The Data Hungry Home: A Post-Anthropocentric and Generative Design Framework

Additional Material and Results

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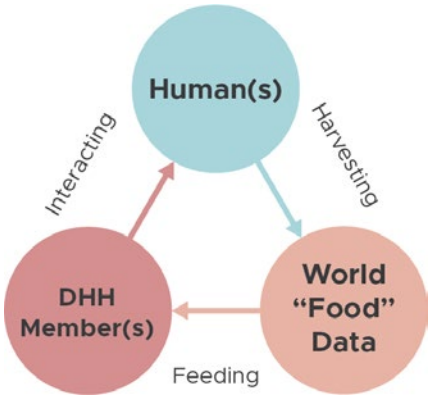
Evolution of the Data-Sustained Ecosystem

The data-sustained ecosystem is a representation of the interconnection of key actors/nodes with certain processes or interactions. One way to think of it is like the water cycle, including the transformations, but with data.

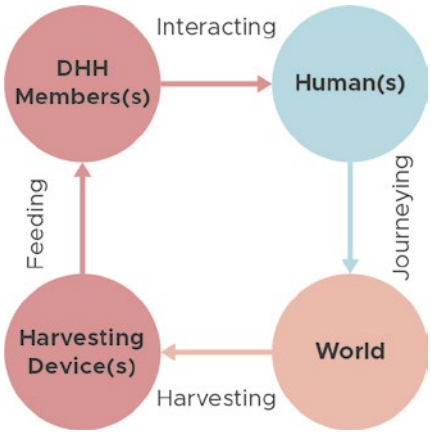
Version 1 (Lee-Smith et al., 2019).

In the first iteration, the ecosystem represents the basic interaction paradigm between humans, the world (of food data), and DHH members. Here, the processes/interactions are harvesting data from the world, feeding it to a DHH member, and interacting with the DHH member.



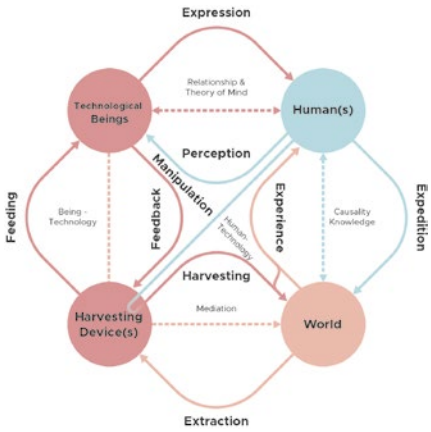
Version 2 (Lee-Smith, 2020).

The second iteration adds the node of harvesting device(s) in recognition of their impact on the experience of collecting and feeding data. The processes/interactions are now, journeying in the world to find data, harvesting these data, feeding them to DHH members.



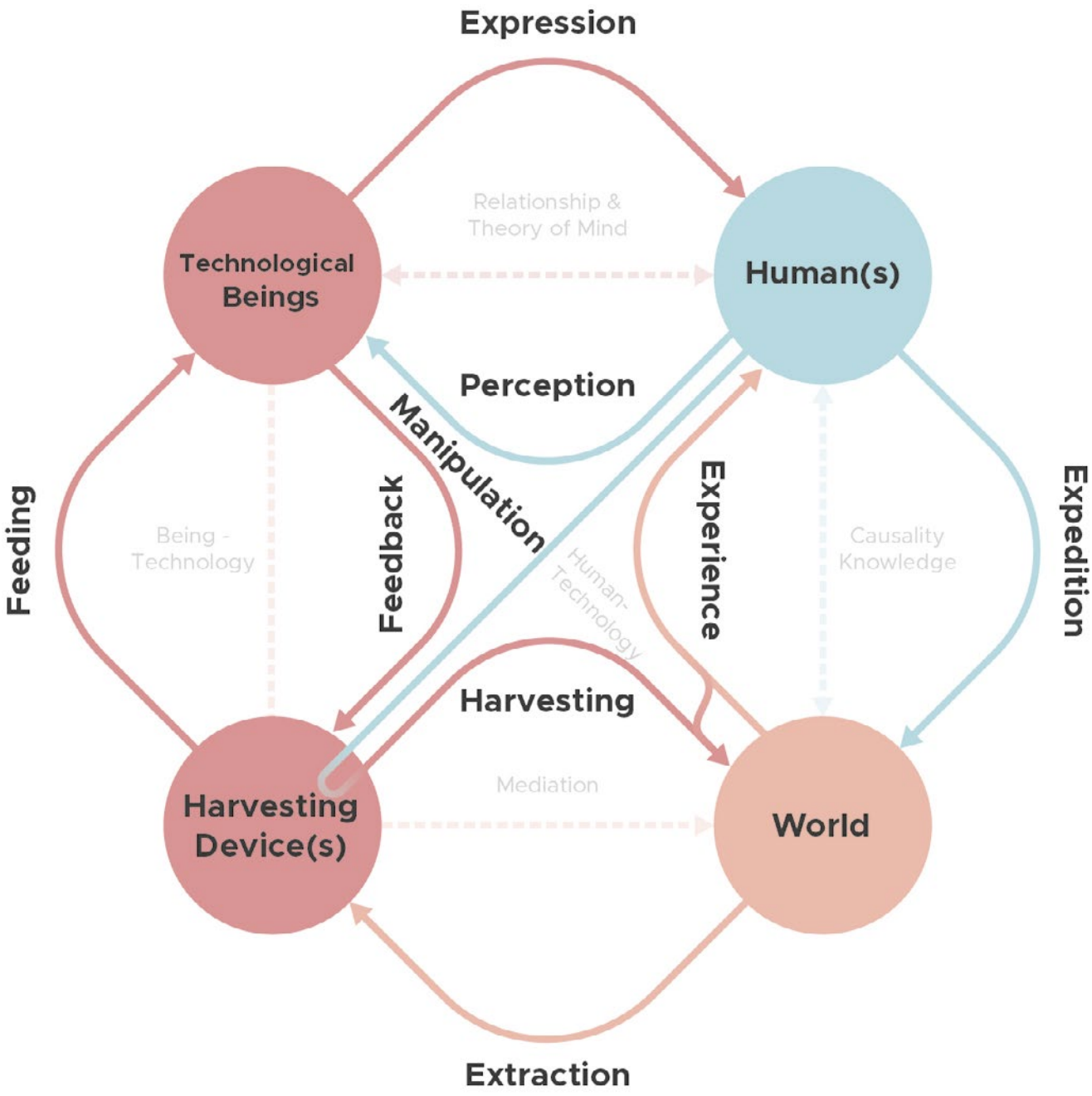
Version 3.

In the third version (enlarged versions on the following pages), we have added detail to the interactions/processes within the data-sustained ecosystem. First it expands the connections between the nodes, which were originally represented as one way arrows, in to loops such as the expression of the "technological being" and the perception of the Human(s) experiencing this expression. Second, it added another layer by considering the latent elements such as mediated expedience of the world through the harvesting device. This can occur for both the human(s) and the technological being(s).



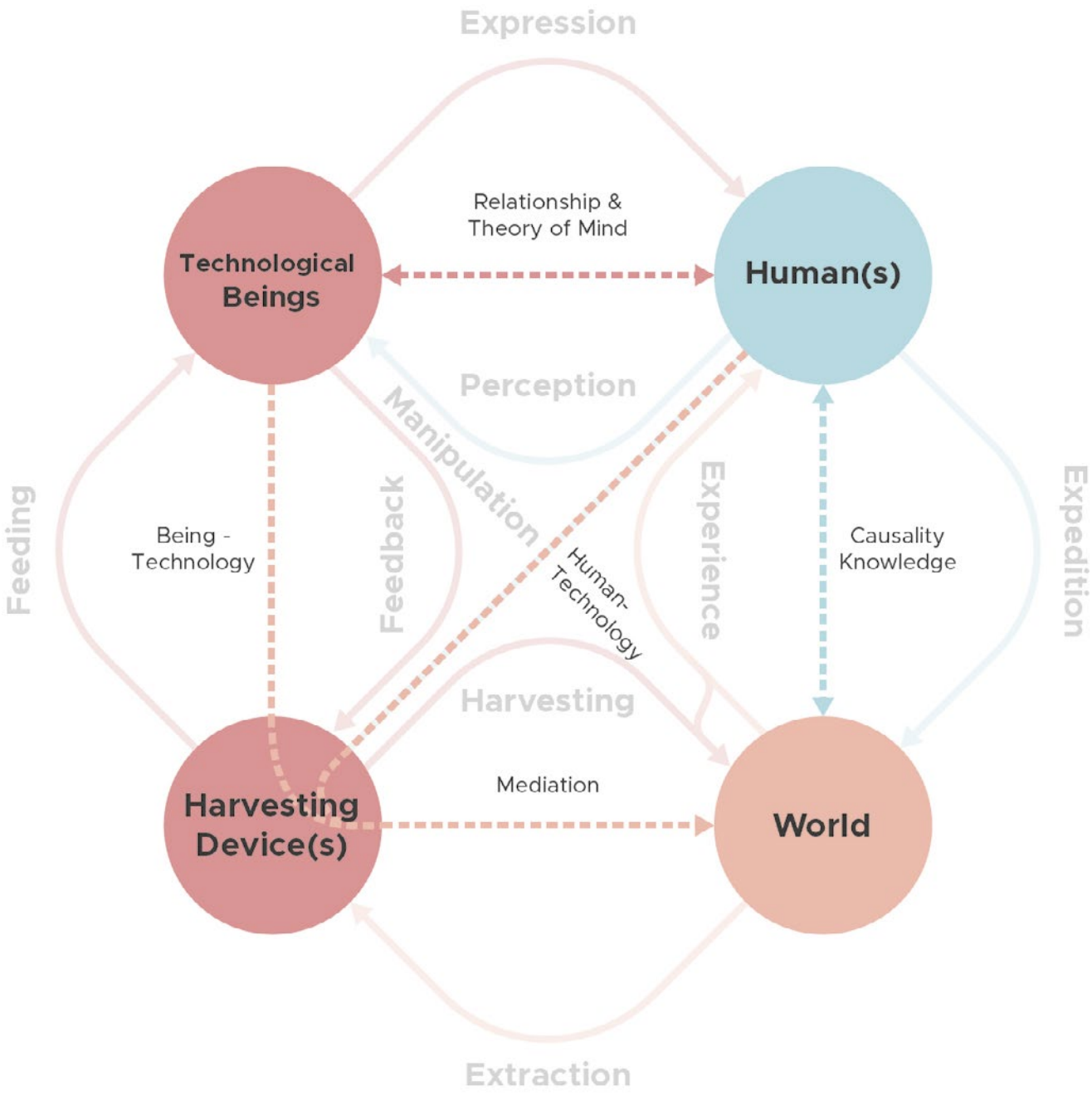
Version 3 Enlarged

Focusing on "overt" interactions, transformations, or processes



Version 3 Enlarged

Focusing on “latent” knowledge, mediation, and relationships



Advertisement Poster

Loughborough University

CDT–EI
EPSRC CENTRE for Doctoral Training in Embedded Intelligence

Ordnance Survey

EPSRC
Engineering and Physical Sciences Research Council

Hey, Alexa?
What is my purpose?

Exploring Physical-Digital Devices and Data Through Thing-Centred Design

October 2020 | Virtual Workshop | 2:00hrs - 2:30hrs

This workshop aims to use methods inspired by co-design to explore, provoke, and speculate on the limits and potential alternate avenues for data and physical-digital devices from a thing-centred perspective. It delves into the outputs of ongoing research in these topics as a means of obtaining expert perspectives on the work.

This aims to be a fun and engaging session that will make you think and may lead you to new ideas in your own work/research. It will involve the discussion, critique, and presentation of, ideas, the conceptualisation of new products/objects and scenarios of use, and an introduction into a particular form of thing-centred design.

It is also a great opportunity to meet and network with like-minded practitioners of design, HCI, HDI, IoT, and similar areas.

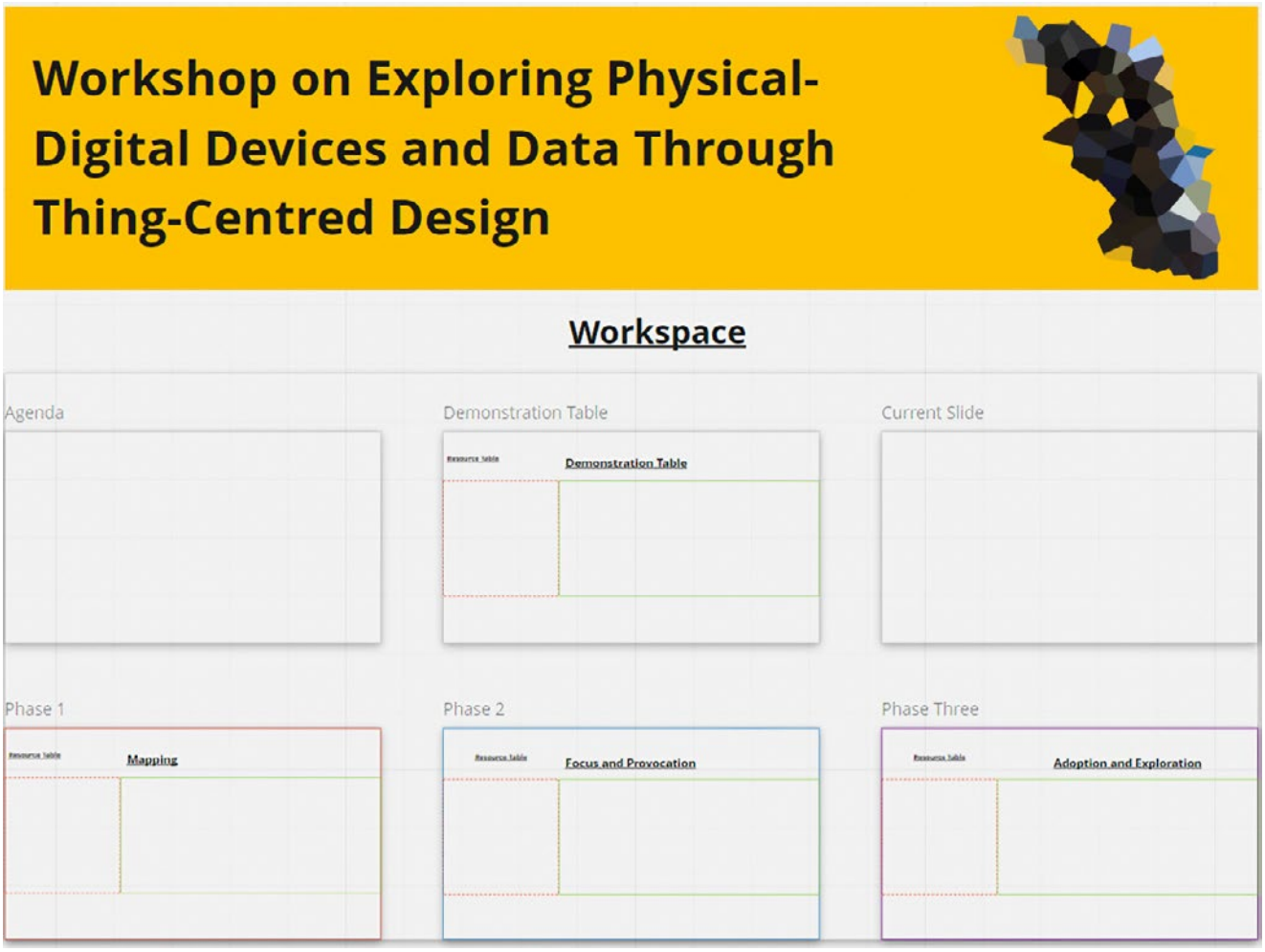
Participant Requirements:

- Must be 18 or over
- Must be a professional/academic/researcher in the field of design, HCI, HDI, IoT, or related field
- Access to Microsoft Teams (**no account required**)
- Access to Miro (**free account recommended**)

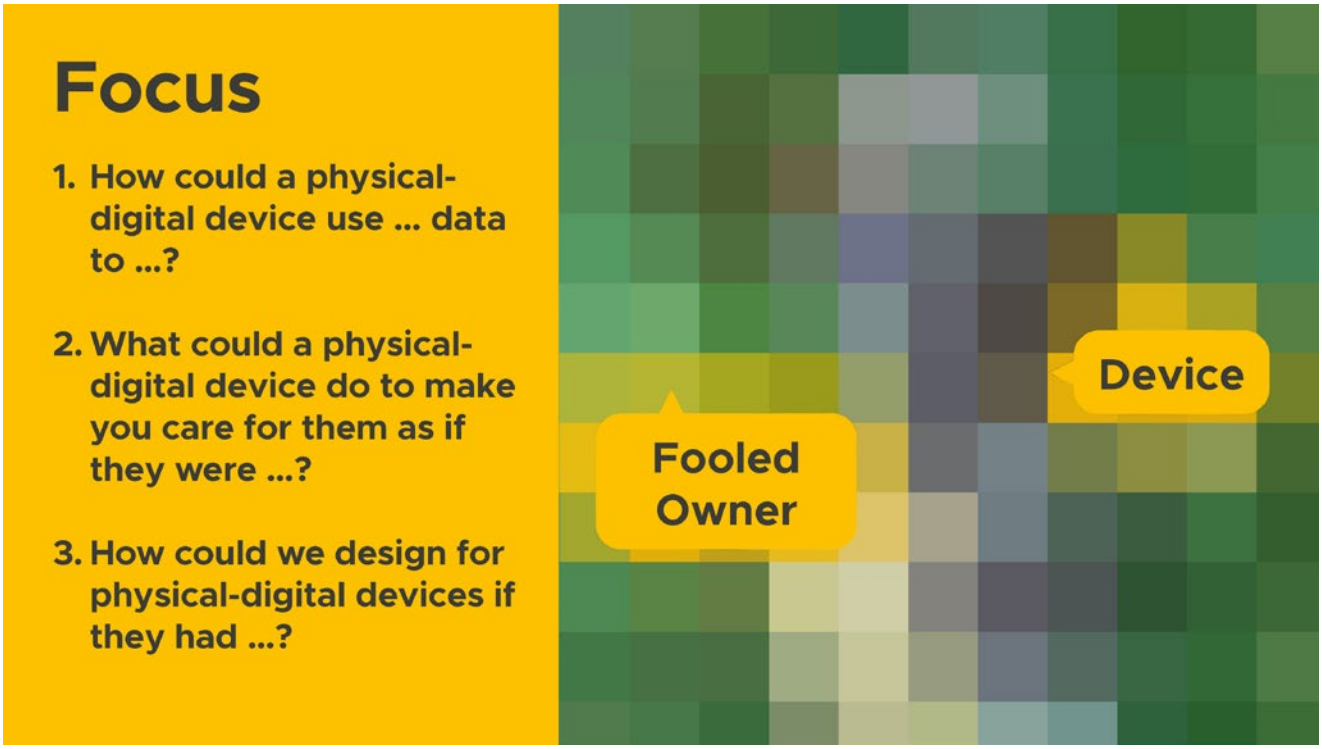
Interested?
Follow the link on Twitter!

Further questions can be directed to Matthew Lee-Smith at **m.l.smith@lboro.ac.uk**

Screenshot of Miro Workspace



Example Slide from Workshop Presentation



Design Cards Selections

Below is the table of all the card selections made by the participants in the design phase. They are organised by session number (S#). Some new cards were added by participants and some selections exceeded the advised amounts.

S#*	Harvesting Device	Technological Being
1	**Space:** Between Two Cities **Speed:** Per Day **Actors:** Weather, Time, Active + Passive **Data:** Family Events	**Space:** Between Two Cities **Speed:** Per Day **Traits:** Friendly/Aloof, Curious/Indifferent, Picky/Omnivorous **Expression Modalities:** Smell, Shape, Texture, Colour
2	**Space:** Bathroom **Speed:** Change **Actors:** Presence, Active + Passive **Data:** Change	**Space:** Mobile/Wearable **Speed:** Ad Hoc **Traits:** Friendly/Aloof, Curious/Indifferent, Picky/Omnivorous **Expression Modalities:** Sound, Colour, Smell
3	**Space:** Beach **Speed:** Per Day **Actors:** Tides, Passive **Data:** Environmental Data	**Space:** Civic Office **Speed:** Blank **Traits:** Sarcastic/Judgemental, Curious/Indifferent, Animate/Inert, Calm/Angry, Abstemious/Greedy **Expression Modalities:** Size, Texture, Smell
4	**Space:** House **Speed:** Blank **Actors:** Household Events, Active + Passive **Data:** Household Events	**Space:** House **Speed:** Ad Hoc **Traits:** Abstemious/Greedy, Tender/Harsh, Picky/Omnivorous **Expression Modalities:** Size, Shape, Mobility
5	**Space:** Outside **Speed:** Blank **Actors:** Everyday Day, Buildings, Time, Date, Active + Passive **Data:** Mood, Colour	**Space:** Inside **Speed:** Blank **Traits:** Friendly/Aloof, Tender/Harsh, Picky/Omnivorous **Expression Modalities:** Shape, Pattern, Smell, Mobility
6	**Space:** Kitchen, Garden **Speed:** Per Second, Minute, Week **Actors:** (Humans, Passive), (Celestial Body, Devices, Active) **Data:** Environmental Data, Music, Emotions	**Space:** Street, River **Speed:** Per Second, Per Hour **Traits:** Curious/Indifferent, Animate/Inert, Calm/Angry **Expression Modalities:** Brightness, Sound, Smell

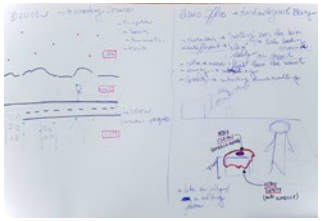
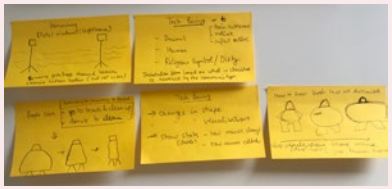
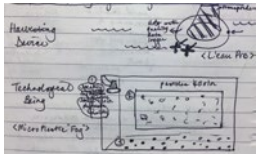
***Session Number**

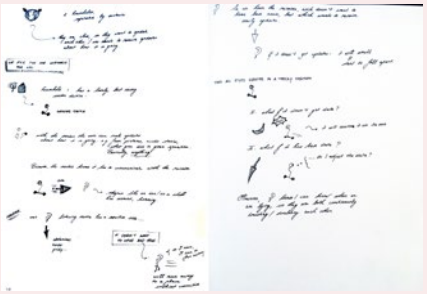
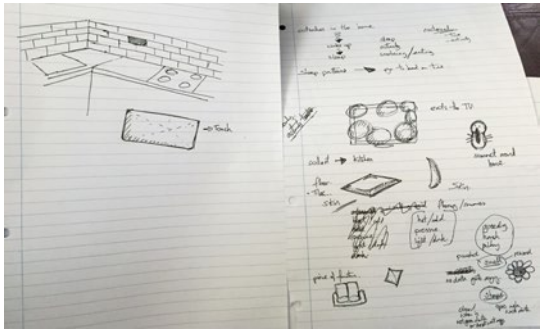
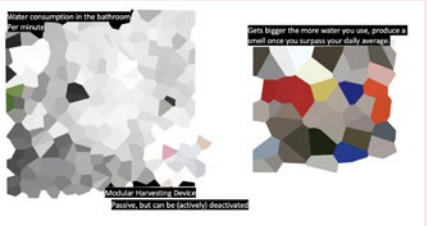
Harvesting Devices and Technological Beings

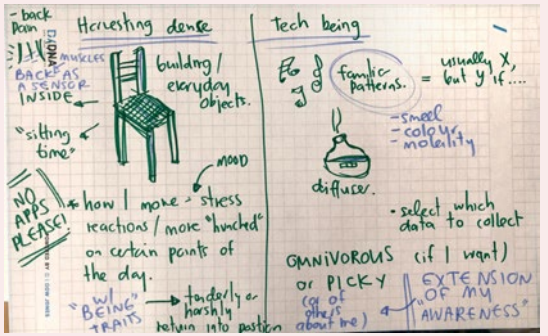
The following are summaries of the harvesting devices and technological beings designed by the participants based on their own descriptions. Pixelated images are where participants have used potenitally copyrighted images. As a reminder, P6 had to leave halfway through and therefore does not have a harvesting device and technological being.

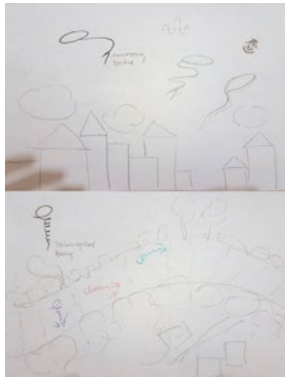
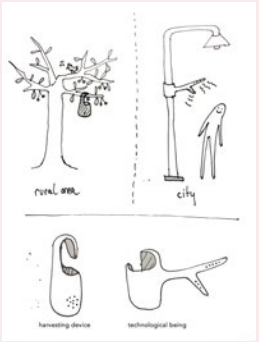
P# (S#)*	Harvesting Device	Technological Being	Images (if provided)
P1 (S1) Hive/Cloth	A beehive-shaped container with multiple harvesting devices within in that family members can take and put on their person to collect data throughout the day.	A tablecloth-like entity that stays dormant during the week and comes to life during the weekend to express the data collected by family members in another house.	
P2 (S1) City Essence	A collection device draws ambient smalls from a remote city.	A distilling device that converts the data from the remote city and allows people to immersive themselves in the essence of this remote city.	
P3 (S1) Tracker/ Shaper	A black box can be put into a train or car that can track your daily routine and other data such as dialogue or emotions.	A modular device/being that can automatically change shape and colour and choose textures depending on different variables such as weather conditions and dialogue sentiment.	None provided
P4 (S1) Petricore/ Comfort	A small handheld device that interacts with weather in another city, changing its texture, sound and smell when touched, to give an immersive physically interactive experience.	A small, comfortable, wearable object with a smooth surface and no rough edges, shaped like a 3D pebble, tactile and haptic when held, for various situations.	None provided

*Participant Number (Session Number)

P# (S#)*	Harvesting Device	Technological Being	Images (if provided)
P5 (S2) Scout/Dweller	A harvesting device collects data from the bathroom and moves to broadcast that it is collecting data.	A device being that emits sounds, colours, and smells. The device-being wants to live in the kitchen and learns which smells, sounds, or colours its co-habitants don't like based on when it is moved from the kitchen.	
P7 (S2) Tap/Curio	A sensor placed on a tap senses movement around the basin and acts as a regular source of food-data for the technological being.	A slinky that can change colour. The slinky moves and sniffs around with an inquisitive nature.	None provided
P8 (S2) Wander Probe	**[P8 did not design a harvesting device, however, the technological being collects its own data]** An autonomous data collector being that relies on the user to move it around to gather information. It has different states like listening, eating data, digesting data, and dreaming, and it gets bored if left in one place for too long.		None provided
P9 (S3) Data Jelly	A two-part sensor array placed near or above a beach and near or in the sea.	A jelly-like being that changes size, movement, vibration, and smell depending on the quality of data coming from the harvesting device. If the data is bad, i.e., signs of pollution or other issues, the being grows, vibrates more, and emits a bad smell.	
P10 (S3) Cherished Symbol	A harvesting device, instrumented pole, windmill, or lighthouse, with powerful cameras to sense and collect data about garbage on beaches and surrounding areas, covering a certain radius.	A community installation in the form of a cherished symbol, designed to raise awareness and motivate participation in garbage clean-up, interactive with changes in shape, visual representation, and recording of people's contributions.	
P11 (S3) L'eauPro/ Caché	A buoy-shaped transponder that floats in water call L'eauPro. The transponder analyses the water it floats in.	The technological being is in a similar shape to the harvesting device. The being is placed in the corner of the ceiling and emits fogs of different odours, sounds, and colours.	

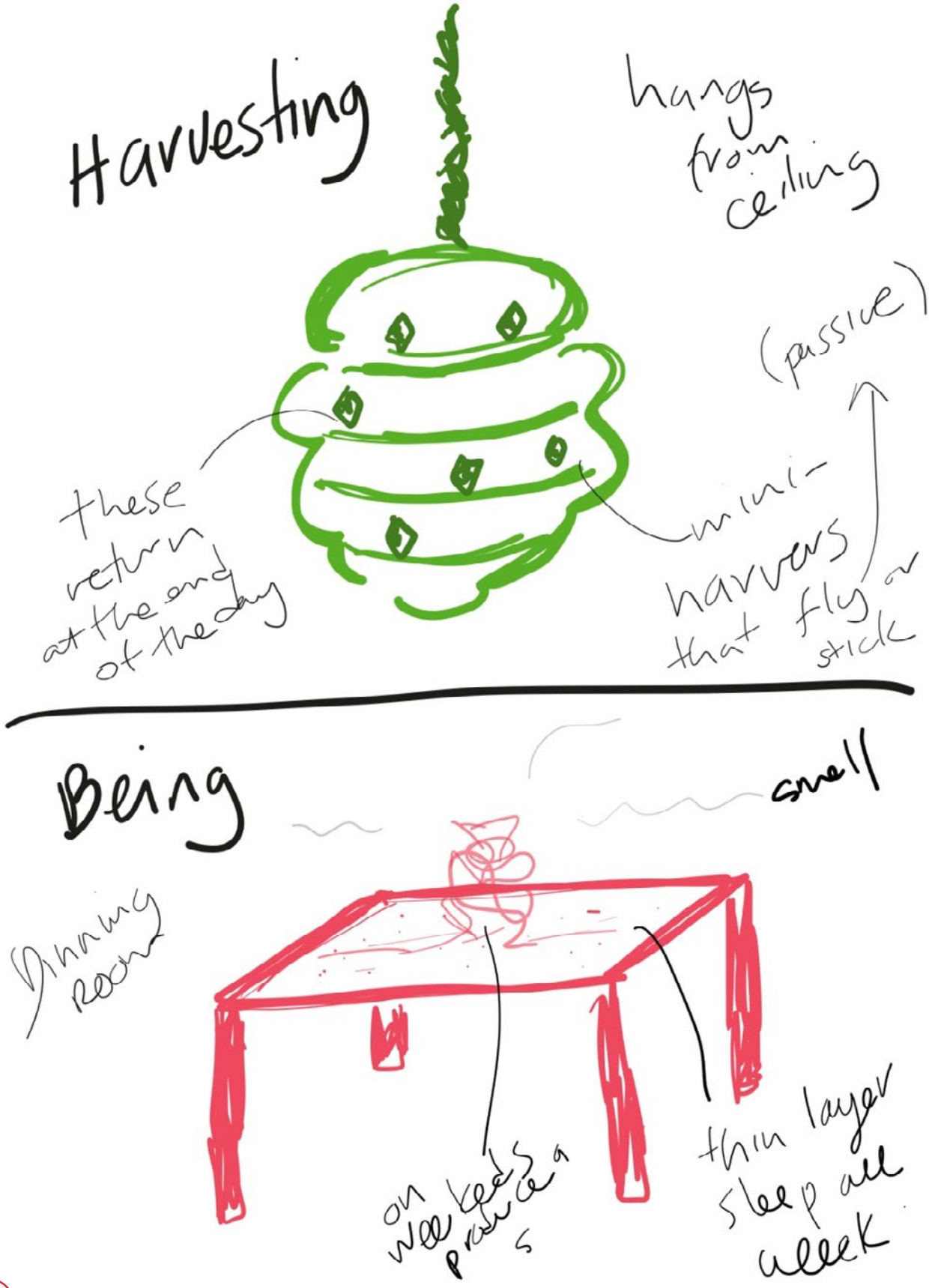
P# (S#)*	Harvesting Device	Technological Being	Images (if provided)
P12 (S4) Only Happiness	A harvesting device in one household equipped with camera, audio, and wheels, sends updates to a passive receiver device in another household. The receiver only wants positive information, so the harvesting device has to be careful in the data it sends to avoid deterioration.	A technological being in a separate household passively receives updates from a harvesting device in another household. It is sensitive and only wants positive information. It may deteriorate or lose its shape if not receiving enough positive data.	
P13 (S4) Positive Push	Two collection device concepts: 1. Tiles that collect activity data through touch interaction and display it with colour-coding. 2. Touch device that records household activity by tracking entries into rooms.	Household objects that encourage healthy habits through various means. One that focuses on improving sleep patterns by making a device or object that surrounds the TV, limiting its use and promoting bedtime. Another that revolves around furniture with personalities that incentivise physical activity and interaction with the house, through rewards like pleasant scents or punishments like hard surfaces or unpleasant scents.	
P14 (S4) Water Doll	Modular device tracks bathroom water consumption to manage data thirst, passively collecting data but with the option to deactivate it.	Takes the shape of a doll, increasing in size as more water is consumed and producing a smell if daily average is exceeded. Minimum water needed to function, with option to deactivate data collection, but with consequences.	
P15 (S4) Interactive Bouquet	**[P15 merged the input and output into one device]** The device changes shape, colour, and releases a fragrance based on human interaction. It has sensors to detect the person and respond accordingly. It uses three input/output modalities: smell, shape, and colour.		

P# (S#)*	Harvesting Device	Technological Being	Images (if provided)
P16 (S5) Pattern Beings	**[P16 stated that both the input and output entities were beings]** A chair-being that detects body position, mood and reminds you to improve their posture through gentle nudges, creating a collaborative experience between you and the chair. Data collected only when sitting.	A being that collects and monitors personal patterns, and can be programmed to collect specific data based on a user's lifestyle and habits. The being acts as an extension of the user's awareness, especially for those living alone.	
P17 (S5) Many Choices	**[P17 Struggled with the task and presents the ideas of several related devices and beings]** 1. A cat-like aloof entity that engages with you when it wants to. The mood of the cat is related to the data it collects on a person and can suggest when one should go to sleep. 2. A dating lamp that collects the moods of dates and ties it to a ribbon gift and ambient light that can play back the mood of these date through light and smell. 3. A very small toy that collects data from the home for children that can be used as memorabilia when they leave. The toy will then play back the smells/moods of different events regardless of if they are positive moments or not. 4. A device that extracts textures and patterns from images taken during trips and recreates them. The selection of the texture or pattern is unpredictable.		None provided
P18 (S5) Orb/Recluse	A small crystal orb is used to harvest colour as a sensory experience by capturing 360-degree vantage points. The device must be held in the user's hand, adding their colour data to the system. The harvested colour is then consumed by an omnivorous, aloof being and excreted as sense-scapes.	The being is tall, thin, and lanky, moving only when the user is not present or not looking. It exists in the corners or behind objects in the home. To feed it, the user brings the orb inside the home, allowing the being to consume the data from wherever it is located. It adds a mysterious aspect to the relationship between the user and the being.	None provided

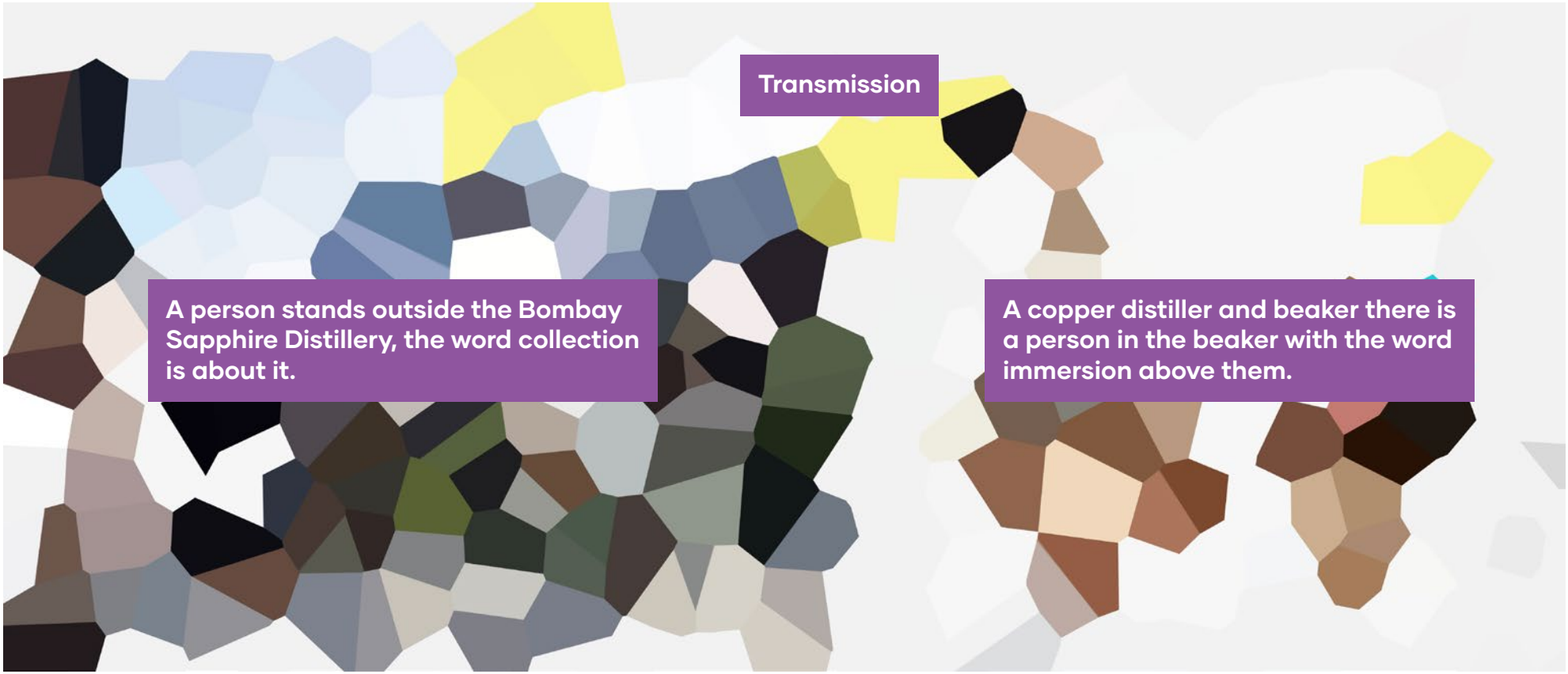
P# (S#)*	Harvesting Device	Technological Being	Images (if provided)
P19 (S6) Metrics Garden	The two harvesting devices for the zen garden system are used to collect data. One collects environmental data, detecting weather conditions. The other is a sensor that detects the mood of the user and contributes to the garden's changing colours.	A zen garden system that changes colour based on environmental and user data collected by two harvesting devices. It reflects the user's mood and provides a self-reflection opportunity through observation of the changing colours.	None provided
P20 (S6) Roaming Garden	The harvesting device collects sounds in a garden and its placement affects the sounds recorded. Placement in a tree, shape, and camouflage can impact the sounds captured.	The technological being is a mobile device that processes sounds into music and light shows, changing every hour based on garden sounds. The output is culturally pleasing.	None provided
P21 (S6) Cloud/River	A device for collecting environmental data and emotions of non-human entities (e.g. trees, rocks) in nature. It moves through air and has a circular component to collect data and detect vibrations.	A technology-based entity that moves in rivers, releases a smell and colour to connect with other non-human entities in nature and build an ecology without human intervention.	
P22 (S6) Rural City	The harvesting device sits in a tree and collects data from nature using sensors, including environmental and sound sensors. It gathers information to create a connection between the urban and natural world.	An urban device that simulates nature by emitting sounds and smells of nature to provide a connection for citizens who may have lost touch with it. It creates an illusion of nature to prevent feelings of its absence.	

Enlarged Participant Sketches

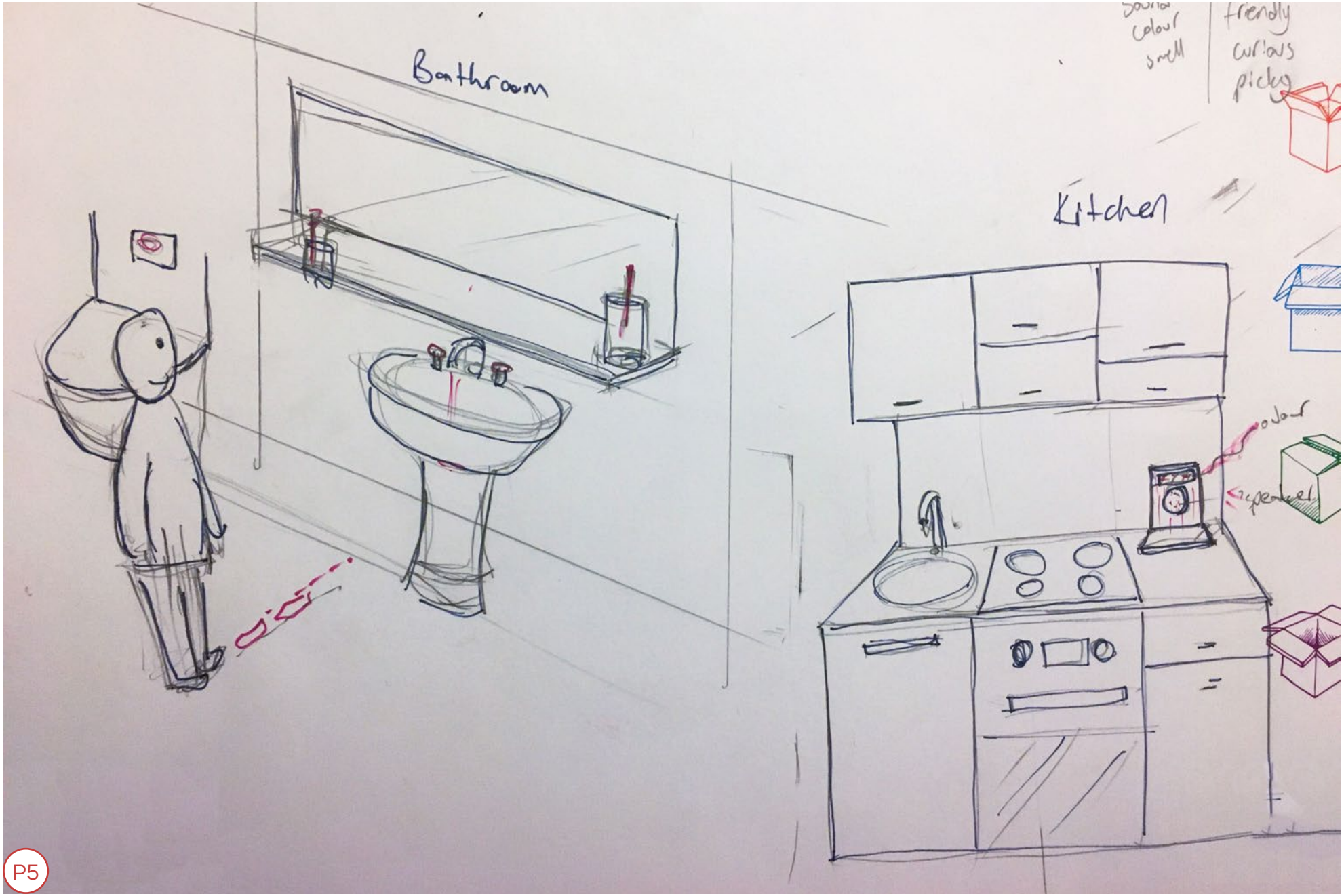
The following are larger versions of the sketches/montages provided by the participants. Pixelated images are where participants have used potenitally copyrighted images.



P1


Transmission
A person stands outside the Bombay Sapphire Distillery, the word collection is about it.
A copper distiller and beaker there is a person in the beaker with the word immersion above them.

P2


Bathroom
colour
smell
friendly
curious
picky
Kitchen
odour
sparkel

P5

Beach → Harvesting Device

→ People
→ boats.
→ Animals.
→ Plants.

SEA

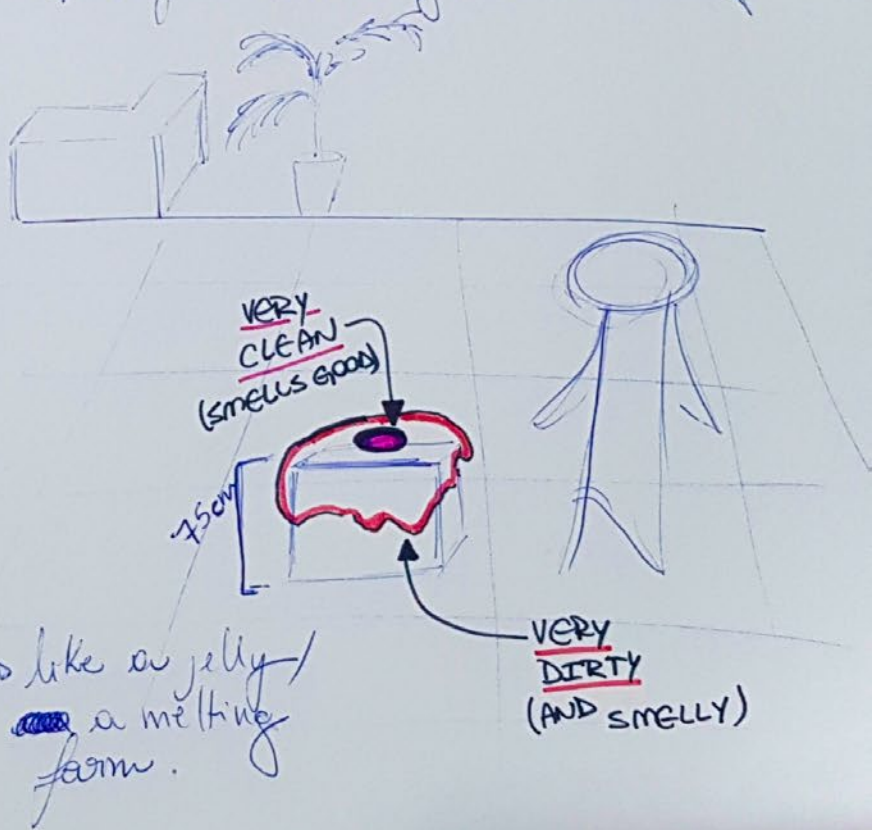
SAND

• children
• curious people

CITY

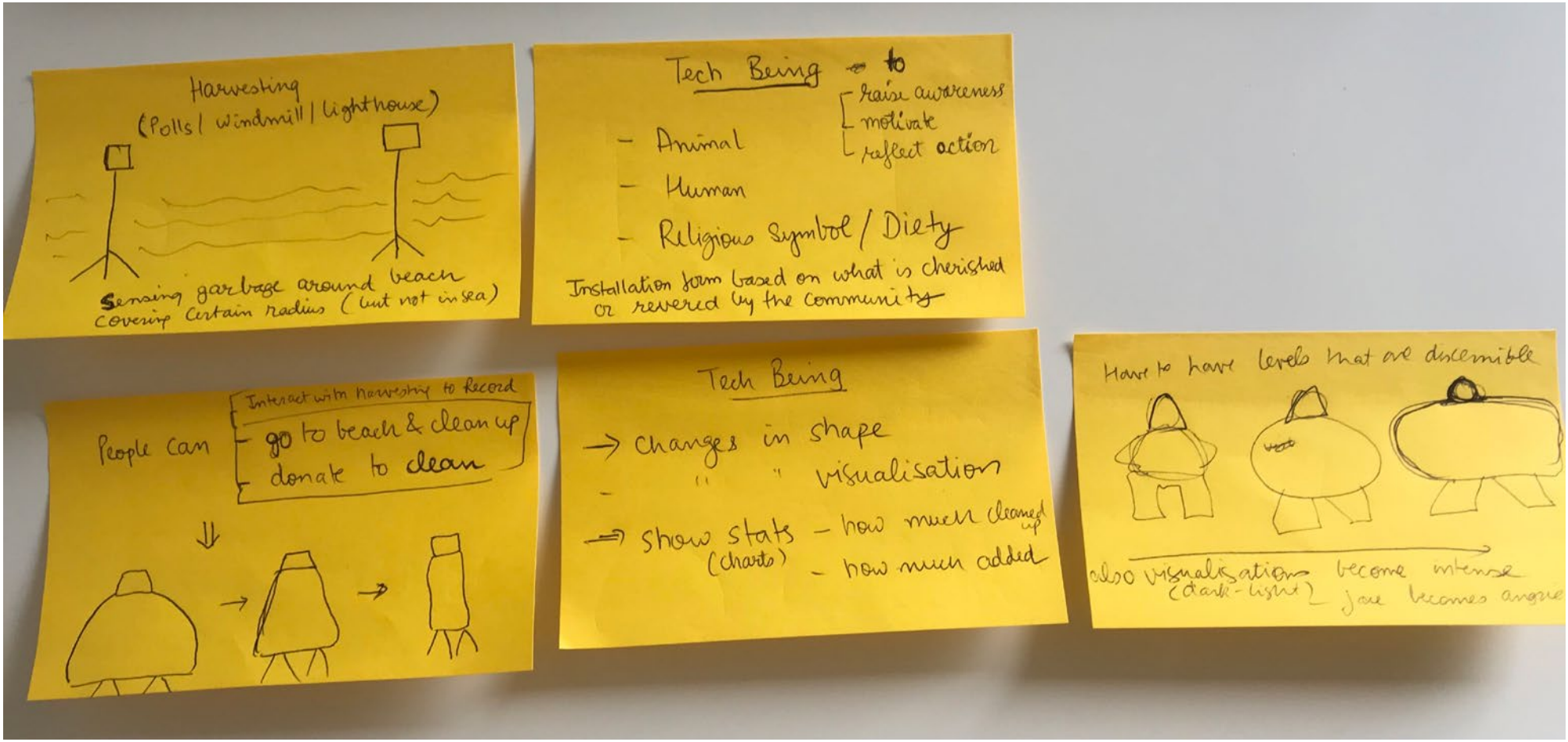
Civic office → technological Being

→ curious → "rolling" over the base → like looking around.
→ indifferent → "rolling" slowly or stopped
→ calm → more "flat" than the usual
→ angry → vibrating
→ Greedy → vibrating & rolling

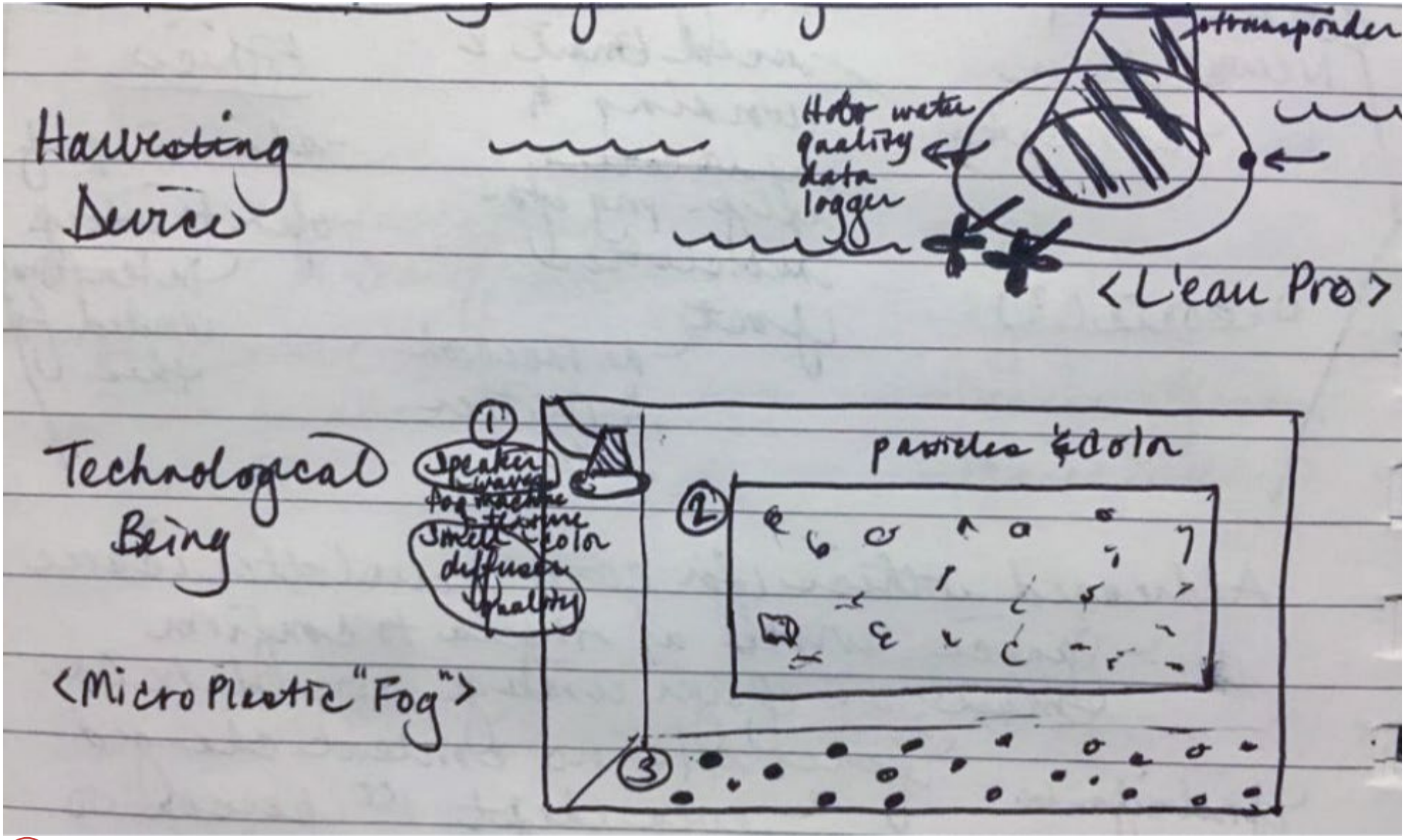


→ like a jelly / a melting form.

P9


Harvesting
(Polls / windmill / lighthouse)
Sensing garbage around beach
covering certain radius (but not in sea)
Tech Being → to
raise awareness
motivate
reflect action
- Animal
- Human
- Religious Symbol / Diety
Installation form based on what is cherished or revered by the community
People can
Interact with Harvesting to Record
go to beach & clean up
donate to clean
Tech Being
→ Changes in shape
" " visualisation
⇒ show stats (charts) - how much cleaned up
- how much added
Have to have levels that are discernible
also visualisation (dark-light) become intense
Jar becomes aware

P10


Harvesting Device
Hobo water quality data logger
<L'eau Pro>
Technological Being
<MicroPlastic "Fog">
1
Speaker waves
fog machine
texture
Smell color
diffuser
quality
2
particles & color
3

P11

2 households, separated by distance

they are close, so they want to update each other / one wants to receive updates about how it is going.

WE PICK THE ONE SCENARIO FOR NOW

household 1 has a lovely, but noisy sender device:

with the sender the user can make updates about how it is going: e.g. food pictures, audio stories, what you did in your spare time. Basically, anything

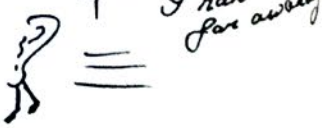
Because, the sender knows it has to communicate with the receiver

shaped like an ear / or a shell. lies around, listening.

HOWEVER our listening device has a sensitive side....

abstemious
tender
picky...

IT DOESN'T WANT TO HEAR BAD NEWS



will run away to a place without connection

So we have the receiver, wich doesn't want to hear bad news, but which wants to receive daily updates.

if it doesn't get updates: it will smell & start to fall apart.

THIS ALL PUTS SENDER IN A TRICKY POSITION

I. what if it doesn't get data?

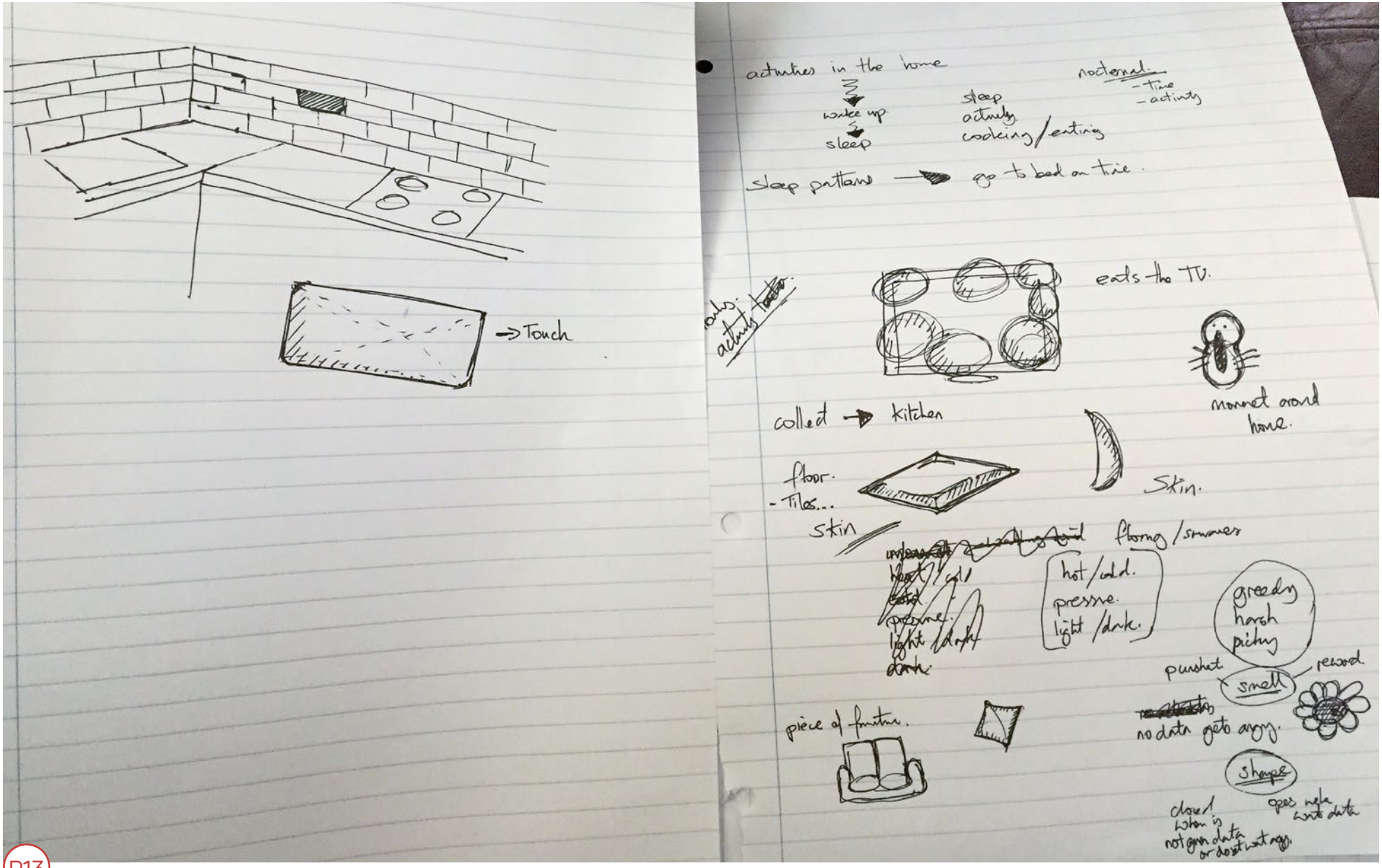
it will source it on its own

II. what if it has bad data?

.... do I adjust the data?

However, they know I can know when we are lying, so they are both continously trusting / doubting each other.

P12

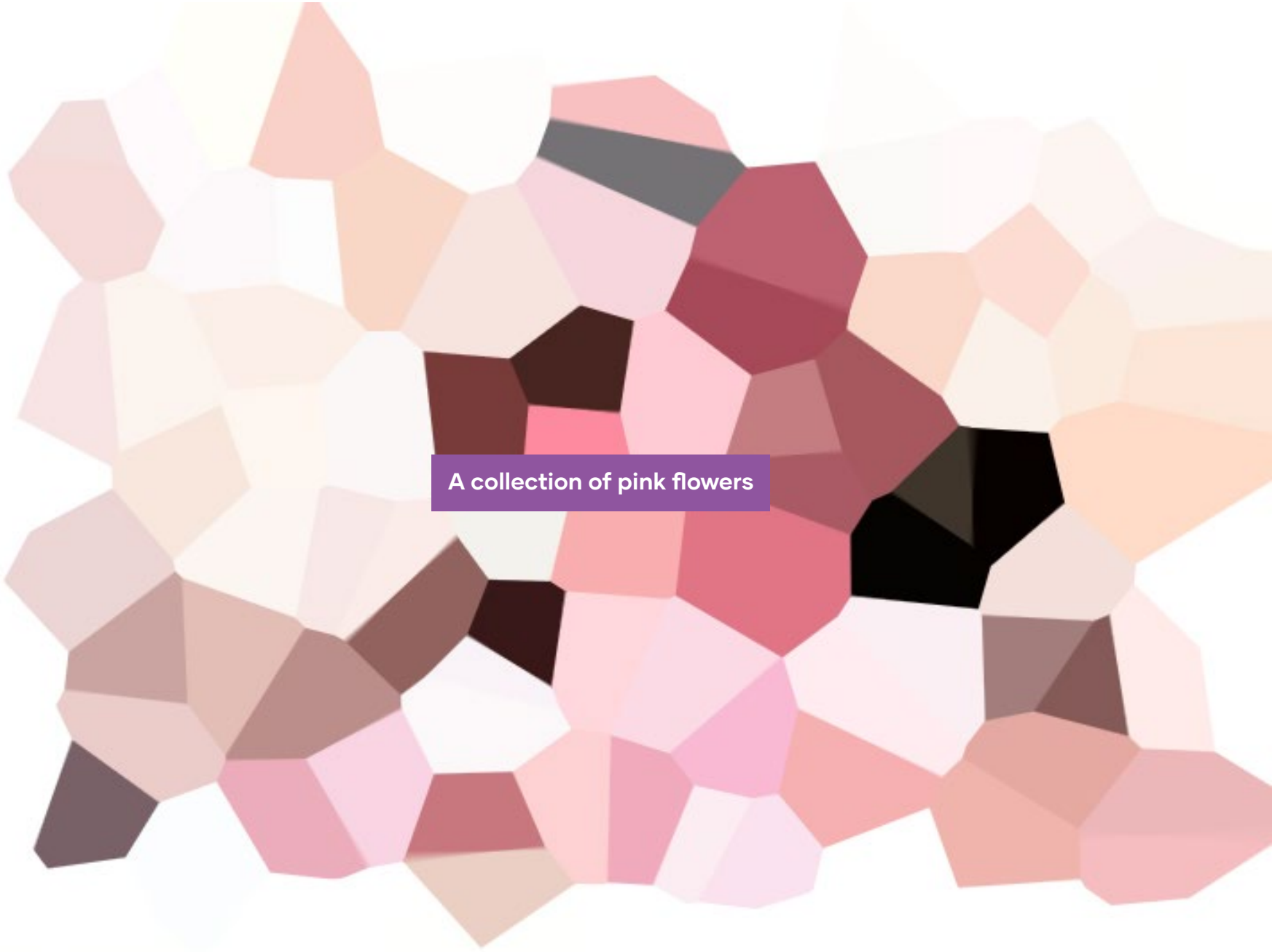

→ Touch
activities in the home
wake up
sleep
sleep
activity
cooking / eating
nocternal.
- time
- activity
sleep pattern → go to bed on time.
eats the TV.
collect → kitchen
floor.
- Tiles...
skin
skin.
moment around home.
flooring / smooth
hot / cold.
pressure.
light / dark.
greedy
harsh
picky
smell
record.
no data get angry.
shapes
piece of furniture.

P13

Water consumption in the bathroom
Per minute
A “modern” and plan bathroom with a toilet, bath with shower, and sink.
Modular Harvesting Device
Passive, but can be (actively) deactivated

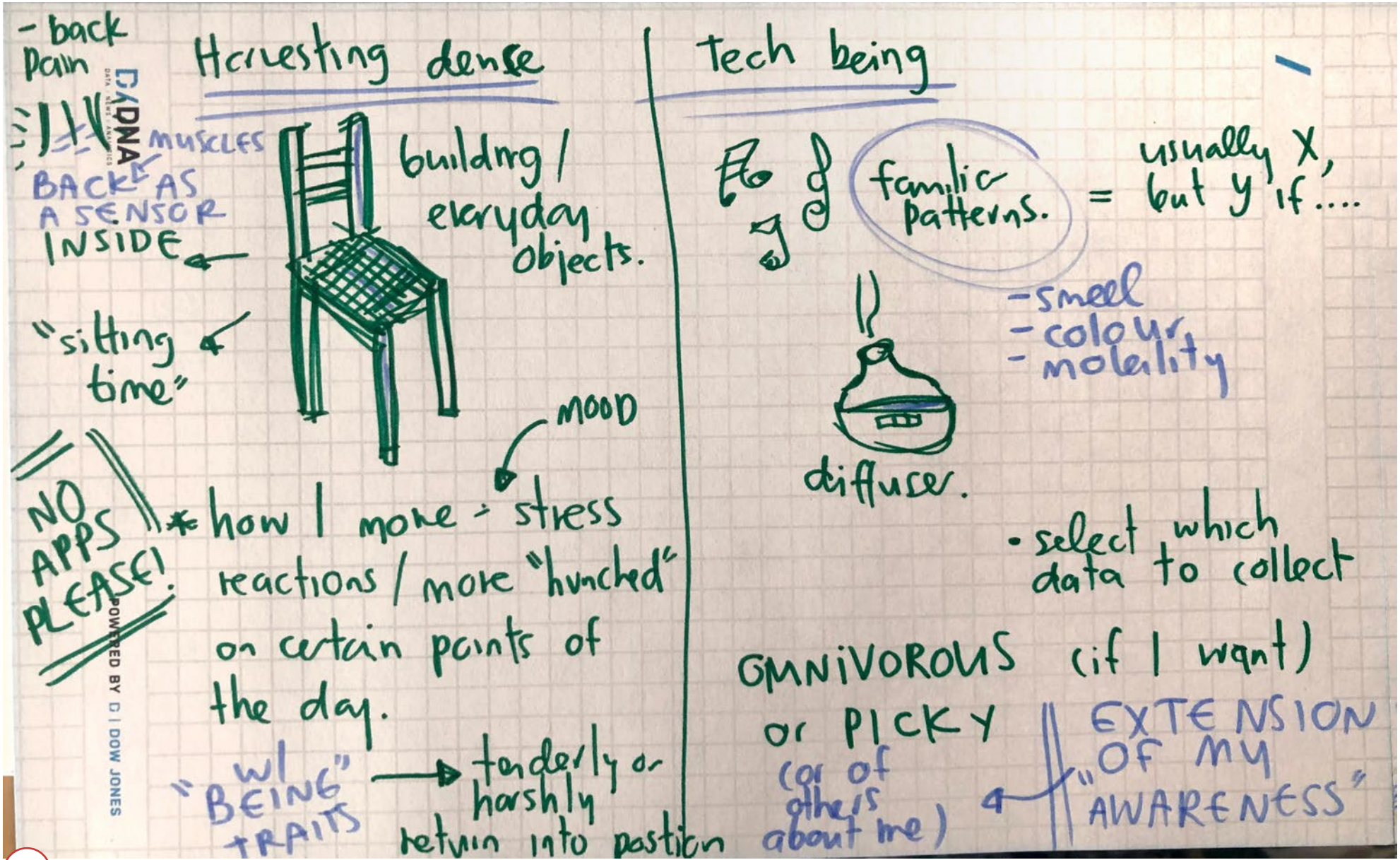
Gets bigger the more water you use, produce a smell once you surpass your daily average.
Four inflatable wavers/dancers

P14

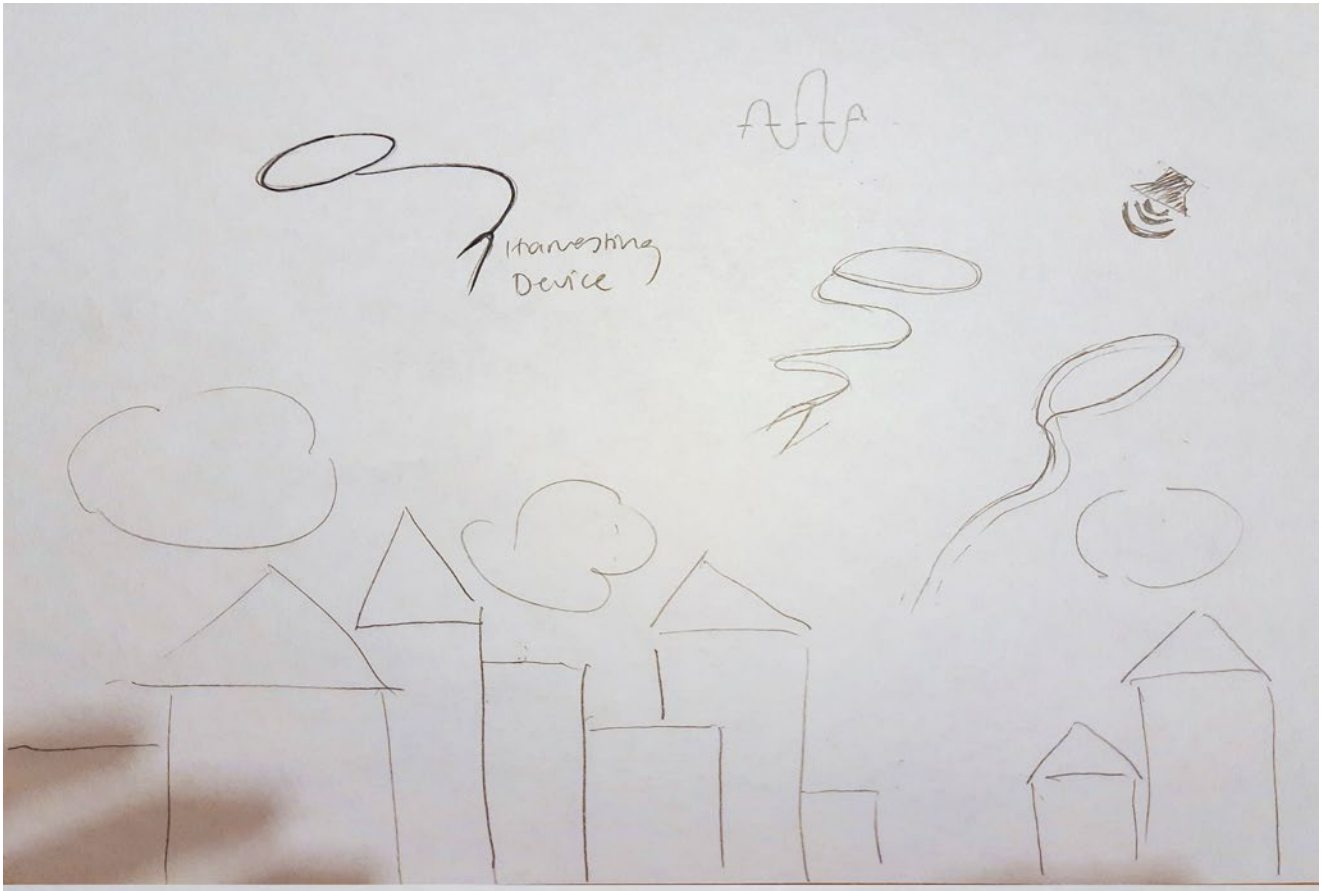


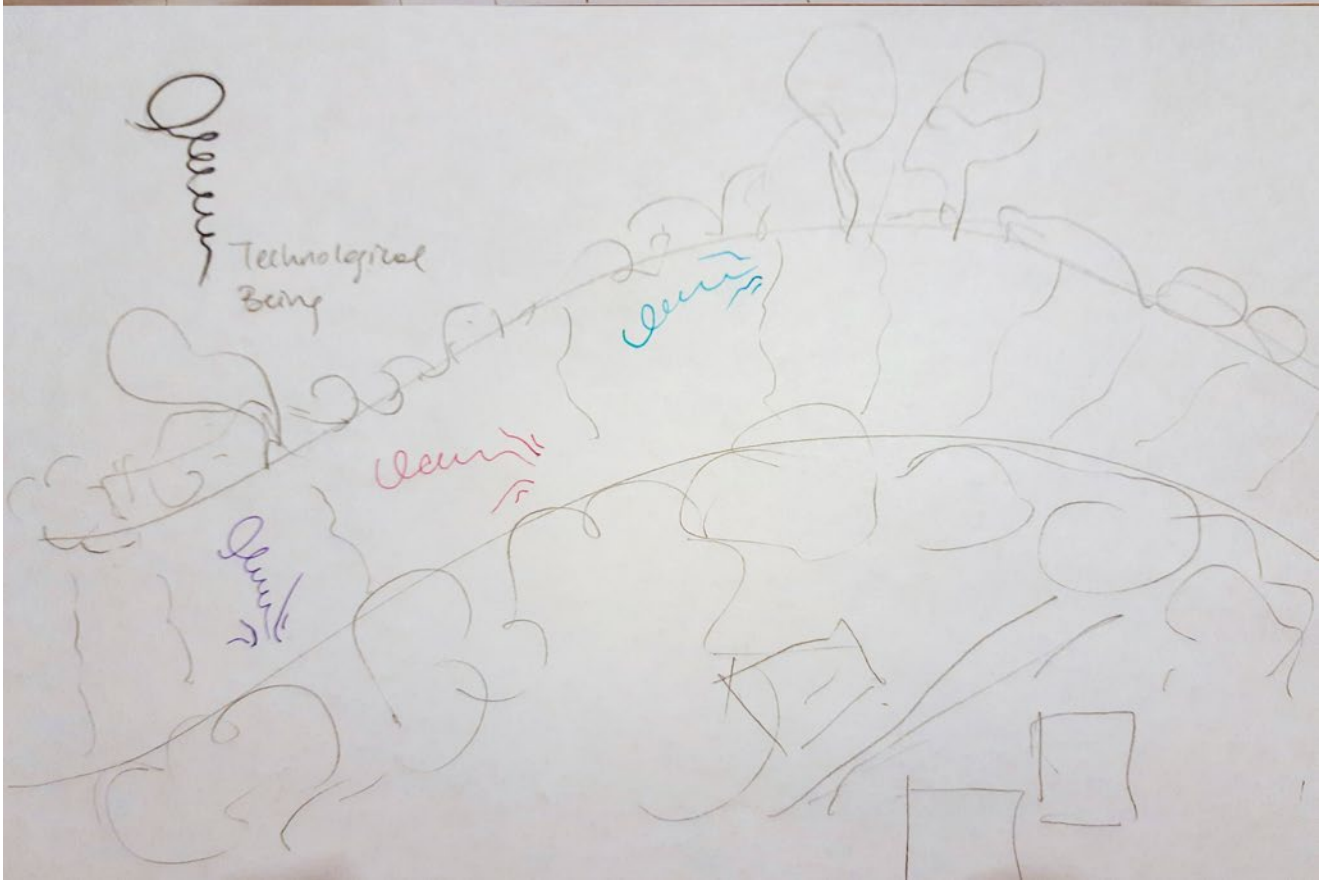
A collection of pink flowers

P15

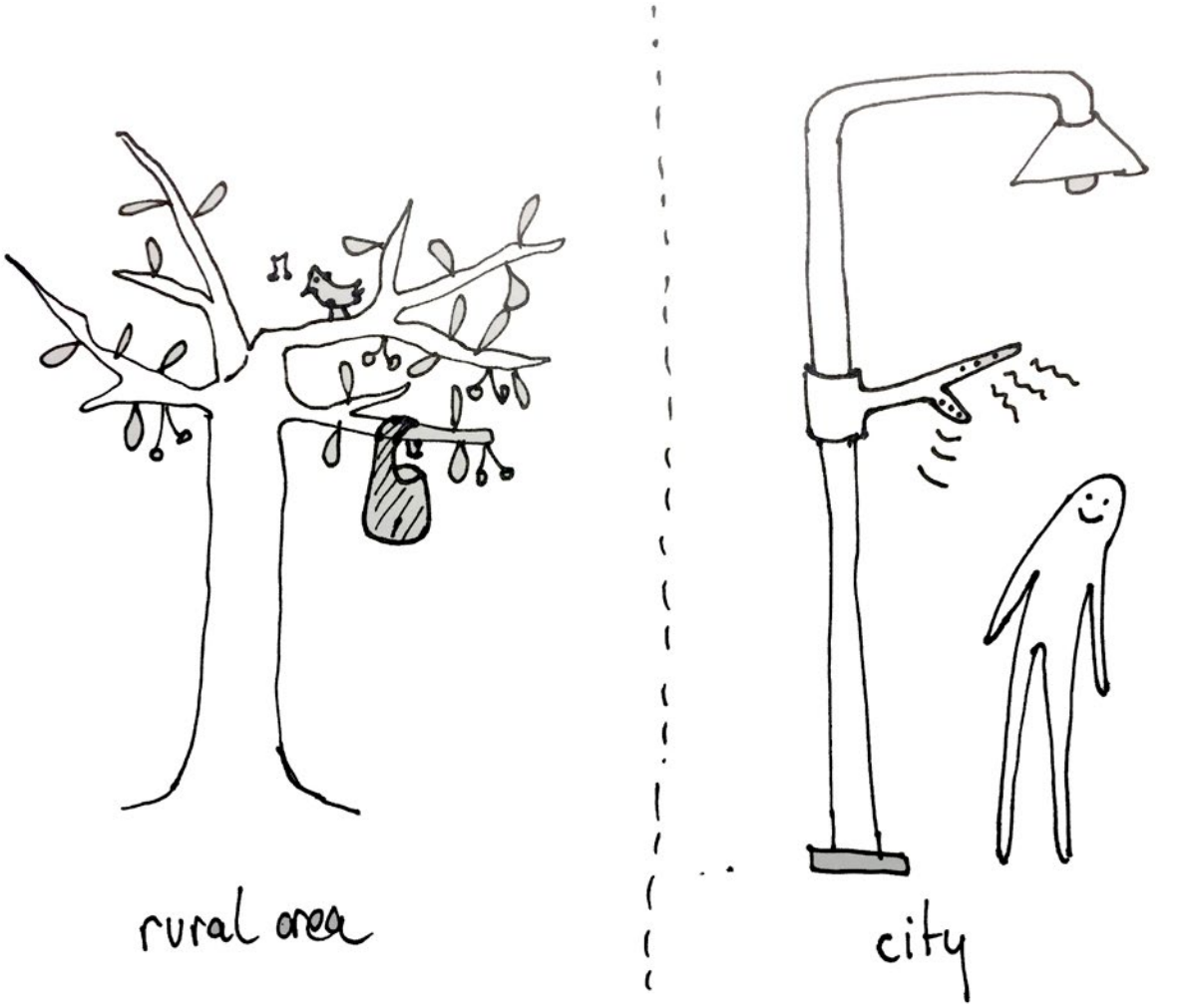

- back pain
Harvesting dense
Tech being
MUSCLES
BACK AS A SENSOR INSIDE
building / everyday objects.
"sitting time"
MOOD
NO APPS PLEASE!
* how I move - stress reactions / more "hunched" on certain points of the day.
w/ "BEING" TRAITS
tenderly or harshly
return into postion
familiar patterns.
= usually X, but Y if....
- smell
- colour
- molality
diffuser.
• select which data to collect
OMNIVOROUS (if I want)
or PICKY
(or of others about me)
EXTENSION OF MY "AWARENESS"
DADNA
POWERED BY D | DOW JONES

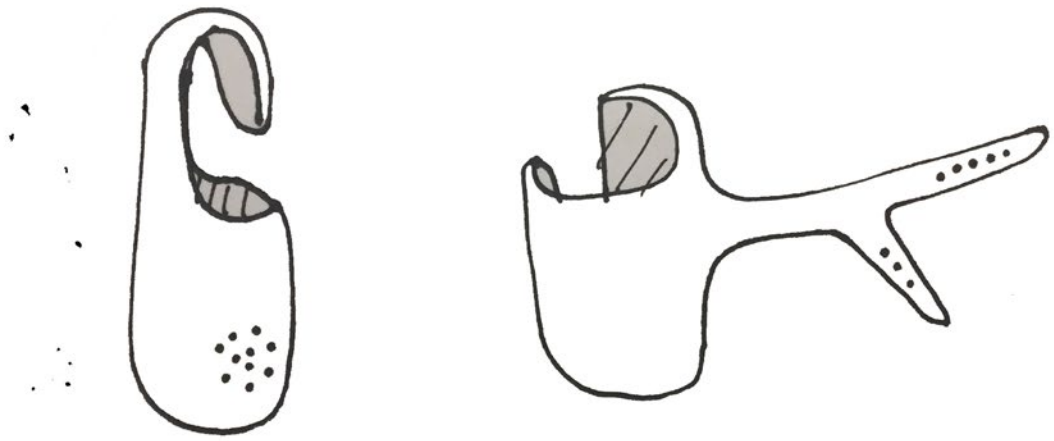
P16





P21





harvesting device

technological being

P22

References

Lee-Smith, M., 2020. The Data Hungry Home: Humans Harvesting Data for Living Devices, in: *Companion Publication of the 2020 ACM Designing Interactive Systems Conference*. ACM, New York, NY, USA, pp. 527–535. https://doi.org/10.1145/3393914.3395832

Lee-Smith, M., Ross, T., Maguire, M., Po Tso, F., Morley, J., & Cavazzi, S. (2019). The Data Hungry Home: Defining, Populating, Feeding, and Beyond. *Proceedings of the Halfway to the Future Symposium 2019*, 1–10. https://doi.org/10.1145/3363384.3363390