# Repair Journey

# Repair Diaries

Between April and May 2020, I have conducted a research study with the goal of exploring practices of repair and reuse of malfunctioning objects in urban contexts. A group of participants was asked to spend about three weeks trying to repair at least one object of their choice, and keeping a diary of it.

Eight participants signed up for the study. They have had varied levels of engagement. One gave up early for health reasons. Among the others, six agreed to join a final online workshop, but two of them had connectivity problems. The workshop had then 4 participants. I have the other two in parallel. Right now (mid June) I'm still waiting to hear from the other one.

# Repair Journey

Along the way, I sent them emails exploring different ways to frame issues about repair, reuse and waste in cities, around the following topics:

- An object's personal diary
- The story of your object
- Value
- The city

# Summary

This document starts with my main takeaways after talking to six out of seven participants. I have also collected the diaries of those who sent them in, as well as the notes I made when talking to them either individually or in group.

- Key points
- Participant Diaries + Notes
  - Key fob / USB charger
  - Toaster / Lawnmower / Food mixer
  - Pants / book?
  - Chair
  - Garden shed
  - Inspection camera
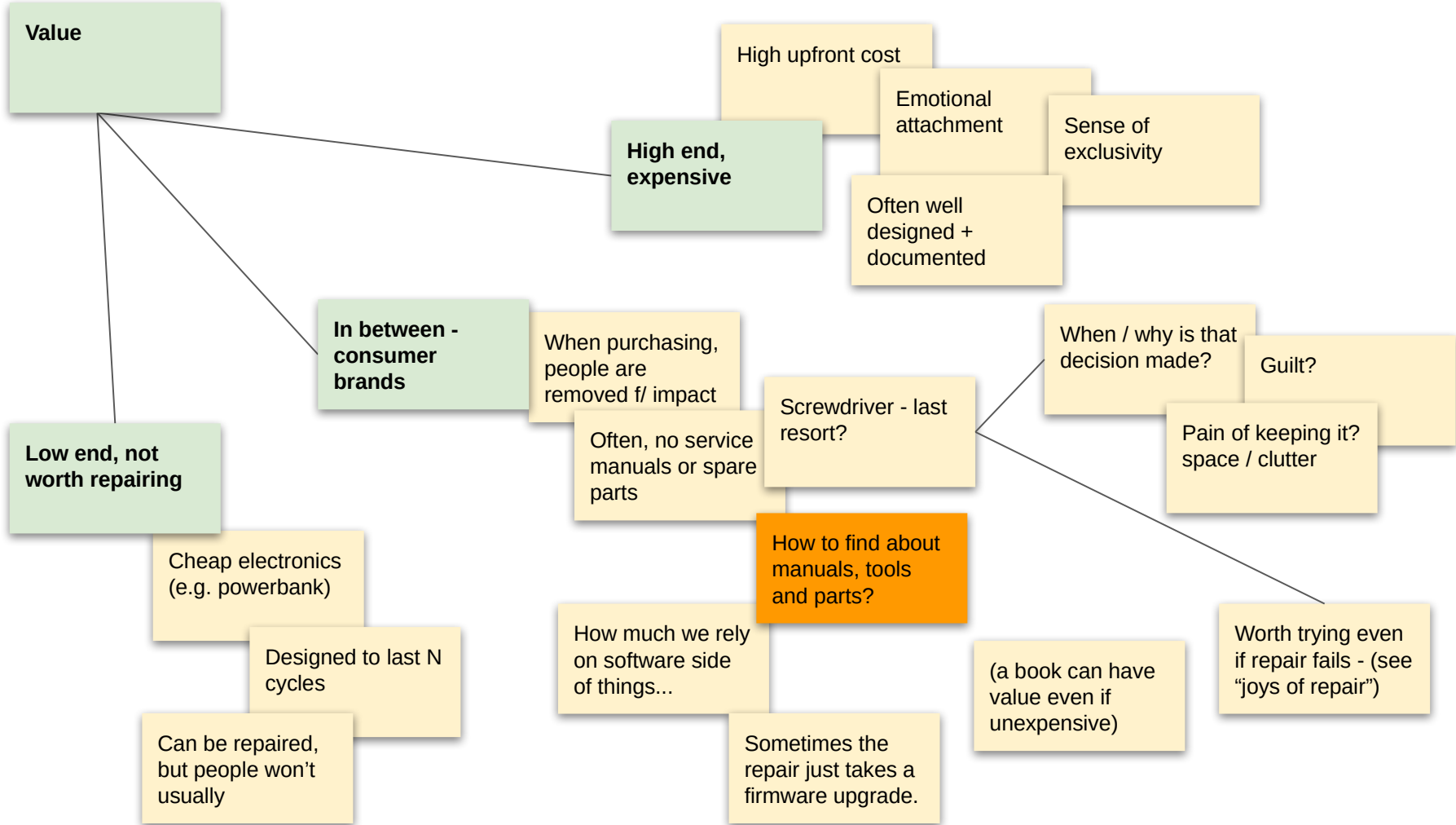  - Messenger bag / Calligraphy box / Relief press / Chess board

# Key points

Notes in yellow come from my interaction with participants

Notes in green are highlights or analytical insights

Notes in orange are insights for co-design concepts

# Repair Journey - Main Takeaways

- How to find about manuals, tools and parts?
- How to identify the problem of one specific broken object?
- How to reward people for repairing?
- How to find about people, spaces, events?
- How to store and move broken objects that can still be repaired?
- How to offer inclusive spaces for repairing?
- How to encourage repurposing by modularity?

- How to treat more objects as a cherished book?
- How to relate the practical skills of craft, repair and making?
- How to undo a robot's work?
- How to make Local Authorities and Councils more active in promoting reuse?
- How to make materials and services known?
- How to use prop shops as models for a local circular economy?
- How to welcome people who struggle with mental issues?

**Value**

**High end, expensive**
- High upfront cost
- Emotional attachment
- Sense of exclusivity
- Often well designed + documented

**In between - consumer brands**
- When purchasing, people are removed f/ impact
- Often, no service manuals or spare parts
- Screwdriver - last resort?
- When / why is that decision made?
- Guilt?
- Pain of keeping it? space / clutter

**How to find about manuals, tools and parts?**

- How much we rely on software side of things...
- Sometimes the repair just takes a firmware upgrade.
- (a book can have value even if unexpensive)
- Worth trying even if repair fails - (see "joys of repair")

**Low end, not worth repairing**
- Cheap electronics (e.g. powerbank)
- Designed to last N cycles
- Can be repaired, but people won't usually

**Process of repairing (typically)**

1 Investigate story of the object

2 Clean its outside

3 Open it up

4 Identify the problem

5 Repair / repurpose

How to identify the problem?

Service manuals

Clean internals

Prior experience

Buy tools / replacement parts

Internet

Use alternative parts

Play / Experiment

Transform

Learn how things are made

**Joys of repairing?**

Overcome planned obsolescence

Document - be useful to others

Avoid damage / environmental impact

How to reward repairing?

**Social value of repair/reuse**

**Repairing / reusing in private spaces**

**Repairing / reusing in the city / community**

Garden shed

Workshop

Retailers

Professional repair shops

Social Media Freecycle Gumtree

"Free to collect" signs replaced by social media

Access to things, parts, tutorials, people

Informal repair markets

Makeshift / informal repairability

How to balance liability / risks?

e.g. old cars - there's always a possible hack

Repair Cafes Men's sheds

Hackerspaces - perceived as inaccessible

How to find about people, spaces, events?

# Participant Diaries + Notes

**Participant 1**
Key fob /
USB charger

"Great to had from you, and sorry for my silence over the past week. I am sure you will be happy to know I have been keeping a diary and in a true-to-style bound notebook. I have even just started repairing - an external usb battery pack, although as you can see from the photos there is some collateral damage to the case. It was bomb-proof!"

"Day 1 - Why repair?

A pastime of mine is fixing software bugs and small electronics. Laptop not working? Cortana giving me grief? Fiddle with the registry until, bam, Microsoft no longer can slurp up my search history and personal data.

But, why fix stuff? It often can take longer and sometimes cost more money to try a repair than just buying a replacement or ignoring the issue. There is a high risk you might even break the things further as you "fix" them. So, why sweat the small stuff?

Well, it is my nature. I have fiddled with computers since I started programming as a kid. I am also a researcher in Life Cycle Assessment, so it is also my job as well as my passion to consider the environmental impacts of man (and woman's)* awesome high-tech creations.

motivation
cost / risk
personal trait

And, I have a 3D printer.

3d printer for
small scale repair
- learning

A 3D printer means an boundless supply possibilities and, inevitably, repairs issuing from (and for) the infernal device.

I recently repaired the case of an electronic key fob which had come apart (understandable after more than a decade riding the helm of various handbags) and the remains of which even electrical tape could no longer hold together. It was not a very important repair, but it has made a Christmas and a birthday present (Mark 1 followed by Mark 2).

I learnt a fair bit about 3D printing, and the possibilities (and limitations) of using it for small scale repair. I'll tell you more on Wednesday.

* Let's not forget Ada Lovelace's legacy"

"Day 4

The reason I chose to repair the key fob was not because I have a personal sentiment for it nor indeed do I believe does the person for whom I made it. Instead the key fob is a token of my appreciation and its making and remaking a shameless ==personal challenge in improving my own skills== in 3D CAD and 3d printing which I would not have undertaken with such rigour without the deadline of the winter family-get together and inevitable trade of presents (increasingly ==homemade== thankfully).

As I learnt, after the kick of buying of the festive period, having a 3D printer means ==patience and skill== - a fair amount more of it than I had hitherto while acting the consumer. Having received a whole bunch of new filament and a new hotend I successfully blocked the nozzle with the new filament and destroyed the hotend. Over the course of ==two months trying to fix the problem==, it has also made me learn a lot about the art of screw extraction and threading new threads ==from the most informed person I know what of from my local university== - as well ad the virtue of using grub screws made of appropriate materials.

meta:maintenance of repair tools / equipment

two months - help from skilled person



However 3D printing also brings joy which goes with pain like yang with yin. And this joy is made incarnate when someone takes the fully-assembled key fob, ==once a shapeless and uninteresting spool of filament==, and goes wow - it works! Best of all with the key fob was seeing the flashing car light up when pressing the lock button.

I doubt they will resist the excitement of summoning the car with the magical button and feel the suggestion engraved on the inside of the transparent case - Drive less and save the planet, will probably be overlooked."

"Day 6 (1/2)

Today I did a spring clean of my drawers of electronics and have some wonderful finds to share with you. You know it's the right time of the year for a spring clean when there is a chorus of birds outside. There is a garrulous group of house sparrows tending to their homes, which are sadly in decline, ironically possibly because of the neatness of modern houses which lack suitable nesting sites. Huddled together they seen oblivious to government guidelines on social isolation - though thankfully for their sake as much as ours it doesn't apply to them. Either way the birds puts a smile on my face and are a lot more welcome than swarms of locusts. More to the point of the repair diary, their business makes me feel I should also keep my nest (of wires and various electronics) in order.

For full disclosure, I also had to do a spring clean to move things out of the spare room.

In the course of my spring clean I found the prototypes and the fossilised remains of the key fob I repaired for a family member. To the left of the picture you can see the remains of the key fob (I didn't preserve the tape that held it together), and to the right, the back, and front covers of the printed key fob. These actually are only a few of the many prototypes and failures on route to a final part, and are in a sign of the first limitation of 3D printing, which ties in nicely to the theme of spring cleaning I introduced you with.

– – – ➤

Waste. And worse, it is all plastic.



hoarding vs spring clean

prototype vs fix

repair and collateral waste

"sustainable" filament

Day 6 (2/2)

When you see someone showing off 3D printed objects, they naturally don't show the waste basket which they use for all the failed prints (of which there are usually at least a few, because of the printer getting jammed, or when trying to work out the right settings). Even when you get the right settings with a lot of objects you have to use extra plastic to support overhanging structures and give enough support to the object so it doesn't get pulled of the print bed. This all means 3D printing produces quite a fair amount of waste material.

As it happens, I am not like most people and am also sharing, for the first time, the contents of my bin, as shown in the picture below. This shows all the waste plastic I have produced from one printer since October.
So why have I gone to the effort of separating it? The reason is because there is some good news.

The good news is that one of the most widely used plastics for 3D printing, polylactic acid (PLA) is a made from plant material, and theoretically can decompose. I say theoretically as the conditions required for the to decompose are only found in municipal food waste digestion tanks, sticking it in your compost bin is reportedly not a good idea. Either way, it is the idea that one day, I may be able to turn all this PLA into compost, or melt it down and recycle it, Precious Plastics-style, that has kept me dogmatically separating my 3d printing waste.

Maybe one day it will come to pass that every hobbyist (and more importantly, every manufacturer) with a 3d printer will be send their waste for recycling, instead of resting in bins like terrible malformed creations of a unforgiving god."
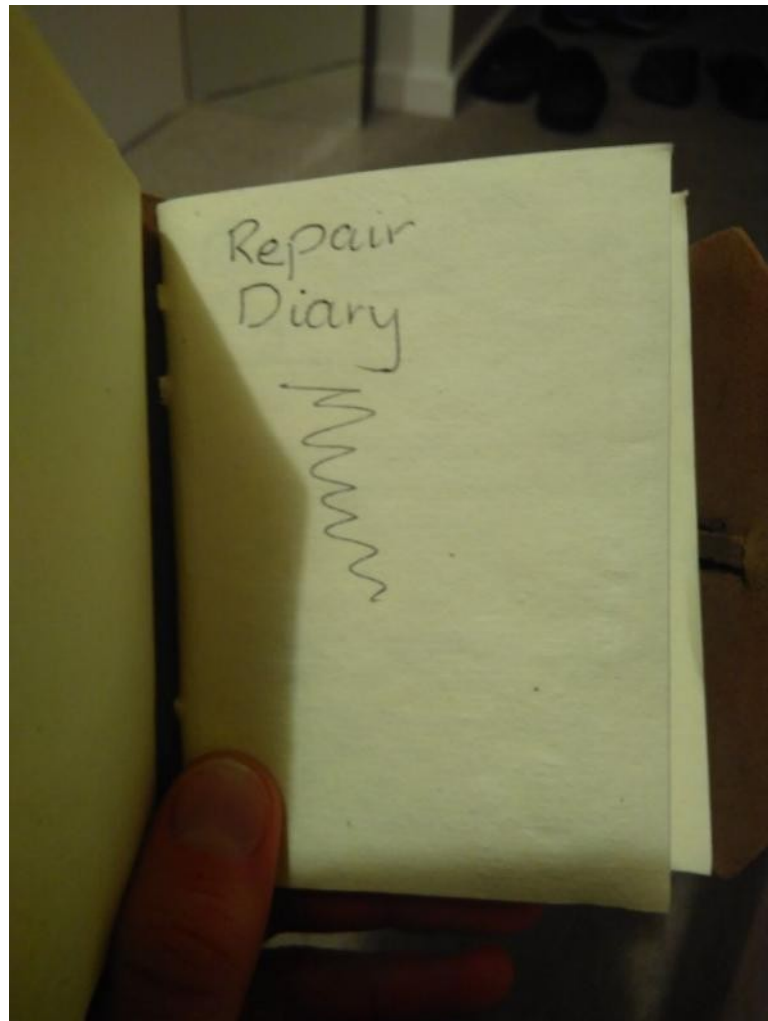
Dear Felipe,

Thank you for your email and sorry for not relying for so long - I did not forget about commitment to help with your study.

The reason for my slow response is that I have been trying to digitize all of my diary, and have ordered parts to try and make a working battery pack by now. It didn't quite work out with the battery pack, but here are some pictures of the paper diary, and a poem (below) I wrote - to be shared anonymously please.

I hope the images and the poem are useful to you in your thesis. Feel free to also use it for the any other work under the terms of the study.

I am producing
it but I am fighting
it

2/5/20

Waste
Reduce ⇒ Reuse ⇒ Recycle
Onan
mesh
bags

Measure waste
each week (cos of the
lockdown)

I learn about what
materials I am putting
in & how they are
(probably) treated

eg.
bioplastics
used in 3D
printing

# Power bank repair



<u>I</u>ssue: does not hold designed
capacity (5200 mAh), only
972 mAh when tested using
phone

<u>M</u>anufacturer : Anker

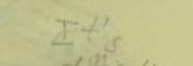<u>P</u>urchased from : CeX (2nd hand
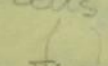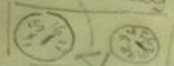~~tool~~ electronic shop) ~ 1yr ago.

18 month warranty from Anker
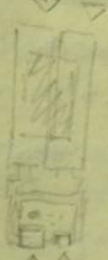24 month warranty from CeX.

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Date &
Month
Made

2016 July

Li-Ion
18650
cells

It's
difficult
to open!

Foam
padding

Inside
of case

Light
Ducts
for
charging
indicator

Micro USB
for charging
battery

USB port
for charging
other devices

... electro-

... gloves

... to
... soldered

... with a
... on that

... is
... ine —
... ng a
... minus
...

Todo used

- Multimeter — check if batteries are below critical voltage
- Knife — open battery pack case
- Soldering iron — desolder the battery connection & resolder it
- Rubber gloves to reduce risk of electrocution
- Internet — to view videos of other people disassembling power banks & for info on batteries.

The issue with life cycle assessment is ~~that~~ this

"How would anyone know if you made it all up?"

( Show the data )

( We can't — it would reveal intellectual property or sensitive information that could put us out of business if widely known )

OR

( Yes, but you must sign a non-disclosure agreement )

It's ...
nucle...
where ...

man...
everyo...

Even ...
vastl...

almo...
mont...
reduc...
to s...

can ...
cait ...

# Repair Diary — Day 14

It's ~~already~~ two weeks since the beginning of Felippe's experiment, and I know I have a lot of repairing to do. In fact, I haven't repaired anything yet — I have, however, at least put down some ~~thoughts~~ thoughts on repair from a ~~very~~ personal perspective — a hobbyist, environmentalist, ~~this~~ western, individualist, & fortunate persu...

Poem - Musings on an Unearthed Microchip, 3rd June 2120

To read a microchip
Like a book, and
Date ICs*
Think how brief the little lives
That made this miniature, green-tinted city sing
For consumers and economic growth
Neither of which thought as far ahead as today
Busy streaming, swiping, texting, gaming, doing business,
Looking for the next byte,
more speed, more digital land to conquer,
to drown in moving pictures like something out of a 21st
century classic
like Rowling or Cixin Li
Less use for that now.
What use could it have?
GPS for navigating streets of cities now flooded.
Next-gen microchips designed for games
Only the rich kids have time for -
Descendants of the shameless consumers that depleted all
the minerals.
The ones that on their phones played imaginary battles.
While their real minions,
in hidden workshops and toxic mines
slaved away to give you
brief
emoji
:joy: .

And what now?
What do these microchips mean to me -
the industrious 22nd century man?
Tin for tat,
Battered for cobalt,
Lined up and fired
in a kiln for lithium,
Cut from umbilical leads
And melted down
for copper
Caps** off for the prospect -
oh so tantalising prospect -
Of tantalum.

The stuff that gassed soldiers then and now,
The fumes from the sap of trees bled dry,
Releasing their magical smoke,
And metals that emperors
Once thought would make them live for ever
Today
Make me so
Unwell

Together with the rest of the elements
Even all the Gods, and cosmic fates
Never, never, dreamt of sticking together.
But our ancestors did.

Just for kicks.

For the chips
So many of them
Despite their various functions in former lives
Despite the marketing and promise of
egalitarian growth
Despite their designers espousing democracy,
The last words on those chips,
were the words of totalitarian states
where they were made.

Did anyone in those old liberal "developed"
countries
see that their freedoms
were made in factories
where those freedoms were most oppressed?

History coming around again
The history books whisper not a word about the
troubles of that state
Which is sure a sign as any that they also had
epidemics, and fumes, and workers that slaved.

Black lives don't matter
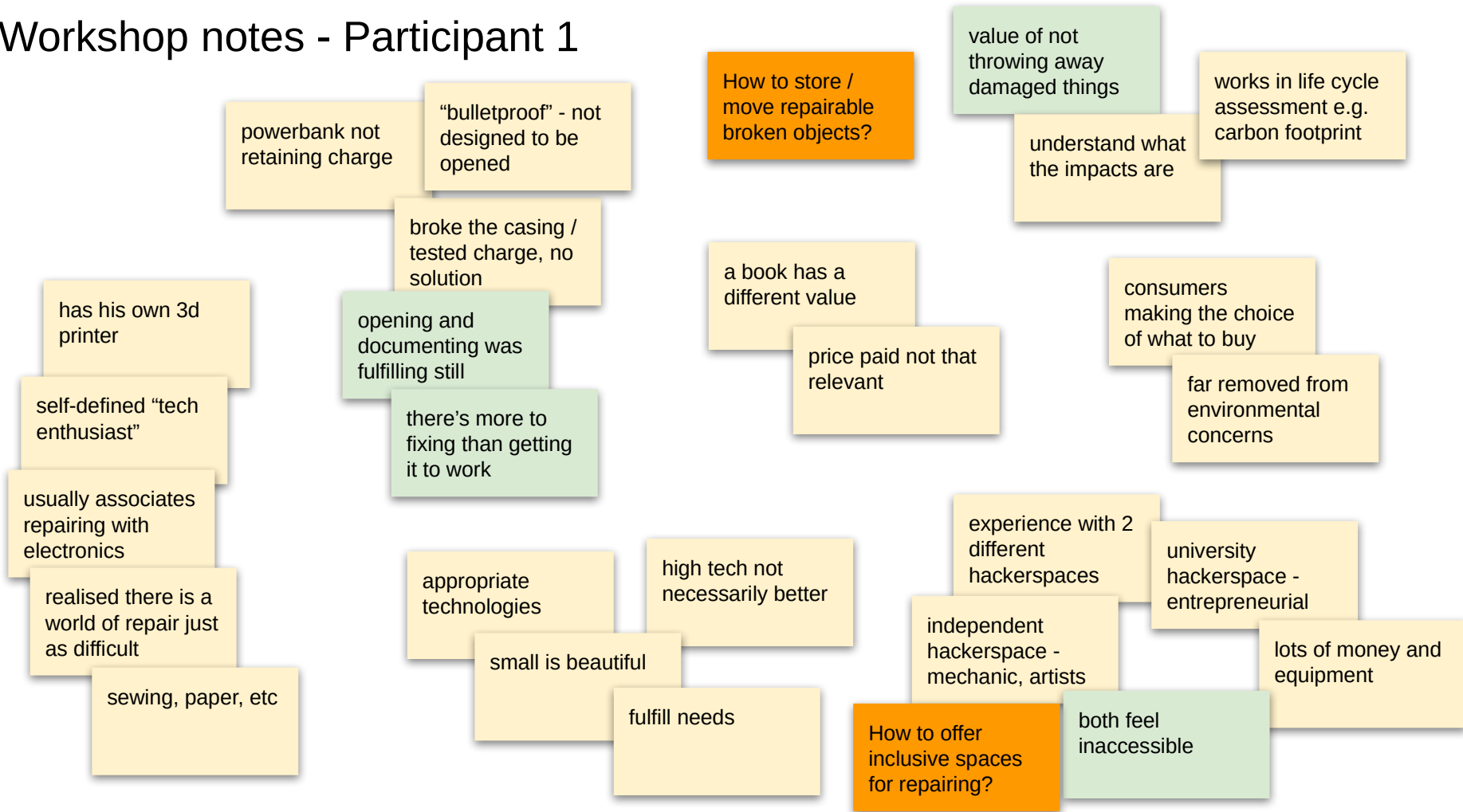Yellow lives don't matter
Children are the future
You don't want to see

* https://www.instructables.com/id/How-to-read-date-codes-on-ICschips/
** Caps is a term commonly used in electronics for capacitors

# Workshop notes - Participant 1

powerbank not retaining charge

"bulletproof" - not designed to be opened

broke the casing / tested charge, no solution

opening and documenting was fulfilling still

there's more to fixing than getting it to work

has his own 3d printer

self-defined "tech enthusiast"

usually associates repairing with electronics

realised there is a world of repair just as difficult

sewing, paper, etc

How to store / move repairable broken objects?

value of not throwing away damaged things

works in life cycle assessment e.g. carbon footprint

understand what the impacts are

a book has a different value

price paid not that relevant

consumers making the choice of what to buy

far removed from environmental concerns

appropriate technologies

high tech not necessarily better

small is beautiful

fulfill needs

experience with 2 different hackerspaces

university hackerspace - entrepreneurial

independent hackerspace - mechanic, artists

lots of money and equipment

How to offer inclusive spaces for repairing?

both feel inaccessible

**Participant 2**
Toaster/
Lawnmower/
Food mixer/

...

"My repair this week will focus on two toasters, both found abandoned in skips recently.

The story:  The Tale of Two Toasters

I will see what parts from both machines can be used to create one working toaster.  I'll then give it away to someone via my website.

Over the weekend, I've repaired a lawnmower and a food mixer, which will go up on my blog once written."

hobbyist repairman

documents his repairs in a public blog

# Workshop notes - Participant 2

takes things apart since he was a child

worked for a large telecom as engineer ~ 20 yrs

on the side, repairs things to people + family

cost of replacement for similar quality

learnt to fix his bike and toys

first as skilled technician, then managing roles

"hobby customers"

stories

unique story: perceived / sentimental value.

as a teenager, summer jobs in car parts + bikes

now working for local authority, unrelated

pocket money to buy biscuits

"objects come with stories"

blog started off for fun - share experience

what did it do before breaking? what changed?

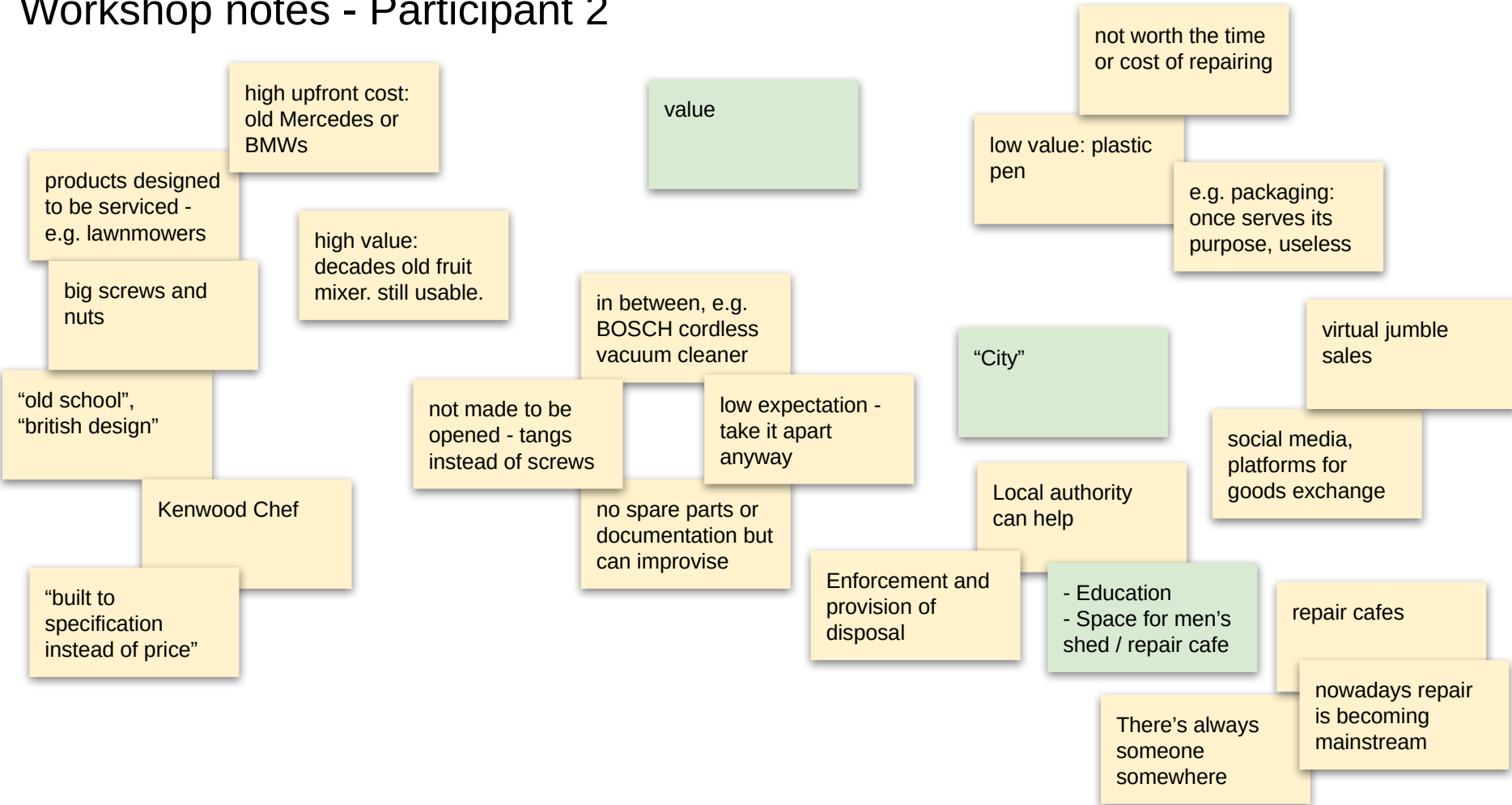ask recent story: find out what happened

1970s calculator fruit mixers vacuum cleaners

joy of getting around planned obsolescence

did you use it in a different way than you regularly do?

failure is part of the process

used to document some failures in the blog

were there noises, fumes, sounds? was it hot?

# Workshop notes - Participant 2

not worth the time or cost of repairing

high upfront cost: old Mercedes or BMWs

value

low value: plastic pen

e.g. packaging: once serves its purpose, useless

products designed to be serviced - e.g. lawnmowers

high value: decades old fruit mixer. still usable.

big screws and nuts

in between, e.g. BOSCH cordless vacuum cleaner

virtual jumble sales

"City"

"old school", "british design"

not made to be opened - tangs instead of screws

low expectation - take it apart anyway

social media, platforms for goods exchange

Kenwood Chef

no spare parts or documentation but can improvise

Local authority can help

"built to specification instead of price"

Enforcement and provision of disposal

- Education
- Space for men's shed / repair cafe

repair cafes

nowadays repair is becoming mainstream
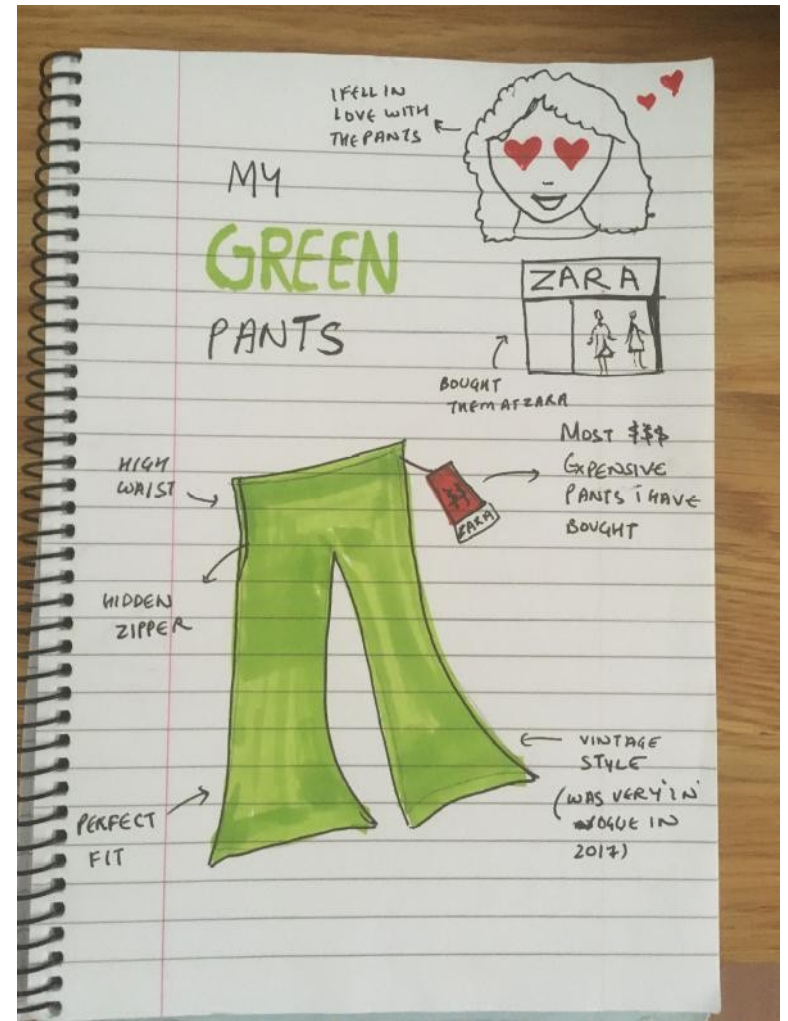
There's always someone somewhere
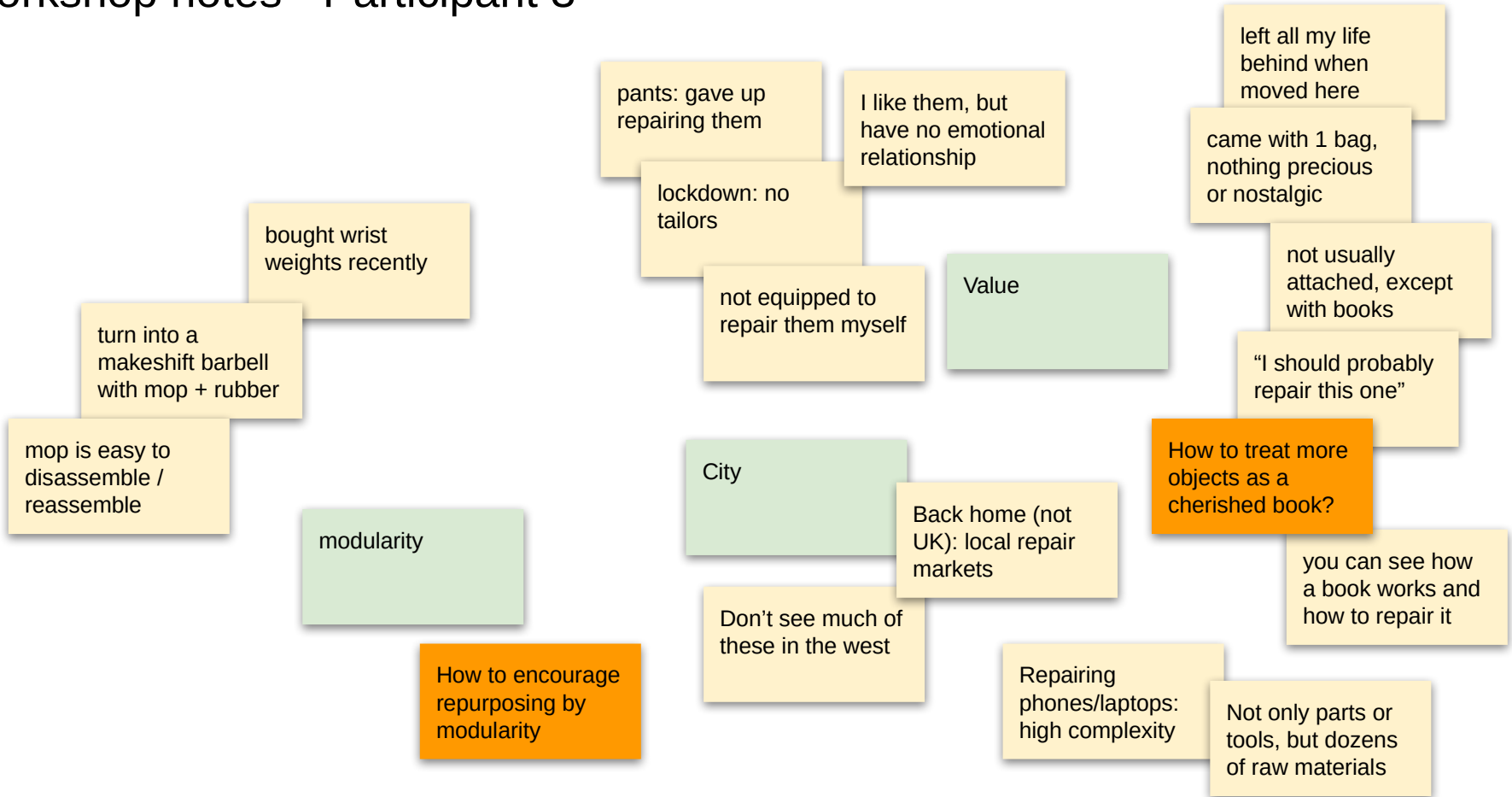
**Participant 3**
Pants/
Book?

"The object I have chosen is a pair of my favourite Zara pants that recently tore from the zip. I'm keeping this diary to record the story of my journey with this object."

# Workshop notes - Participant 3

pants: gave up repairing them

I like them, but have no emotional relationship

left all my life behind when moved here

came with 1 bag, nothing precious or nostalgic

bought wrist weights recently

lockdown: no tailors

not usually attached, except with books

Value

turn into a makeshift barbell with mop + rubber

not equipped to repair them myself

"I should probably repair this one"

mop is easy to disassemble / reassemble

How to treat more objects as a cherished book?

modularity

City

Back home (not UK): local repair markets

you can see how a book works and how to repair it

How to encourage repurposing by modularity

Don't see much of these in the west

Repairing phones/laptops: high complexity

Not only parts or tools, but dozens of raw materials

# **Participant 4**
Chair

# Adopting a chair

I had 2 things in mind that I could document for the study. 1 is my phone which recently developed a couple of vertical lines on the screen either from water damage or a hit. I might park that as even with new tools I got today it's unlikely I'll be able to open the stripped screws that would be step one. The second one is a longer term project - I found a wooden chair down the road that's missing the seat. I've been putting it back because I'm thinking of it more as a design and making exercise that will need some time and was waiting on some things to help me start. I'm happy to document the work on it but I doubt it will be done in 2 weeks, working on it on and off. How does that sound?

I was walking down our street with my partner and saw a pair of chairs near a tree like the one in the picture. A house was being renovated and they had been putting different things on the curb, some broken and some not.

It's been more common to find items on the curb in UK than other countries I've lived in. I've always thought it was because people tend to move houses often or people making space for themselves or another item. There's even been a clause in my rental contracts explicitly saying you can't leave items behind, which is fair but taking everything with you is not always an option either. So the curb is often where things end up (I've seen contracts forbidding that as well).

Our interaction with things on the sidewalk somewhat amuses me. Sometimes it's a just a sideways glance as if you don't want to get caught looking at it. Other times it's more involved but still transient with a good dose of hesitation. You can physically see the mental switch from "I'm out to buy fruit" to "do I need this?".

For household items we usually have to agree we need it first. If it's just one of us, this involves texting pictures of the item and making a case for it. If we're together and want it, it's down to wether we can pick it up right away or return to it. Over the years we've picked up this chair, a lamp base, books, shelves and a tea set.



Left: A wooden lamp base that we salvaged and added a new shade before we moved to our current place.
Right: My partner sending me pictures of a table she found as she knew I was thinking of getting one for my printer.

"cleaned it and kept it in the kitchen"

hard to find dust masks with the pandemic

solved with ceramics supply store

first use: filament spool holder

3d printer to experiment with different shapes

We cleaned it, and kept it in the kitchen for quite some time. I had some sanding paper I got from the local tool-station some time ago, which I tested on it. Dust masks are nowhere to be found with the pandemic so decided against fully sanding it. Eventually my partner found some at a ceramics supply store. She's been making ceramics and was worried about inhaling the fine plaster and ceramics dust. I was quite surprised that they were priced reasonably and the vendor actually shipped them. Still I thought I might as well sand the chair once I have a clear idea of the final outcome. Maybe the current weathering suits it.

The chair eventually became a project to get to. It briefly served as a spool holder for filament which worked surprisingly well. One thing I noticed was that if you were to add a cussion straight on the slabs it would be lower than the other chairs in the house which would likely be less comfortable for me.

Over time I would fleetingly think about what we could do with it. My partner is an artist and experiments with different ways of making using looms, making ceramics, jewellery and more . Maybe we could make a loom directly on it and weave a seat, or use one of the fabrics she printed her work on. What about those cool voronoi shapes I've seen 3D printed? What other shapes could you only do with a printer?

from paper to 3d
model
photogrammetry

Since 3d printing a seat was in the back of my mind, I wanted to have a 3d model of the chair to design and fit the seat on. I took a cutting mat that had a grid on it, placed it on the floor with the chair on its side and traced it on a piece of paper. In Fusion 360 I could now import a picture of the outline and use the grid to size it somewhat accurately. A little bit later I had a model of part of the chair and a quick first form for a seat. While I get a sense of how the a seat would look I'd like to see it on the full chair. Modelling that would need a lot of detailed measurements thought. Maybe an opportunity to try photogrammetry.
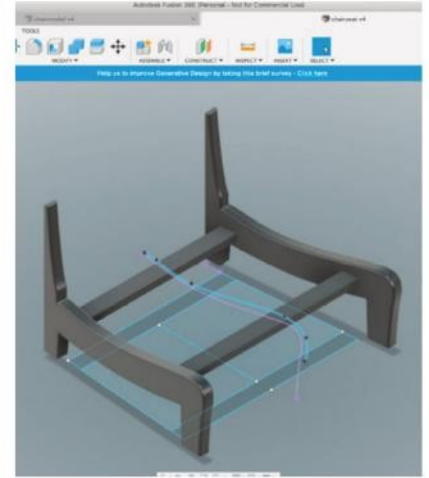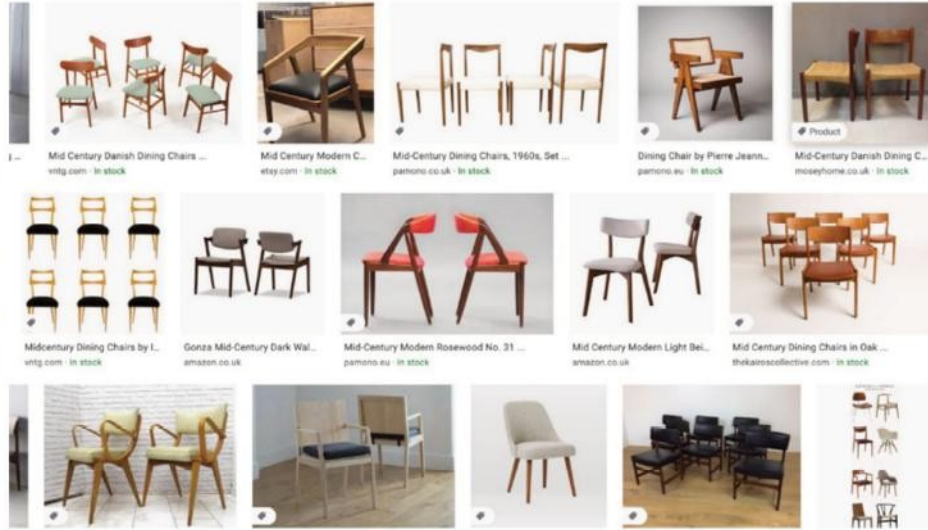
The chair frame has a mid-century feel from what I can tell so I decided to do a quick search for inspiration.

transforming - height, shape, fabric

Checking the height of the seat by using a box. It looks like whatever I add will have to rise above the curved sides to feel comfortable. Playing around with a cussion and my partner's printed fabrics to get a quick sense of forms and textures. I also dug out some pieces of off-cut wood that we bought a local timber supplier. They could help with raising the seat and making the gaps smaller and easier to bridge.
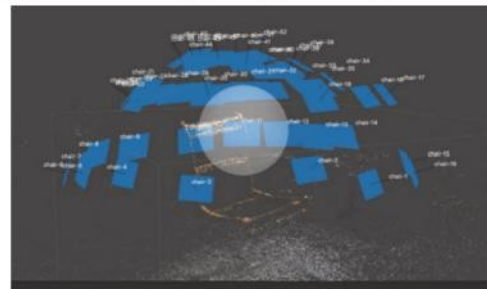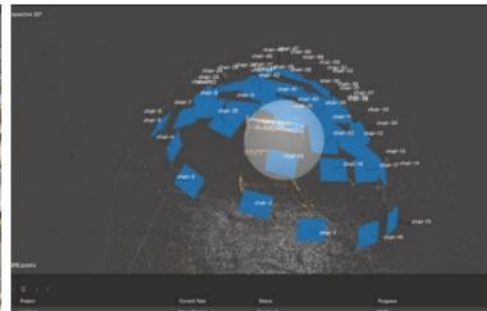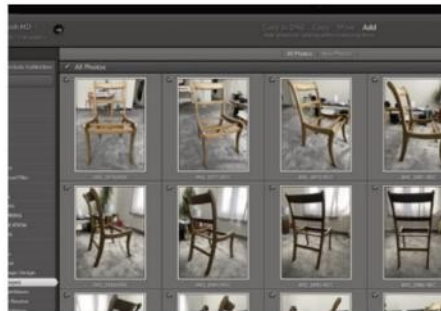
I searched online and watched a couple of youtube videos on photogrammetry. All I need is a camera and software to stitch the pictures and generate the model. The software is where things get tricky as opensource software for Mac needs compilation and can only work with nvidia cards that support CUDA. I have an AMD openCl card which makes using a trial of Metashape the only thing that I

could tell would work.

From the youtube videos I saw the other day I knew I had to take pictures from at least 3 different heights and around the object so decided to put the chair on a sidetable and try. After importing the pictures from my phone to the software I start the workflow. The point cloud it generated was not as dense as the ones I saw in the

examples. The legs were almost non existent. I had the chair in the middle of the living room which meant a lot of things in the background. The light was not great either.
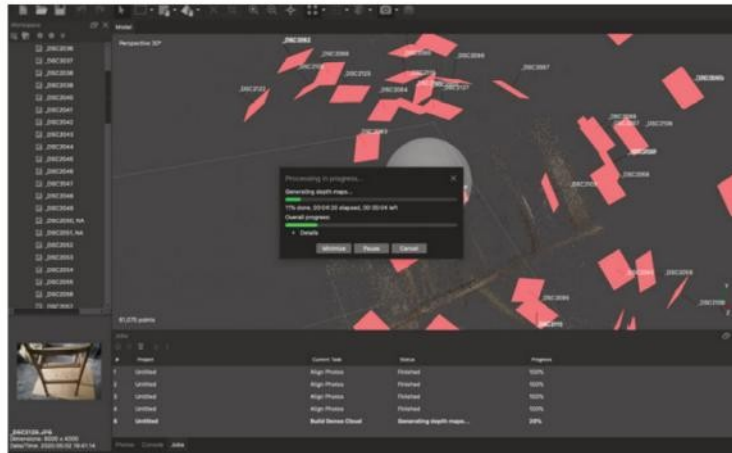
I gave it a second go with the help of my partner holding up a sheet to occlude the background but in the end the results where similar. Third try in the kitchen that has more uniform lighting also yields the same results. At this point I'm not sure if this is a waste of time or not so I look up online on how I can improve my results.

multiple attempts: changing background, lights

My partner finally opened up the foam she received for another project. I really like the looks of the texture. It feels though it wouldn't survive the abrasion of use. I've been thinking on and off about ways of creating a cushion. We also have some polyurethane foam we could sculpt a seat from. My partner shows me all the different websites she had found when looking for her project. They stock all shorts of foams and pads. Our neighbourhood has 4 hardware stores. They tend to be more expensive and have limited stock, so we often find ourselves buying things online.

another material: foam

websites to source materials - more affordable

I've been using a cheap cushioned IKEA chair as a work chair and it's comfortable enough, so I thought it might be a good idea to have a peak at how it's made. A nice plastick plate formed for strength with minimal material and weight, a slab of foam and a zipped cover. The hooks on the plastic plate clamp on the round metal frame. Pretty simple and neat.
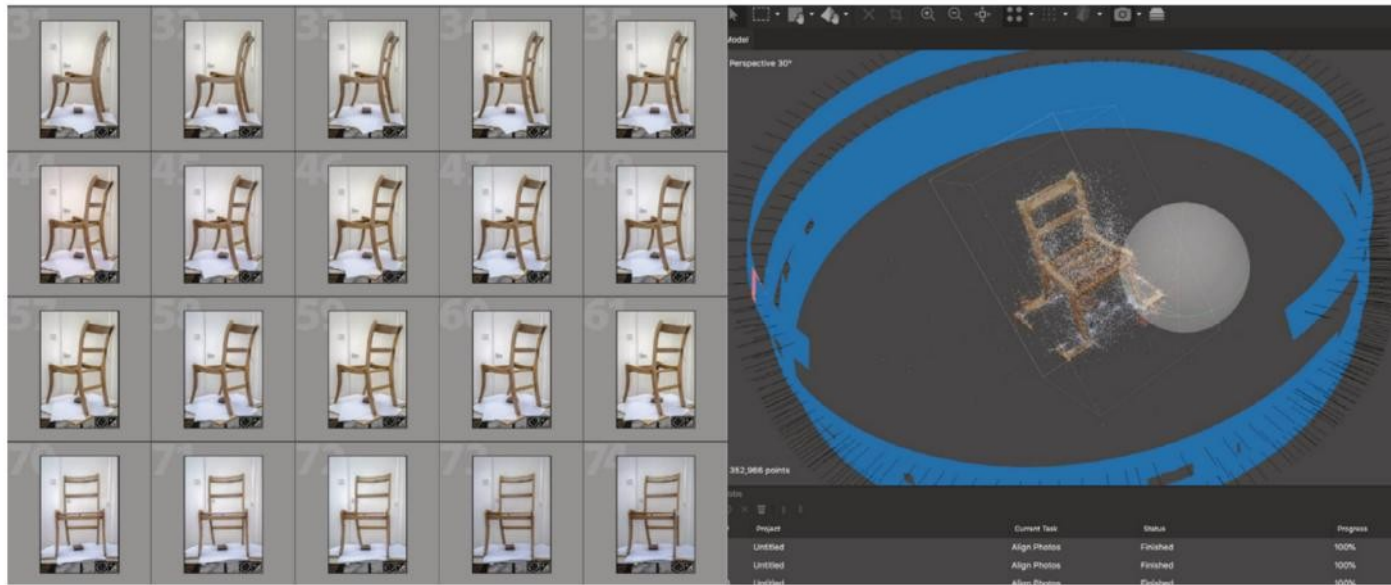
using a revolving chair as base for photogrammetry

This morning I wanted to have another go. I took apart the revolving office chair and placed a cardboard with some weight on it to keep it flat. Now I could place the wooden chair on it, turn it and take pictures from a single point with a fixed plain background. This time I used a proper camera on a tripod and my partner's studio lights. Once everything was set I controlled the shutter from my phone while rotating the chair. I briefly marvel on how easy it is to remote control the camera these days. Probably went a bit overboard with shooting 500 shots though. In Lightroom I spent some time adjusting contrast and making the texture pop as I read it helps. In metashape the first step for the sparse cloud took longer and building the dense cloud required leaving the laptop to work overnight. The next day it was still processing. It seems that if the screen goes into screensaver it would stop. A few hours later I had a points in space that really looked like the chair. There was a bit of cloud of random points but thought that they would be ignored when meshing.

After crunching the dense cloud into a mesh I got a chair encased in something that looked like molten aluminium. Turns out it didn't ignore the random points. Editing out the unneeded mesh seemed too much. I remembered seeing somewhere that you can filter points. I found a way to delete by selecting with a lasso and eventually by colour. After a few attempts it produced a mesh that was good enough.

While amazing, this process was much more invovled than using something like Scandy which is for 3d scanning heads using your phone camera. I was able to scan myself with that in minutes while one of the first attempts was computing. With Lidars coming to phones I can see things like scanning this chair becoming trivial and available very soon.

refining the mesh

expecting a new generation of smartphone apps

sketching ideas,
reflecting upon
limits and materials

In parallel with working out how to make a digital model of the chair I've been sketching different ideas to see what works visually. I'm also starting to think what it would take to actually make them with the means we have. The printer's volume is smaller than the biggest gap on the chair which means I can either make parts or will have to break bigger things to smaller components.

I decided to try making one of the sketches into a model to see how it translates. It's still not there. That said since there is noone waiting to actually use the chair I can take my time just enjoying trying things out :)
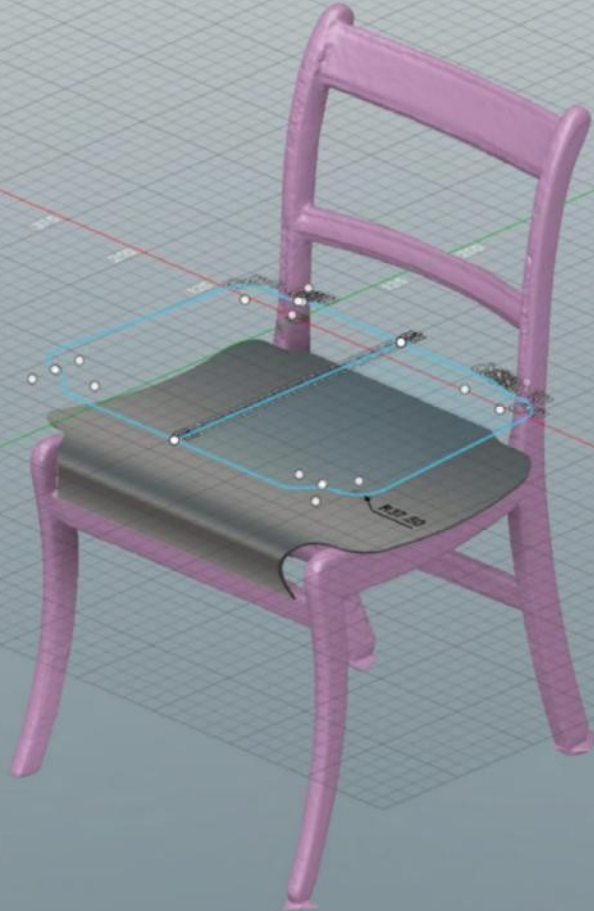
decided to prototype

# Workshop notes - participant 4

always saw father and older brother building things

"I was the one who would break things"

repair depends on how much you care about a thing

paying or losing things - risk

realised now how many things had to be repaired

I repair things out of curiosity

phone repair was dead end

got a PC by mid 1990s

bikes etc

when I visit family, people expect me to fix things

curious and not worried about breaking things

recently got into 3d printing

growing older, product designer

making, not repairing

transferable skillset

How to relate the skills of craft, repair and making

"if a human being assembled it, you can fix" (brother)

today, often are robots that assemble things

How to undo a robot's work?

lives in residential area, people moving in / out

chair

things in the street arguably not worth posting online

gets things from the street (but not too many)

good excuse to use the 3d printer

getting things from the recycling point: impractical

# Workshop notes - participant 4

where to look for (trustable) people?

How to make materials and services known?

discarding is a contingent decision

"classical": dance, ceramics. never electronics

Local Authority sends email about social activities

there are ways to get materials and services

not a characteristic of the object

How to make LAs active in promoting reuse?

Local Authority

friend repairing old motorbikes

hackerspaces - not that accessible

consumers want to get the job done

had a garage in old council share building

partner is an artist - often rents place w/ extra bedroom

"in between legality"

involved with education, uses infra for herself

# **Participant 5**
Garden shed

"Sorry I have not been in contact much about my repair diary. I have been rebuilding a small shed/cupboard outside so it is very weather dependant which for the most part has been good but also I am reusing old and salvaged materials so sometimes things stop while I search for the right kind of timber or hardware. My family all are pretty good at hanging onto useful things so I put a call out every time I need something and they usually come up with the goods close to what I need.

Im also working with no plans and some wonky surfaces (not straight or odd shaped) so its all a bit challenging for my 50 year old brain. Anyway I keep trying."

Tiny shed cover for garden tools

Angles / elevations

"I can't do any technical drawing"

Expecting visit from friend who's good in making

Owns or borrows tools / equipment

# Interview notes - participant 5

"mum and dad used to repair things"

things now more affordable and get delivered

I don't do as much - have more money, I think

As I get older, more interested in fixing things

Store a bit of stuff home

Scraps of wood

Buys props for TV and film

Decide what to buy, hire or make

Most jobs will get rid of everything

"I don't like seeing things being thrown away"

End up bringing stuff home

How to use prop shops as circular economy case?

Carbon emissions

Costs: transport

Domestic objects

Furniture

Large prop houses

Exterior stuff, medieval, egyptian, etc

Cars

Huge buildings with all sorts of things

Hire instead of buying

No structured system to discard stuff

COVID-19: people more aware

Buying second-hand goods on ebay

Knows someone who clears gov buildings

No system in place - no LA department

Men's sheds

Trading post

Superhire

Tayside Re-users in Dundee

**Participant 6**
Inspection camera

"I did get round to poking a repair I had been meaning to do for a while, so thank you for the motivation to do it.

My object was an inspection camera (bought from Lidl) that came with a loose battery retaining spring. It had worked OK for a few uses, but the final time I used it, the batteries overheated as the connectors crossed. I caught it in time to prevent major damage, but put it to one side. As it was past the return to store point I failed to get the manufacturer warranty help (required phone call, and due to anxiety that did not seem worth while).

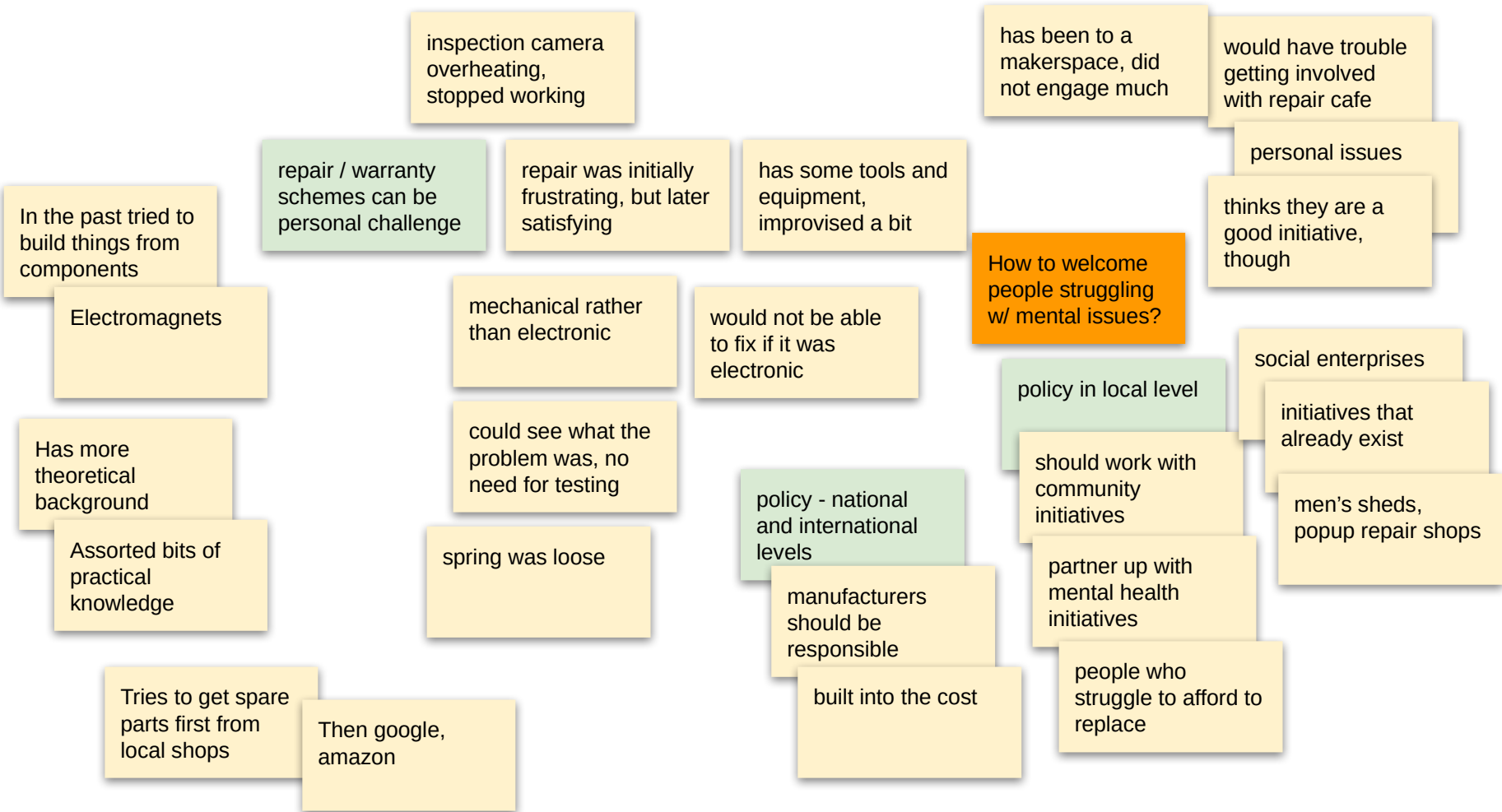In any case, you provided me the motivation to take another look at it.

In the short version, I took the case off, and an internal cover, to extract the relevant power supply plate. Many attempts at wiggling the spring back into the designed retainer failed, so I took it to my workshop where I reformed the plate using my vice as a sort of anvil. In the process, the cable connector snapped off at the solder point to the plate, but I finished fixing the spring regardless.

I had a solder iron at one stage, but that had been misplaced, so I used my cooking blowtorch to melt the solder and reattach the cable.

With that final step, the camera now works again (and has since been used).

The repair process was somewhat frustrating initially, as the first few attempts _almost_ worked, but in the end it very satisfying having turned junk back into a useful tool. Total time taken was about 1.5 hours in a single stint.

I already have a fair collection of tools and equipment at home, and was able to get away without spare parts, the unit was not sealed with security screws or any such. I was able to improvise the missing tool (soldering iron) as I said. I had looked at repairing the unit previously, but was frustrated by a lack of facilities. Since then we moved, and hence the workshop. The changes meant that the repair went from frustratingly impossible to pretty straightforward."

inspection camera overheating, stopped working

repair / warranty schemes can be personal challenge

repair was initially frustrating, but later satisfying

has some tools and equipment, improvised a bit

has been to a makerspace, did not engage much

would have trouble getting involved with repair cafe

personal issues

thinks they are a good initiative, though

In the past tried to build things from components

Electromagnets

mechanical rather than electronic

would not be able to fix if it was electronic

How to welcome people struggling w/ mental issues?

policy in local level

social enterprises

initiatives that already exist

Has more theoretical background

could see what the problem was, no need for testing

should work with community initiatives

men's sheds, popup repair shops

Assorted bits of practical knowledge

spring was loose

policy - national and international levels

partner up with mental health initiatives

manufacturers should be responsible

people who struggle to afford to replace

Tries to get spare parts first from local shops

Then google, amazon

built into the cost

**Participant 7**
Messenger bag/
Calligraphy box
Relief press
Chess board

"I managed to get one of my restorations / complete overhauls written up for you: I had a messenger bag for around ten years, and wore the fabric right out so last summer I salvaged some elements and re-made the bag to my own spec:

I just took this photo, I'll try and get a better shot tomorrow if that helps? I just realised I used pencil as well, I'll try and do it in ink."
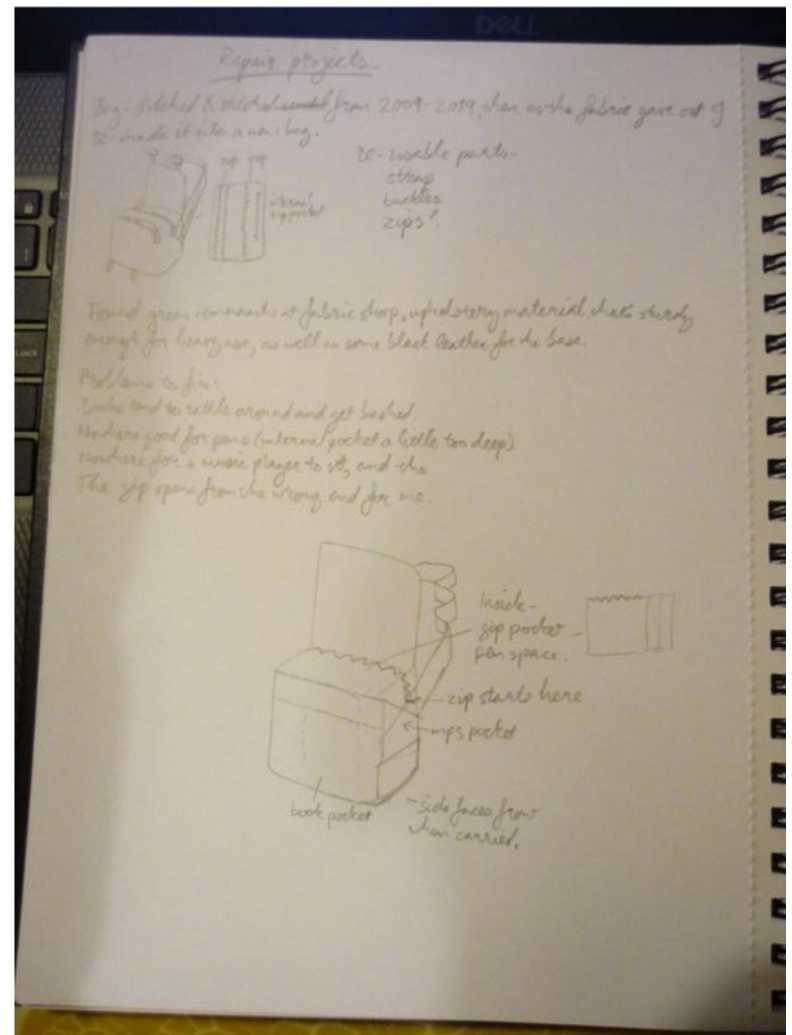
"I've also got a few woodwork projects: an old falling-apart set of bookshelves I turned into a calligraphy box.

and a bedside cabinet I turned into the flat plate of a relief press.

as well as the hinge in a folding chessboard."