

Dr Dorothy Hardy

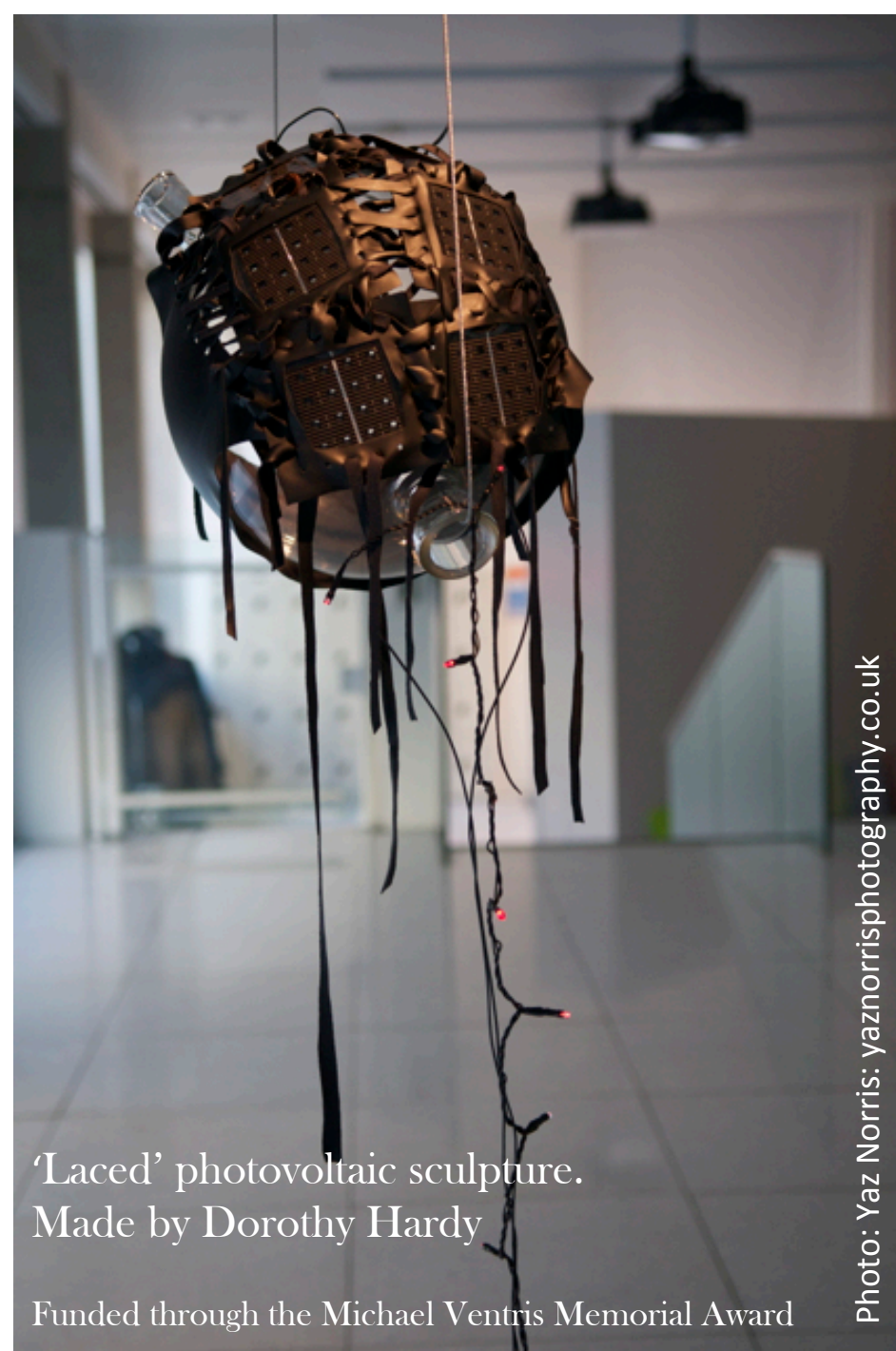
Freelance
Research
Communicator

Repair, recycling and disposal
of E-textiles

Workshop on Manufacturing and
Sustainability of
Electronic Textiles

16th January 2020

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'Laced' photovoltaic sculpture.
Made by Dorothy Hardy

Funded through the Michael Ventris Memorial Award

Embroidered
cloths
enwrought with golden
and silver light*

*W.B.Yeats

Mixed materials?
Landfill!

LAND-FILL

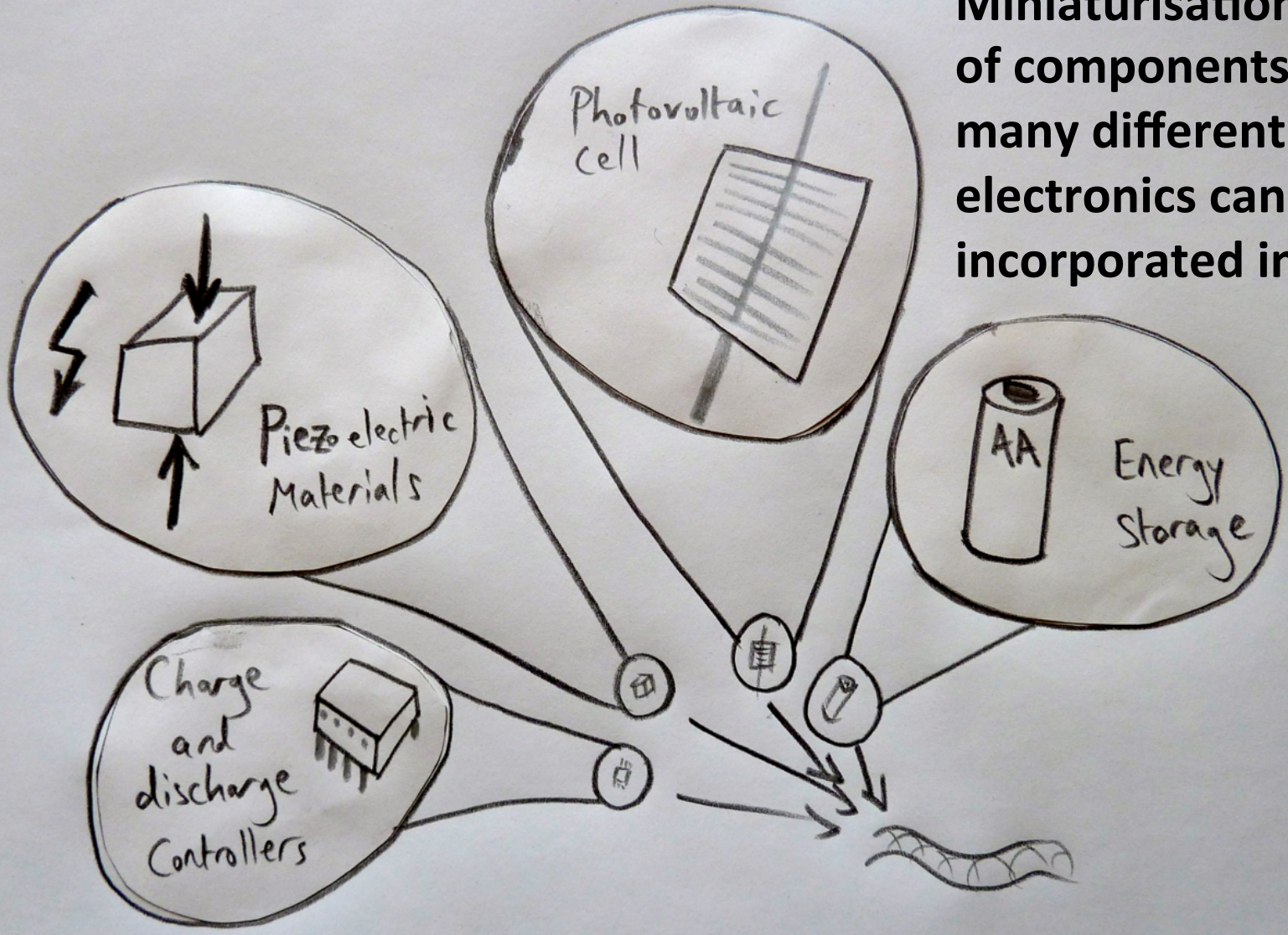
TEXTILES

ELECTRONICS

There are
no
recycling
facilities
for
electronic
textiles



Miniaturisation of components means that many different types of electronics can be incorporated into textiles.





A message pinged to her wrist, sending vibrations down her arm.

He loves me?

Please get onions and bread.

He needs me!

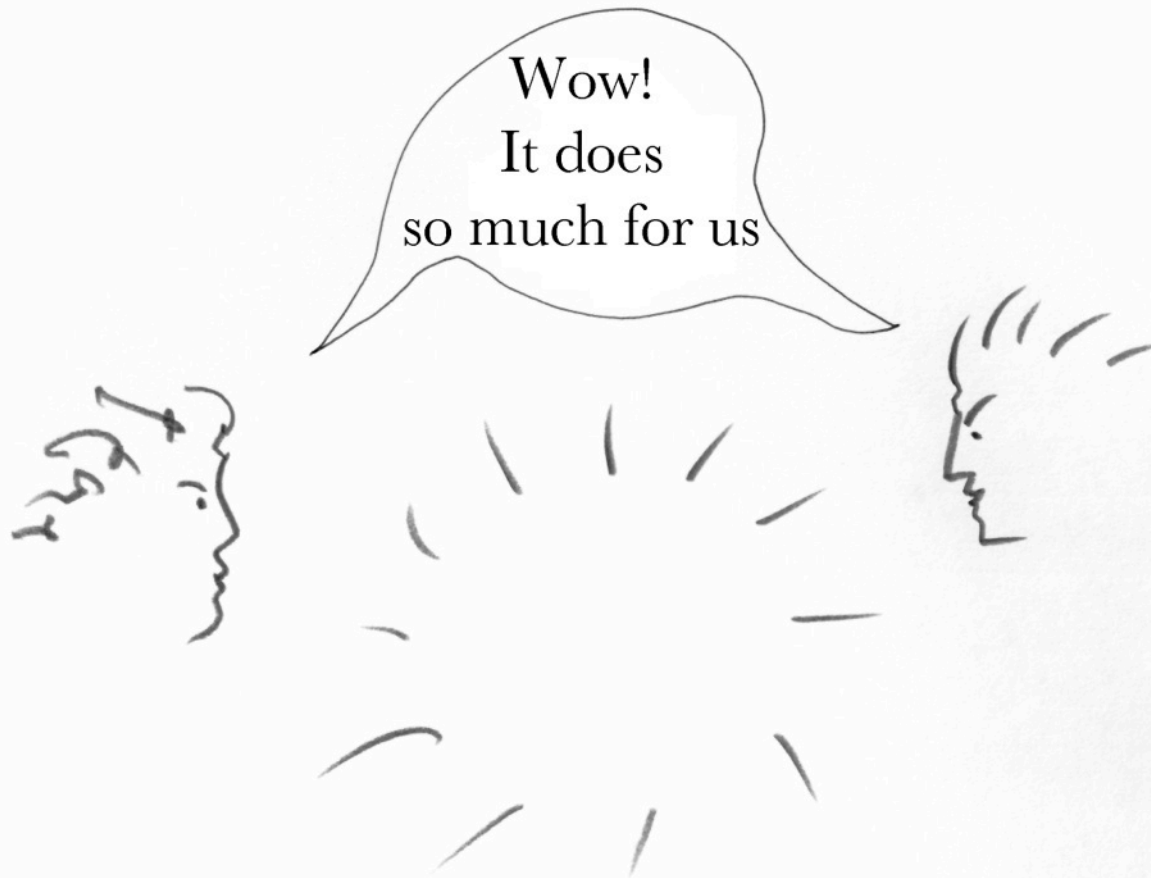
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‘Humans are ... large, expensive to maintain, difficult to manage, and they pollute the environment.’

Kaufman, Perlman and Speciner 1995

Quoted by Norman in *The Design of Future Things*

What is the need for electronic textiles, and how do people interact with them?

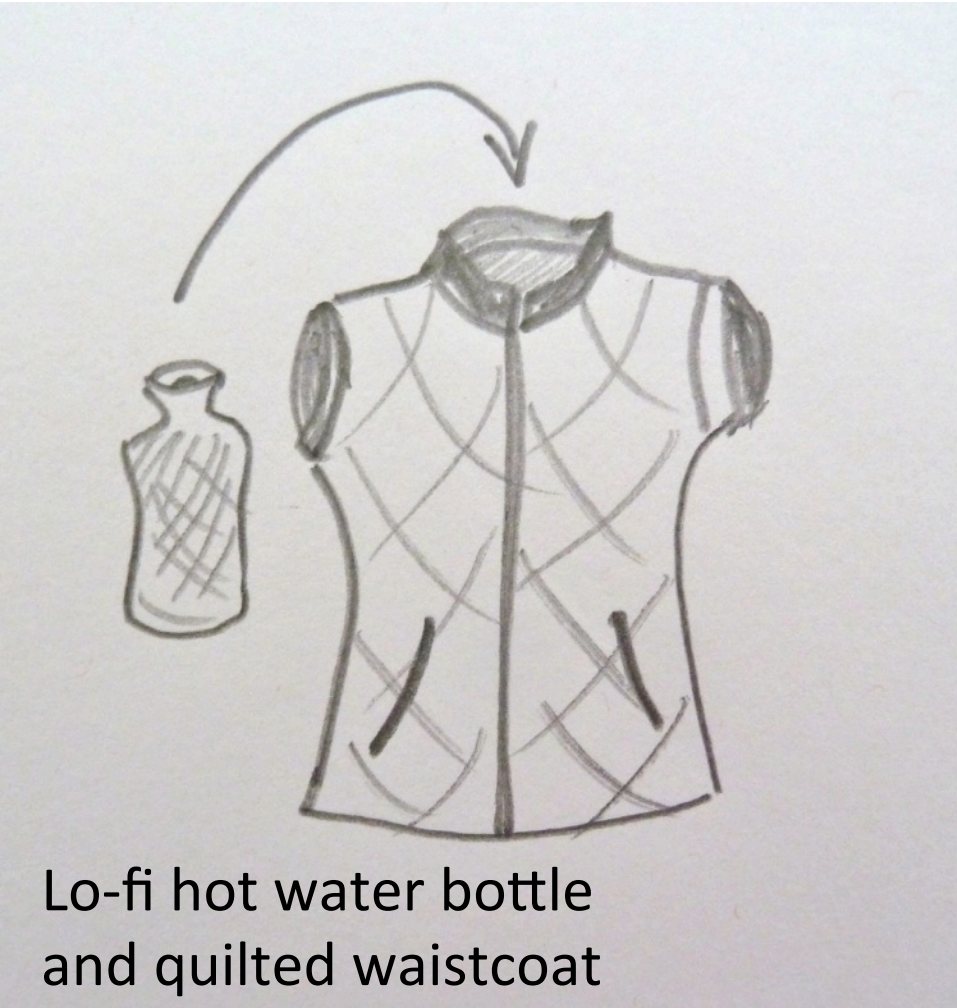


A sustainable E-textile

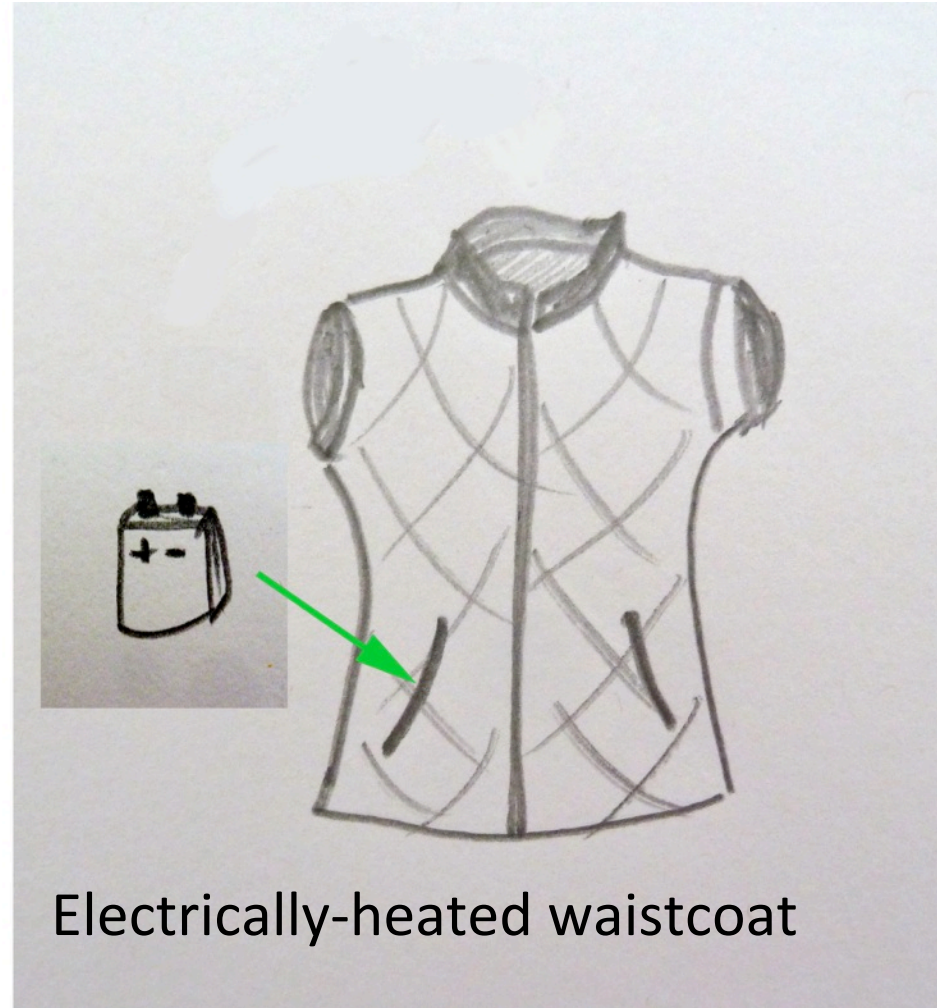
There are no facilities for reprocessing waste E-textiles

*JD
19/7/18*

Heated textiles have existed for over 100 years



Lo-fi hot water bottle and quilted waistcoat



Electrically-heated waistcoat

What is in E-textiles?

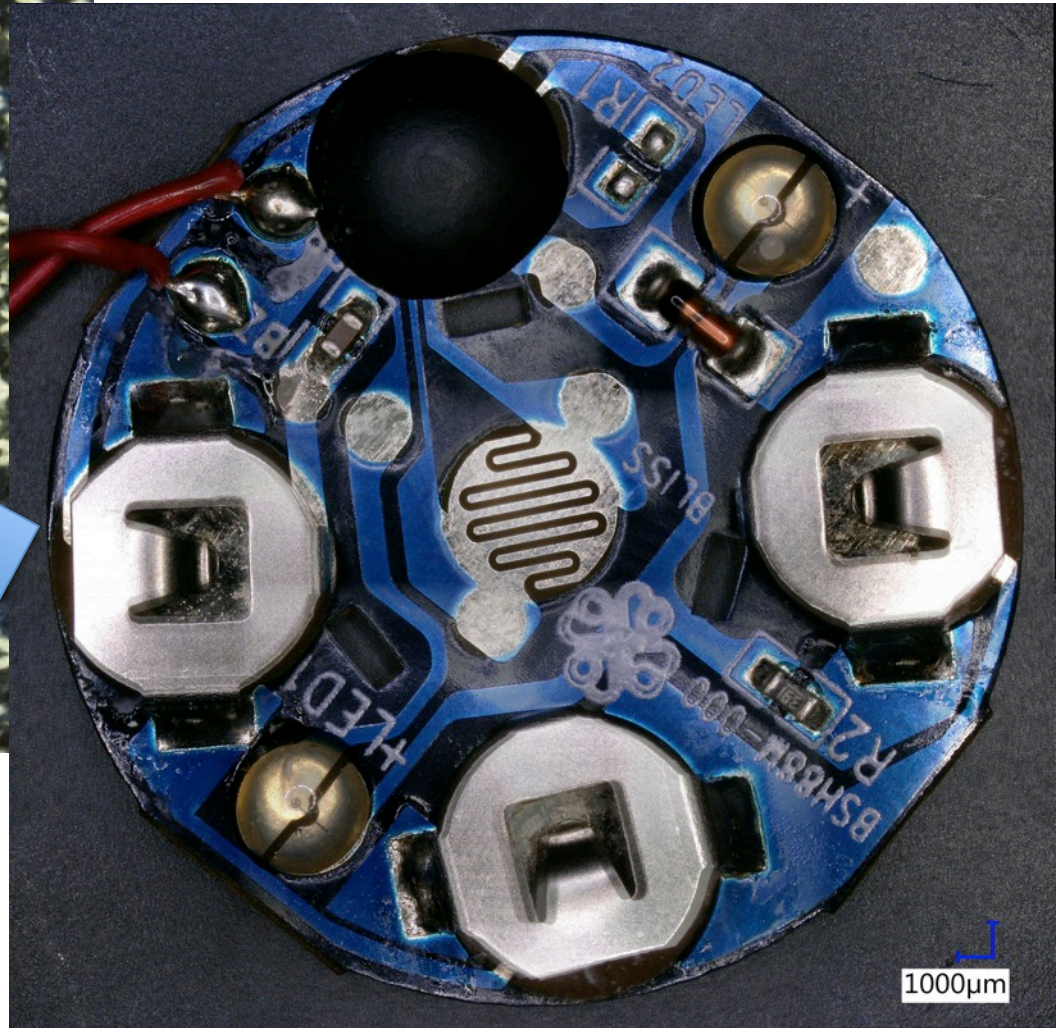
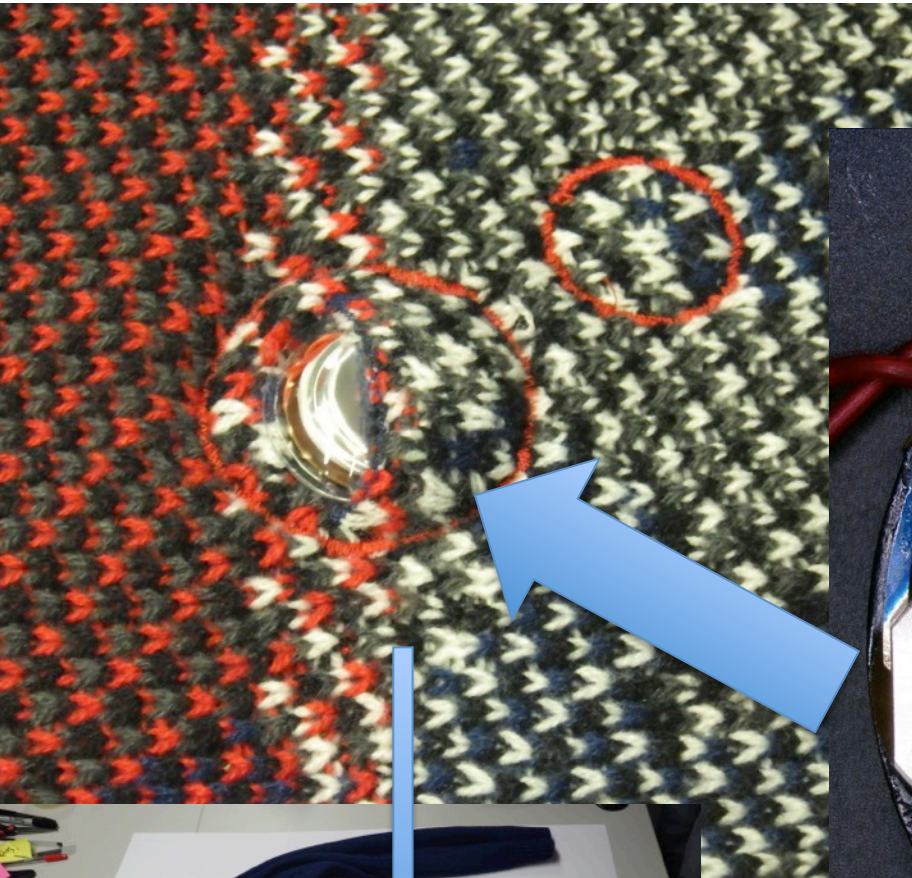
What is on the market?

What can be done to make E-textiles sustainable?

- Design
- Use
- Re-use
- Disposal



The commercial reality: A Christmas jumper



This jumper has electronics sealed into a plastic pod: batteries cannot be replaced

Heart-rate monitoring sports bra teardown

The electronics are removable, but the bra is a composite of materials. Some required heat to separate them.



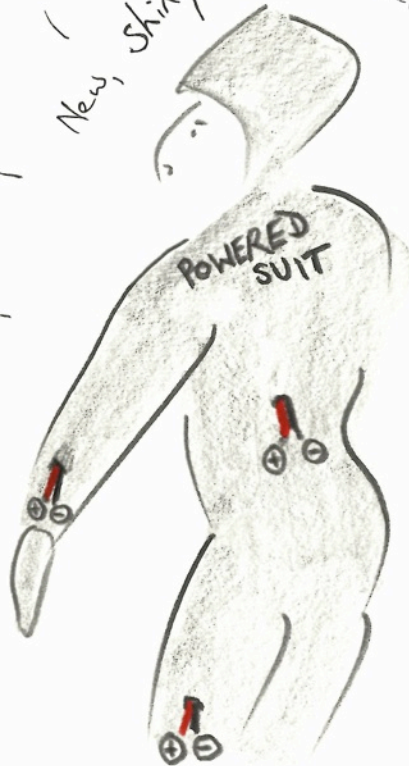
Carbon-loaded tape

Photo:
Emily Cole

Now, where shall we put the battery?



New, shiny wearable tech



By the way, these batteries can explode!



Choice of power source

A woman with dark hair, smiling, is riding a stationary bike. She is wearing a dark grey cycling jacket with a pattern of glowing orange rectangular lights on the sleeves. The background is a blurred indoor setting, likely a gym or a studio.

Connecting components within electronic textiles

Model: Eloise Salter
Co-designer of the
'Light My Elbows'
cycling jacket

<https://repository.lboro.ac.uk/articles/>

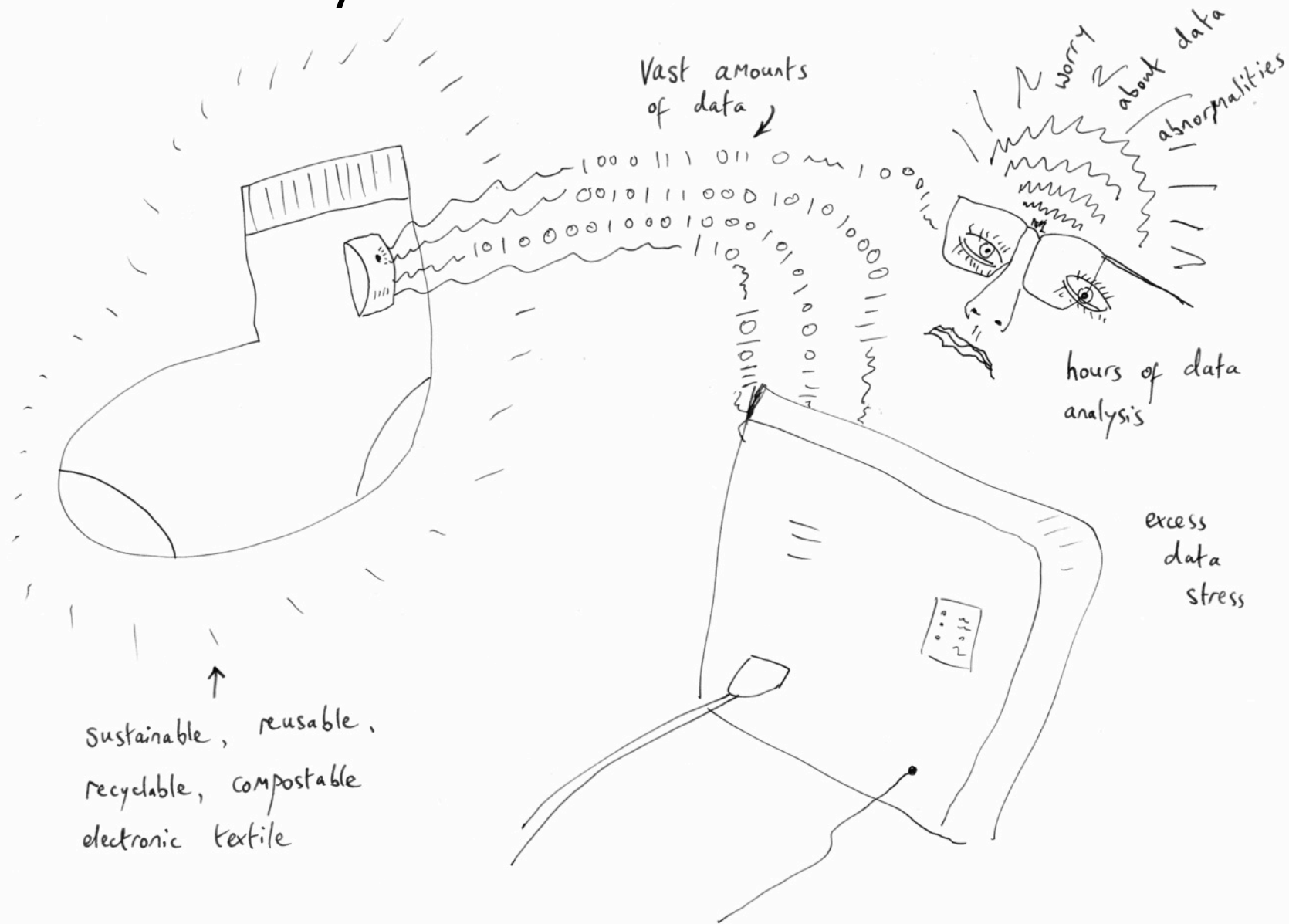
Light_my_elbows_a_cycling_jacket_incorporating_electronic_yarn/
9741278



Electrical connections

Conductive copper wires are embroidered onto the copper ring, but no wires are sewn into the textile. This makes wire removal possible.

What is actually needed?



**Save the planet:
reduce waste!**

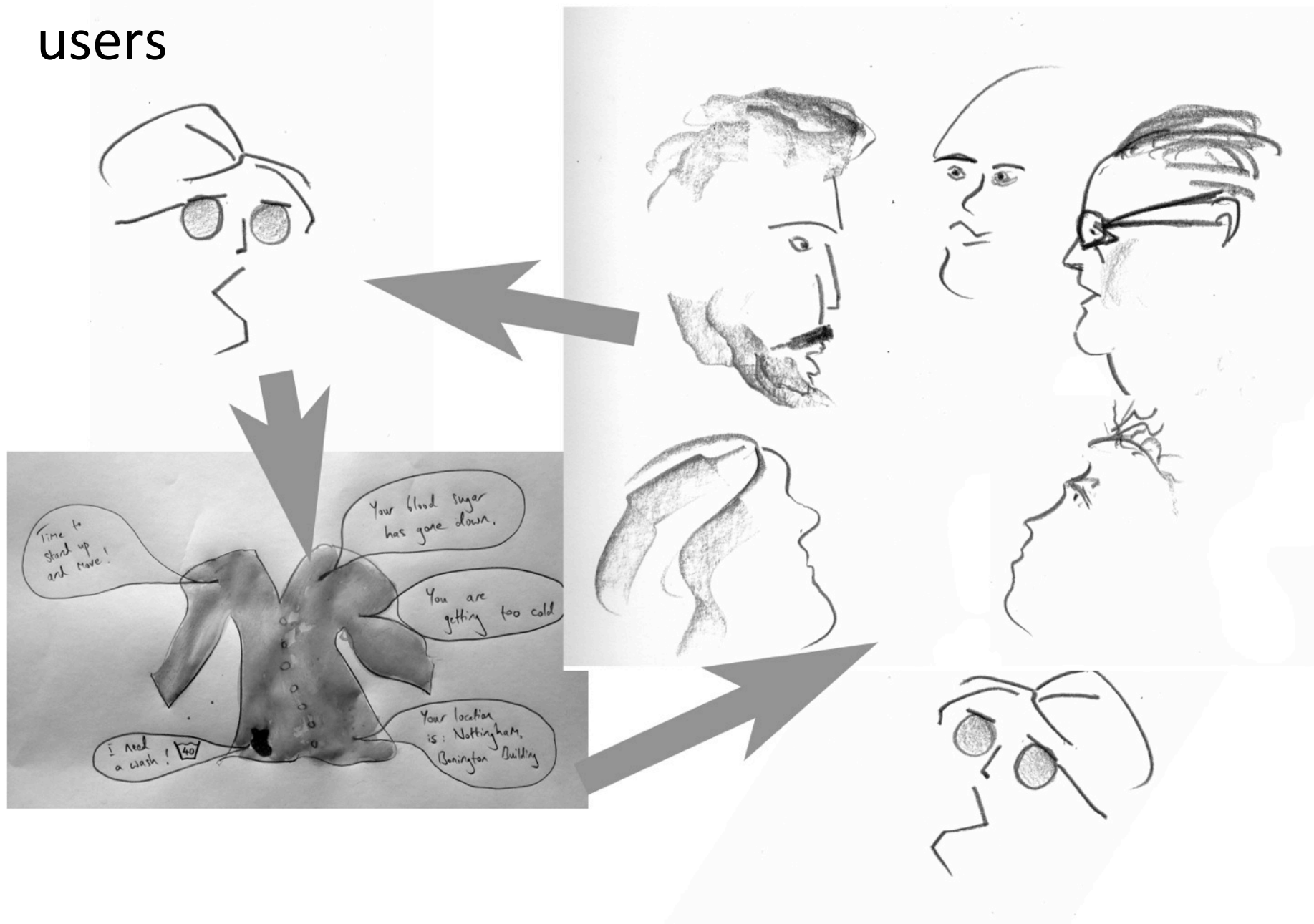
Look after your new phone
very carefully.

Yeh. Gimme!

Changing
attitudes

1/9/18

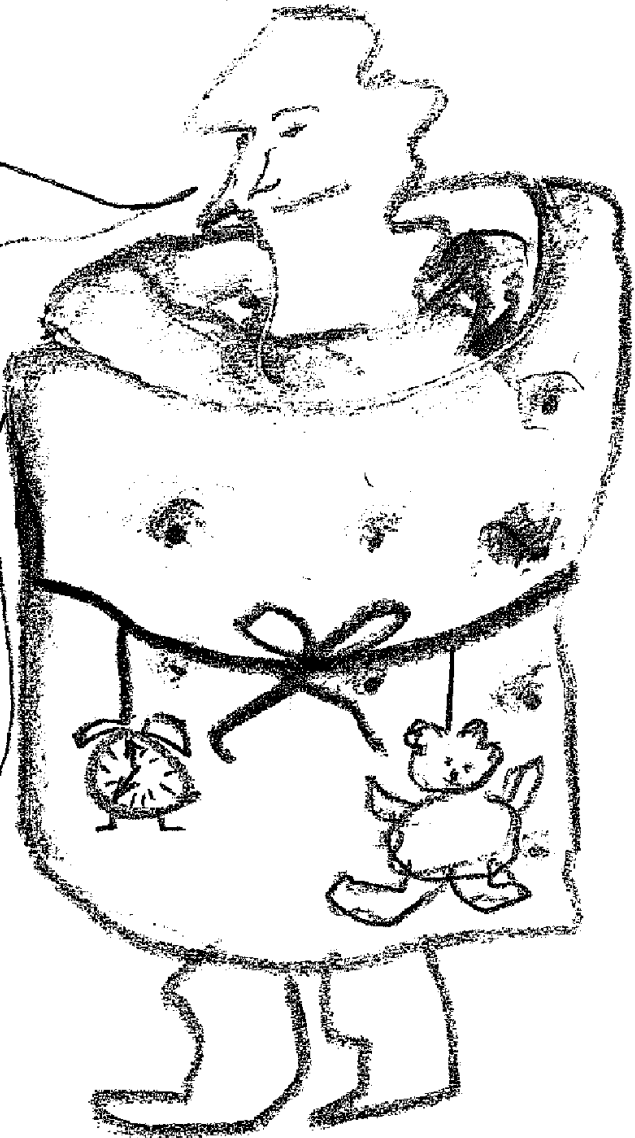
Co-design ensures that products are as required by users





Why are you wearing a mattress?

This is my wearable with sleep functionality inbuilt alarm and comforting facility.



Test lo-fi alternatives before making E-textiles

JAH
28/1/16

Sustainability action

- Separability of components
- Optimising power generation and storage
- Minimising toxicity and recyclability
- Designing reliable connections
- Standards
- Legislation
- Facilities for recycling and disposal
- Attitudes

The data streamed from her wearables.
It was all good. Her designs were trending.
But when would anyone invent the app that could tell her:
'Why did I come into this room?'



E-textiles can lead the field in sustainability or be legislated out of existence.

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