

D11

Co-Designed IoT Concepts 2

ESR 4 - Smart Cities
Felipe Schmidt Fonseca

Primary Supervisor	Industry Supervisors
Dr Nick Taylor (until October 2021)	Solana Larsen
Dr Nick Spencer (since November 2021)	Brandi Geurkink
Secondary Supervisor	
Professor Mel Woods	



**Northumbria
University**
NEWCASTLE



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 813508.

Contents

This file contains documentation about the concept ideas co-designed during the second year of PhD research focusing on waste prevention and smart cities at the OpenDoTT project.

Some of the original concepts created in earlier stages of research were remixed, refined and updated during this period. The versions presented here result from experimentation and reflection, as well as discussions with colleagues, supervisors, consortium partners, and the audience of conferences and events where the research was presented.

1. Background
2. Updated concepts (2021)
 - Universal Registry of Things
 - E-I
 - Transformation Labs

1. Background (2019 / 2020) - Original concept ideas

1/8

Universal Registry of Things

Open database

Information about as many types of objects as possible.



2/8

Point and Reuse

App / Website

Allows users to quickly evaluate the potential value of an object.



3/8

Save This Thing

App / Website

Geo-referenced open directory of reuse alternatives with user evaluation / reputation system.



4/8

Make Waste Visible

Urban Interventions

Expose the volume of waste generated by towns and cities.



5/8

Data on Reuse

Open Dataset

Data about different kinds of reuse of materials in urban environments.



6/8

Reuse Bin

Urban Service

Track your donations.



7/8

Transformation Lab / Shop

Blueprint

Urban infrastructure for reuse / upcycling of materials.



8/8

Reuse Commons

Urban Service

Collective stewardship of post-consumption materials.



In the first year of research, two research studies were conducted, seeking a deeper understanding about how discarded or second-hand goods and materials circulate in cities, and how people behave in regards to such materials. The focus was how to improve the prevention of waste.

A central issue identified in that landscape is the ability to assess the potential value of second-hand goods and materials. In order to promote a greater level of reuse, the skills and experience to evaluate them must be accessible to interested parties.

[illegible]

Some of the original concept ideas were carried to the second year of research. They were remixed and updated along a combination of activities: training modules on hardware prototyping, privacy and internet health, as well as exchanges and presentations. A new participatory research study called *reuse.city co-design lab* was conducted to help turn the concepts into prototypes, whilst addressing the following research questions:

1. What are the skills and abilities involved in the reuse of materials?
 - 1.1. Can those skills be augmented and replicated with the aid of digital systems?
 - 1.2. What kind of hardware and software would contribute to make that happen?
2. What kind of facility can help improve the proportion of materials that are reused in cities and regions?
 - 2.1. Are there relevant experiences in place anywhere in the world that can inspire such systems? How can they be replicated and expanded?

Two concept ideas developed on the first year were updated in collaboration with the participants of the lab: the **universal registry of things** and the **transformation labs**. A third concept called "**evaluation interface**" emerged from iterating discussions over another of the original concepts, called point and reuse.

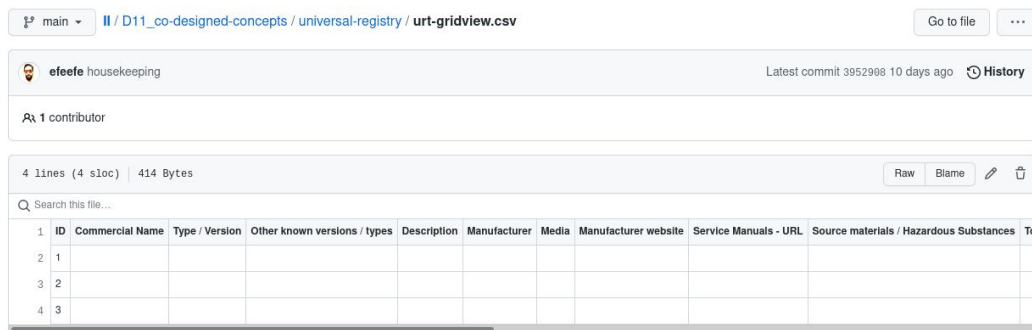


1/3

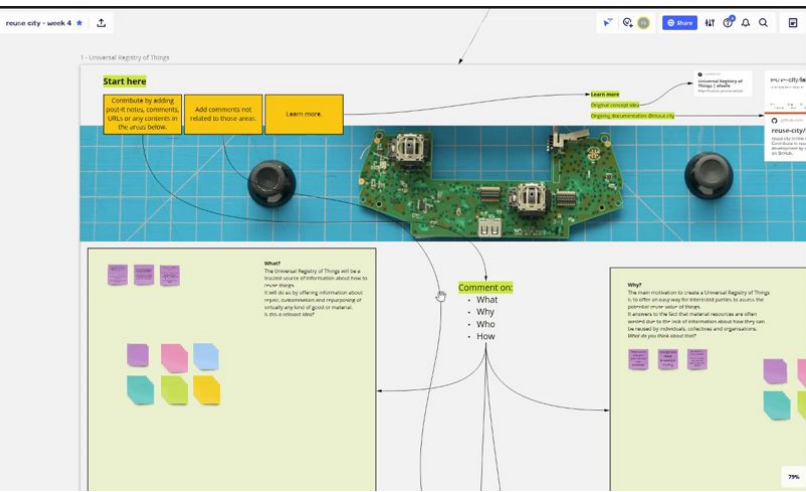
Universal Registry of Things

Commons-based specifications and governance

Data for the Universal Registry of Things is to be provided by manufacturers, associations, repair professionals, community groups, artists and other stakeholders. It comprises of objective specifications, descriptions and links to online resources as well as stories and subjective accounts on the reuse of things.



1	ID	Commercial Name	Type / Version	Other known versions / types	Description	Manufacturer	Media	Manufacturer website	Service Manuals - URL	Source materials / Hazardous Substances	To
2	1										
3	2										
4	3										



A video presentation of this concept idea was made to trigger participation during the reuse.city lab and collect feedback while prototyping a version of the Universal Registry of Things.

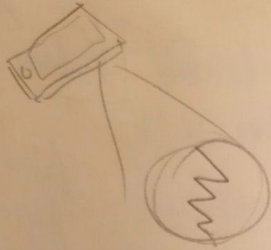
The video is available on the internet archive:

https://archive.org/details/reuse-city-lab_concepts/universal-registry.mp4

2/3

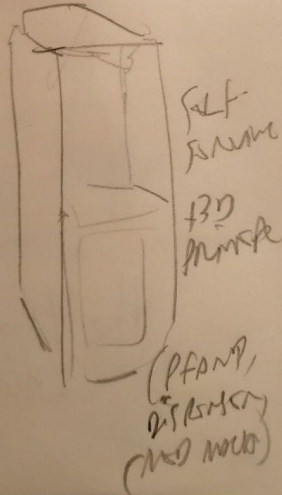
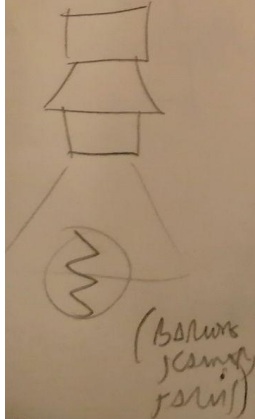
E-I

PHONE APP



Portable/
Desktop
Assistant

SHOP/
PUBLIC
SPONS



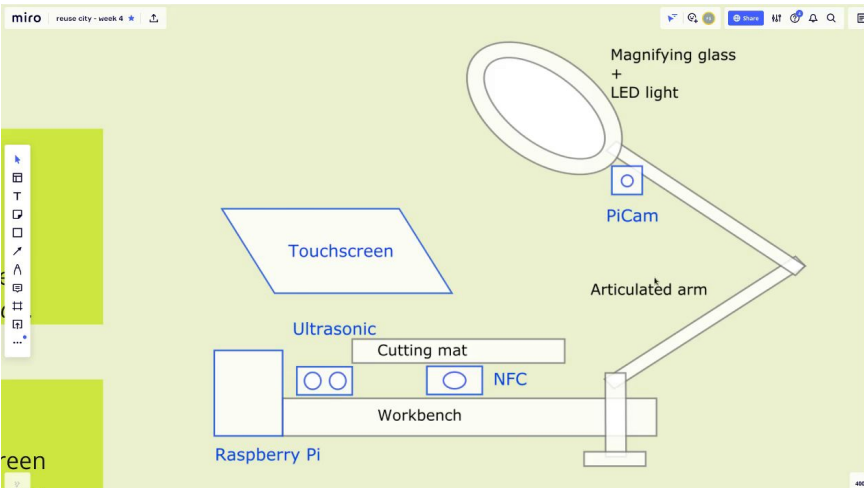
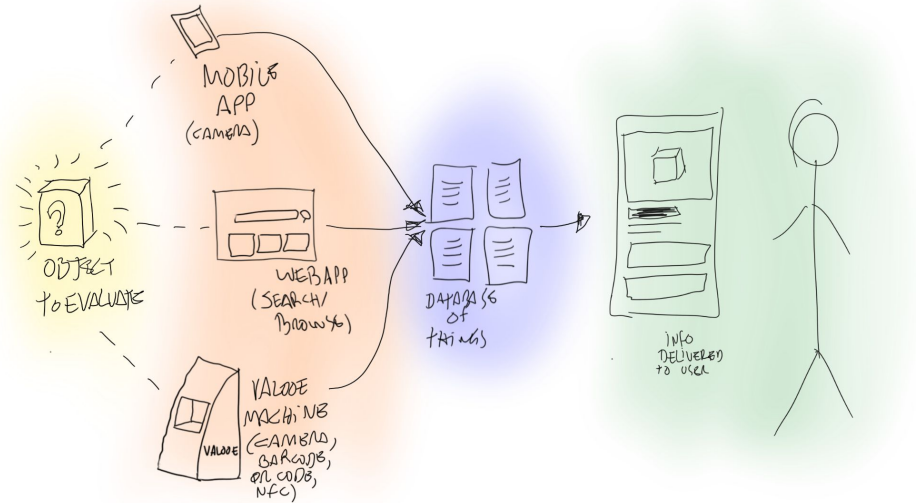
E-I, Evaluation Interface, is technology (hardware + software) created to increase the ability to reuse materials. It works as follows:

1. The user brings an object before the machine.
2. E-I identifies the object based on its characteristics - size, shape, color, weight, barcode, qr code, description label and/or any other identifiers. The user can feed additional characteristics by typing or interacting with E-I via voice.
3. E-I parses the identified object against the Universal Registry of Things and delivers to the user information about the potential reuse of the object: repairability index, access to spare parts, list and description of raw materials, service manuals, second-hand market value, possibilities of upcycling, adaptations and transformations, user stories, etc.

E-I can be deployed in different form factors: an app for mobile devices; a workbench equipment; or even a larger version shaped as a kiosk or vending machine.

Speculative repair assistant

The goal with E-I at this point is not to develop a functional product, but rather to discuss how digital information technologies can help society reuse a larger proportion of materials that are currently discarded, and what would the implications of such technologies be in terms of use, privacy, health and safety, policy and economy.



A video presentation of this concept idea was made to trigger participation during the reuse.city lab and collect feedback while prototyping a version of E-I.

The video is available on the internet archive:

https://archive.org/details/reuse-city-lab_concepts/e-i.mp4

3/3

Transformation Labs

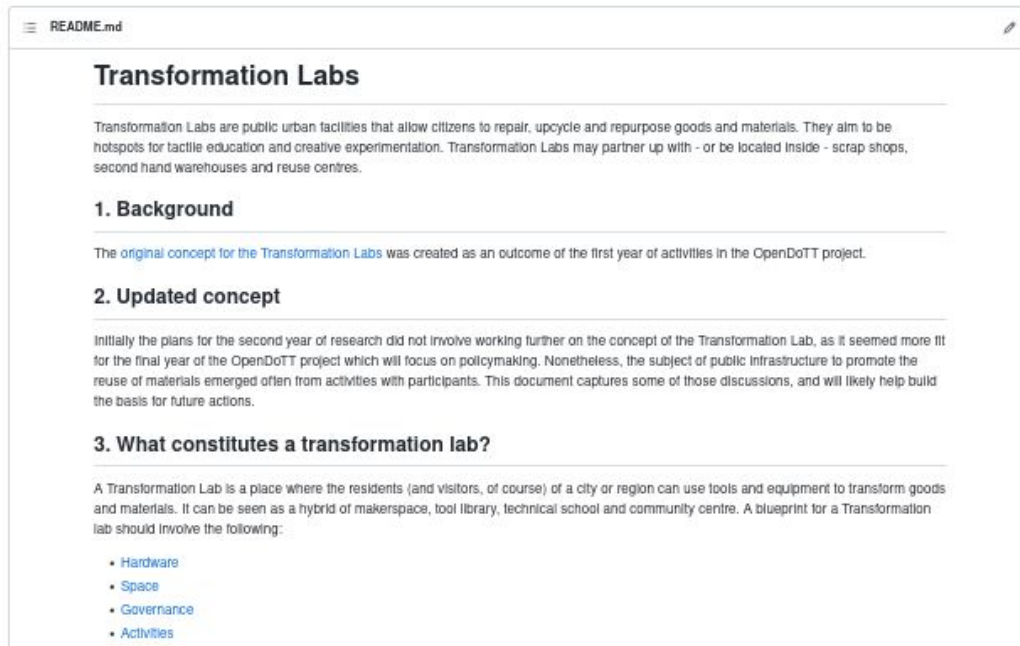
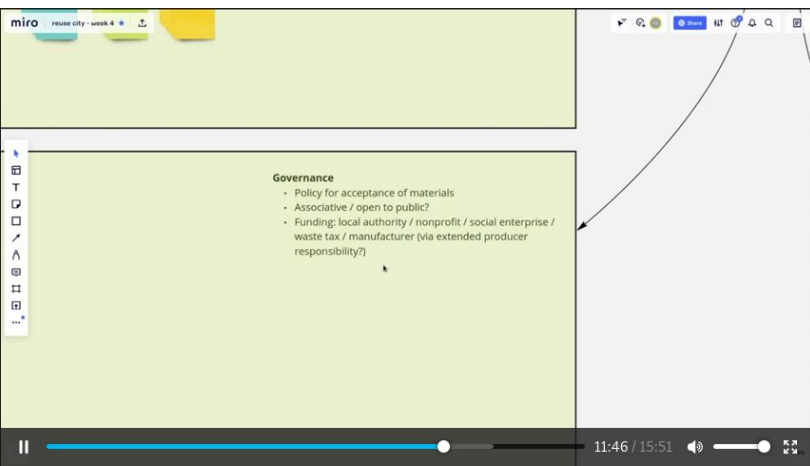


Transformation Labs are public urban facilities that allow citizens to repair, upcycle and repurpose goods and materials. They aim to be hotspots for hands-on and technical education, as well as creative experimentation. Transformation Labs may partner up with - or be located inside - scrap shops, second hand warehouses and reuse centres.

A Transformation Lab is a place where the residents (and visitors) of a city or region can use tools and equipment to transform goods and materials. It can be seen as a hybrid of makerspace, tool library, technical school and community centre.

Open blueprints

The specification for creating Transformation Labs must include definitions of technology, space requirements and management. Such specifications must be open and freely accessible to municipalities, businesses and nonprofits to use - and improve on - them.



A video presentation of this concept idea was made to trigger participation during the reuse.city lab and collect feedback about Transformation Labs.

The video is available on the internet archive:

https://archive.org/details/reuse-city-lab_concepts/transformation-labs.mp4