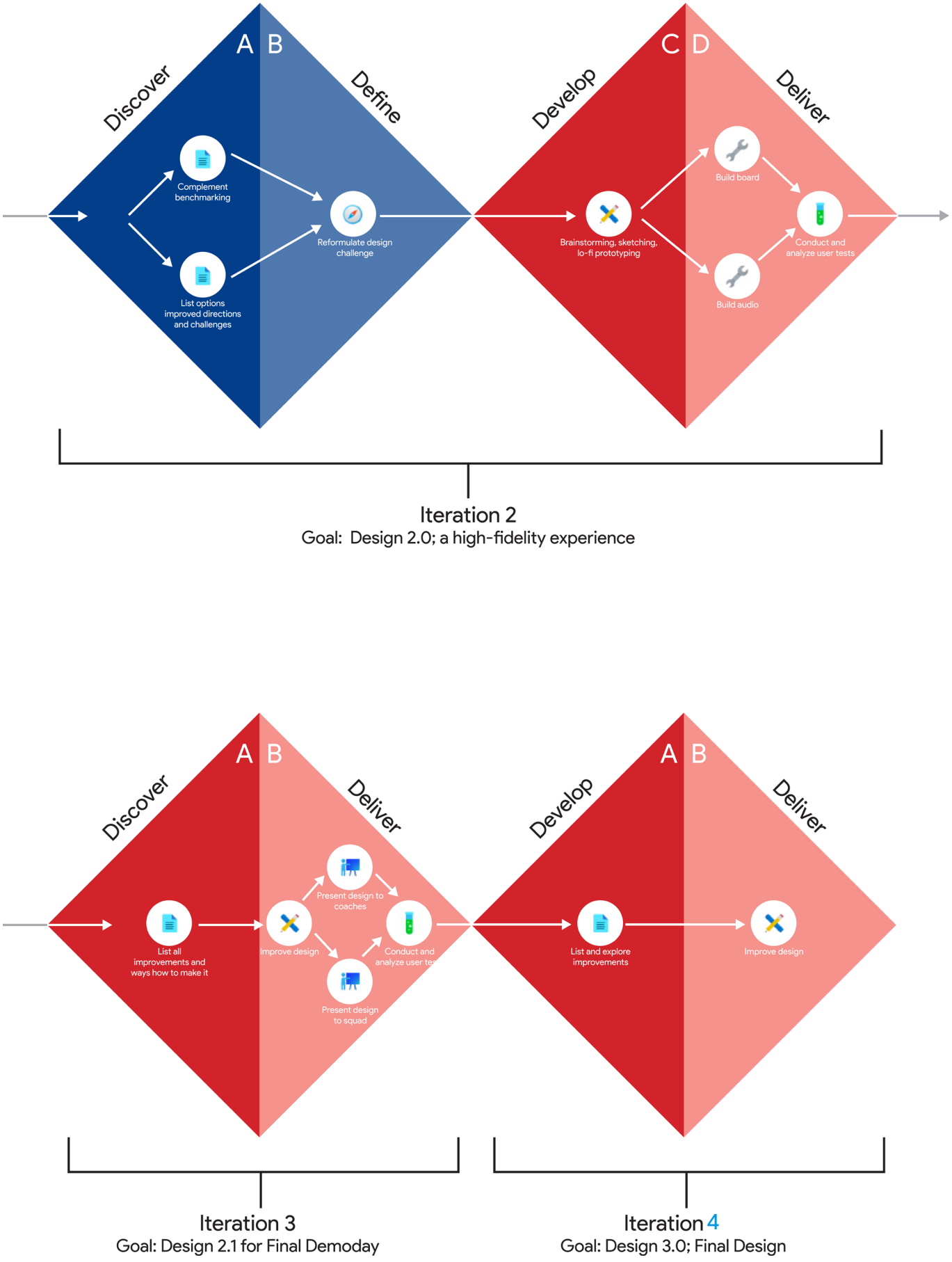


Figure 15. Visualisation of the process (part 2 of 2).

Digitale interacties woensdag:

Whatsapp tussen 12 en 1
Gepint tussen 12 en 1
Automatisch verbonden met wifi thuis tussen 1 en 2
Whatsapp tussen 1 en 2
Deursensor --> lampen op kamer aan tussen 1 en 2
Deursensor --> 2 min vertraging --> lampen uit op kamer
Play store tussen 1 en 2
Wekker op telefoon
Deursensor --> lampen aan
Muziek via spotify
Televisie aan (ziggo mediabox)
Apple TV (Youtube)
Laptop aan
Word
Teams
Outlook
Play store app downloaden
Chrome (Canvas, Miro, Osiris)
Whatsapp op laptop
Bluetooth oordopjes verbonden
En weer Disconnected
Inchecken NS
Uitchecken NS
Bluetoorth oortjes connected
Spotify
Google agenda checken voor locatie workshop.
geSynchroniseerd vanaf outlook, canvas, mytimetable.
Oortjes disconnected
Ipad verbinden met wifi
Miro on ipad
Synchronizing onedrive
downloaded Teams on ipad
Inchecken NS
Connected oortjes Bluetooth
Inchecken NS
NS checken vanwege gekke dingen op t station
Nog 2 x checken want gekke shit, ander spoor
Ipad met wifi in trein

Miro downloaden terwijl k net heb gebruikt?!
Merk dat k uit verveling en t wachten op insta wil, maar weet dat ik geen data meer heb.
Feedback in Miro zetten.
Toch insta op, ge ergerd worden dat het niet laad.
Werkapp gekeken voor planning van werk.
Uitchecken NS
Laptop aan thuis
Word to pdf
Chrome to download consent form
Outlook to send mail
Google Agenda to check to do's.
Canvas to check Lecture topic tomorrow.
Testen voor toegang chrome.
Sms vanaf de site met code.
Gegevens ingevuld, afspraak gemaakt.
Ipad los updaten.
Wifi op terras zoeken om dingen op te zoeken wantja heh geen data.
Google afbeeldingen telefoon van mam.
Telefoon 10%, paniek. Op besparingmodus
Op wifi thuis even op insta gescrolled
Deursensor, lampen aan.
Bets social media. Coockies accepteren
Interesting: https://www.thebestsocial.media/nl/lipton-campagne/
DeurSensor, lampen uit.
Televisie ziggo mediabox
Chrome
Info Algemene Beschouwingen
Nos algemene beschouwingen liveblog
Deursensor, lampen aan.
Deursensor, 2 minvertraging lampen uit.
Lampen toch weer aandoen want
Chromecast aansluiten op beeldscherm.
Google home want wifi instellen
Boksen aansluiten op beeldscherm
Ziggo casten naar chromecast.
Wekker zetten.
Lampen uit doen.

Figure 16. A screenshot of the list of one of the designers, about the digital technologies used during one day.

Figure 17. A phone looks like a magical black box. What functions are hidden in there? Each designer created a mind map about all functions assigned to this black box.

Figure 18. Screenshots of three answers to the question: if we would describe our phone as something else, what would it be?

2nd PP: Interviews

To gain a better understanding of people's perception and vision upon digital technologies in their lives, semi-structured interviews were conducted with ten individuals. Their ages varied from 18 to 80 years old (more details about the set-up can be found in Appendix A). The interviews were partly focused upon digital technology in general and partly upon the participant's relationship with their phone.

It was found that people perceive digital technology as an essential part of everyday life. Most participants (regardless of their age) have a positive view upon digital technologies: it offers loads of possibilities, leading to hopeful new developments. An often named risk is personal data being collected by companies or institutes. Even though most participants realize the main risks this issue involves, their automatic reaction was to look away from this matter. After all, this issue feels complex, big and abstract, while it also feels impossible to quit using these digital services. One participant mentioned: "I think lots of data is being transferred to companies and advertisement things, but I try to not think about that, because I just don't want to." (p2) In addition, another participant said: "I prefer not to dwell on to that, because I think it would drive me crazy." (p5)

3rd PP: Literature Research & Benchmark

Literature research confirmed the assumption that current society highly relies upon digital technologies: both people's mental and physical environment is constructed around it. This also holds on a higher level for societal systems, such as education, health care or the police authorities (Accenture Digital Health Technology Vision, 2021; Sesay, Ramirez, & Oh, 2017; Marcum, 2014).

On an individual level, these technologies rapidly and radically change people's way of living (OECD, 2019; Scott, Valley, & Simecka, 2016). It brings lots of opportunities, but also affects one's well-being.

On a societal level, a huge consequence of digital technologies is the possibility to manipulate and steer large groups of people, caused by data collection. For example, during the run-up to the presidential elections in 2016, the company 'Cambridge Analytica' used personal data of 50 million American Facebook users for microtargeting to influence their voting behavior in favor of Donald Trump (Koelé, 2018; Lewis & Hilder, 2018).

Moreover, benchmarking was done to design trends that focused on the human relationship with digital technologies. The main findings including the design gap are described in "2.2 Design Trends around Data Collection".

Conclusion

Literature research (3rd PP) mainly identified two design areas: (1) improving the well-being of an individual caused by their interaction with digital technology such as their phone, and (2) giving people (instead of companies) autonomy over their personal data being collected. Both areas also came forward in the frustrations revealed by the 1st PP experiments. The interviews mostly highlighted area 2. Area 1 and 2 are connected up to a certain degree: applications collect users' personal data without them having much to say about it (area 2), to align its content with the behavior and interest of the user, which influences the user's interaction with the device and with that their well-being (area 1). In this relationship, area 2 is the source and area 1 a consequence. The designers felt a high urgency to focus on area 2, as they preferred to tackle the source over

the consequence. Moreover, a design gap was found for designs that actively help to gain autonomy over personal data. These thoughts led to the following design challenge:

> *Create a design that increases people's (1) knowledge and (2) autonomy in what data is being collected and how it is being used.*

A new design brief was written to define the new design scope. A poster of this brief was presented for the squad to gain feedback.

PHASE C & D: Narrow Down Design Challenge

The current design challenge mainly described a design direction, rather than a limited design challenge. To narrow it down further, a meeting was scheduled with a design sprint structure. The meeting set-up can be found in Appendix C and outcomes are shown in figure 19. It resulted in the design challenge:

> *How might we create an 'action-kit' that people are willing to use, focused on tackling the current set-up of the Google search function?*

This challenge was chosen for several reasons:

- An action-kit was chosen as the designers wanted to create something that actually does something in the nowadays world, rather than only rising awareness. It is impossible however, to directly adjust the source; the designers cannot change the algorithms of data collecting systems such as Google or Facebook. Thus, the design should help people to interact in a proper way with the existing systems. A toolkit forms a suitable medium to transfer ideas and tips here.
- The challenge was narrowed down by focusing on Google Search. Firstly, because the services of Google are widely used in daily life. Secondly, the service 'Google Search' has a quite clear purpose, yet includes lots of different types of data that arevisually present on the web page (location, search results, advertisements, etc.). Therefore, it is a clear and appropriate example in the context of personal data being used to personalize outcomes.

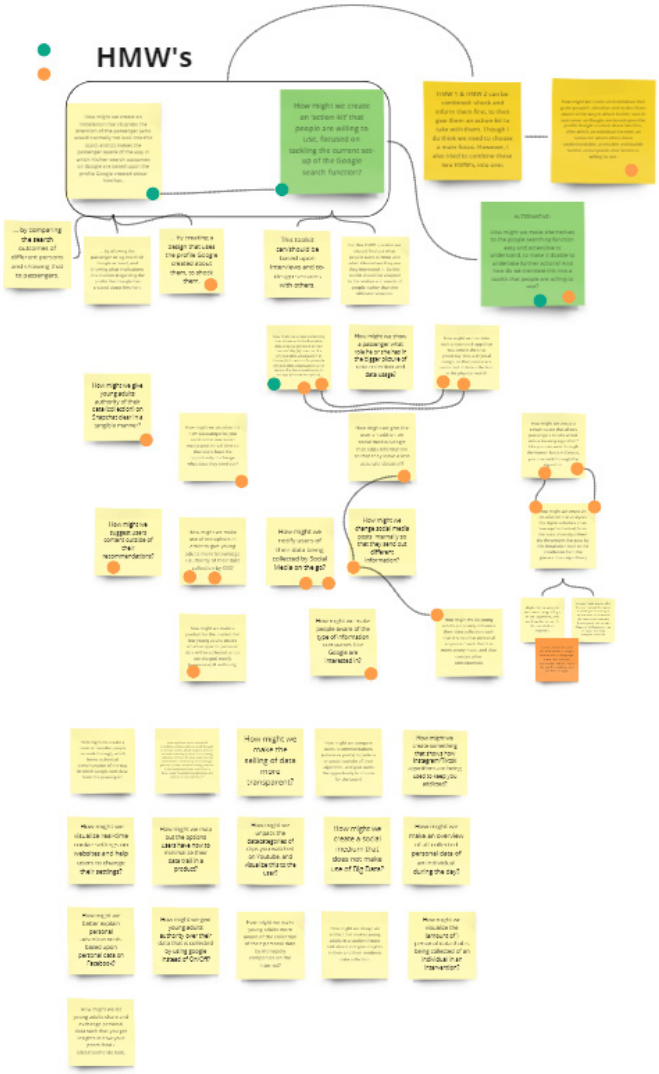


Figure 19. A screenshot of the outcome from the design sprint meeting, focused on formulating a narrowed down design challenge.

Iteration 1. First Concept: Toolkit Toolgle

GOAL: Make a prototype of a first thought-through concept for the Midterm Demoday.

WHEN: 12/10/2021 – 29/10/2021

This iteration worked towards the Midterm Demoday The concept was generated by two internal iterations: (1) create a first (low-fidelity) idea, which could be used as a starting point for (2) a co-design session, to create a more thought-through concept.vv

Figure 20. Low-fidelity prototypes, created in the design sprint session.

PHASE A & B: Sub-iteration 1 Generating a First Concept

To come up with concepts, rapid ideation was done during the design sprint session mentioned earlier on. It resulted in multiple low-fidelity prototypes (see figure 20).

A pattern was noticed in the ideas: they were focused on catching attention, informing, or addressing action points (see figure 21). Combining these categories could be effective: grabbing someone's attention first, to motivate them to be informed, after which they are willing and able to take action (if needed).

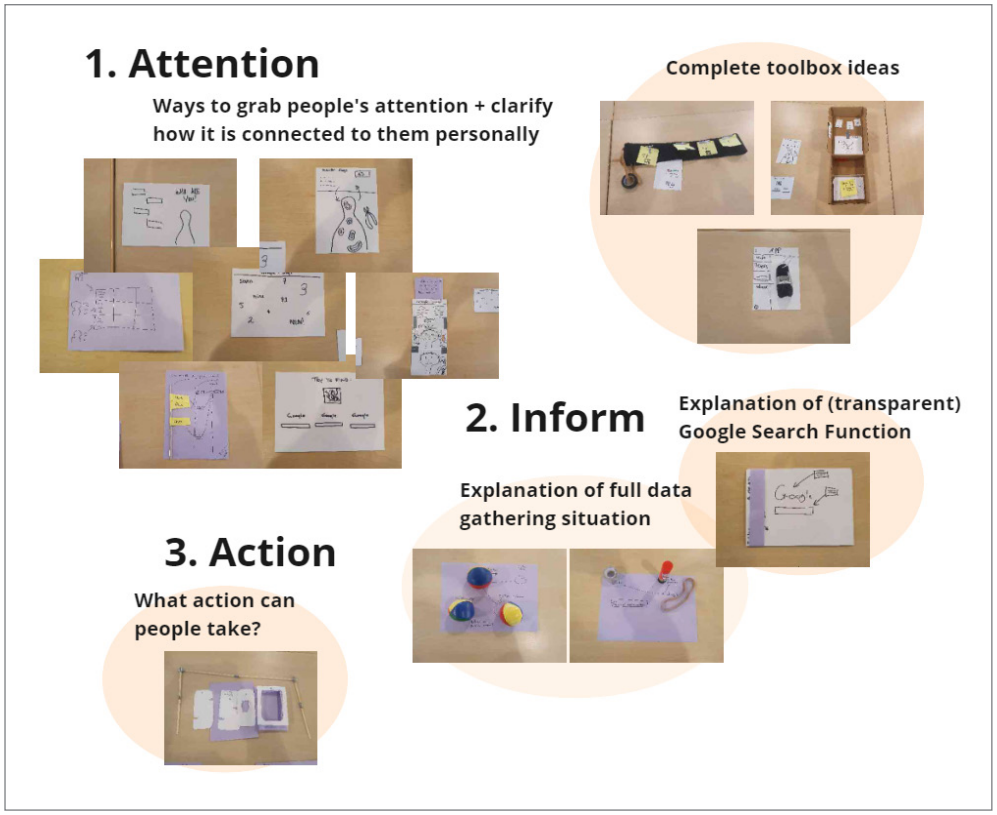


Figure 21. Low-fidelity prototypes categorized in 'attention', 'inform' or 'action'.

This Attention-Information-Action (AIA) strategy appeared to be similar to the AIDA Marketing Framework, visualized in figure 22. It assumes consumers move through several stages when buying product or services: Awareness, Interest, Desire and Action (AIDA). These stages are relatable to the AIA phases. Although: desire is about convincing someone to have a pre-defined opinion ('I want to buy this'), while our project is about allowing the user to form their own opinion about Google.
Both AIDA and AIA try to catch people's attention and motivate them to take action in the end. The success of AIDA and similarities with AIA indicated AIA could be a useful strategy.

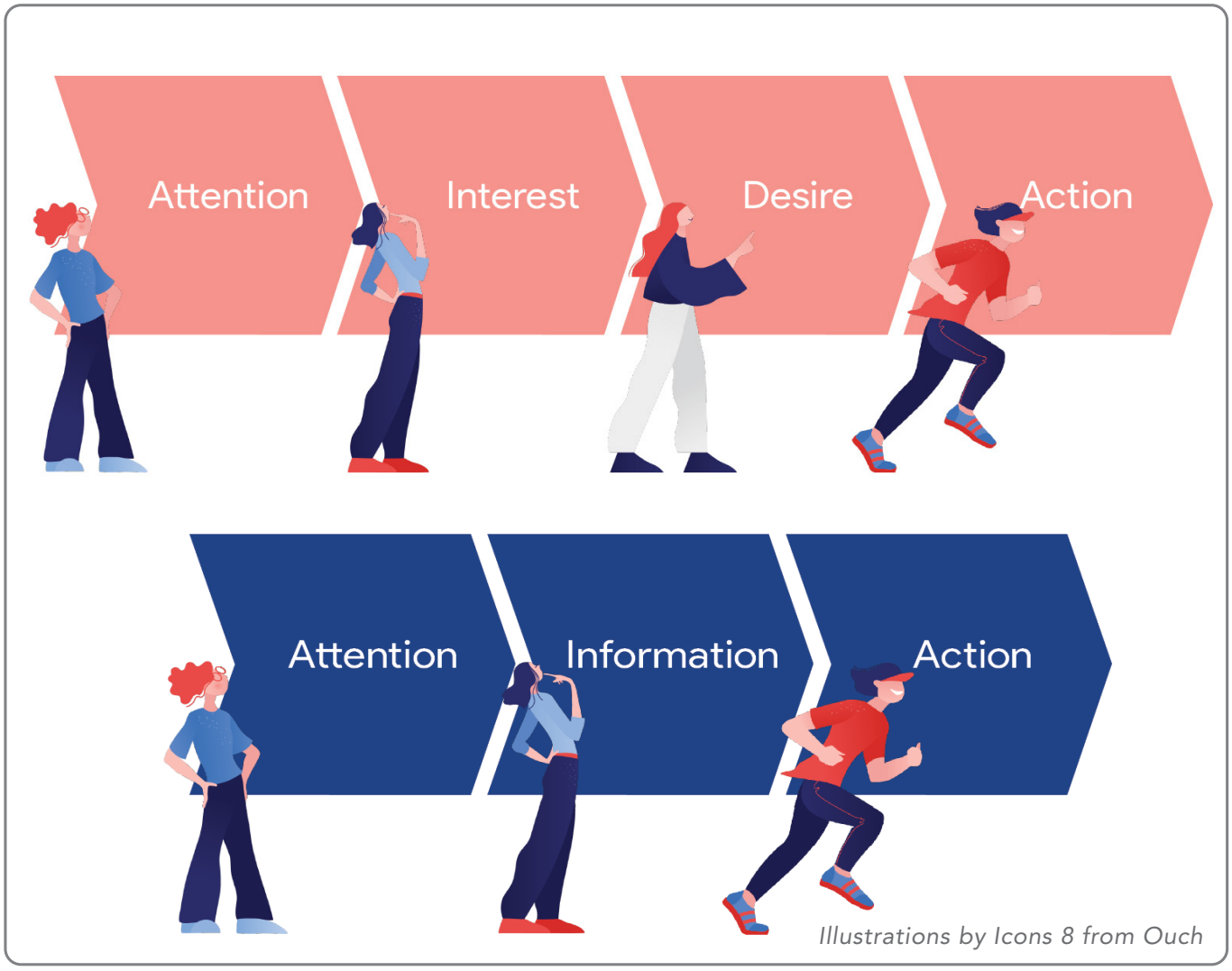


Figure 22. A visualization of the AIDA framework (above), in comparison with the AIA strategy (below).

Thus, for the first concept, three prototypes were chosen that each belonged to one category (attention, information and action). It resulted in the following low-fi prototypes, that would be combined into one toolkit:

1. Attention: Mirror Showing Online Identity

This (low-fi) prototype (see figure 23) is a mirror with a screen inside. The mirror recognizes the individual, after which tags pop-up around the reflection of the person, describing properties and activities based upon the person's online behavior. This concept was chosen as it shows the passenger their perception of their identity (through the mirror) and Google's perception of their identity (through tags around their reflection) simultaneously. The goal of this prototype is to shock the passenger about what information Google has on them, which would motivate them to learn more about this topic in the information-prototype.

Figure 23. The prototype chosen for the 'attention' category.

2. Information: Physical Data Flows

This prototype (see figure 24 and 27) visualizes the data collected by Google. By making use of physical materials that one could interact with, which represented digital elements, the goal of the prototype was to create understanding in how different types of data that Google collect, influence one's search result. It was made of paper but represented a screen. The prototype is explained in more detail in Appendix B.

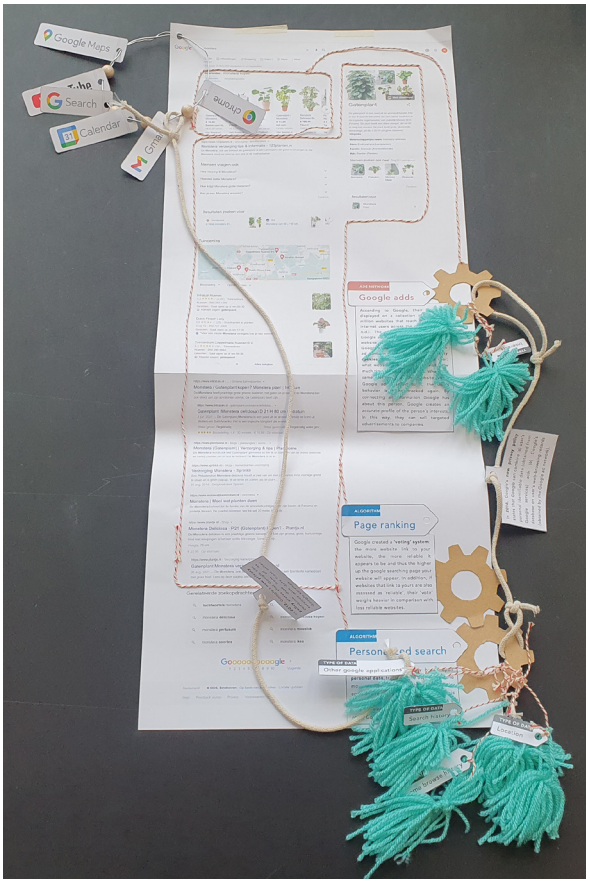


Figure 24. The prototype chosen for the 'information' category.

3. Action: Phone Cards

This prototype (figure 26) exists of four cards; one for each main Google setting. A phone can be placed underneath each card to redirect the phone to the webpage of that specific setting, to turn it on or off. This concept was chosen as it is a very effective yet simple solution to help people controlling their Google settings.

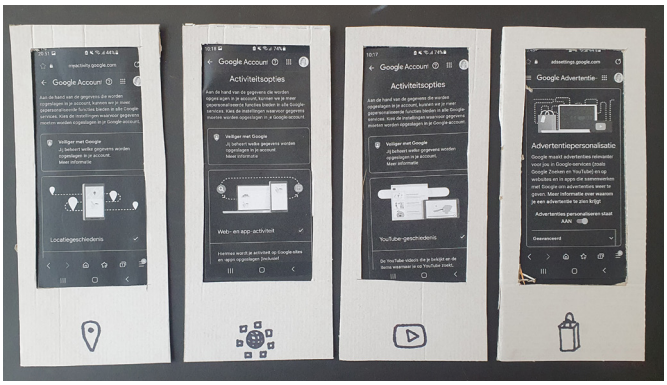


Figure 26. The prototype chosen for the 'action' category.

Based upon these prototypes the design challenge was adapted to:

> *How might we create an 'action-kit' including an attention-, information- and action-part that people are willing to use, focused on making it more transparent what data Google collects from you and give people the possibility to react.*

Figure 27. A close-up of the information prototype.

PHASE C & D: Sub-iteration 2 Midterm Concept

Co-Design Session

A co-design session was done with two master Industrial Design students (see figure 27, 28, 29 and 30), to critically review the current prototypes and elaborate on their strong aspects, so that a midterm concept could be built. All members of the design team participated too. It led to multiple findings and conclusions for each prototype.

1. Attention

The interesting part of the mirror is the personal but creepy feeling it evokes. To deepen this effect, the students suggested to replace the mirror for an audio experience in which "Google" tells you what it knows about you. Additional noise-cancelling creates an intimate setting that makes it easier to truly reach someone. Besides, it forces the passenger to listen to everything, instead of quickly scanning the tags on the mirror and moving on.

Figure 27. A co-design session was done.

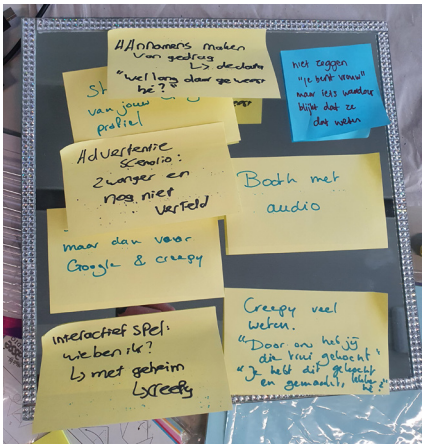


Figure 28. Post-its with thoughts about the attention-prototype.

2. Information

The physicality of the data streams was appreciated, as this makes the information more concrete. However, the prototype contained too many elements, which makes the story complicated again. Thus, it should be simplified in the next iteration. Furthermore, the idea of making it interactive was considered as valuable, as this implies an engaging experience which stimulates people to actively explore and learn. It was highlighted as important to exaggerate the differences in the Google Search page a bit when turning settings on or off, to be sure people would identify them.

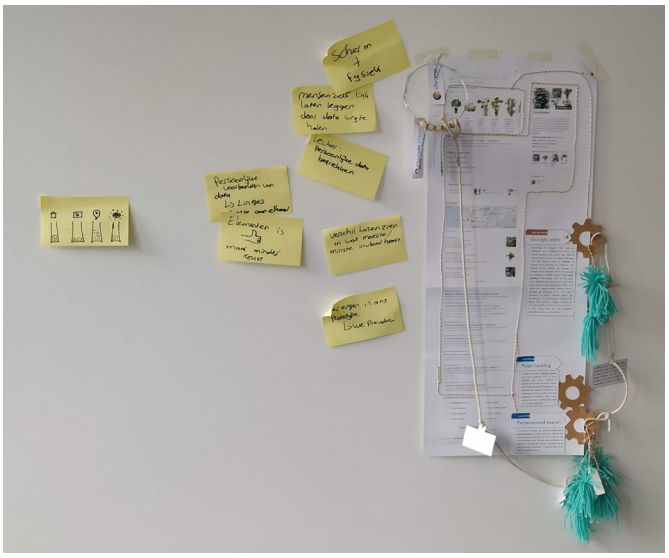


Figure 29. Post-its with thoughts about the information-prototype.

Figure 30. Post-its with thoughts about the action-prototype.

3. Action

This prototype is appreciated for its simplicity and usability. However, the current form of the prototype was not thought through yet. Instead, it was suggested it could be integrated in the information-prototype. Another idea was to create a separate set-up, that allows people to leave a trace to indicate they turned off a certain setting. It allows the designers to find out if and what action people take after going through the full experience.

Midterm Concept

The midterm concept existed of three prototypes (see figure 32), together forming one experience. It starts with (1) an audio experience, after which the visitor can interact with (2) a prototype showing Google's data streams physically, to finally (3) decide about their own settings. These prototypes were developed separately and should be merged into one toolkit in a later iteration. The design decisions for each prototype are described below, followed by the feedback gained at the Midterm Demoday.

Figure 31. This QR-code leads to audio created for the Midterm Demoday.

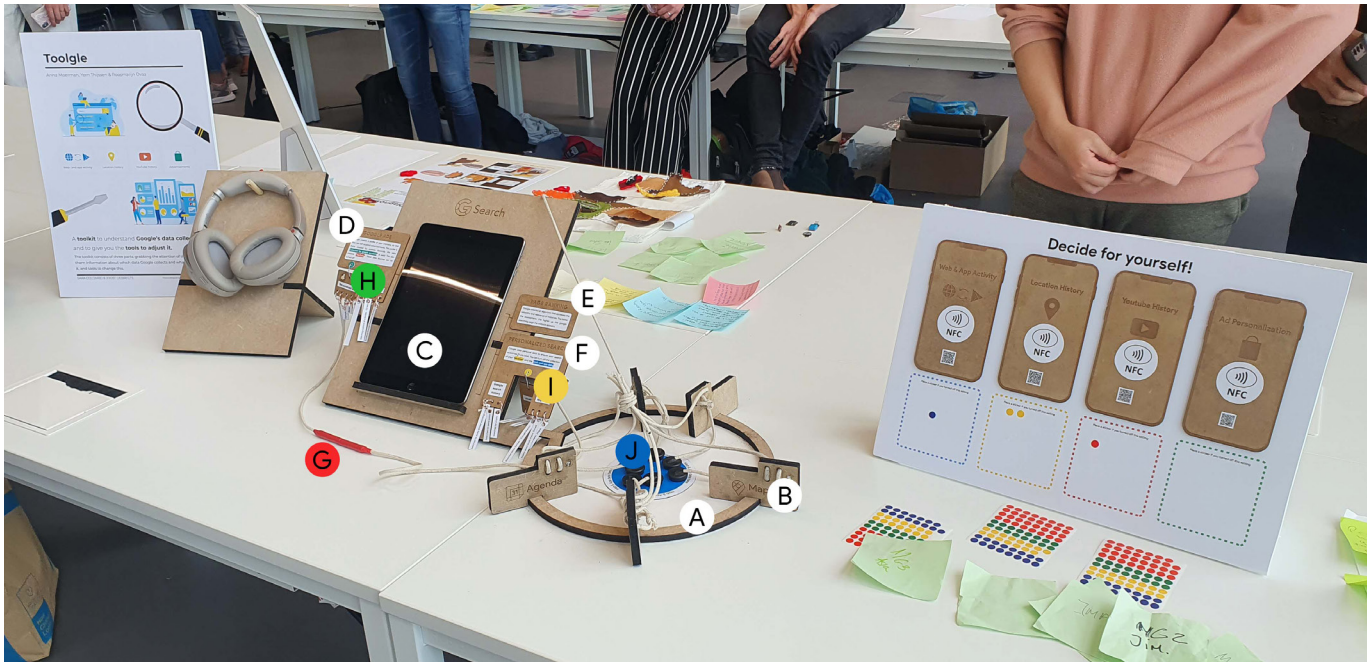


Figure 32. The Midterm Demoday set-up.

1. Attention: Audio Experience

In the audio experience, a voice introduces itself as Google and explains the type of information it knows about the listener. By scanning the QR-code in figure 31, the audio can be heard. The text was not personalized as the designers looked into it, but did not think this was technically feasible. The voice had a deep and intrusive tone to create a more shocking and intense experience. This was supported by some soft ambient chords in the background. Lastly, the voice only named facts, as it was decided it should shock people with the truth.

2. Information: Physical Data Streams

This prototype physically shows Google's data streams (figure 35). On top of a wooden ring (see figure 34 and a in figure 32), blocks (see b) were standing, representing a certain Google service. The Google Search service was enlarged. The webpage is shown on the tablet (c) and the small plates on the left and right side (d, e & f and figure 33) explain the main algorithms responsible for the search outcomes. Four parts of the prototype can be removed by the visitor, each indicated by another color (g, h, i & j). These parts represent the four main settings available in every Google account. When turning the setting on or off (by removing that part in the prototype) the Google Search page on the tablet changes, based upon the new input (see an example in figure 37). In this way, the visitor could explore the effect and meaning of every setting. On the Google Search page, it was chosen to show the result of 'headphones', as this product involves multiple types of data related to most settings, making it an appropriate example. The changes

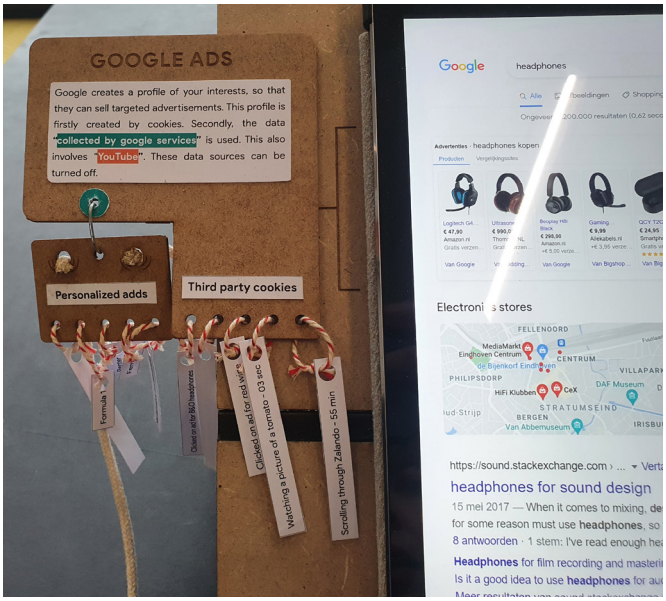


Figure 33. A close-up of the small plate on the left.

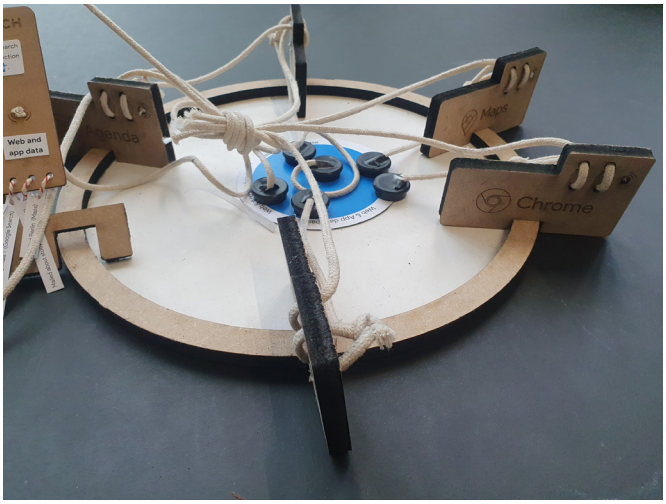


Figure 34. A close-up of the circle all services were connected to.

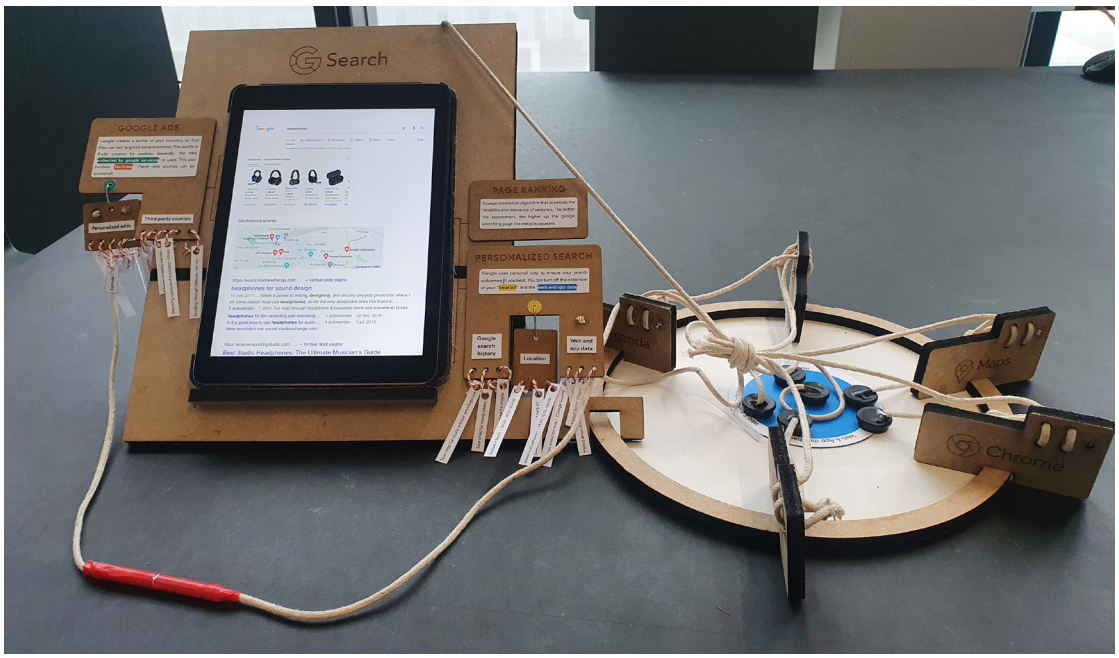


Figure 35. The information prototype for the Midterm Demoday.

in the results of the Google Search were exaggerated for clarification. Overall, the purpose of this installation was to convince people to make conscious decisions about their settings. It should not push them into a certain direction.

3. Action: Phone Scan Board

It was decided to not fully integrate this prototype into the information-prototype, as the latter had an overload of information already. Instead, the prototype (see figure 36) visualized what setting(s) visitors could turn off after going through the experience. An NFC-chip or a QR-code inside each phone outline could be scanned, to visit the webpage of that setting. When turning off a setting, the visitor could put a sticker in the corresponding frame underneath.

Figure 36. The action-prototype after the Midterm Demoday.

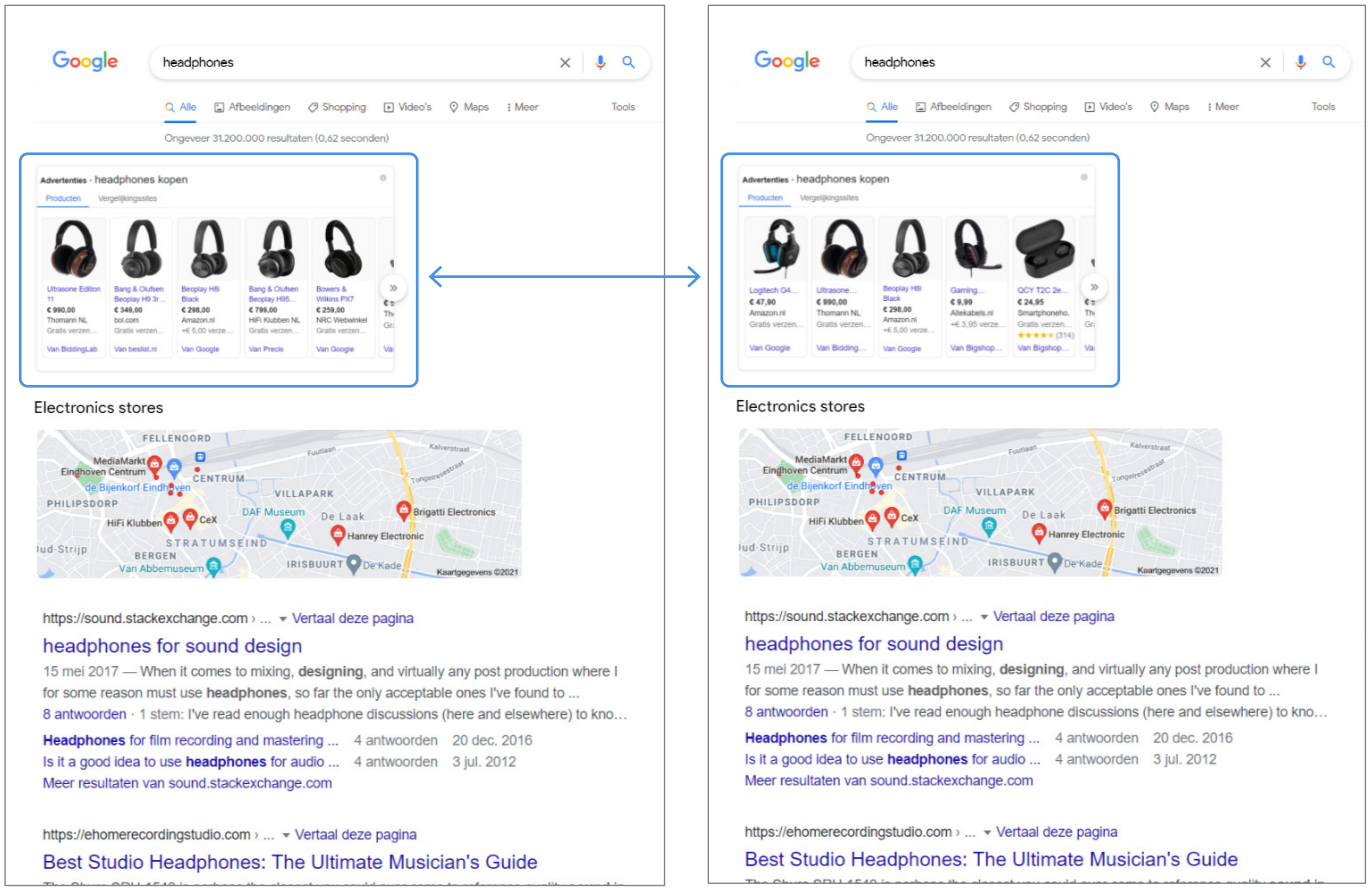


Figure 37. When turning ad personalization on or off, the advertisements change from more specific on the left (studio headphones) to more general on the right.

Midterm Demoday Feedback

Visitors of the Midterm Demoday perceived the experience as interesting and fun. The assumption of sound being an interesting medium was confirmed, as it creates an intimate setting. The noise cancelling sealed the listener off from the rest of the world, resulting in experiencing the message more intensely. The content was described as interesting yet awkward, since it could be confronting. Furthermore, the fragment was perceived as too long and the dark voice felt a bit exaggerated.

Regarding the information-prototype, the interactivity and the physicality turned out to be strong aspects. People were eager to touch the prototype to find out the effects and meaning of the elements. However , explanation from the designers was still needed. People were motivated to keep exploring because of the interactions made possible in the design.

Only four visitors (out of +/- 20) decided to turn off settings (figure 36). In addition, visitors were less eager to explore this prototype. The designers think this is related to the fact this prototype includes less new elements to explore. However, the ones that tried the action-prototype appreciated it because it connects the information-prototype with their personal situation. They switched between the two prototypes (information and action) to improve their understanding of a certain setting before considering adjusting it for themselves.

In general, visitors indicated the three prototypes could be connected in a higher extent, to create one unified experience instead of three separate ones. Furthermore, personalizing the attention- and information-prototype would make the experience stronger, as it becomes more engaging and makes the visitor feel more personally attacked. Criticism was given upon the installation being biased as it favors the action of turning settings off. Lastly, the context (location, target group, etc.) in which this installation would be placed remained unclear, as a business plan was missing.

Iteration 2. Experienceable Design: Do you let it flow?

GOAL: Create a high-fidelity experience, based upon the midterm design.

WHEN: 08/11/2021 – 07/12/2021

From the Midterm Demoday, it was concluded the main idea of the concept could be a proper way to address the design challenge. As people were so excited about learning by exploring, it was chosen to transform the mid-term concept into a higher-fidelity experience, rather than a toolkit.

PHASE A & B: Fine-tune Design Challenge

Based upon the midterm feedback, the design challenge and context was adjusted and defined in more detail. The installation would be meant to be placed in a city center for two weeks, after which the installation moves on to another city in the Netherlands. This location was chosen as it is visited by all types of people rather than one bubble, who often have the time to explore their surroundings. By moving from city to city it contains a surprise factor, rather than becoming a permanent feature of the city. Because of this location and the target group of citizens, the municipality is a suitable partner and financier. The main target group for this project are young adults between 18 and 30 years old. Digital technology is fully integrated in their daily life and their norms and values will determine the norms and values of the nearby future. It is important they are well informed to form a well-considered opinion. Additionally, the topic of data collection is relevant for everyone, thus the installation should also be experienceable for all other citizens that pass by.

All in all, the design challenge changed to:

> *Create an experience in the city center that shows what personal data Google collects and how this influences Google Search outcomes, by (1) triggering people's interest and curiosity, (2) informing them about the precise data collection and (3) making it easy to take action*

PHASE C & D: Build New Concept

The Midterm Concept should be developed into a standalone installation people autonomously interact with. Especially the information-prototype was challenging, as it had to be simplified. At the same time, enough information must be communicated, as the visitor needs to understand their settings, to feel motivated to consider adjusting them. Therefore, much attention was paid to this part of the experience.

In order to define and discuss new ideas, low-fi prototypes, sketches and mindmaps were made (see figure 38, 40 and 41). It resulted in a prototype sketch, visible in figure 39.

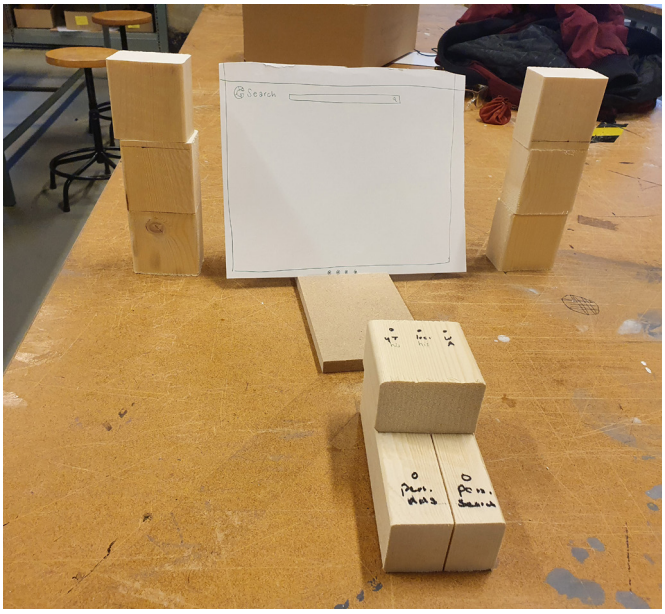


Figure 38. Defining and discussing an improved prototype, by using physical materials.

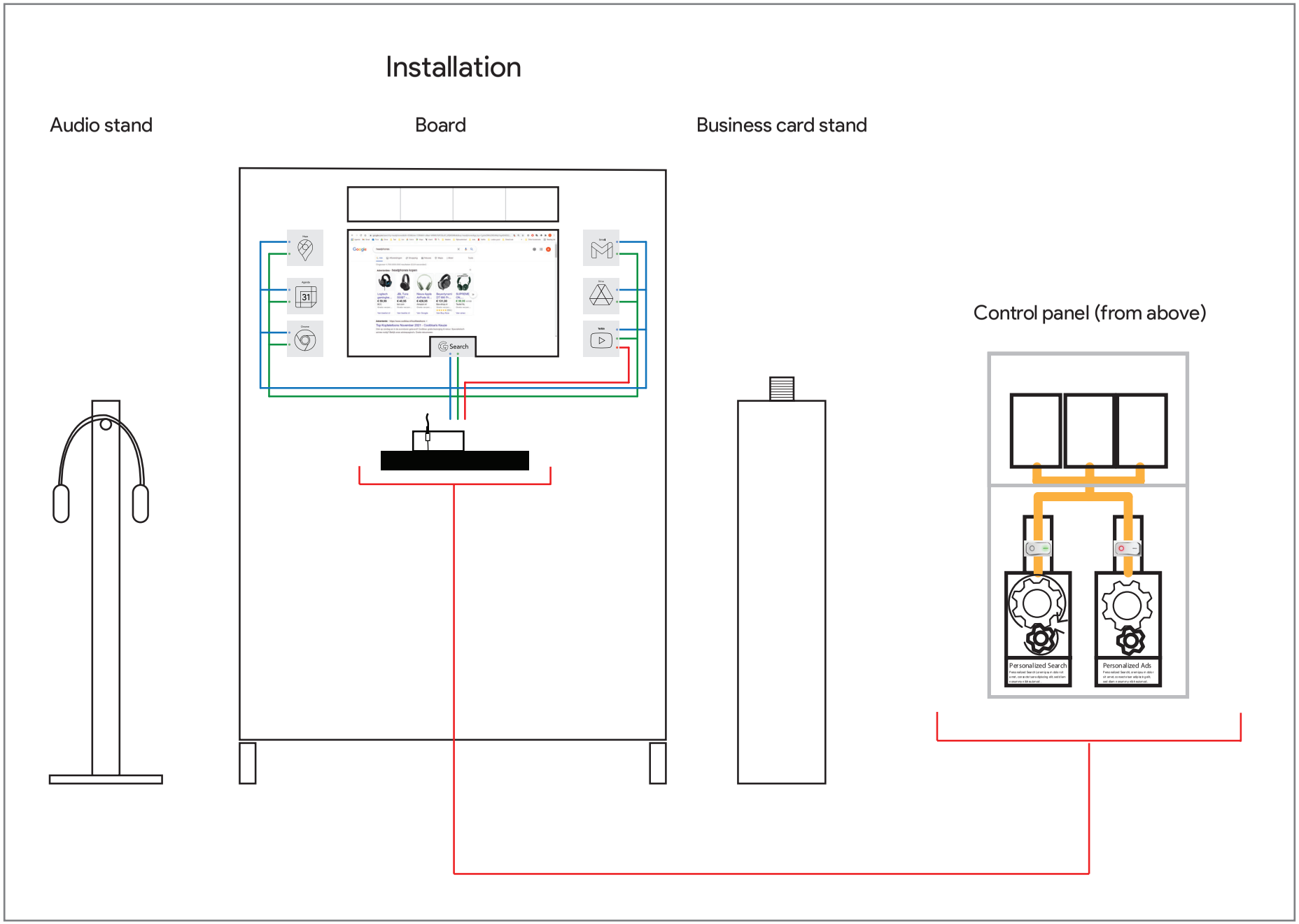


Figure 39. A schmatic sketch of the prototype that the design team had in mind to build.

It would have made sense to build a low-fidelity prototype of the new set-up, test it, and then create a high-fidelity version. However, if this process had been carried out at that point of time, no time would be left to create a finetuned high-fidelity version before the Final Demoday. Therefore, the team decided to build certain parts low- or high-fidelity (explained below under "Design Decisions"). The created concept could then be user tested, to subsequently execute a third iteration in which the low-fidelity parts could be re-designed, resulting in the Final Demoday design.

Figure 40. To imagine how the design would look like in terms of sizes, paper surfaces were cut out and sticked to a door.

Design Decisions: Audio Experience

The Midterm Demoday clearly pointed out visitors saw an opportunity in hearing a personalized text, based upon their profile specifically. Therefore, a code was written that copied personal values from someone's profile into the audio fragment leading to a varied yet confronting audio. To prevent the audio being perceived as exaggerated, the dark voice was replaced for a text-to-speech voice and the background sounds were removed (figure 42).

Design Decisions: Data Flow Board

During the Midterm Demoday, it was clear people did not realize what elements they could interact with. Therefore, it was decided to create (1) a 'control panel' containing all settings visitors can interact with, connected to (2) a large vertical board showing a physical overview of all data streams.

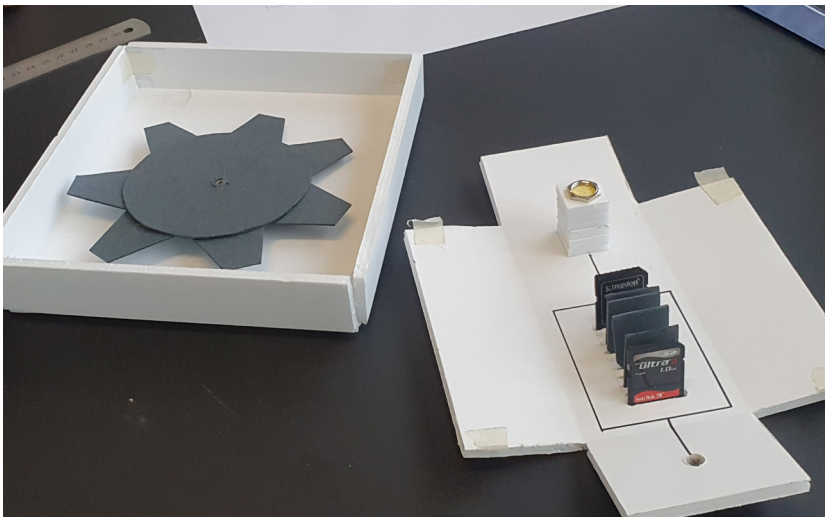


Figure 41. Defining and discussing an improved prototype, by using physical materials.

Figure 42. This QR-code leads to the new audio experience.

It was crucial the control panel (see figure 44) would be well-designed, because it formed the core of the communicated content: it introduces the Google settings, reveals their nature and offers the possibility to interact to explore their effects. Therefore, a low-fidelity version was created first, after which it could be tested and improved. The most important design decisions for this prototype, are:

- LEDs were used in the control panel and the vertical board to indicate data flowing from one place to another.
- A box was created for each setting (see figure 44 and 46). The settings 'web & app data history' (WH), 'location history' (LH) and 'YouTube history' (YH) allow data storage. These are controlled by (un)plugging an AUX cable. If connected, LEDs show a data flow towards several SD-cards, to implicate data being stored. The other settings 'personalized search' (PS) and 'personalized ads' (PA) allow the application of an algorithm and can be controlled by a switch. If turned on, LEDs show a data flow towards a gear that starts turning.

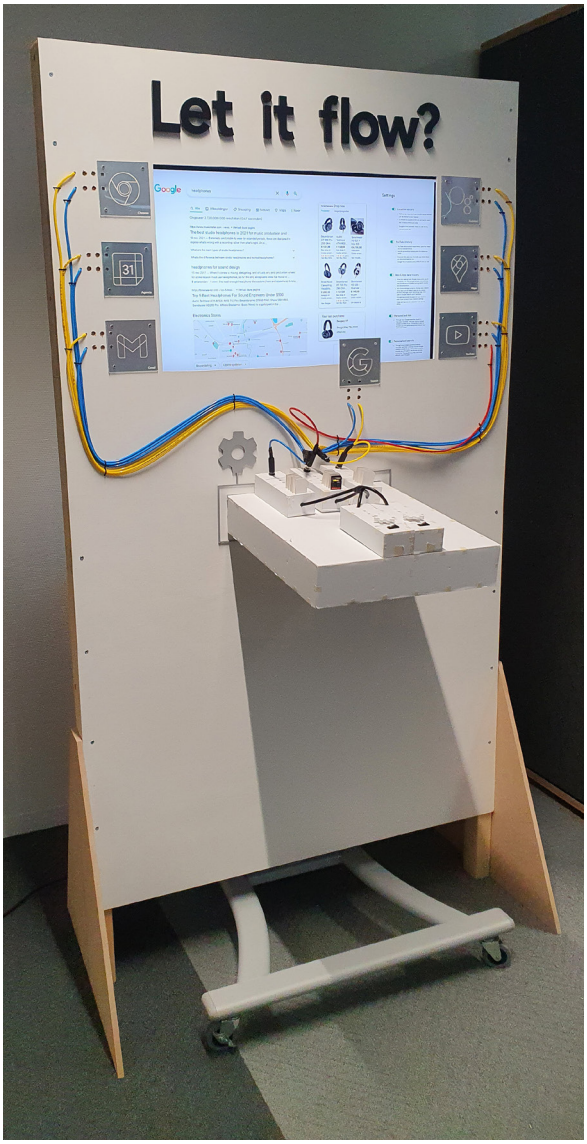


Figure 43. A photo of the created prototype.

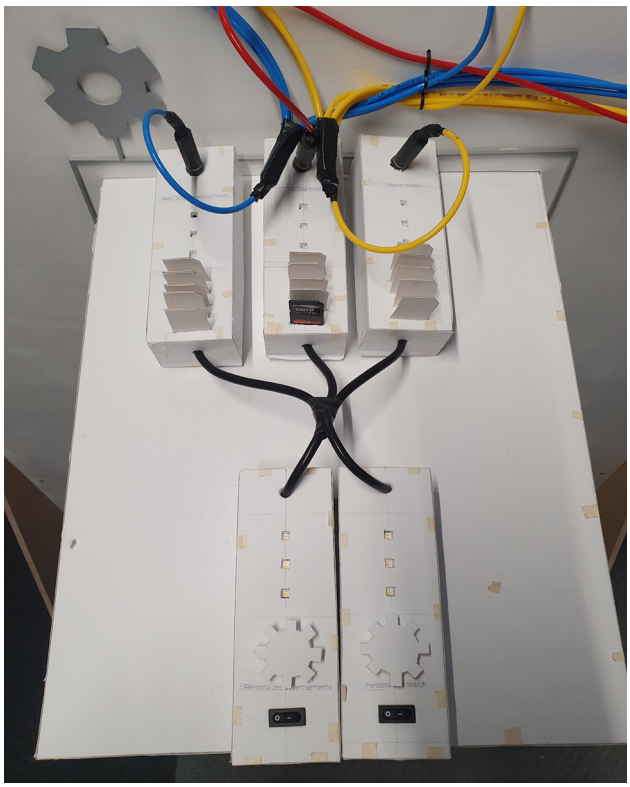


Figure 44. A photo from above of the control panel.

Figure 45. A photo of the building process.

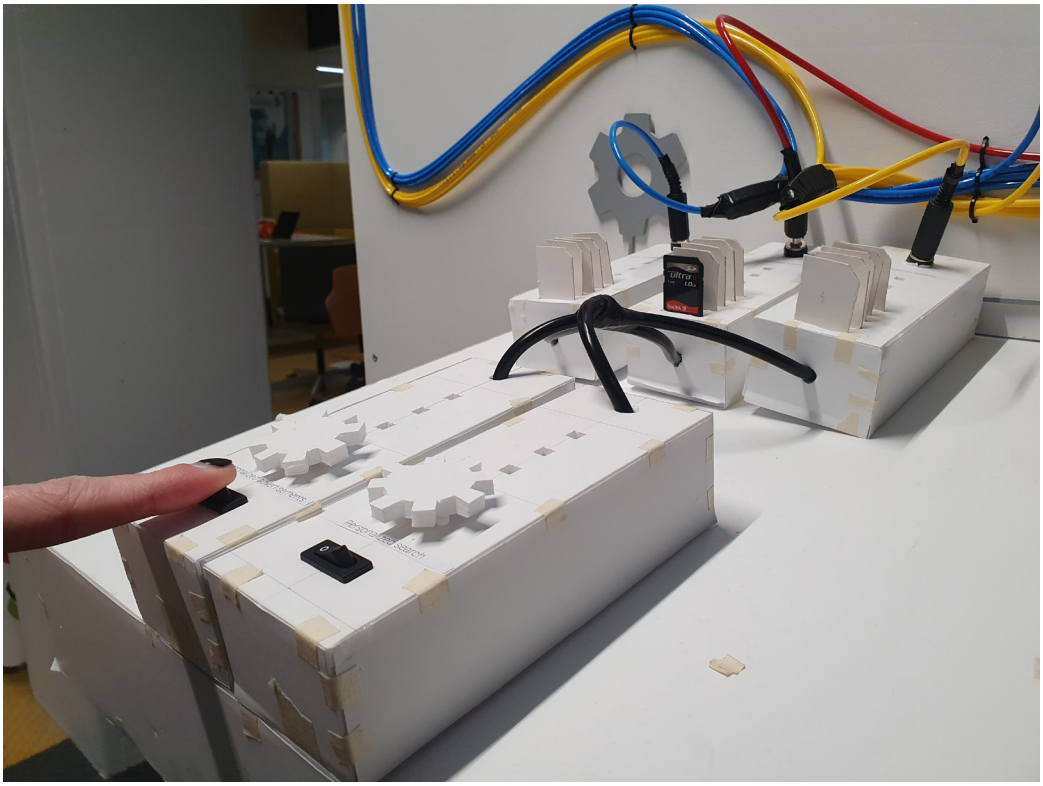


Figure 46. The control panel, while someone pushes one of the switches.

Figure 47. Another photo from the information prototype.

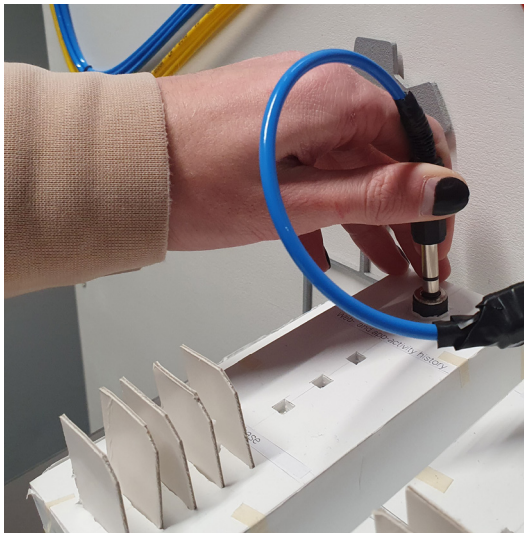


Figure 48. History settings could be turned on or off, by (dis)connecting an AUX plug.

- The cables were consciously organized, to show the correct influence of each setting. For instance, YH only collects data from the YouTube service. Another example is that PA and PS can be turned on or off by the switches, but the black cables connected to the other three settings cannot be removed (see figure 44). After all, turning off these settings does not disable Google to prepare this data in case it will be turned on.
- Each setting is assigned to a different color: yellow, red, blue or green. These colors are easy to distinguish. Besides, they are in line with the style of Google, creating a more unified installation that clearly communicates the topic.

The board should be clear and simple. It involved less nuanced design choices in comparison with the control panel, thus it was chosen to be made high-fidelity, apart from some details that were still open for change. The most important design decisions for this prototype, are:

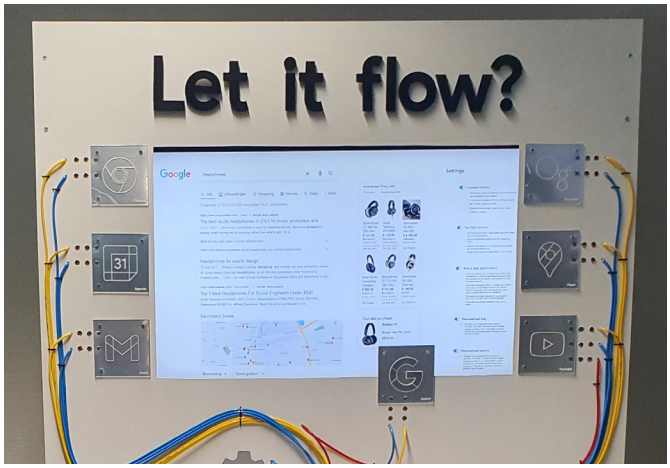


Figure 49. Google Search is enlarged on the screen in the middle, surrounded by other Google services.

- The board is constructed of a wooden plate. In the middle (see figure 49), an enlarged visualization of the Google Search is displayed on a screen. It is surrounded by small plates that represent multiple Google services. On the side of each service plate, the LEDs show a constant flow of data, passing into a wire leading to the control panel (see figure 50).
- To create a technological and futuristic appearance, elements representing (parts of) Google should look sleek,

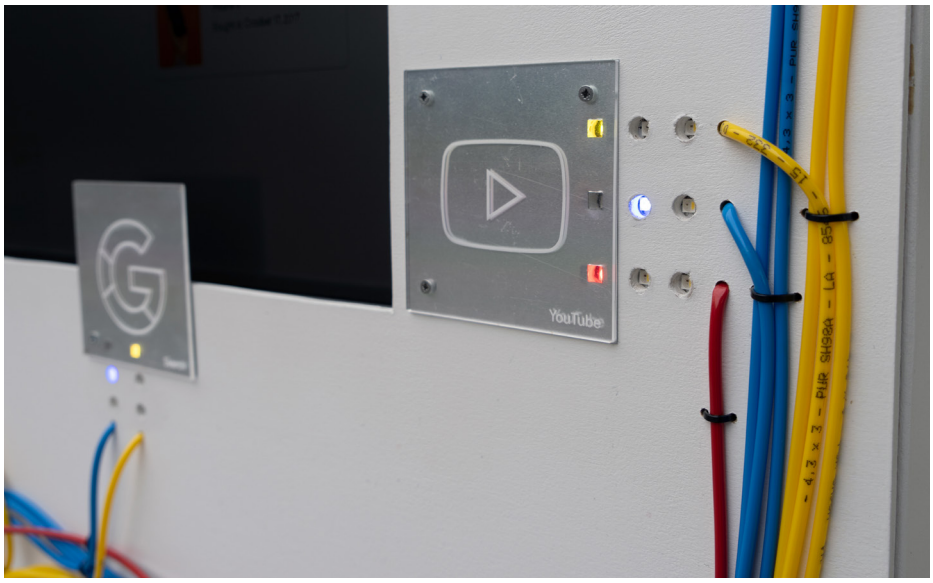


Figure 50. LEDs indicate a data stream flowing from the services into the cables.

artificial and clean. The 'service plates' for example, were constructed by one plate of aluminum covered with plexiglass, in which its logo was engraved. The plastic wires representing data streams are tightly guided over the board.

- The wires, LEDs and settings had corresponding colors. In this way, the visitor can see in a glance what setting gathers data from what service(s). Other elements were colored black or white, to prevent a chaotic appearance.
- On the Google search screen (figure 51) an overview explained pros and cons for each setting, to allow the visitor to make a well-considered decision.

Design Decisions: Business Cards

The midterm action-prototype appeared to be less effective than desired. People were mostly interested in the other prototypes, probably because these felt more surprising. It was decided to change the format from a board into a business card, on which QR-codes were showed connected to the setting webpages. It allows later interactions, when not facing the other prototypes. In this way, the business card extends the experience; it is a reminder to the surprising experience, and a trigger to think, discuss or explore the addressed topic later on.

For this iteration it was decided to not focus on developing this business cards yet. All time and energy was put into the other prototypes, as these were more difficult to build, yet super important for a successful experience. After all: if these would not be understood, the action-prototype would probably not be understood or interacted with either.

Conducting User Tests

In order to verify assumptions, the created experience was user tested. Four randomly asked individuals were asked to listen to the audio fragment first and then interact with the prototype, while thinking out loud. Afterwards, a semi-structured interview was done. The tests were mostly focused on investigating the understandability and user experience of the created concept. The precise set-up of this user test is described in Appendix D. Most important findings are described below. Unfortunately, during these user tests, only the blue LEDs (connected to the blue cables) were working. These are the most important findings:

- To hear the personalized audio fragment, the subject had to log in into Google, which was done by three out of four participants. Two liked the audio while one really disliked it, explaining it felt like a "consent form" he was forced to listen to. Overall, the audio and the board were perceived as separate experiences, rather than forming a single whole. Lastly, two individuals liked the text-to-speech voice, as it reminded them to the voice Google used in their services too. One was annoyed however, as it sounded too robotic.
- All four individuals said they liked the concept of making the Google settings visible and physical, as these are perceived as vague and secret. Especially the physicality of the cables and the possibility to (un)plug the AUX cables was liked.
- Nobody understood the control panel without an explanation from the design team. It was unclear the boxes represented Google settings and nothing indicated what cable belonged to what box. Moreover, they felt confused about the

precise meaning of the cables, and their effects when being (un)plugged (in). This confusion was partly assigned to the LEDs not completely working, as these would have given feedback about the data (not) flowing. Lastly, everyone considered or tried to pull out SD-cards, since they were allowed to interact and these cards were touchable too. The idea of SD-cards visualizing data storage was clear. In contrast, the gear used to visualize the algorithm settingswere not perceived as self-explanatory. People felt even more confused as they misunderstood the position of these settings (PS and PA) in relation with the others (LH, WH and YH). It was unclear what data was flowing towards and from these two settings.

- The changes on the Google search page were too subtle, which also negatively influenced the comprehension of the effects of each setting. People switched back and forth on a settings, to detect differences and figure out the implied effect. It took lots of effort. Lastly, nobody read the pros and cons listed on the side.

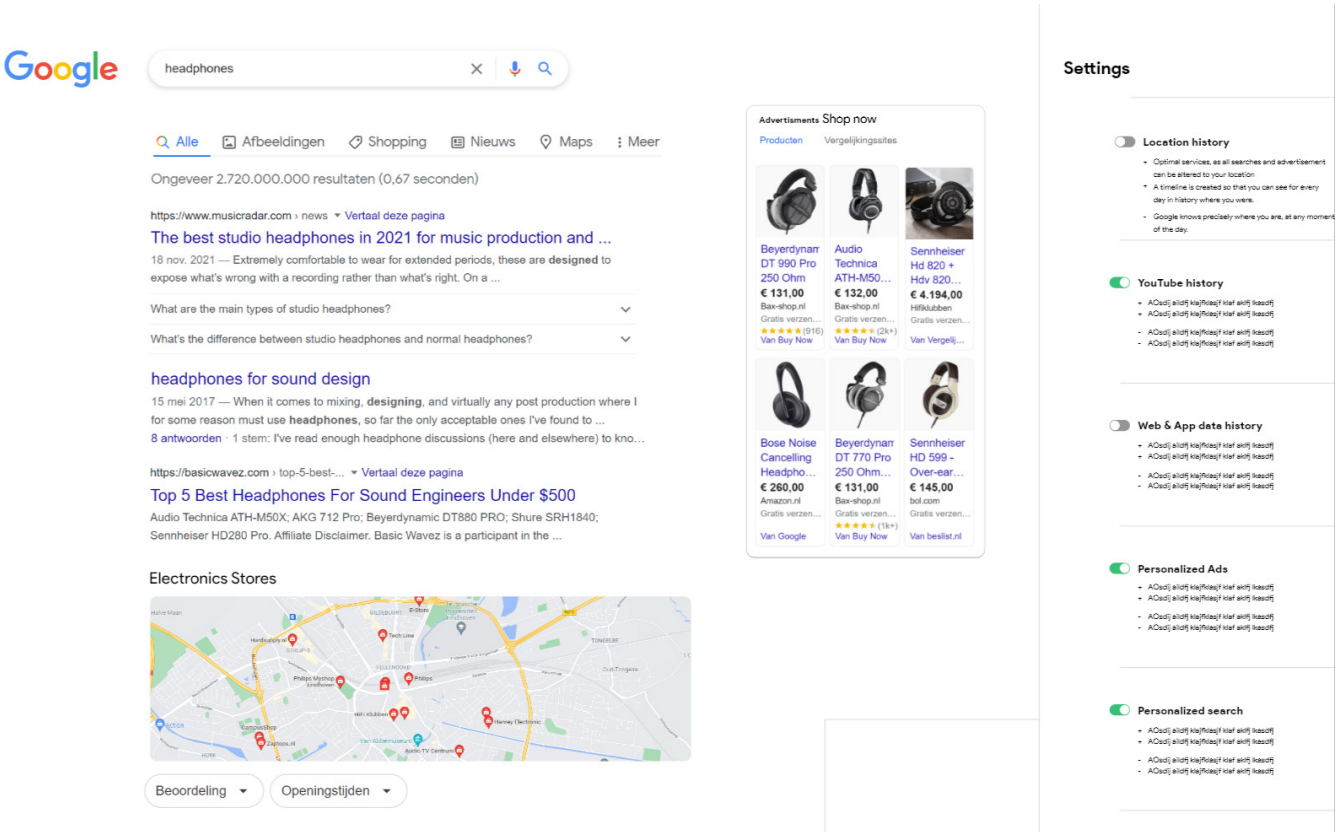


Figure 51. A screenshot of the created visuals shown by the screen. It shows a Google Search page, with an overview of all settings on the right.

Iteration 3. Final Demoday Design: Let it flow?

GOAL: Create a high-fidelity experience that feels like one whole for the final demoday.

WHEN: 08/12/2021 – 17/12/2021

PHASE A, B, C & D: Improving the Design

To keep an open view upon all possible changes, regardless of time- or skill-restrictions, the most ideal prototype was described, based upon the feedback gained from the user tests. An impact effort matrix was used to decide what was feasible to implement, resulting in the following changes:

- For the audio experience, the voice was changed to another text-to-speech female voice, whose speaking quality was less robotic and thus less boring, yet still sounded like the Google voice. To merge the audio experience and the interactive board in a higher extent into one experience, the voice ends its story by introducing the board. The audio can be heard by scanning the QR-code in figure 54. For the same reason, audio was added to the board. When a setting was turned on or off, the same voice said: "[*name of setting*] turned [off/on]".
- To make the effects of settings more clear, an animation was created when turning location history on or off (see figure 52). It shows data flowing from the service plates towards the map, or the other way around. Due to time restrictions, no animations for other settings were created. The overview with pros and cons was removed, because no participant of the user tests used it. The search term changed from 'headphone' to 'smartphone', as this still involves data related to all settings, while it feels a bit more personal. Therefore, changes in search outcomes might be identified more easily. In addition to these changes in the screen, understandability was also improved as all LEDs were all functioning correctly.
- A high-fidelity version of the control panel was made (see figure 53, 55 and 56). Attaching boxes to a separate platform did not really make sense, thus the settings were inserted in the platform itself. To make clear this panel showed settings available in a Google account, a title "Google Settings" was engraved on top. As people were having difficulties in understanding the relation between all settings, lines were engraved showing the data flow. This includes two circles with binary numbers, titled 'Other data sources', connected to PS and PA. Moreover, it was tried to disable the possibility to touch the gear or SD-cards. The gear was covered by the plexiglass. The idea was to insert the SD-cards very deeply, so that people could only see and not grab the SD-cards, but as can be seen in figure 55 this did not work out as planned.
- In the last prototype, the cables were blocking the view upon the control panel. Therefore, cable holders were designed that ties the cables together.
- To create intuitiveness in where to plug the cables, the surface with elements belonging to a certain setting was given a color (blue, yellow, red or green). The personalized search and personalized ads were both assigned to the green color, to indicate their similarity.
- Finally, business cards were designed and printed (see figure 57).

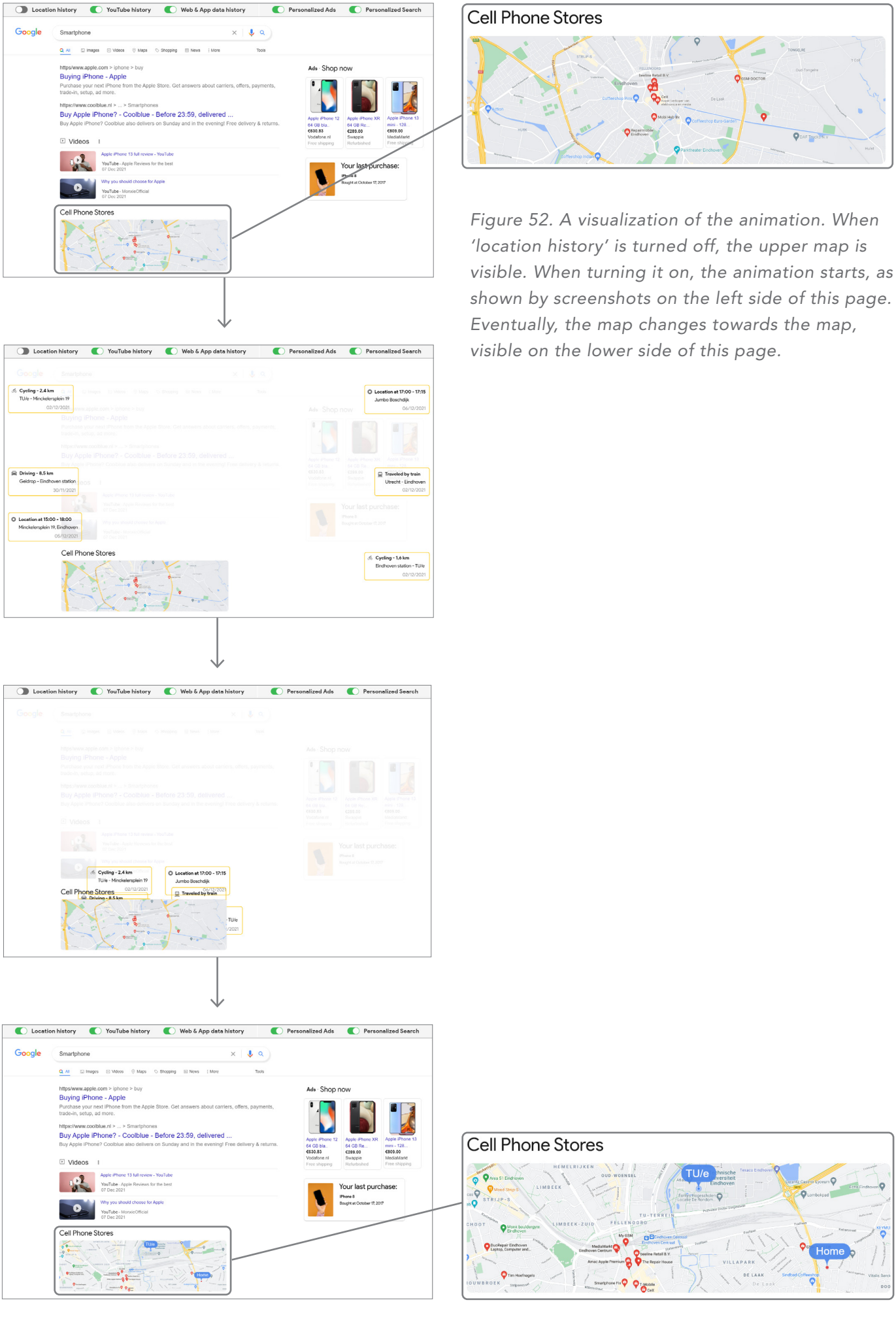


Figure 52. A visualization of the animation. When 'location history' is turned off, the upper map is visible. When turning it on, the animation starts, as shown by screenshots on the left side of this page. Eventually, the map changes towards the map, visible on the lower side of this page.

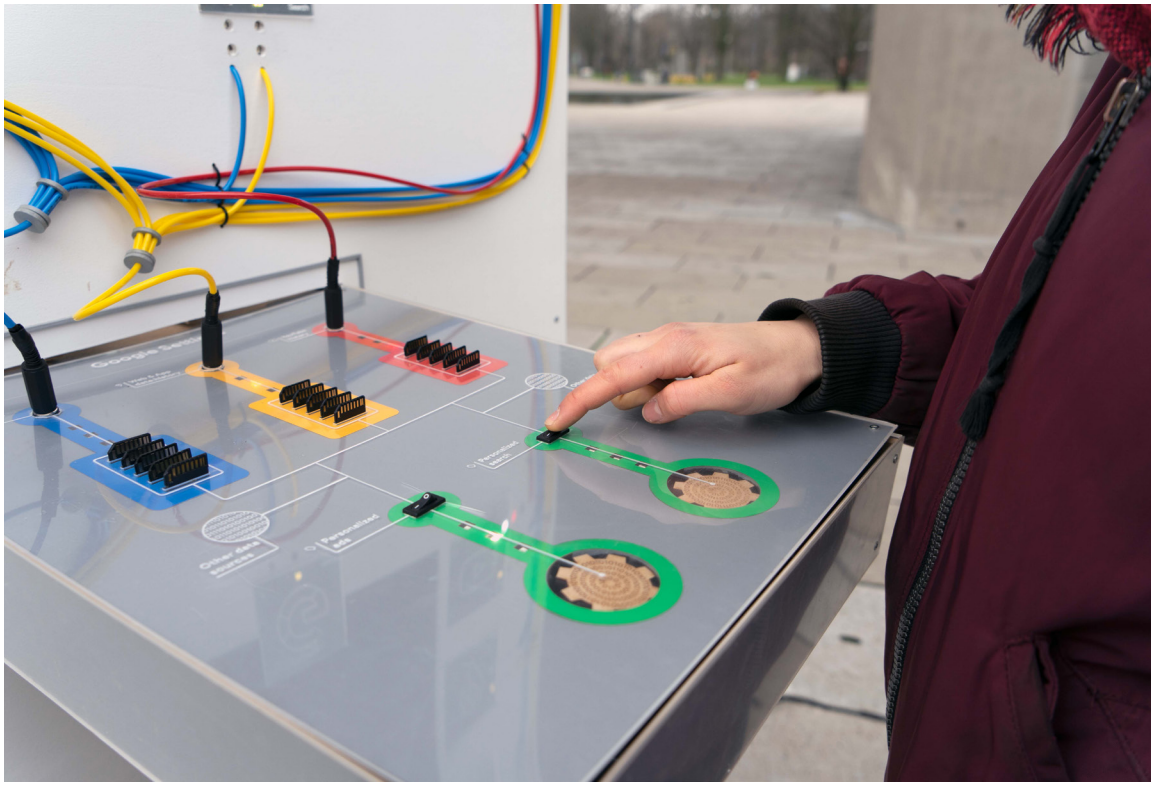


Figure 53. Someone interacting with the control panel.

Figure 54. Scan this QR-code to hear an example of the personalized audio experience.

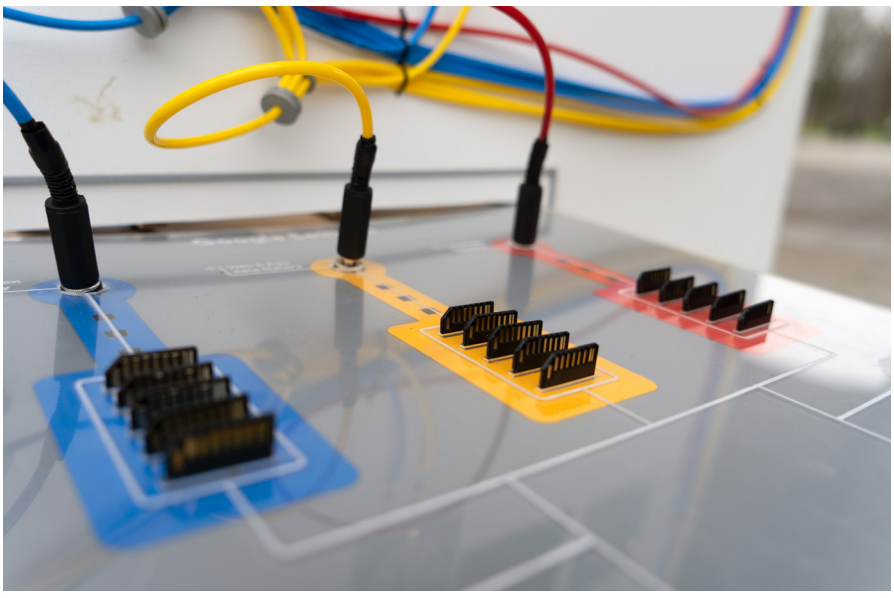


Figure 55. A close up of the history settings.

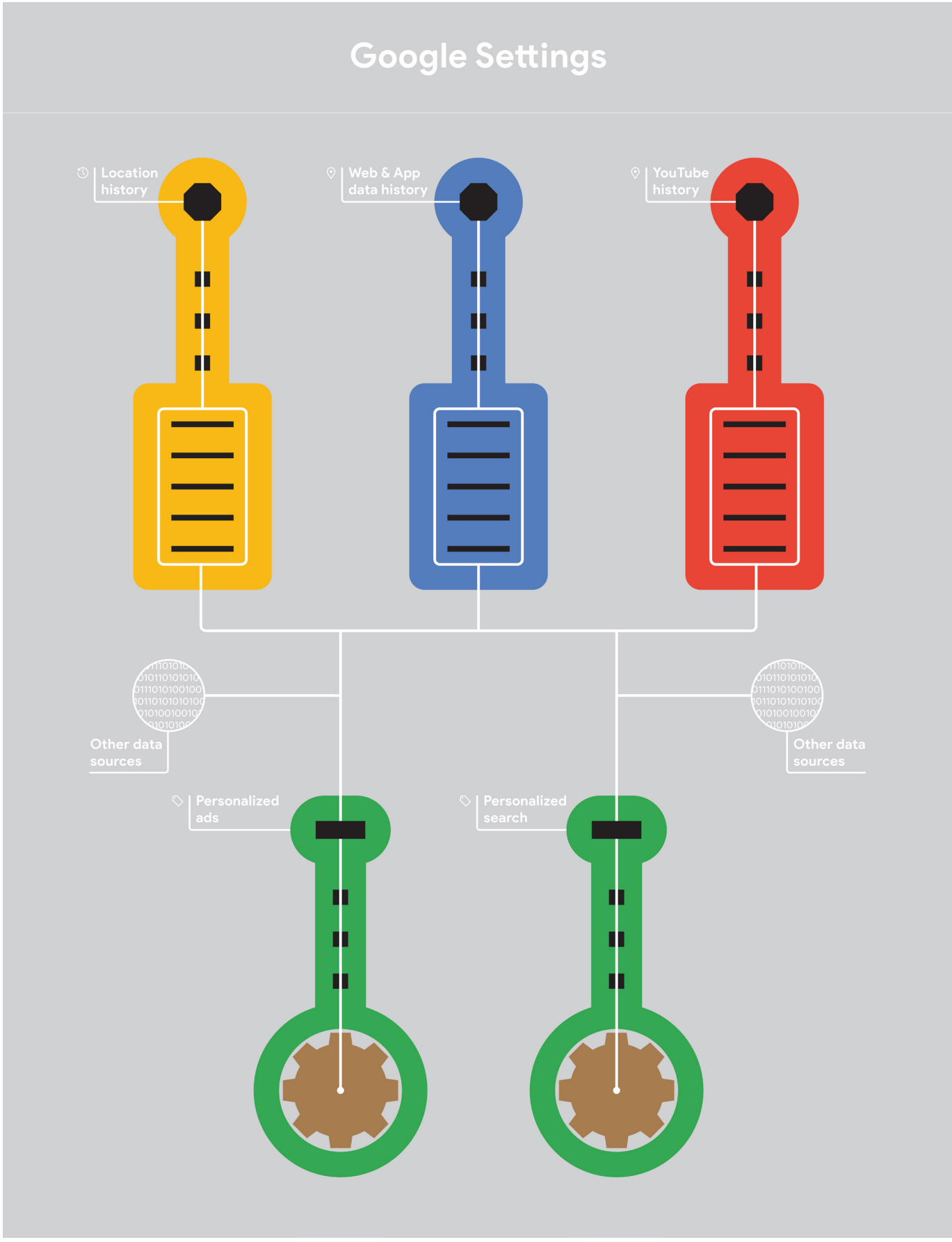


Figure 56. A graphical visualisation of upper side of the control panel.

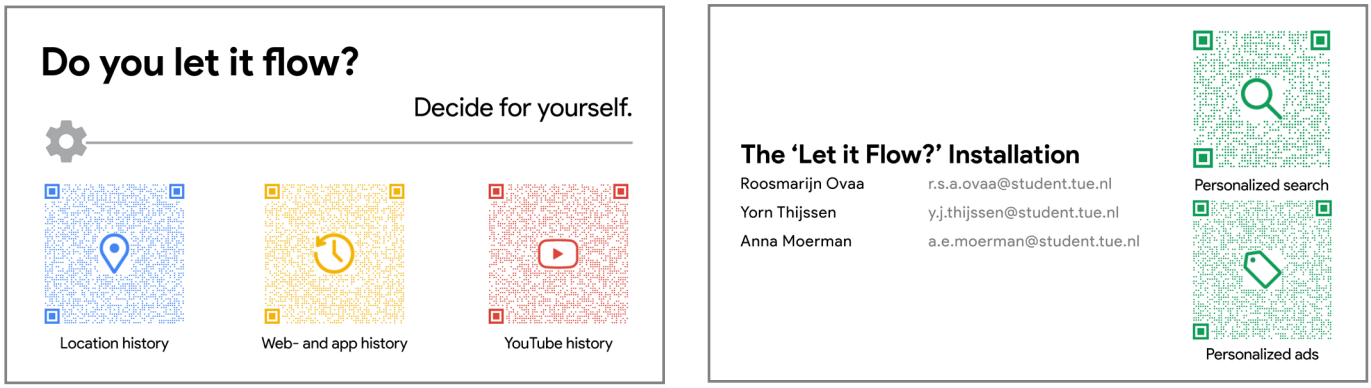


Figure 57. The two sides of the business card.

PHASE D: Feedback Session and User Tests

To validate the new experience, it was physically demonstrated to two coaches to gain feedback. Furthermore, user tests were conducted with five students. These tests mainly focused on the effect this experience had on their vision upon their Google settings. The complete user test set-up can be found in Appendix E. After going through the experience, a semi-structured interview was done. These were recorded and transcribed, to conduct a thematic analysis, so that all feedback could be categorized to draw proper conclusions. A list of all findings can be found in Appendix F. The main findings are described below.

Audio Experience

The information told in the audio fragment was not 100% correct for everyone. Regardless the accuracy, hearing Google saying who you are according to them, brought up expressive reactions. Some were indignant that Google guessed their age wrong, some were intrigued about the level of detail of the information Google had on them. Through these reactions the difference between personalized and non-personalized audio became very clear. In addition, the majority of the participants mentioned that it sparked interest.

Board including Control Panel

Although the audio literally explained, participants did not realize the control panel showed five main settings available in every Google account. This is probably due to having an information overload, and not paying attention to these sentences at the end of the fragment. In general, participants did not actively think about the meaning of all elements on the panel. When asking about it however, they automatically understood the meaning and implications of most visualizations. The gear was the only aspect that was still unclear; it was not associated with algorithms. Moreover, as feared, all participants still tried to grab the SD-cards. In contrast, the animation worked out well: it created a moment at which people could see what happened, which improved their understanding.

It was interesting to see participants explored the board on their own pace and with their own ambitions. While one person was done in one minute, someone else kept interacting for fifteen minutes. These different levels of engagement could also be identified afterwards; the longer they interacted with it, the more they discovered and understood. Nevertheless, everyone felt satisfied afterwards and said they fully understood what was happening, thus it

did not disturb their personal experience. Additionally, it was concluded the prototype entails a certain balance between learning by exploration versus guidance. When being forced to explore too much, people feel lost in the information and lose motivation to try to understand. When receiving explanations only, no interactions or active thoughts are needed from their sides, resulting in losing interest. In the next iteration, a bit more guidance can be given, to create the correct balance throughout the experience.

Business Cards

The business cards were perceived as a great addition to the board, to provide a concrete way to take action. For example, someone mentioned: "In this way, it does not only leads to awareness, because then many people think like, what now? The cards are a tool to help in that too, which I really like". Moreover, someone said "I think this card adds a lot to kind of promoting the installation, but even more to opening a discussion", since it is very likely the card will be put in a pocket or wallet, after which it will appear in a different situation with other people. Another participant said "Although this is the simplest part of your design, it really brings everything together." Everyone said they would scan the card later on, but no participant eventually actually did. During the experience, they did not feel any urge to do so. Therefore, it was chosen to go back to a bigger form of the action part to make it more part of the installation, but this time made sure to make it as present as the other two parts.

Installation as a Whole

The overall set-up really triggered people's curiosity, because of its size, colors and lights. When recording a video, outdoors on campus, people approached it and touched the panel to find out what it was meant for. One participant of the user test said "it's appearance just clearly expresses you can touch it" (p1). Thus, seeing the prototype piques people's interests and induces them to interact.
Participants still perceived the audio as a separate experience from the board interactions, though they understood the connection and it was not indicated as disturbing. However, someone said the audio could be useful for adding some guidance about the set-up of the board.. Some confusion was caused by the audio being personalized, as almost everyone expected the Google Search screen would thus be personalized too. After several interactions, most of them concluded it was not, but it clearly hindered them. Lastly, the business cards were described as a good last step in the overall process: "this really finishes the experience" (p5).

Effect

Every participant started considering and discussing what personal data was gathered by Google and what would be appropriate. They said the installation helped in clarifying their settings, but fully fathoming was still not considered a piece of cake. Nevertheless, everyone said they planned on taking a closer look to their settings later on, thus it lowers their threshold. Lastly, the user tests revealed discussions to be a vital part of the experience. It pushes people to reflect upon the situation, making them aware of dilemmas and motivates them to take action if desired.

Based upon the user tests of iteration 3, several changes were made, resulting into the final design as described in the next chapter.

4. Final Design

This chapter provides a detailed description of the final design, combined with a business plan.

4.1 Final Design: Let it flow?

The final design is shown in figure 60 and concerns an experienceable installation consisting of three parts. Visitors are guided along the three parts by footprints on the floor. A couple meters in front of the installation, a small information panel is placed, that explains the designers' reasoning to create this experience.

4.1.1 Part 1: Audio Experience

First, the visitor faces a board that offers an audio experience (see figure 61). This part tries to create a sense of personal urgency for the visitor, to grab their attention and stimulate interest in the topic.

The visuals and text provide an explanation about how to play the audio. It states to put on the headphones first, after which it can be decided to hear a personalized audio message, or a general audio message. Although other parts in the installation also contain audio, headphones were chosen over speakers, since the personalized audio message contains personal information . For the same reason, the option to hear a general script is added: the visitor can decide to keep their personal information to themselves. In this case, visitors can just press the play button above the platform to hear the audio on the headphones. The exact script can be found in Appendix K.

If the visitor decides to hear a personalized audio message, they should log into their Google account on the tablet in the platform and subsequently press the play button. This script can be found in Appendix K. A tablet with touchscreen was chosen to create a cleaner appearance and for anti-theft reasons. The visitors' Google account will be used to retrieve their Personalized Advertisement profile (which was explained in more detail under "2.1 Background"). The script is personalized by copying several labels from this profile, into a pre-defined text. The code for this can be found in appendix M. For example, when living situation is found, the following sentence will be added:

> *"As for you living situation, you are part of the group [*value*]"*

If a visitor has their personalized ads settings turned off, a pop-up notification refers them to listen to the general audio script. An example of the personalized script and the general script can be listened to by scanning the QR-codes in figure 58 and 59.

Figure 58. Scan this QR-code to hear an example of a personalized audio experience.

Figure 59. Scan this QR-code to hear the general audio experience.

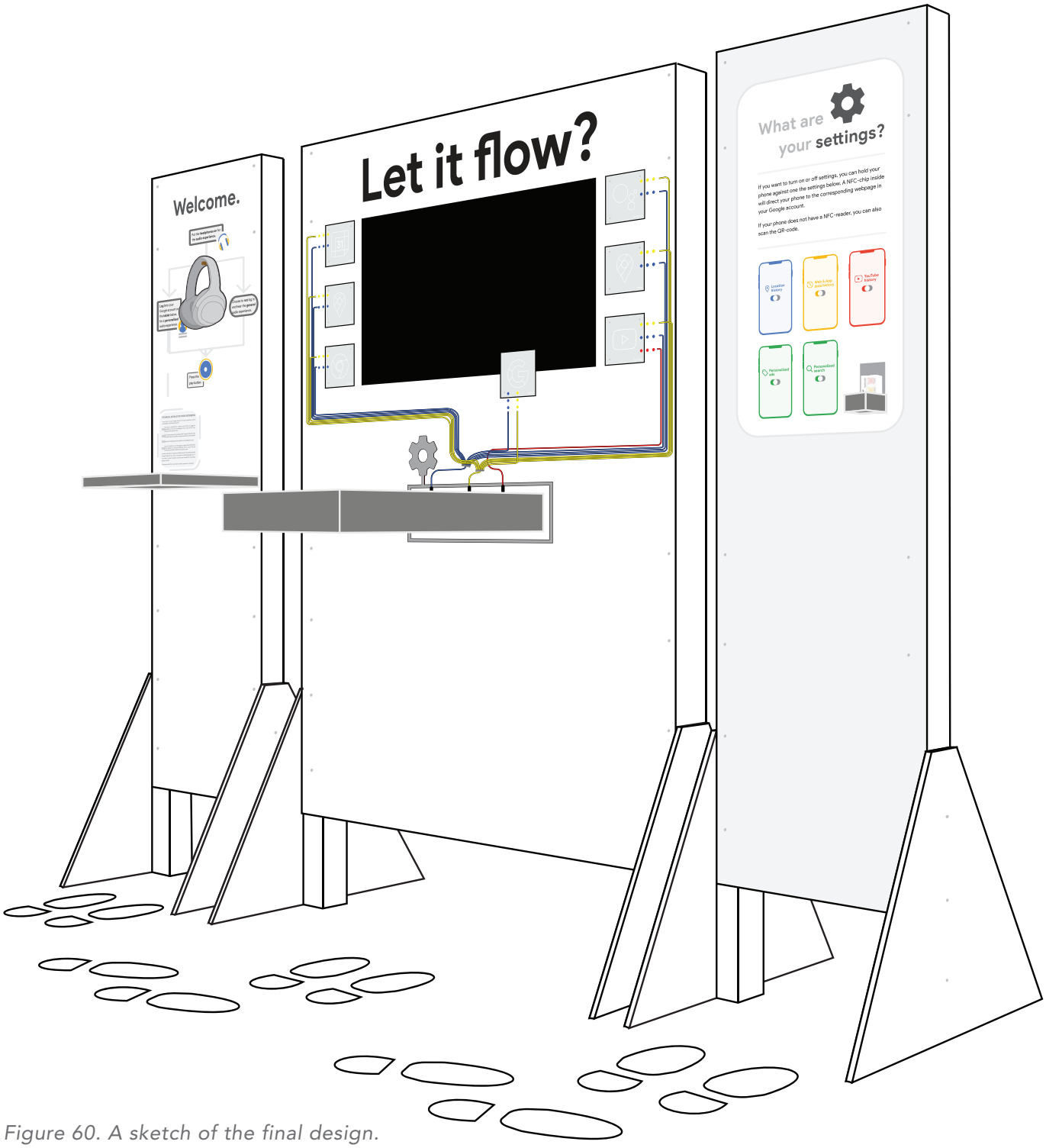


Figure 60. A sketch of the final design.

Both the general and personalized audio are constructed as follows:

1. A short introduction in which it is explained Google is talking to them, so that they understand who this voice is.
2. Information about themselves is being told. This part contains information about their age, gender, languages, relationship status, employment status, industry, marital status, living situation and educational status (if can be found in their profile). Also three 'random' values are added that contain information about hobbies and interests, to make the text more varied and point out this information was not added to their profile by themselves. For the general script, it is just told that Google knows this type of information from them instead of mentioning the specific information as is done in the personalized message.
3. The information board is introduced to guide the visitor to this part and make the whole installation more unified. A few elements on the board are explained, to help them understanding the basics. However, not every element is explained, to make sure the right balance between explanation and exploration is achieved.

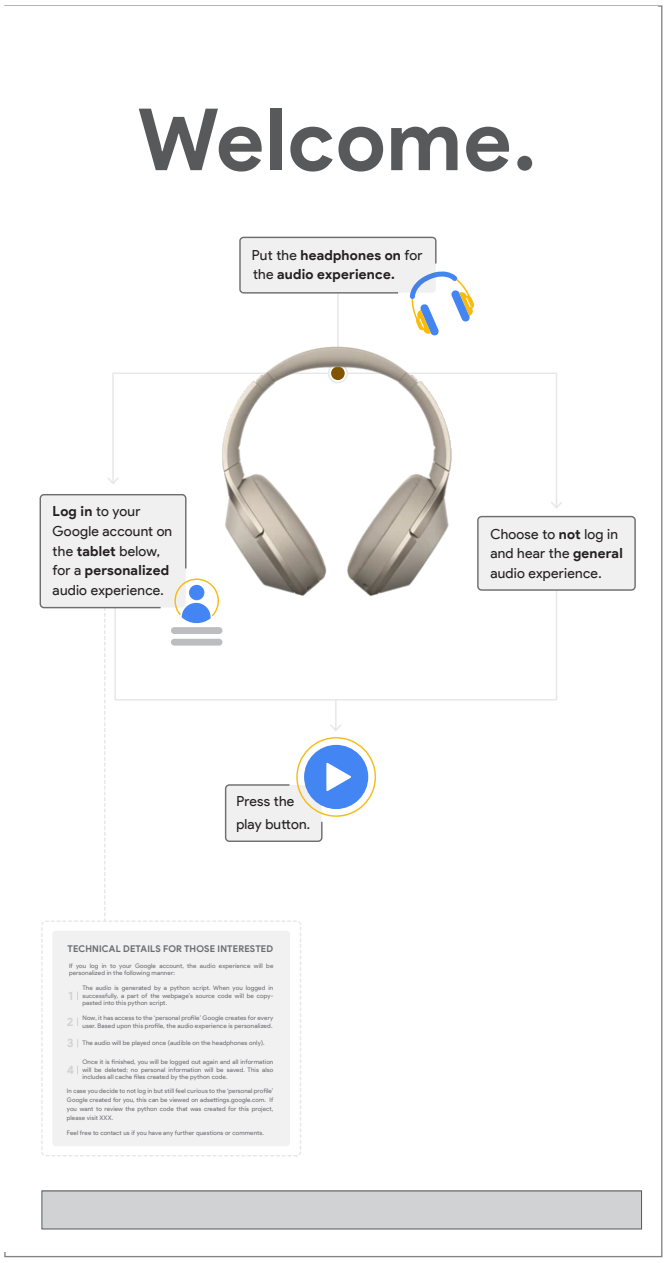


Figure 61. A sketch of the front view upon the board providing the audio experience. In the lower left corner (above the pannel) a text was added explaining the technical details.

To make the installation transparent about its mechanisms, a short and simple text was added (see figure 61 and appendix H to read the full text) to explain what and how personal data is used to personalize the audio experience. So, visitors know what they sign up for when logging in; they can make a conscious decision

The voice used in the audio file is TTS female voice that was clearly generated by a computer, while not sounding too robotic. The second user test indicated people appreciate the female computer-like sound because it reminds them to the voice used by Google Translate or Google Assistant, but if the voice gets too robotic, the audio becomes boring with the same intonation again and again.

4.1.2 Part 2: Information Board

In the second part of the installation, visitors can explore the meaning of the five main settings available in every Google account and their effects. This part consists of three elements: the board itself, a screen behind the board and a control panel.

The Board

The board shows seven Google services, visualized by the engraved plates. Cables are connected between these services and specific settings on the control panel, resembling data streams in the Google system. They are similarly colored as the setting it is connected to. In this way, cables explain what data is being collected at what Google service. LEDs in the corresponding color at the beginning and end of each cable indicate whether data is flowing (see figure 62).

The Control Panel

On the control panel (see figure 63 and 64), the main five Google settings are shown: location history (LH), web- and app data history (WA), YouTube history (YH), personalized ads (PA) and personalized search (PS). To clearly communicate the panel shows Google settings, a title was added on top, saying: 'Google settings'. Using corresponding colors for the settings and cables makes it intuitive to know which plug belongs to which setting.

The settings are divided in two sections: history settings and personalization settings. SD cards are implemented into the history settings to visualize data (not) being saved . A see-through box is put over the SD cards to make clear these are just for aesthetical and understanding purposes, and cannot be interacted with. The personalization settings

Figure 62. LEDs indicate a data stream flowing from the services into the cables.

concerns algorithms that can be turned on or off. It is displayed by a gear that turns if activated .

For the history settings, the on/off switch was chosen to be a plug, inspired by modular synthesizers. By removing a plug, the setting turns off. Physically disconnecting the data stream from the storage automatically means no more data can be saved. The personalized settings can be turned on and off by means of a switch. These settings do not disable data streams, it merely turns on or off a certain algorithm.

All settings are connected with white engraved lines, to show how the data flows. Two lines coming from circles with 'binary' numbers in it, are going to the personalization settings. It illustrates that the algorithms are also fed by data from other sources (the circles) and do not necessarily need data stored by the history settings.

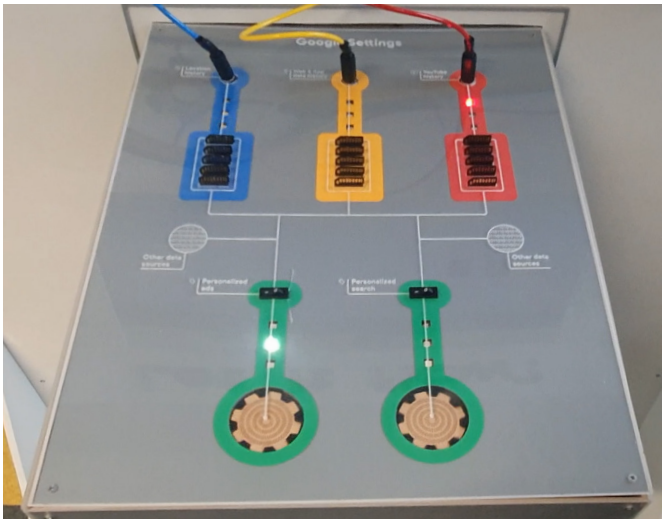


Figure 63. A photo on which a LED of the lower left and upper right setting are blinking (on this photo, the box around the SD-cards is missing).

LEDs on the panel resemble whether data is flowing (see figure 63), similarly as the LEDs on the board. For the storage settings, the colors of the lights resemble what type of data is flowing. Since the personalization settings work with a collection of different types of data, these lights are white.

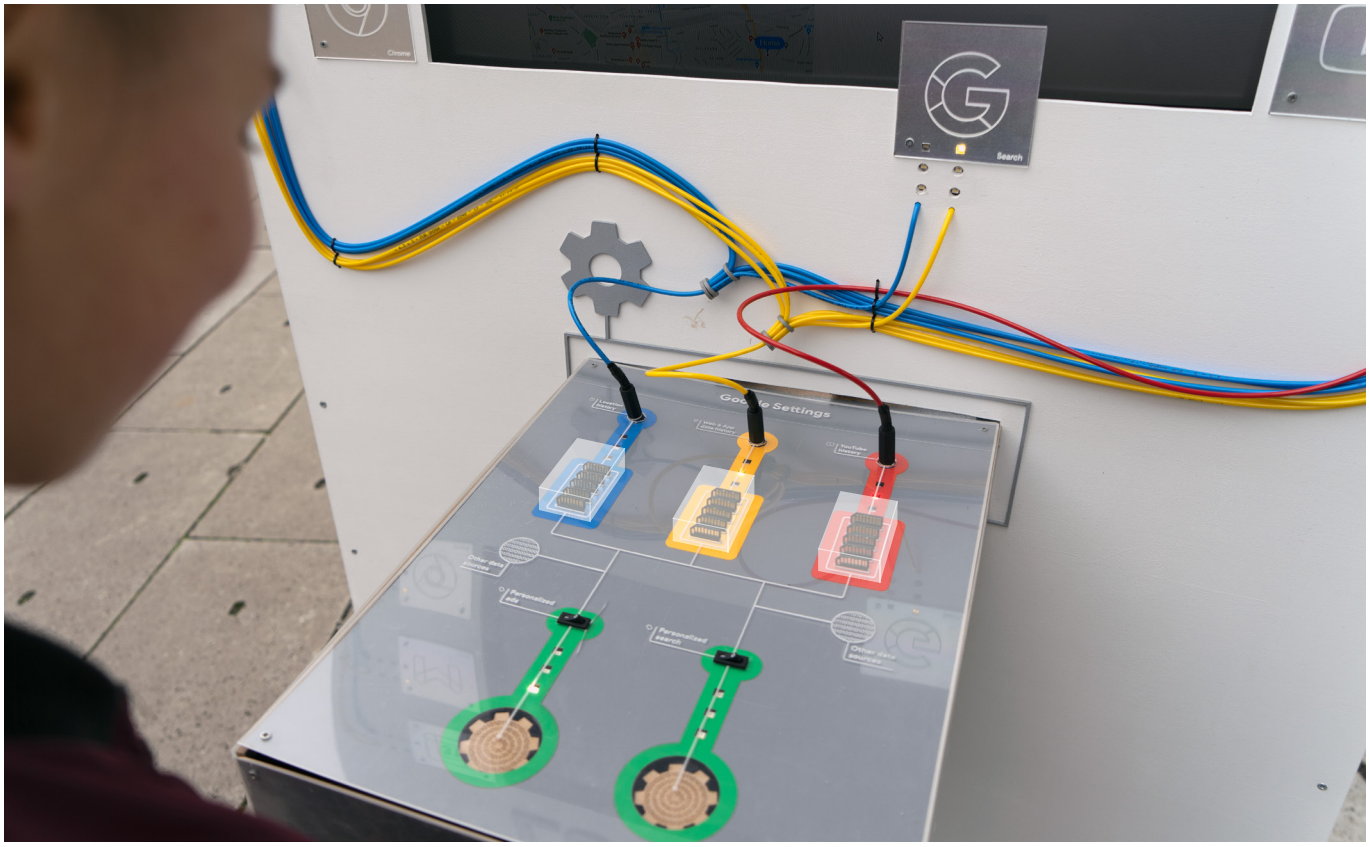


Figure 64. The control panel of the final design. As visualized, the SD-cards will be covered by small persplex boxes.

The screen

The screen shows a Google search page. When visitors turn off certain settings on the control panel, the Google search page changes, depending on the data that is allowed to be collected. In this way, the visitor can explore the settings and their consequences to improve their understanding of these settings. Animations are used to show the precise transformation (an example is shown in figure 52 earlier on), to ensure the visitor sees and understands what changed. Additionally, the same voice from the audio experience is audible, saying: "[*type of setting*] turned [on/off]" to improve the feeling that the three parts of the installation create one larger installation. This sound is played on speakers instead of through headphones, as the content is not personal and allows multiple people to interact with the board simultaneously.

4.1.2 Part 3: Links to Settings

The last part (see figure 65) focusses on making it accessible for visitors to take action on their data being collected by Google – if they choose they want to. On a board, five phone shapes are attached, each representing one of the five main settings The colors match the ones used in part 2. The phone shapes indicate that visitors can put their phone in front of them. NFC-chips in the board redirect the phoneto the webpage of the corresponding setting, where they have the possibility to adjust it for their account. In case their phone cannot read NFC-chips, the QR-code can be scanned inside the phone shape. This design lowers the threshold to look at or make changes in their settings, as visitors do not have to search for the settings themselves. Next to the phone shapes, a tray is attached filled with business cards. These cards display contact information about the makers of the 'Let it Flow?'-installation. Additionally, they show the five QR-codes of the 5 Google settings. By taking a business card with them, they will be reminded of the addressed issue and their settings later on. It can lead to conversations with others and allows them to consider their settings on a later moment.

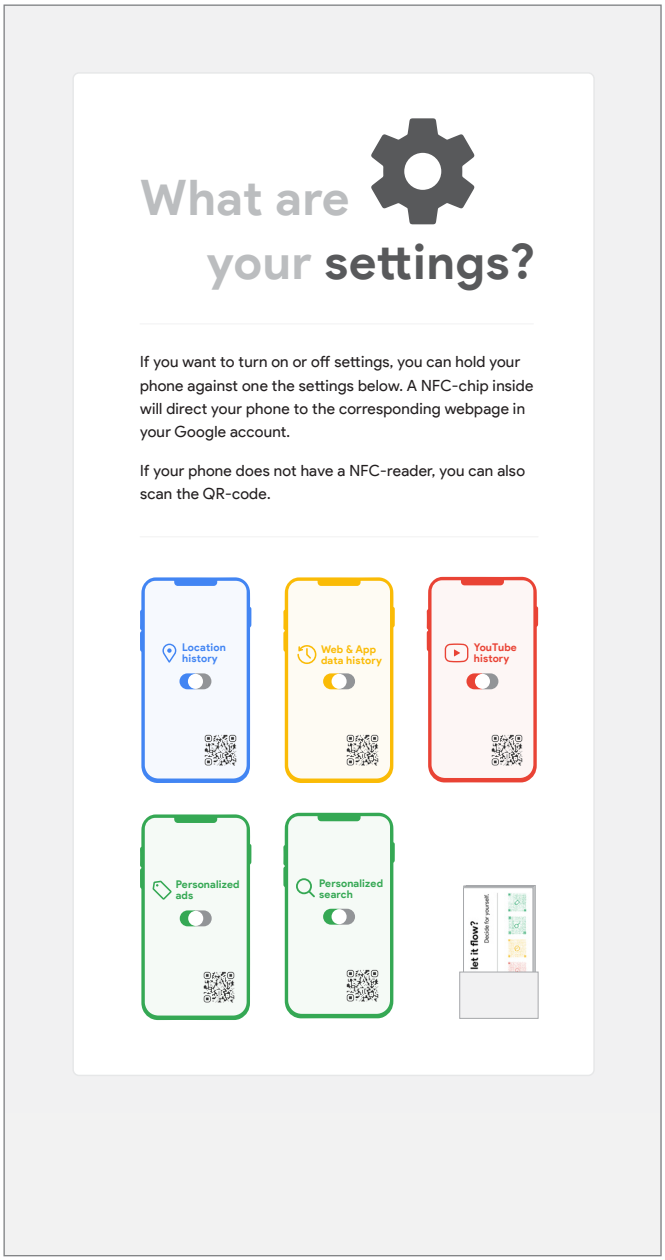


Figure 65. A sketch of the front view upon the board providing the audio experience.

4.2 Business Plan

To consider the feasibility to implement this installation in the outside world and to define the precise context in more detail, a business plan was written. The most important details are discussed below and the full Business Model Canvas can be found in Appendix G (Osterwalder & Pigneur, 2010).

The **key partners** of this plan are (1) Consumentenbond and (2) municipalities (e.g. Eindhoven, Rotterdam, Amsterdam, Utrecht, Enschede, Delft, etc.). Consumentenbond is a non-profit organization that focuses on consumer protection as an independent party (Consumentenbond, 2019). Amongst others, they actively guard online privacy of Dutch citizens. For example, in November 2020 they went to court, claiming Google does not comply with the privacy legislation (Consumentenbond, n.d.). Consumentenbond is a well-known organization in the Netherlands with a large network. The design team will approach them, ask whether they see value in the project and propose to execute this project for them. This means the designers are employed by Consumentenbond. It will be interesting for Consumentenbond as the project's topic and goal of this project is in line with their vision, norms and values. Moreover, it might be valuable to put their name on such a physical installation, that will travel through the country (which will be described in the next paragraph). In return, Consumentenbond offers the design team a huge network and lots of working experience in this field. In case Consumentenbond decides to refuse our proposal, other organizations can be approached, such as the "Data Privacy Stichting" (in English: "Data Privacy Foundation"). If nobody decides to employ the design team, it can carry out the project on their own. The rest of the business plan is written assuming Consumentenbond decides to employ the team.
On behalf of Consumentenbond, municipalities will be approached to collaborate. They will pay for the construction of the installation together, after which it will be placed in each city center for two weeks. The municipalities chosen to contact have a link with digital technologies in their city, which makes it relevant to let their citizens critically think about this topic.

The **customer segments** exist of municipalities (who should see value in the idea and pay for it) and citizens (who are the end users of the product and should appreciate the experience). Amongst all citizens, the product is mainly focused on individuals between 18-30 years old. However, it is important other citizens can also go through the experience without any obstacles. Especially when operating on behalf of a municipality, it is extremely important nobody feels excluded.

This product includes two **value propositions**: one for the citizens and one for the municipalities. For citizens, this product is a fun, explorative and personal experience that enables them to understand and control their Google settings. It solves the problem of people neglecting these settings, as it feels too complicated and abstract to dive into, while they interact with Google on a daily basis. Additionally, they will appreciate their municipality for this socially relevant yet fun installation, which in return is valuable for the municipality. Especially cities that try to evolve into a 'smart city' (involving advanced digital technologies), should take responsibility to educate their citizens about the digital world and spark discussions. This allows citizens to make conscious decisions, required for actual freedom. Besides, placing this installation is a sign of transparency and engagement; important values for a municipality to express to their citizens.

For good **customer relationships**, citizens should be informed about the installation being placed. This can be done by announcements in local newspapers and via social media. In addition a website should be created, where people can find more information about it, including contact information of the people responsible for this installation. This creates a transparent and open ambiance. For a good relationship with the municipality, it is important their name is clearly present in (announcements about) the installation, to ensure citizens connect this concept with their municipality. Furthermore, the municipalities will be approached on behalf of Consumentenbond. When discussing possible collaborations, it is important they have the opportunity to give feedback to the design, after which changes can be made, to ensure they agree with the outcome.

The **costs** can be divided in material costs and working hours that should be paid. Working hours are meant for (1) developing the design further, based upon the wishes of the municipalities, (2) building the prototype and (3) moving the installation to a city centre. The complete list with all costs can be found in Appendix I, resulting in a price estimation of €4784,70. Except from electricity costs, the municipalities will pay this sum together (which makes them responsible for the revenue streams).

5. Discussion

This project was focused on the design challenge:

> *Create a design that allows people to understand the data flows of Google and act upon it by considering their settings.*

This section discusses the main findings in respect to this challenge, addresses limitations of this project and finally propose future studies that can be done.

5.1 Findings

The process of making and reflecting enabled the design team to identify several aspects, important for this design challenge. These are divided in the topics: data collection, design elements and the "Let it flow?" design itself.

Data Collection

People think personal data being collected is an important issue. However, as it feels too big and abstract, while they do not want to stop using the digital services, they choose to simply ignore the issue. Most solutions that play into this matter only aim for creating awareness. Other solutions are often too detailed or complex, resulting in a high threshold to get engaged.

Design Elements

When creating a design focused on explaining an abstract and complex story, such as the collection of personal data, showing a physical representation appeared to help. User tests indicated that physicality makes the situation more concrete and lowers the threshold to get engaged: the object can be explored simply by using the senses, rather than ratio only.

Moreover, including interactive and moving elements, such as moving LEDs and switches, help to trigger people's curiosity. It leads to being interested and motivated to explore the possibilities and story of this installation. This also holds for personalized elements: this increases the personal urgency people experience, and with that increases their interest. When interacting with the installation, people like to have clear and direct feedback, to identify and understand the effect of their action. In addition, when designing an installation that communicates a high amount of information, a balance should be found between literally explaining aspects and allowing them to figure out aspects themselves.

Furthermore, being able to have a discussion appeared to be an essential element to actually get people thinking and reflecting. This thought can be taken into account when considering the context in which the installation is placed.

Lastly, the AIA-strategy seems proper to use as a guideline when setting up such an installation. A drawback is that people need to go through the attention- and information-phase first, in order to come to the action-phase and complete the full experience. All these phases lead to the risk of creating an installation that is too complicated. If the first and second phase require time and effort, the risk of people losing their interest is involved. On the other hand, for this type of topics it can be really hard to move people towards

this action-phase. The AIA-strategy appeared to be successfully applied in the "Let it flow?"-installation. Thus, the AIA-strategy can be helpful to create an experience that steers and supports people towards the action-phase.

Design: "Let it Flow?"

Overall, the design "Let it Flow" reaches the design goal. People indicated they feel like their understanding of the settings improved, although not being perfect yet. Additionally, people feel motivated to scan the QR-codes on the business card later on. The AIA-strategy is applied successfully, as people clearly go through the different phases: first they are curious, which even increases after the audio experience, after which they try to understand the interactive board and finally indicate they will scan the QR-code and adjust their settings if desired. The information-prototype included lots of stimuli, yet this was not perceived as something bad. It offered lots of elements to explore and with that allowed everyone to interact on their own pace and with their own ambitions. Everyone felt satisfied at the end.

5.2 Limitations

Several limitations can be found, within this project. Firstly, (parts of) the "Let it Flow?" installation have never been tested in the actual context: a city centre. Instead, all tests were done on campus with people who are highly educated and familiar with Industrial Design, which is not a valid representation of the target group. If the installation had been tested in a public space, people with other backgrounds would have been reached. Besides, in a public space, people might act differently. Both aspects could have resulted in other findings.

Secondly, the long-term effectivity of this installation has not reached its aimed potential. Out of the 5 participants, X has actually checked out their Google settings in the three weeks after the user test.

In addition, the installation as described in the "Final Design" chapter has never been tested. There is a chance that findings of earlier user tests were wrongly interpreted, leading to wrong design decisions that were not discovered.

Thirdly, the designers have put lots of energy in exploring what prototype to make by understanding the data streams, sketching ideas, using materials to envision ideas, or discussing. Instead, more low-fi prototypes could have been made that were actually testable, such that that decisions could be based on these test results rather than assumptions. This might also have led to more reliable and accurate findings. Besides, maybe time would have been left to verify the business plan with experts and companies.

5.3 Future work

If another study could be done, it would firstly be valuable to further develop the "Let it Flow?" installation. It can be tested in a public space and the business plan can be validated by experts. Moreover, other directions could be explored. For example, what would be the effect of creating a fully personalized experience, as personalization appeared to be such an effective way in grabbing people's interest? For example, the interactive board can show the search result for that person specifically. When adjusting the settings on the control panel, the settings

in their actual Google account are adjusted too. Would that lower the threshold to adjust settings? Another direction would be to place the installation in another context, such as high schools to educate teens about the consequences of their personal data being collected and used by tech companies. Lastly, it would be interesting to further explore the AIA-method in a future study, to see if this is a valuable method.

6. Conclusion

6.1 Recap

The main objective of this project was to:

> *Create a design that allows people to understand the data flows of Google and act upon it by considering their settings.*

In order to obtain this goal, the following research questions were formulated:

1. What is the current situation? More specifically: what data does Google currently gather from users, what control do users have and what do Google users think about this?
2. What design trends can be identified that aim for creating awareness, understanding or action towards data collection by digital agencies? Subsequently: what design or research opportunities can be found?
3. What design can be developed, based upon those opportunities?

6.2 Answers to Research Questions

Google collects a variety of types of data among which personal data. People generally know this happens and think it is an issue, but do not know the details. As it feels too complicated and abstract, they deal with it by ignoring it. In their Google account however, they can access five main Google settings that influence their data being collected: location history, web & app data history, YouTube history, personalized advertisements and personalized search.

A benchmark showed a design gap for physical designs, as most solutions that try to explain the situation are constructed by (long) texts or complex visualisations. Besides, most designs do focus on creating awareness, and do not include any support of what action(s) can be taken.

The design process has led to the design "Let it Flow?", as described in "chapter 4. Final Design". From the design process was concluded that several factors are important to consider:

- Physicality, to make the abstract and complex story more concrete and allow people to learn by using senses instead of ratio only.
- Interactive and moving elements, to trigger people's curiosity, which motivates them to explore.
- Personalized elements, to increase the personal urgency people experience, and with that their interest.
- A balance between guidance and exploration should be found, to maintain the curiosity and motivation of the visitor to explore.
- The AIA-strategy, as this can help to guide the visitor in the process from awareness towards actually taking action.
- A discussion, to actually get people thinking and reflecting.

6.3 Final Design: Let it Flow?

The final design incorporated all factors, described above. From the user tests was concluded people enjoy the experience and feel like understanding the data flows of Google in respect to the Google Search service in a higher extent. They felt curious and intrigued to explore the installation. The goal of motivating them seemed to be accomplished. However, part 3 of the installation was not activating enough to actually take action. Changes were made in the final design to increase the importance of the action-prototype, but it is not tested and thus unsure whether the eventual installation successfully moved people towards the action-phase. Nevertheless, participants in the user test clearly reflected upon their norms and values for this matter, so the installation can still be seen as a successful contribution towards the design challenge.

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Appendix

Appendix A: Set-up interviews iteratie 0

Introduction:

In relation to our project you will be asked some questions about your experience and relationship with the digital world. This will take about 15 minutes.

Questions:

What is your age?
What do you understand by the 'digital world'?
What is your/your experience with this? What do you think about it?
Do you spend a lot of time on your phone? • How much approximately? • How did you experience this? • Have you ever kept track of it?
Do you feel safe with your phone or with your phone around?
Do you feel safe without a phone?
Could you live without a phone? (For how long?)
How do you see the future, regarding digital technology? How does that make you feel?
Do you know what happens with your data via your phone? Can you explain (as much as possible)?

Appendix B: Explanation Information Prototype Iteration 1

This board (see figure 66) is a physical visualization of the data collected by Google. Labels of all its services are attached to the iron ring in the left upper corner. The "Google Search" service is fully shown and was made of paper, but represented a screen. The elements around the page explain how this page is constructed and what data is being gathered. The thick cream coloured wires show how data streams are connected. In this way, someone can follow all the physical wires and read the explanations, to understand how (personal) data is used to create this page. If the wires change because settings are adjusted, the webpage should change too, to show the effects of turning settings on or off.

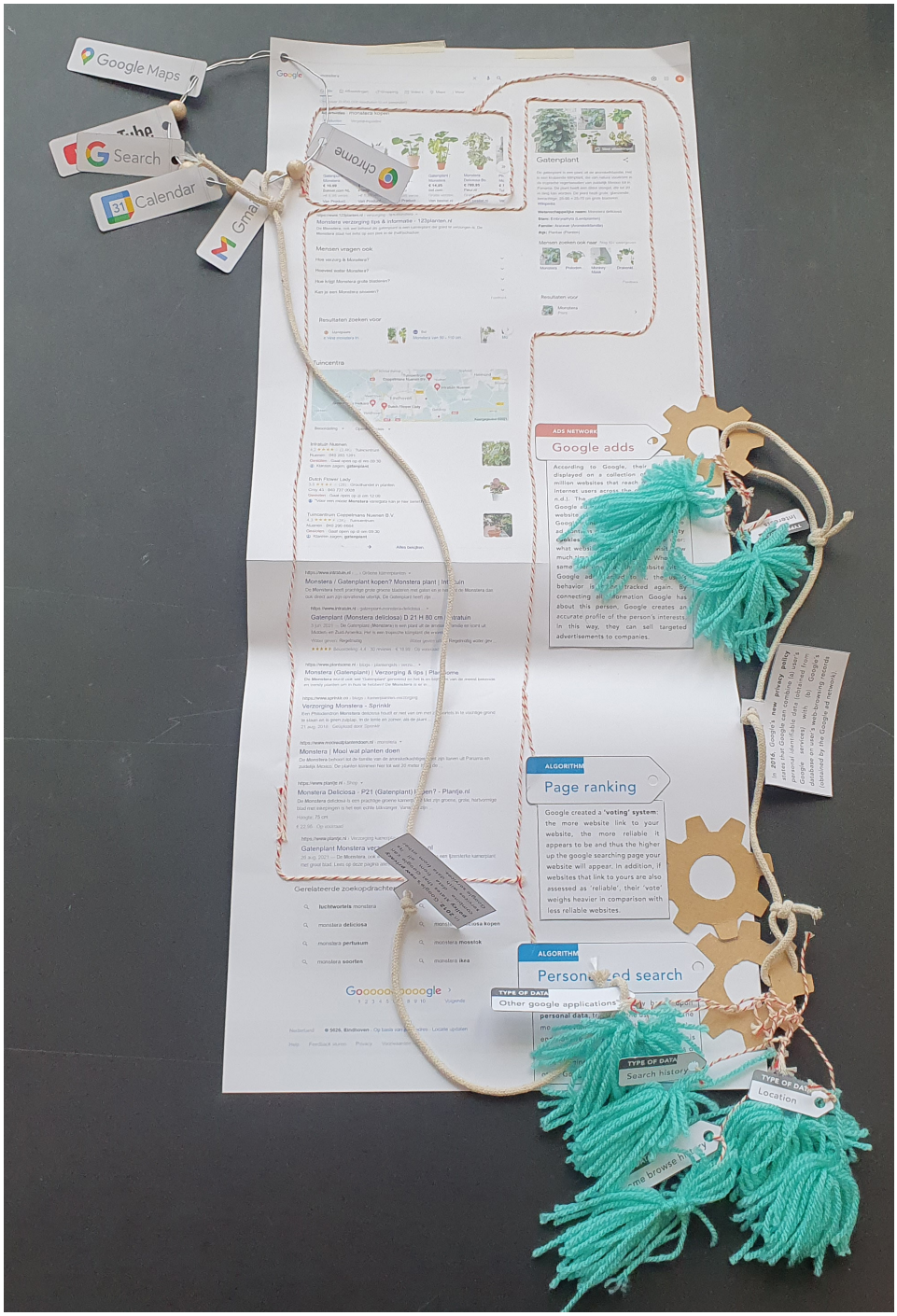

Figure 66. The created prototype.

Appendix C: Design Sprint Meeting Setup

Time:	What:
10.15 – 10.25	Welcome
10.25 – 10.35	Read through all individual prepared HMW-questions
10.35 – 10.37	Vote
10.37 – 10.50	Make a choice for HMW
10.50 – 11.00	break
11.00 – 11.10	Together create a minimum of 5 prototpyes within 10 minutes
11.10 – 11.20 Extra 5 minutes	Per person, Iterate 2 minutes on every prototype made in previous round.
11.25 – 11.40	Per person, pitch each prototype idea in 1 minute. No responses yet.
11.40 – 12.00	Make 10 new prototypes together
12.00 – 12.15	Break, with activity: yoga? No talking about prototypes
12.15 – 12.16	Individually choose 3 prototypes for next round.
12.16 - 12.19	Work out each of the 3 prototypes for 1 minute
12.19 – 12.29	Individually pitch each prototype for 1 minute. 1*3*3 = 9 minutes total
12.29 – 12.31	Voting
12.31 – 12.50	Discussion on eventual choices

Appendix D: Set-up User Test Iteration 2

Introduction:

Hi and welcome to our user test. The test consists of three parts. First, we ask you to log into your Google account for an audio experience if you decide to do so, otherwise you will hear a general audio. After this, you are free to interact with the prototype during which you may explain your thoughts. We will ask you some questions about both parts afterwards.

Let the participant experience the experience: audio experience (personal or not, based on whether the participant wants to log into google for this) + board with the lo-fi control panel, up until the point they feel satisfied and think they understand it.

QUESTIONS:

Audio

- What did you think of the audio experience?
- What impact did it have on you?
- What purpose do you think it had?
- What did you think of the content of the audio? (with the purpose in mind)
- What did you think of the voice of the audio? (with the purpose in mind)
- What did you think of the length of the audio? (with the purpose in mind)

Visualisation

- What do you think the wires mean?
- How did you think the Google Apps relate to the product/screen?
- What do you think of the visualization of the data flows?

Scherm

- What did you think of the screen?
- What did you think happened on the screen?
- What do you think the different parts mean?
- What did you see happen on the screen?

Control panel

- What do you think the different controls mean?
- What did you think of the interaction with the prototype?
- How do you think the different controls are related to each other?
    - What are your opinions about how this is visualized?

Overall

- What do you think about how the different parts relate to each other?

Appendix E: Set-up User Test Iteration 3

Introduction: Welcome to the "let it flow?" user test. In this test we will explore the effects of the various parts of the experience of this installation. It is good to remember that we are testing the installation and its effects, and that we are not testing you.

Let the participant experience the experience:

- Experience the audio
  - o personal or not, based on whether the participant wants to log into google for this.
- The board, up until the point they feel satisfied and think they understand i
- Give the business card

Now we will ask you questions about the specific parts of the experience, after which general questions will be asked. In chronological order: attention (audio), information (the installation), and action (business cards). But first:

- What are your thoughts about this installation?

Attention

- What feelings did emerge when u where listening to the audio?
- Did you feel motivated to explore the board?

Interaction/understanding?

- In your own words, what did you see and learn from the installation?
- Do you think you understand where and how google collects your data? (What are the icons? What are the wires?)
- Do you think you have a better understanding of the 5 google settings? Can you explain?
- Do you think you understand what influence your own data has in your google search results?

Action

- What are your thoughts and feelings about the business cards?

Final:

- Do you feel motivated to do further research about what Google knows from you, after going through this experience? Because of what element (in the experience)?
- Did the experience trigger your interest to look to your own settings? Because of what element?
- If you would come across this installation in a public space, would it draw your attention? Do you think you were going to interact with it?

Appendix F: List of findings user tests iteration 3

After a thematic analysis on the transcriptions from the user test (see figure X), important quotes were divided under the correct theme. Findings were concluded based on these quotes that were divided under the different themes.

- **Audio**
  - Is sometimes correct and sometimes not, but both outcomes affect people. It grabs their attention either way. Sometimes errors could be traced back.
  - Some find it a nice introduction to the topic + setting. Others think it is a bit separate from the board. (See more in 'flow')
  - Hearing the personalized message sometimes leads to feeling awkward / uncomfortable / 'big brother is watching you'.
  - People think it is funny (could be a coping mechanism)

- **Understanding board**
  - Overload of information (not everyone understands / sees the same, because of it)
    - So, there is confusion about what is going on. Needs time to understand (patterns etc). + Different individuals focus on different parts of the board.
  - The board is not fully understood. However, the subjects themselves feel satisfied and feel like they do understand what is happening. So, it does not disturb their experience of the board (until we talk about the actual thoughts behind it).
  - We should find a balance between a low threshold to interact and try to understand the installation, while it should be high enough that people do not fully understand what is happening so that they puzzle and explore what's going on. How to keep it simple yet challenging?
  - People often do not notice the changes on the screen, though they do notice the location change. So, the animation will probably solve this problem.

- **Understanding control panel**
  - The categorization / settings are clear to participants, but was not clear that these were the 5 main google settings
    - Participants felt themselves like they understood the panel
  - SD cards and gears were not always clear.
    - after being questioned participants started thinking about it.
    - people wanted to interact with sd cards
  - It was clear the data was flowing in, by the lines on top of the control panel+ cables

- **Flow whole installation (combi audio + board + cards)**
  - Audio is not fully connected with board yet. But it does not need to be something wrong. Though some more guidance might be nice.
  - The attention information and action parts make it a whole experience, it completes the experience.
  - The board not being personalized creates confusion in combination with the audio beforehand.

- **Business cards**
  - Nice, as it provides possibility for 'action'.
  - Nice as you can take it with you
  - Bring up discussions (later)

- **Personalized and general screen/board**
  - People felt confused about the board not being personalized. It would add lots of value if the board would be personalized. Or it should be clear it is not personalized.

- **Awareness of data/settings before experience**
  - In general, participants were aware of their data sharing
    - and some of them make conscious decisions already
  - People were not consistent in saying they were careful with their information and actually turning off / on certain settings. Sometimes they were inconsistent consciously, and sometimes unconsciously.

- **Effects after experience**
  - Everyone said they were going to take a look to their settings. Not everyone was going to look into what Google knew about them.
    - Check whether this actually happened!
  - It lowers the threshold to take a look to their settings, but still the precise settings + data that is being gathered feels huge, which still leads to a high threshold.

- **Title**
  - People do not have really strong opinions about the title. Often, they do not fully undestand at first, though it tickles their curiosity. When thinking about it for a longer time, they do understand the relationship.
  - It is somehow clear for them that flow is about data, but they doubt whether it would be clear for everyone.
  - triggers curiosity in what it (the installation) is (about)

- **Awareness & consciousness related to experience**
  - People clearly realize it is about being more conscious about the data you provide to Google
  - Sometimes, people indicate they specifically don't want to know about the precise situation. It is too much; they just want to close their eyes for that.
  - it creates understanding of what changes within google when settings are changed (because of the screen)
  - having a discussion with others (after the experience or when showing the business card to someone) is an essential part of the installation

- People do not directly reflect upon the installation being physical. However, in their feedback you can read about it indirectly (such as someone who talks about the buttons / plugs + us making this physical made it possible to talk about it as concrete as we did). But still, it is remarkable no one named it.

- **Attracted or repel by installation**
  - There are so many elements, it really draws attention. Especially the LEDs that are moving. People like these lights.
  - It is clear the installation affords interaction, which draws attention and curiosity.
  - The installation looks interesting. However, as it is something you don't completely understand yet, you're not sure what will happen, so for some people the threshold will be higher / lower to walk towards it, depending on your personality (being more / less confident about acting in public).
  - The prototype looks high-fidelity enough to interact with the elements visible on the control panel. It is clear that only these elements should be touched, in contrast with the elements on the board.

- **Pondering about Google**
  - People can interact and explore as much as they want, while still feeling satisfied. Some people like to explore and think about it for a longer time on a deeper level, while others want to think about it less. Still, everyone felt satisfied. It is a good thing that everyone can interact with it on their level.
    - in the same way about how they care about their data sharing and google in general.

Appendix G: Business Model Canvas

Business Model Canvas

Key partners

Consumentenbond - as the party who employs the design team to execute the project. Consumentenbond offers the design team a huge network and lots of working experience in this field.

Municipalities - as clients for this project. Municipalities are appropriate to contact, if they have a link with digital technologies in their city, which makes it relevant to let their citizens critically think about this topic. Consumentenbond will place this installation in the city centre in each participating municipality for 14 days, after which it moves on to the next location. Collaborating with the municipality is useful, as citizens will probably experience a product offered by the municipality as more reliable and independent. Furthermore, it is an easy way in to gaining the correct licenses and equipment, such as a license to place an installation in a city center, arrange electricity or arrange a moving van.

Key activities

For the value proposition, key activities are:

Being able to reach citizens through local newspapers and social media, to inform them about the presence of the installation. Furthermore, a website should be created citizens can visit to find out more about the installation. Both aspects help to express an open and transparent mindset, so that everything is clear for citizens.

Discussions with municipalities in which they can give feedback to design, which will ensure the outcome will satisfy their expectations.

The installation should look clean and be sturdy, to lower the threshold to approach and interact.

Key resources

Key resources for this installation are: having a good network to reach municipalities; municipalities as clients; money to pay for all the costs, so that the installation can be created; a local newspaper, social media accounts and a website to announce news about the installation.

Value Propositions

For the citizens:

The products offers a fun, explorative and personal experience to passengers, which will

make them understand the Google settings and gain control over them.

It solves the problem of people lacking control over their personal data in their Google account. This topic feels too complicated and abstract to dive into, thus people decide to simply ignore it, while they interact with Google on a daily basis. The 'Let it flow?'-experience has a low-threshold to interact with. The physicality makes the abstract concept of 'data' concrete. Furthermore, seeing the effect of turning settings on/off makes them very understandable. Moreover, the lights, personalization and interactive elements make the experience feel as something fun and interesting, rather than being lectured.

For the municipalities:

This product offers a relatively cheap, but fun and accessible way to educate citizens about personal data Google collects and how to gain control over it. Especially cities that try to evolve into a 'smart city', involving advanced digital technologies, should take responsibility to educate their citizens about the digital world and spark discussions, to allow citizens to make conscious decisions, required for actual freedom. Citizens will appreciate their municipality for helping them to consider and deal with these difficulties.

For the consumentenbond:

It will be interesting for Consumentenbond to employ this design team to execute the project on their behalf, as the project's topic and goal is in line with their vision, norms and values. Moreover, it might be valuable to put their name on such a physical installation, that will travel through the country (which will be described in the next paragraph).

Customer Relationships

Customer relationships are:

Regarding the citizens, they should hear about the installation through the local newspaper or social media. Moreover, they should be able to read about it on a website created for this installation. This helps to makes everything around the placement of this installation feels clear for them. Clarity helps in having a good relationship. Besides, the tone of all communicated information should be warm and inviting, as they should feel comfortable to explore the installation and contact the people responsible for it, if they want to.

It is important to have an open and direct relationship with the municipalities, as they are the clients. Here, it is important their feedback is taken seriously. Furthermore, their name should be clearly visible in the installation, to show their citizens their relationship with this installation

Channels

Information for citizens will be announced in the local newspaper, through social media or on the website of the installation. They can reach the people responsible for the installation through these channels. Furthermore, the end-users will be citizens that pass the installation in the city centre.

Communication with municipalities is done over mail, Teams and phone.

Customer segments

Assuming this project is executed by the designers employed by Consumentenbond, the customer segments are:

Municipalities - as clients for this project. Municipalities are appropriate to contact, if they have a link with digital technologies in their city, which makes it relevant to let their citizens critically think about this topic. They should perceive the idea as valuable to pay for it. It is really important they think their citizens will appreciate the installation, and with that appreciate their municipality.

Citizens - as the end-users of the product. They should appreciate the experience. Amongst all citizens, the product is mainly focused on individuals between 18-30 years old, since Digital technology is fully integrated in their daily life and their norms and values will determine the norms and values of the nearby future. However, it is important other citizens can also go through the experience without any obstacles. Especially when operating on behalf of a municipality, it is extremely important nobody feels excluded.

Cost structure

The costs can be divided in material costs and working hours that should be paid. Working hours are meant for (1) developing the design further, based upon the wishes of the municipalities, (2) building the prototype and (3) moving the installation to a city centre. The complete list with all costs can be found in Appendix I, resulting in a price estimation of €4784,70.

It is unsure how much Consumentenbond needs to earn from this project, so there might be costs added. All though Consumentenbond is a non-profit organization, they need to make some money to invest in themselves and keep themselves alive.

Revenue Streams

Except from electricity costs, the municipalities will pay the costs together.

Appendix H: Text "Technical Details" for the Final Design

A close-up of the text can be read below.

TECHNICAL DETAILS FOR THOSE INTERESTED

If you log in to your Google account, the audio experience will be personalized in the following manner:

1. The audio is generated by a python script. When you logged in successfully, a part of the webpage's source code will be copy-pasted into this python script.
2. Now, it has access to the 'personal profile' Google creates for every user. Based upon this profile, the audio experience is personalized.
3. The audio will be played once (audible on the headphones only).
4. Once it is finished, you will be logged out again and all information will be deleted; no personal information will be saved. This also includes all cache files created by the python code.

In case you decide to not log in but still feel curious to the 'personal profile' Google created for you, this can be viewed on adsettings.google.com. If you want to review the python code that was created for this project, please visit XXX.

Feel free to contact us if you have any further questions or comments.

Appendix I: List with All Costs for Business Plan

Wood (MDF) (poles, boards, box around TV, platforms for tablet and control panel)	€100,-	Estimation based on the costs for the prototype
Aluminium	€5,-	https://www.hornbach.nl/shop/KAISERTHAL-Vlakke-plaat-1000x200x0-8-mm-aluminium/7297043/artikel.html
Plexiglass	€2,50	https://www.hornbach.nl/shop/GUTTAGLIss-Hobbyglas-glad-helder-250x500-ca-2mm/1477798/artikel.html?wt_mc=nl.paid.sea.google.alwayson_assortment.bau.product.1058757834.55658842769.&gclid=Cj0KCQiAq7COBhC2ARIsANsPATExAo5C_TRwbd_K-XeNdoMQQLJPXNLVObrlaVcn7rblzfjRnxrlsgUaAhy4EALw_wcB
Sticker material	€7,-	https://www.plotterie.nl/product/mat-vinyl-starterset-pakket-s/
Paint	€36,-	https://www.verfwinkel.nl/histor-perfect-finish-houtlak-mat.html?gclid=Cj0KCQiAq7COBhC2ARIsANsPATGy0flgcbeGGVtlnB_mhT84ViSmWMSnntp2xPWIEGRu86Ch9WsgSCwaAjY4EALw_wcB
Varnish (water resistant)	€20,-	https://www.verfwinkel.nl/wijzonol-lbh-silicon-alkyd-systeemverf-3.html
Laser cutter	€50,-	https://www.laserbaas.nl/kosten
Big screen	€100,-	(Vintage)
Tablet	€80,-	(Vintage)
Headphones with noise-cancelling	€100,-	(Vintage)
Electronics	€80,-	Estimation based on the costs for the prototype
Fuel for the van	€300,-	
Electricity	€4,20 per municipality (to have the installation up and running 10 hours per day, for 14 days)	Calculating with rounded off and large numbers: 2 adapters: 2 x 20 watt Screen: 50 watt 20+20+50 = 90 so max 100 watt per uur Price kwh incl. = ~30 cent So 0.1 * 0.3 = 0.03 cent per hour Times 10 hours per day = around 30 cent per day
Total:	**€884,70**	

Costs of employing people:

	Hours:	People:	Salary	Costs
Hours to discuss, test and develop prototype further	40	2	€20,- / hour	€1600,-
To build prototype	50	2	€20,-/hour	€2000,-
To move and place design at each location (for 5 cities)	20	2	€15/hour	€300,-
Total costs:				**€3900,-**

Therefore, the total amount of costs will be €4784,70. It is unsure how much Consumentenbond needs to earn from this project, so there might be costs added. All though Consumentenbond is a non-profit organization, they need to make money to invest in themselves and keep themselves alive.

Appendix J: Midterm Feedback

Tops

- Experience is very sick
- <3 PersonA + Person B
- Visually pleasing
- Clear
- Real cool sound experience
- Not only valuable for individuals, also for companies
- Audio headphones is good, focused, secluded
- Red magnet = clearest
- Love the intensity of the voice
- Voice is fun

Tips:

- Could be applicable in high schools
- You could try different types of voices and see what works best
- People want to go back to see what changed (from the 'action' to 'informing')
- Action: write down how many have experienced it "I was here"
- Define context (museum?) + target group
- It is a moment of experience, not behavior change
- Moment of reflection
- Access personal example to show
- Personal scan for google account access; personalized
- "Oh, I really don't want to see that"
- Turn it into a nice voice, try voice NS (don't focus on making the voice sound creepy, but make the content sound creepy)
- Creepy + comic
- Color the wires too, makes it more clear
- Intervention would be great
- How could we use our old data (of 10 years ago) in the world today? (To show people the long term effects?)
- Maybe we can incorporate this in the sound experience?
- You could also search for the insurance company 'Promovendus', Indra said they were aiming for using data to see whether someone is allowed to have a certain insurance or something (I did not completely get her story, but we can check it out)
- We could also search for the sensors that are being placed in new cars, so that insurance companies (?) can check when you had a car crash how fast you went, when you crashed, etc. What is the border of privacy? How can this type of data be used against you?
- Why would someone hire us? Who is our customer?
- Give information on why we are doing this

- Give people the possibility to make the complete consideration. What are the positive or negative sides?
- Scale idea?
- Interaction bigger -> who is the target group?
- Where is my data going? Where do I have to be scared of? Risks/Consequences
- It is hard to see what is happening, because you are fumbling with small elements, so you are not looking at the screen
- The blue ring is unclear
- Toolkit: for multiple uses

We had 6 votes.

Own points of feedback

- Location can be confusing; where is this all connected to? Be clear in the focus on Google Search.
- Maybe also implement long-term vision? (Turkey 10 years ago vs now).

Appendix K: Audio Scripts

Iteration 1: Midterm Demoday

> Hey, I am Google. Close your eyes. I would ask you to introduce yourself, but I know who you are. I would ask you how you are, but I already know. Do you remember where you were May 23rd in 2009? Because I do. In fact I know exactly where you've been since you met me, every minute of the day. And night. I know where you ate your dinner, where you slept or didn't sleep and when you were bored. I know where you live and how you pay for that. I have met all your relationships, or lack of. I knew that you were in love, even earlier than you did. I know which schools you went to, and where you got your diplomas. Now don't be scared, but I read your emails, too. Don't get me wrong. I mean this in the best way possible. I am here for you. I want to please you. I want to provide you with the best of me. That's why I need to know… everything. But you knew that, …right?

Iteration 2: User test I

> Hello. I am Google. I would ask you to introduce yourself, but based on your internet activity I already know who you are. You are a [gender] from [age]. You speak [language]. You are [relationship status]. You work at a [employment size] company. You are in the industry of [industry]. As for your living situation, you are part of the group [living situation] and your educational status is [educational status]. You are, among other things, interested in [random1], [random2] and [random3].

Iteration 3: Demoday

> <u>Personalized</u>
> Hello. I am Google. I would ask you to introduce yourself, but I already know who you are already. You are a [gender] from [age]. You speak [language]. You are [relationship status]. You work at a [employment size] company. You are in the industry of [industry]. As for your living situation, you are part of the group [living situation] and your educational status is [educational status]. You are, among other things, interested in [random1], [random2] and [random3]. I know these things, based on your internet activity. I use this power to please you and give you the best experience you can have. However, there are 5 settings you can change to influence what I show you. I dare you to play around with the cables and see what happens on the screen! Then, you can make your own decisions. So, are you letting it flow?
>
> <u>General</u>
> Hello. I am Google. I would ask you to introduce yourself, but I already know who you are. I know exactly where you've been, what videos you watch, what products you are interested in, which apps you use, what you search for on the internet. I know these things, based on your internet activity. I use this power to please you and give you the best experience you can have. However, there are 5 settings you can change to influence what I show you. I dare

you to play around with the cables and see what happens on the screen! Then, you can make your own decisions. So, are you letting it flow? Google settings by playing around with the cables and switches and see what happens on the screen! Then, you can make your own decisions. So, are you letting it flow?

Final Design

Personalized

Hello. I am Google. I would ask you to introduce yourself, but I already know who you are. You are a [gender] from [age]. You speak [language]. You are [relationship status]. You work at a [employment size] company. You are in the industry of [industry]. As for your living situation, you are part of the group [living situation] and your educational status is [educational status]. You are, among other things, interested in [random1], [random2] and [random3]. I know these things, based on your internet activity. I use this power to please you and give you the best experience you can have. However, there are 5 settings you can change to influence what I show you on your Google Search. On your right, you see my large interaction board. Go stand in front of this board if you haven't already. You can see there are different types of data flowing from multiple Google services to the control panel in front of the board. On the control panel you can turn off and on the 5 Google settings. These settings include your Location history, Web and App Activity and YouTube history, as well as Personalized advertisements and Personalized search. Changing these settings will show you how this influences your Google Search on the screen. Be aware that I show you an example of a general search item and the screen does not show your personalized search results. But I dare you to investigate the Google settings by playing around with the cables and switches and see what happens on the screen! Then, you can make your own decisions. So, are you letting it flow?

General

Hello. I am Google. I would ask you to introduce yourself, but I already know who you are. I know exactly where you've been, what videos you watch, what products you are interested in, which apps you use, what you search for on the internet. I know these things, based on your internet activity. I use this power to please you and give you the best experience you can have. However, there are 5 settings you can change to influence what I show you on your Google Search. On your right, you see my large interaction board. Go stand in front of this board if you haven't already. You can see there are different types of data flowing from multiple Google services to the control panel in front of the board. On the control panel you can turn off and on the 5 Google settings. These settings include your Location history, Web and App Activity and YouTube history, as well as Personalized advertisements and Personalized search. Changing these settings will show you how this influences your Google Search on the screen. Be aware that I show you an example of a general search item and the screen does not show your personalized search results. But I dare you to investigate the Google settings by playing around with the cables and switches and see what happens on the screen! Then, you can make your own decisions. So, are you letting it flow?

Appendix L: Audio Code

```
Code audio
#scraping Google after login
#Source: from https://betterprogramming.pub/web-scraping-behind-authentication-with-python-be-
5f82eb85f0
import requests

headers = {
[CURL COMMAND FROM SOURCE CODE COVERTED TO PYTHON]
}

params = (
    ('hl', 'en'),
)

response = requests.get('https://adssettings.google.com/authenticated', headers=headers,
params=params)

url = "https://adssettings.google.com/authenticated?hl=nl&ref=my-account"
s = requests.Session()


# SCRAPING IN LINES (https://stackoverflow.com/questions/36709165/beautifulsoup-object-of-type-
response-has-no-len)
#https://stackoverflow.com/questions/328356/extracting-text-from-html-file-using-python

from urllib.request import urlopen
from bs4 import BeautifulSoup

#url = "https://adssettings.google.com/authenticated?hl=nl&ref=my-account"
html = response.text
soup = BeautifulSoup(html, features="html.parser")
#soup = BeautifulSoup(result)

# kill all script and style elements
for script in soup(["script", "style"]):
    script.extract()    # rip it out

# get text
text = soup.get_text()

# break into lines and remove leading and trailing space on each
lines = (line.strip() for line in text.splitlines())
# break multi-headlines into a line each
chunks = (phrase.strip() for line in lines for phrase in line.split("  "))
# drop blank lines
text = '\n'.join(chunk for chunk in chunks if chunk)

print(text)
#getting website text in list
#sources:
#Splitting from uppercase: https://www.geeksforgeeks.org/python-ways-to-split-strings-on-up-
percase-characters/
#Delete until: https://stackoverflow.com/questions/54367928/python-remove-all-ele-
ments-in-list-before-specific-element
# Delete after: https://www.kite.com/python/answers/how-to-remove-everything-after-a-charac-
ter-in-a-string-in-python
#print(text)
AdwordsList = text[text.index('Learn how to control the ads you see')+39:]
AdwordsList2 = AdwordsList.split("What you've turned off (0)", 1)
AdwordsList3 = AdwordsList2[0]

#print(AdwordsList3)

# Splitting on UpperCase
res_pos = [i for i, e in enumerate(AdwordsList3+'A') if e.isupper()]
```

```
res_list = [AdwordsList3[res_pos[j]:res_pos[j + 1]]
            for j in range(len(res_pos)-1)]

#print(res_pos)
#print(AdwordsList3[0:10])


res_list.insert(0, str(AdwordsList3[0:res_pos[0]])) #add to list what went lost in splitting
through capital letters

# Printing result
print("Advertentie identitetswoorden:", str(res_list))

#Putting the words into the script
# source text to speech: https://pypi.org/project/pyttsx3/
# language: https://cppsecrets.com/us-
ers/505510911110410511611497106105105105116107971081219711010564103109971051084699111109/Im-
plementing-a-text-to-speech-program-in-python-using-gTTS-.php
pip install gTTS

pip install playsound

from gtts import gTTS
import random

error = "not found"

def search(list, searchword):
    for i in range(len(list)):
        if list[i] == searchword:
            #print(res_list[i])
            return i
    return False

#Script with Branche
#text = "Hallo. Ik ben Google. Ik zou je vragen om jezelf te introduceren, maar op basis van
jouw internet activiteit weet ik al wie je bent."
text = "Hello. I am Google. I would ask you to introduce yourself, but I know who you are al-
ready."

# VALUES
# Gender
if search(res_list, 'Male'):
    #print('Man is wel gevonden')
    gender = res_list[search(res_list, 'Male')]
else:
    if search(res_list, 'Female'):
        #print('Man is niet gevonden, Vrouw wel')
        gender = res_list[search(res_list, 'Female')]
    else:
        #print('Man en vrouw zijn niet gevonden')
        gender = 'Person'

print('gender = ' + gender)
text = text + " You are a " + gender


# searches
yearSearch = 'years'
languageSearch = 'Language: '
maritalStatSearch = 'Marital ' #oplossing verzinnen!
empSizeSearch = 'Size: '
industrySeach = 'Industry: '
livSitSearch = 'Homeownership ' #oplossing verzinnen!
edStat = 'Education ' #oplossing verzinnen!

# age
age = res_list[search(res_list, yearSearch)]
text = text + " from " + age
```

```
print('age = ' + age)

# language
if search(res_list, languageSearch):
    lang = res_list[search(res_list, languageSearch) + 1]
    text = text + ". You speak " + lang + " language. "
else:
    lang = error
print('lang = ' + lang)

if search(res_list, 'Relationship'):
    #print('Relationship found')
    marStat = res_list[search(res_list, maritalStatSearch) + 2] + res_list[search(res_list,
maritalStatSearch) + 3]
    text = text + "You are " + marStat
else:
    marStat = 'Single'
print('marStat = ' + marStat)

# employer size
if search(res_list, empSizeSearch):
    empSize = res_list[search(res_list, empSizeSearch) + 1]
    text = text + ". You work at a " + empSize + 'company. '
else:
    empSize = error
print('empSize = ' + empSize)

# industry
if search(res_list, industrySeach):
    industry = res_list[search(res_list, industrySeach) + 1]
    text = text + ". You are in the industry of " + industry
else:
    industry = error
print('industry = ' + industry)

# living situation
if search(res_list, livSitSearch):
    livSit = res_list[search(res_list, livSitSearch) + 2]
    text = text + ". As for your living situation, you are part of the group: " + livSit
else:
    livSit = error
print('livSit = ' + livSit)

if search(res_list, edStat):
    if res_list[search(res_list, edStat) + 1] == 'Status: ':
        if res_list[search(res_list, edStat) + 2] == 'Current ':
            edStat = 'current college student'
        else:
            edStat = res_list[search(res_list, edStat) + 2]
        text = text + " and your educational status is " + edStat + "."
    else:
        edStat = error

# add all values to list so that randoms are not the same
valueList = [gender, age, lang, marStat, empSize, industry, livSit, edStat, languageSearch,
maritalStatSearch, empSizeSearch, industrySeach, livSitSearch, edStat]
print(valueList)

#print(res_list)

#creating random values and check if they are already used
random1 = res_list[random.randint(4, len(res_list) - 1)]

while search(valueList, random1):
    random1 = res_list[random.randint(4, len(res_list) - 1)]
    if search(valueList, random1) == False:
        valueList.append(random1)
        break
```

```
random2 = res_list[random.randint(4, len(res_list) - 1)]

while search(valueList, random2):
    random2 = res_list[random.randint(4, len(res_list) - 1)]
    if search(valueList, random2) == False:
        valueList.append(random2)
        break

random3 = res_list[random.randint(4, len(res_list) - 1)]

while search(valueList, random3):
    random1 = res_list[random.randint(4, len(res_list) - 1)]
    if search(valueList, random3) == False:
        valueList.append(random3)
        break

text = text + " You are, among other things, interested in " + random1 + ", " + random2 + "
and " + random3 + ".  I know these things, based on your internet activity. I use this pow-
er to please you and give you the best experience you can have. However, there are 5 settings
you can change to influence what I show you on your Google Search. On your right, you see my
large interaction board. Go stand in front of this board if you haven't already. You can see
there are different types of data flowing from multiple Google services to the control panel in
front of the board. On the control panel you can turn off and on the 5 Google settings. These
settings include your Location history, Web and App Activity and Youtube history, as well as
Personalized advertisements and Personalized search. Changing these settings will show you how
this influences your Google Search on the screen. Be aware that I show you an example of a gen-
eral search item and the screen does not show your personalized search results. But I dare you
to investigate the Google settings by playing around with the cables and switches and see what
happens on the screen! Then, you can make your own decisions. So, are you letting it flow?"
print(text)

language = 'en'

import pyttsx3
engine = pyttsx3.init()
voices = engine.getProperty('voices')

female = 'HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_MS_EN-US_ZIRA_11.0'

engine.setProperty('voice', female)

#rate
rate = engine.getProperty('rate')
engine.setProperty('rate', 150)

#engine.say(text)
engine.save_to_file(text, 'final-design-personalized-audio.mp3')
engine.runAndWait()

import pyttsx3
engine = pyttsx3.init()
voices = engine.getProperty('voices')

female = 'HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Speech\Voices\Tokens\TTS_MS_EN-US_ZIRA_11.0'

engine.setProperty('voice', female)

#rate
rate = engine.getProperty('rate')
engine.setProperty('rate', 150)
engine.say(text)
engine.runAndWait()

flow = 'Are you letting it flow?'
audio_file = text + flow
engine.save_to_file(audio_file, 'anna_audio.mp3')

# general google script
engine.setProperty('rate', 150)
```

```
text = “Hello. I am Google. I would ask you to introduce yourself, but I already know who you
are. I know exactly where you’ve been, what videos you watch, what products you are interest-
ed in, which apps you use, what you search for on the internet. I know these things, based on
your internet activity. I use this power to please you and give you the best experience you
can have. However, there are 5 settings you can change to influence what I show you on your
Google Search. On your right, you see my large interaction board. Go stand in front of this
board if you haven’t already. You can see there are different types of data flowing from mul-
tiple Google services to the control panel in front of the board. On the control panel you
can turn off and on the 5 Google settings. These settings include your Location history, Web
and App Activity and Youtube history, as well as Personalized advertisements and Personalized
search. Changing these settings will show you how this influences your Google Search on the
screen. Be aware that I show you an example of a general search item and the screen does not
show your personalized search results. But I dare you to investigate the Google settings by
playing around with the cables and switches and see what happens on the screen! Then, you can
make your own decisions. So, are you letting it flow?”
engine.say(text)
engine.setProperty(‘rate’, 130)
#engine.say(‘Are you letting it flow?’)
engine.save_to_file(text, ‘test_vandaag.mp3’)
engine.runAndWait()
```