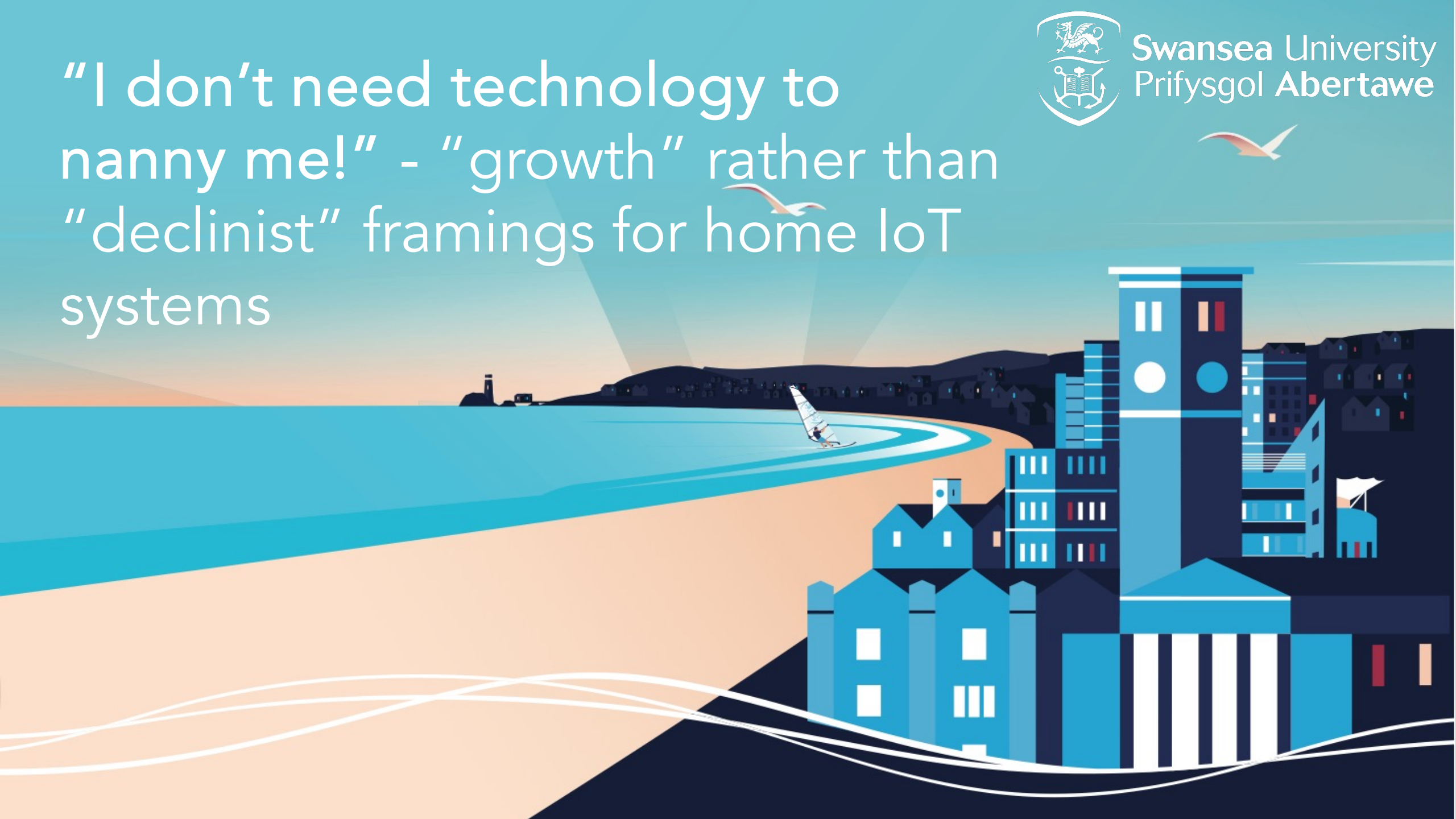
“I don’t need technology to nanny me!” - “growth” rather than “declinist” framings for home IoT systems



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The Internet of Things (IoT)

A network of interconnected everyday objects that can send/receive data via the internet

Examples include:

- “Smart” devices
  - Watches
  - Speakers
  - Lights
  - Thermostats
- Home Security
- Health
- Vehicles

IoT hold immense promise for enhancing the lives of millions.

The Internet of Things (IoT)

Current IoT systems risk excluding older adults due to poor design, ageist assumptions, and costs.

Most current home IoT systems marketed towards older adults are not growth-oriented but rather decline-focused, monitoring and signalling well-being issues.

In 2013, Rogers and Marsden[1] call to move beyond frailty and declinist drivers in developing such systems for older adults.

[1]Yvonne Rogers and Gary Marsden. 2013. Does He Take Sugar? Moving beyond the Rhetoric of Compassion. Interactions 20, 4 (jul 2013), 48–57. https://doi.org/10.1145/2486227.2486238

The Older Generation Toolkit

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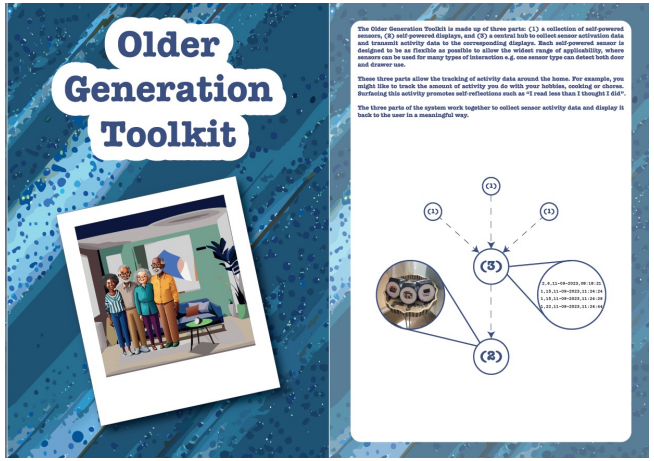

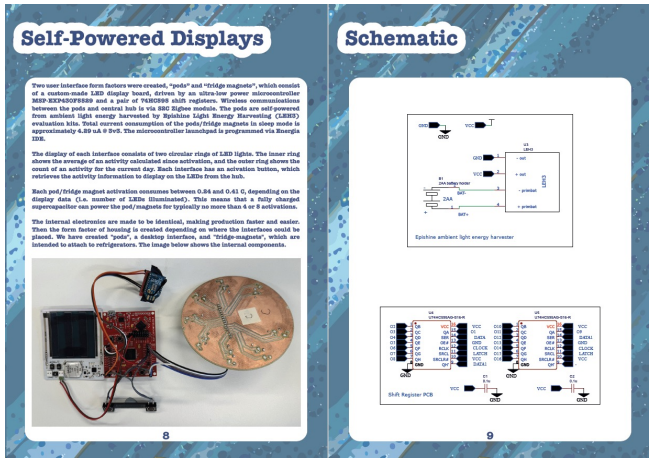

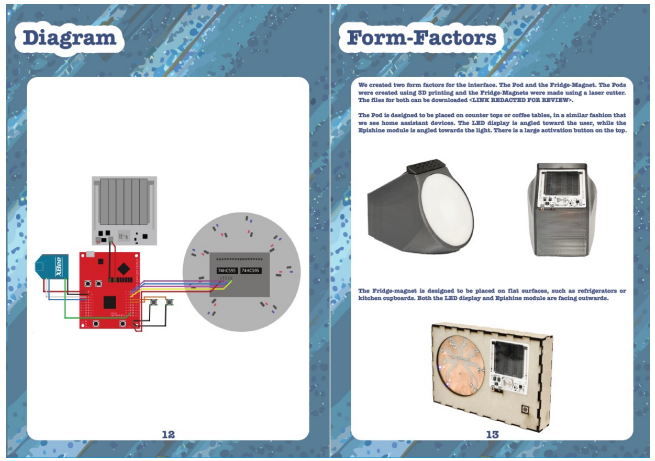

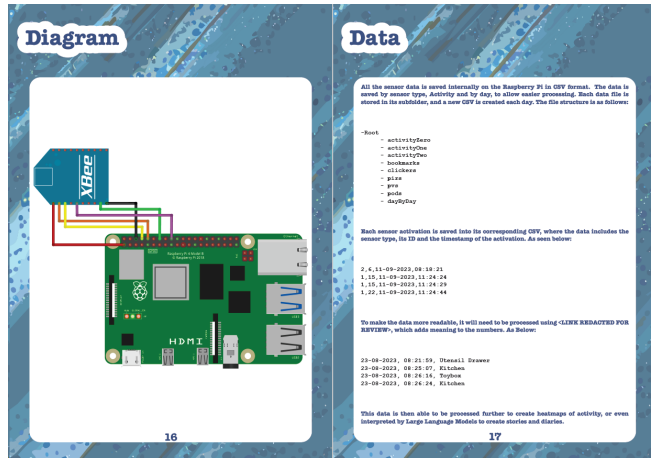

Co-Designing the Toolkit

- Workshop I: Exploring views on home-based IoT systems
- Workshop II: Refining the Design Concept
- Implemented the concept design
- Deployments
- Improvements

Workshops I & II locations

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Awen Institute Living Lab, Swansea

Workshop I:
Exploring views on home-based IoT systems

- Recruit older adults who are describe themselves as “aging well”
  - 14 participants (9F, 5M; ages 52–76, mean 69.4, s = 6.6 and with mix of socio-economic backgrounds)

- Participants were split into three groups. During the day, groups took part in three session:

- Session one: Your life with Technology:
  - Discussions of their earliest memories of non-digital home technologies they had used
  - Discussions of their earliest memories of home digital technologies
  - A day-in-the-life activity where participants walked us through the physical and digital devices/objects they used morning, noon and night
  - Discussions of current standard IoT home devices (e.g., smart lightbulbs)

- Session two: Situated Experiences:
  - Using 3 simulated environments - kitchen, living area and garden - a bodystorming activity on what digital services might be useful in that context

- Session three: Current Technologies:
  - Discussions of current IoT targeted at older people.

Workshop I:
Exploring views on home-based IoT systems

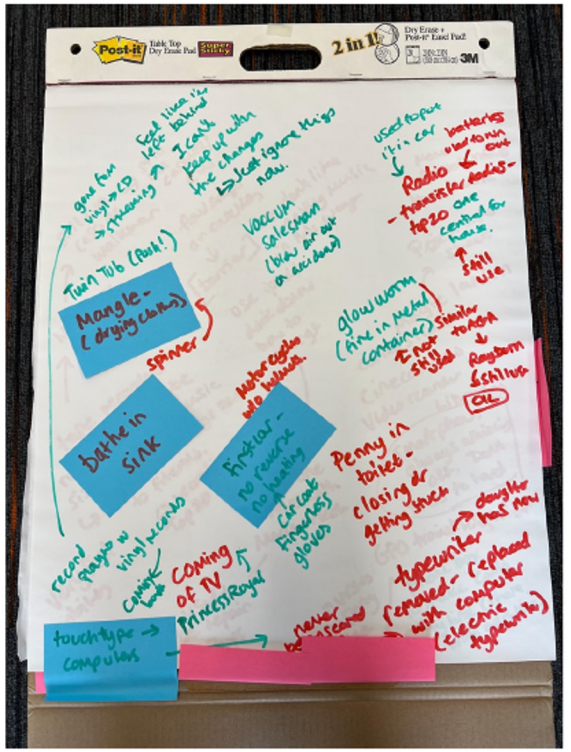
Findings

i. Participants have diverse and full home-lives.

ii. They demonstrated a “growth” mindset - which is contrary to the declinist narrative in many research papers.

iii. Home monitoring was seen as an imposition on their home life.

iv. Participants were very concerned energy usage and particularly the cost of living.



IoT Concept

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Over a period of two months, we created a home IoT concept. The features of the proposed system were:

1. A multiplicity of simple sensors that could be attached to objects and locations throughout a home at low cost.

2. Objects and locations in the home would have significance [to the occupants] with regards to meaningful experiences and activities in the home (e.g., “fun”, “socialising,” “hobbies”).

3. Sensors would generate simple wireless “pings” when the objects or location in the home were active.

Workshop II: Surfacing Home Activities

- Recruit older adults who are describe themselves as “aging well”
  - 16 participants (12F, 4M; age 59–84, mean 71.2, s = 6.3) and with mix of socio-economic backgrounds
  - 6 returning participants

- Split into 3 groups and rotated through 3 sessions:

- Session one: The life of the home.
  - Participants were asked about the positive and important activities they regularly took part in at home.
  - For each activity they were asked to describe the sorts of objects and places that were involved.

- Session two: Self-powered sensors and objects/places.
  - Participants were then provided with the set of harvesters-cum-sensors and asked to associate them with any of the objects/places mentioned in session one.

- Session three: The quantified home.
  - We explained how the pairing of objects/places [session one] and sensors [session two] could be used to surface the “quantity” of meaningful activities participants had identified.

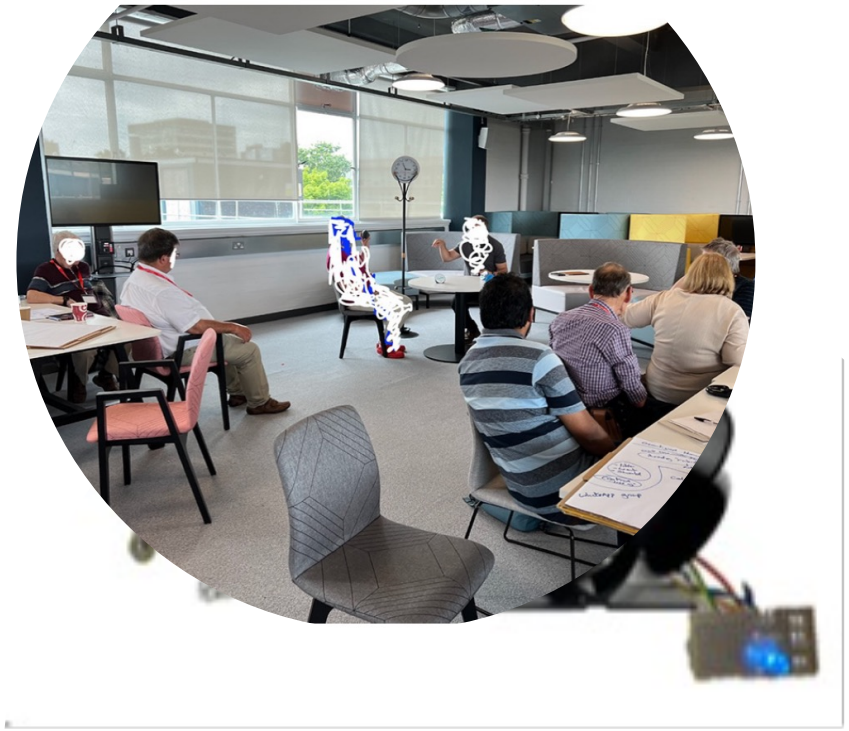
Workshop II: Surfacing Home Activities

Findings

i. A collection of everyday activities and their associated objects
   - "I keep my good plates in the dining room dresser and keep them for best"

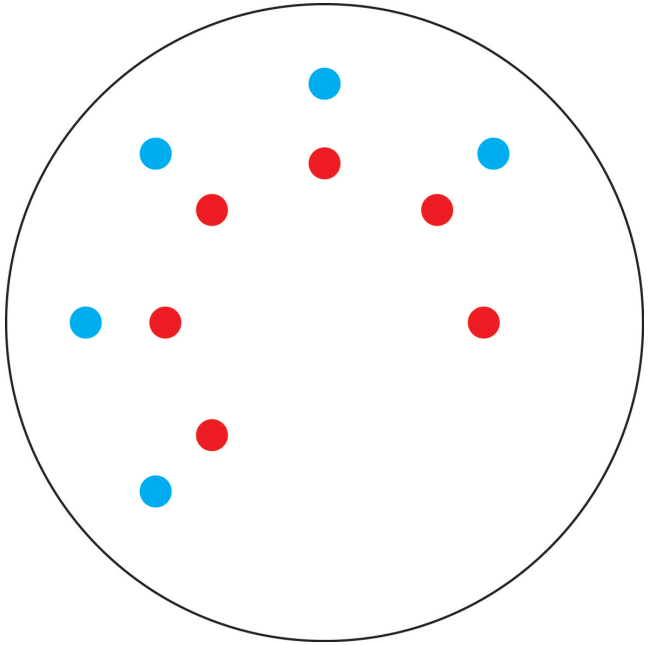
ii. A list of objects associated to the harvester-sensors types
   - Kinetic-energy switch to binary states (opened/closed)
   - PV linked with storage areas

iii. A collection of activities our participants were particularly interested in reflecting upon
   - Such as hobbies, cooking and socialising.



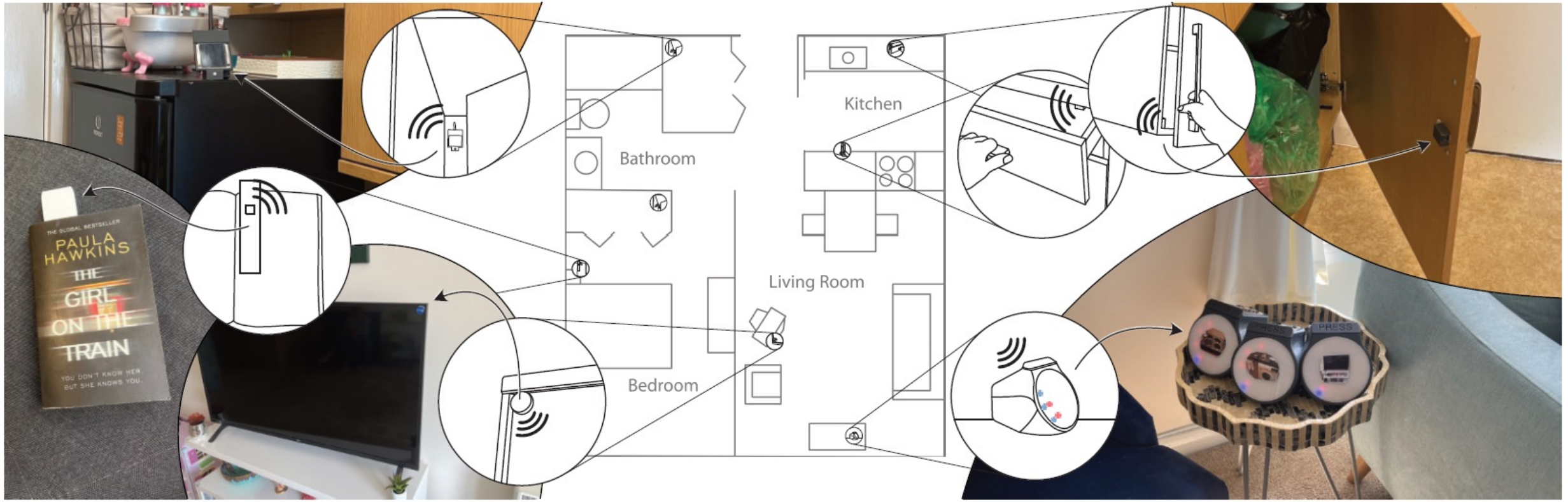
Refine and Implement the Concept

- Design a toolkit that is predominantly self-powered.
- Only platforms reflections, conversations and insights (non-intrusive) by the occupants and visitors in regard to diverse, user-defined, meaningful home activities, *e.g.* hobbies, socialising, fun, relaxation *etc*.



Deployments

- Toolkit sensors and displays deployed
- 3 homes (2 flats; 1 house)
- 2-3 weeks



Deployments

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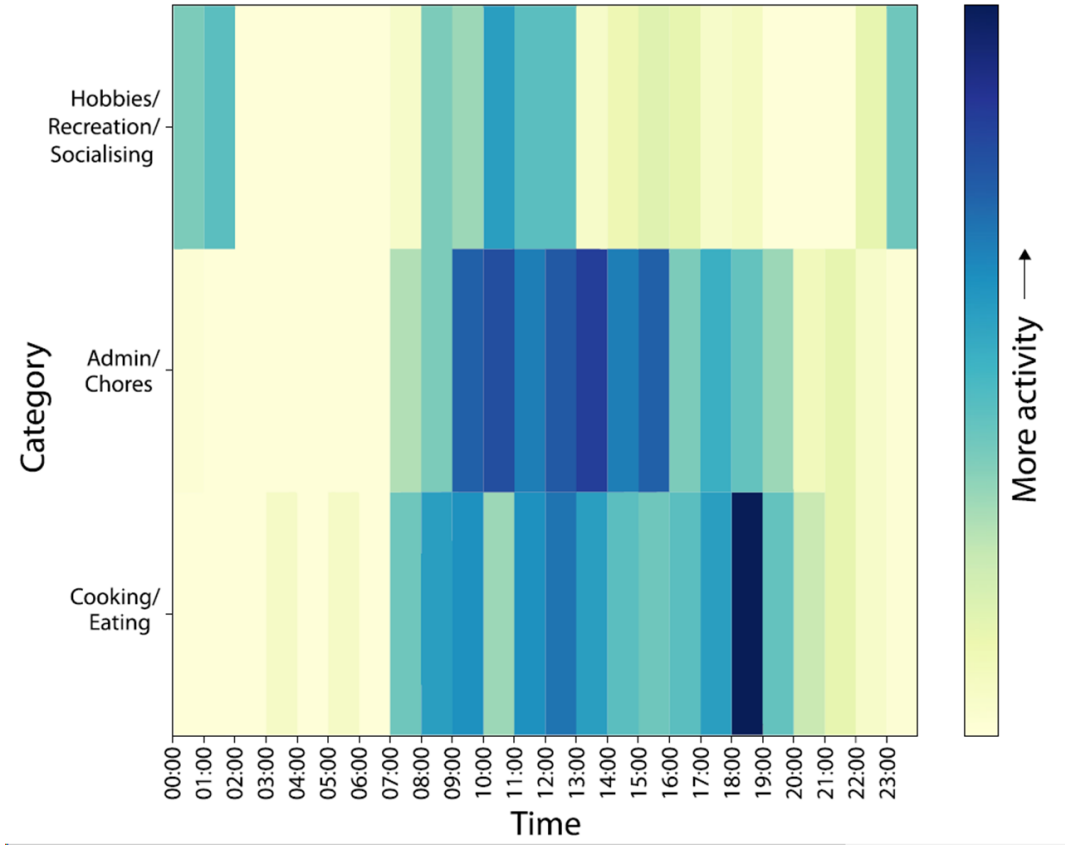
- Retrieve the data following deployment
- Formatted in various forms

```
23-08-2023, 08:21:59, Utensil Drawer
23-08-2023, 08:25:07, Kitchen
23-08-2023, 08:26:16, Toybox
23-08-2023, 08:26:24, Kitchen
23-08-2023, 08:26:51, Utensil Drawer
23-08-2023, 08:27:03, Bin Cupboard
23-08-2023, 08:29:19, Kitchen
23-08-2023, 08:55:33, Utensil Drawer
23-08-2023, 09:04:11, Kitchen
23-08-2023, 09:49:50, Toybox
23-08-2023, 10:53:05, Bin Cupboard
23-08-2023, 10:53:09, Kitchen
23-08-2023, 10:58:51, Toybox
```

Raw Data



Heat Map

Deployments

Story

“In the cosy one-bedroom flat nestled on the fourth floor of a charming block of flats, lived X, a woman in her early 60s ……..
Monday morning arrived, bathing X's living room in a soft golden glow as the sun's rays filtered through the sheer curtains. Her worn yet welcoming furniture seemed to come alive in the morning light, and the faint hum of the kettle indicated the start of another day
……..”

Deployments

Structured Diary

Patterns & Observations:
1. Leisure and Reading: Your dedication to reading was evident, with regular reading sessions both early in the morning and in the evenings. These moments allowed you to unwind and enjoy personal time.

……..

Recommendations:
1. Efficient Kitchen Organisation: To streamline your kitchen activities, consider reorganising cupboards and drawers for easy access to utensils, pans, and cleaning supplies.

……..

4. Hydration and Breaks: With your busy routines, remember to stay hydrated and take short breaks to maintain your energy levels throughout the day.

Deployments

- Participants reflected on their home use
  - Often made suggestions for more sensor placements
  - "*Just having it here is making me think more of what I do around the flat*"

- Often found the Stories to be amusing
  - "*What an exciting life we lead*!"
  - "*My partner doesn't dance until they have had five pints*"

- Were able to identify events from Heatmaps and RawData
  - "*That was me in the kitchen making tea past midnight on Tuesday*"
  - "*We are obviously unloading the dishwasher then*"

Improved Sensor Actuators

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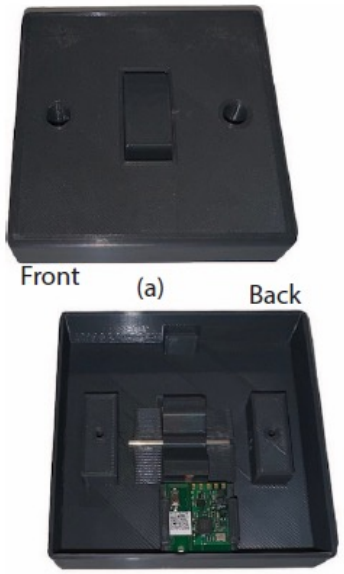
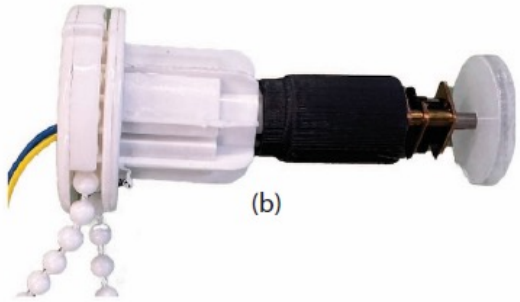
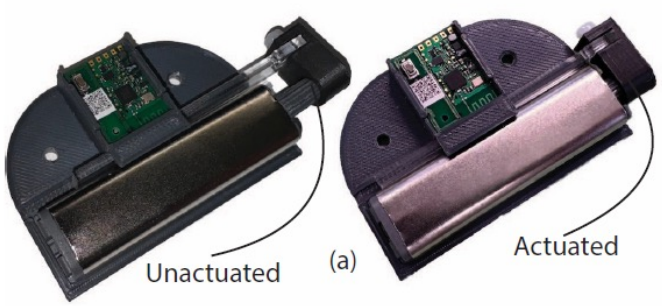


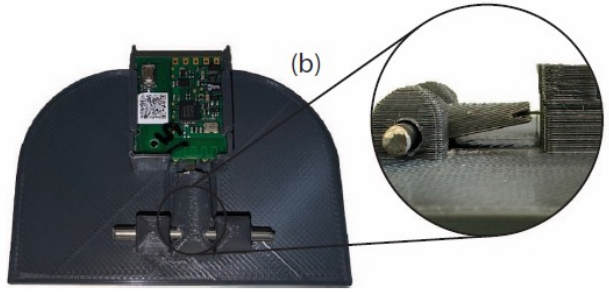
Light Switch Sensor
(single, double, triple)



Roller Blind Sensor

Thermal Sensor





Drawer & Door Sensors

AI Generated Images

Thanks for listening!