

Schools Design Challenge

Final Report



Introduction

The design challenge was organised following an Innovation Lab workshop on waste management in March 2016. Re-thinking the size of the landfill bin was the number one priority idea following the workshop and the Lab wanted to do things differently by inviting students to get involved.

Background

The EU Waste Framework Directive sets out the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It also defines a number of waste management targets which all EU countries have been working towards. One of these targets is;

- 'by 2020, the preparing for re-use and the recycling of waste materials such as paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households, shall be increased to a minimum of overall 50 % by weight'¹

The present recycling rate in NI is 42% and to help meet the EU recycling target the Innovation Lab ran a workshop with the Department of Agriculture, Environment and Rural Affairs (DAERA) and the NI councils with a focus on how the quality and quantity of kerbside recycling within NI can be improved.

During the workshop many ideas were generated which could help NI increase household recycling. The workshop participants 'voted' on which ideas they wanted to see taken forward for further action and the following five ideas were selected.

- Reduce the size of the landfill bin and the frequency of collection;
- Provide stickers on the inside of householder's bins and stickers on the bins with what it should hold
- Apps, instant access to information
- Create incentive schemes to demonstrate the individual or community benefit from recycling
- Have consistent recycling system at home, work and on the go

The Challenge

'Reduce the size of the landfill bin and the frequency of collection', was voted the top priority for the councils. After further refinement of the idea the challenge or problem statement has been defined as:

'Rethink landfill - Design the next generation of landfill bin for Northern Ireland'

The Innovation Lab decided to use open innovation to ensure the best possible solution could be designed. The challenge was opened up to Year 13 students in Northern Ireland secondary schools. Five schools applied to be involved. Three of which went forward to the design stage.

The Schools

Three schools, Bangor Grammar, Lagan College, and Rathmore Grammar, researched designed and prototyped their ideas for the next generation of land fill bins

Bangor Grammar



84 Gransha Road
Bangor
Co Down
BT19 7QU

Lead Teacher - John Titterington

Pupils - Jack Riordan, Matthew Armstrong-Sanchez, Sam Urey,
Ross McCune

Lagan College



44 Manse Road
Belfast
BT8 6SA

Lead Teacher - Brendan Hasson

Pupils - Anna Shaw, Lorcan Mullen, Sam Kingsbury, Shannon
Mackey

Rathmore Grammar



Kingsway

Finaghy

Belfast

BT10 OLF

Lead Teacher - Luke Beegan

Pupils - Megan O'Reilly, Joshua Beatty, Chloe Cassidy, Odhran Doherty, Matthew Miskimmon

Sponsors

The challenge was sponsored by Department for Agriculture, Environment and Rural Affairs (DEARA), Eco-Schools NI and STEMNET W5.



Design Challenge

Challenge:

- How might we understand the behaviours of the users and ensure these influence the landfill bin design?
- How might we discourage NI residents from putting recyclable items and food waste into the landfill bin?
- How might we design a service which complements the landfill bin design?
- This must detail how the landfill waste is collected.

Criteria for Success

- You will be marked on the following criteria:
- Clear understanding of the challenge
- Designed to encourage recycling
- Innovative – creative design
- 3D model using AutoCAD or equivalent software
- 3 x A3 posters showing concise research, design and service
- Functioning prototype – opening, closing and handling (scaled or full size)

The Judges

Three judges were asked to attend the final presentation to review and judge the designs.

Owen Lyttle – Environmental Policy Division (DAERA)

DAERA has responsibility for food, farming, environmental, fisheries, forestry and sustainability policy and the development of the rural sector in Northern Ireland. The Department assists the sustainable development of the agri-food, environmental, fishing and forestry sectors of the Northern Ireland economy, having regard for the needs of the consumers, the protection of human, animal and plant health, the welfare of animals and the conservation and enhancement of the environment.

John McMullan – CEO Bryson Recycling

Bryson Recycling is Northern Ireland's largest social enterprise has been delivering recycling services for over two decades.

William Lee – Founder Design Factor

The Design Factor is an award winning design consultancy based in Belfast, Northern Ireland.



Lagan College: Final Design

Award given for Best Display

The Lagan College Design includes:

- Standard lid dimensions that fit existing bin lorries
- Reduced Capacity bin with 3 zones
- Aim is not to be in the 'red zone'
- Colourful design that appeals to children and young people.
- Small air holes to release gases, rather than a large build up at landfill.
- IC chip in bin lid to record weight from each household
- 4 Wheels for stability and ease of movement
- Annual statement of waste produced
- Rewards/Perks for households who make a waste reduction

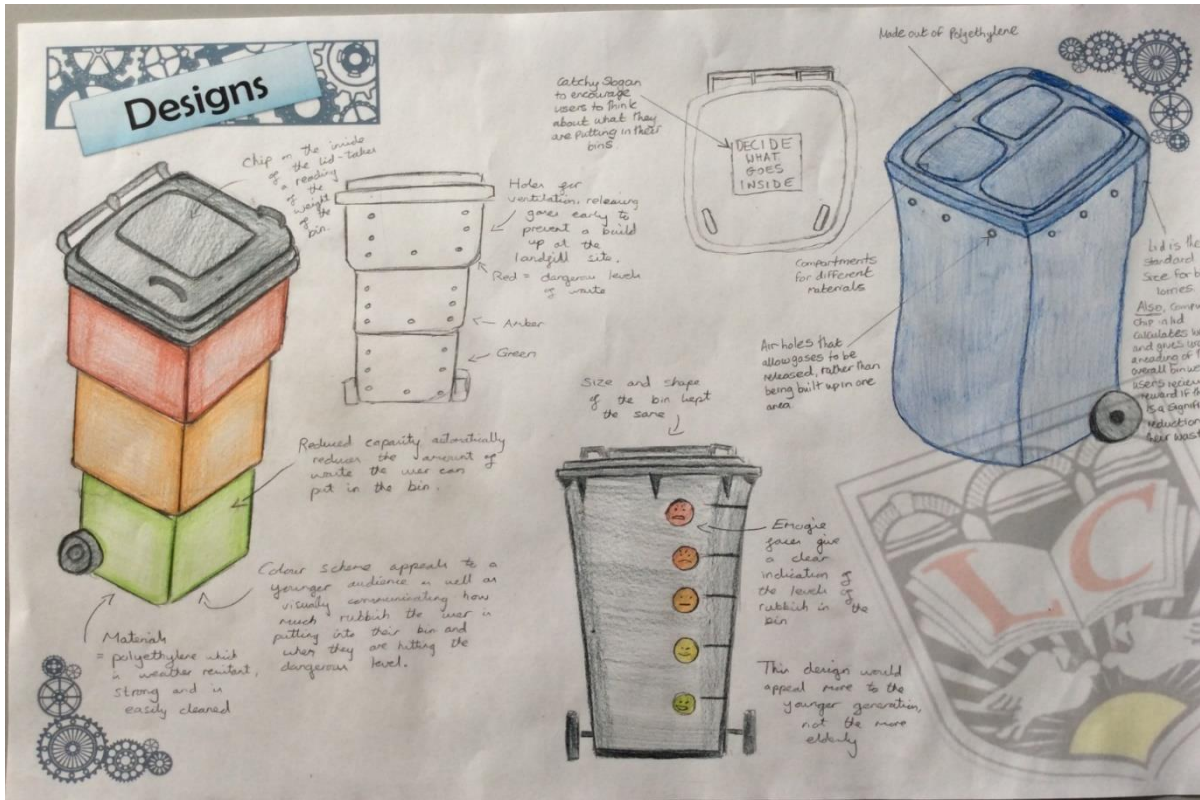
Function- Our bin uses pre-existing IC chips to record the weight of each collection. This data is then collated to gather an annual weight.

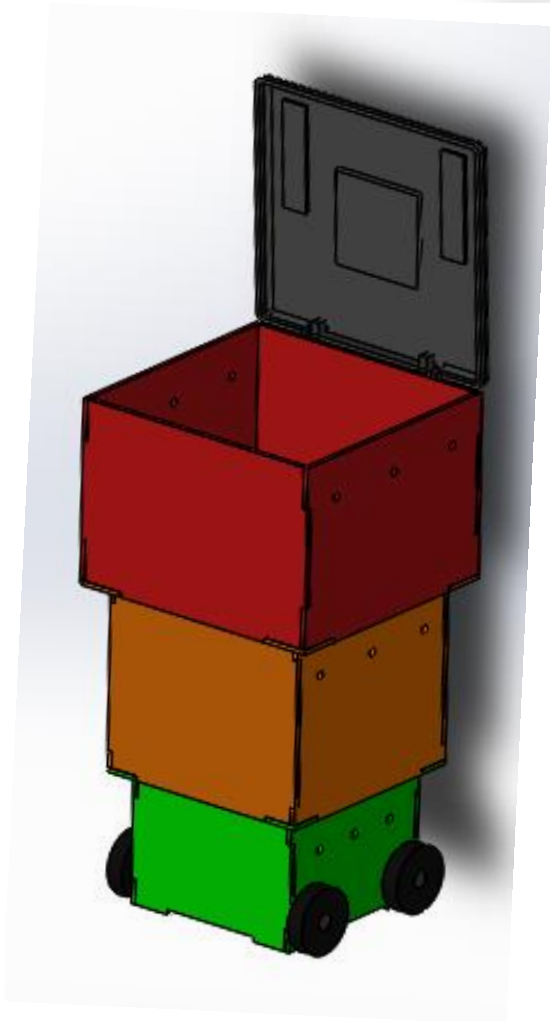
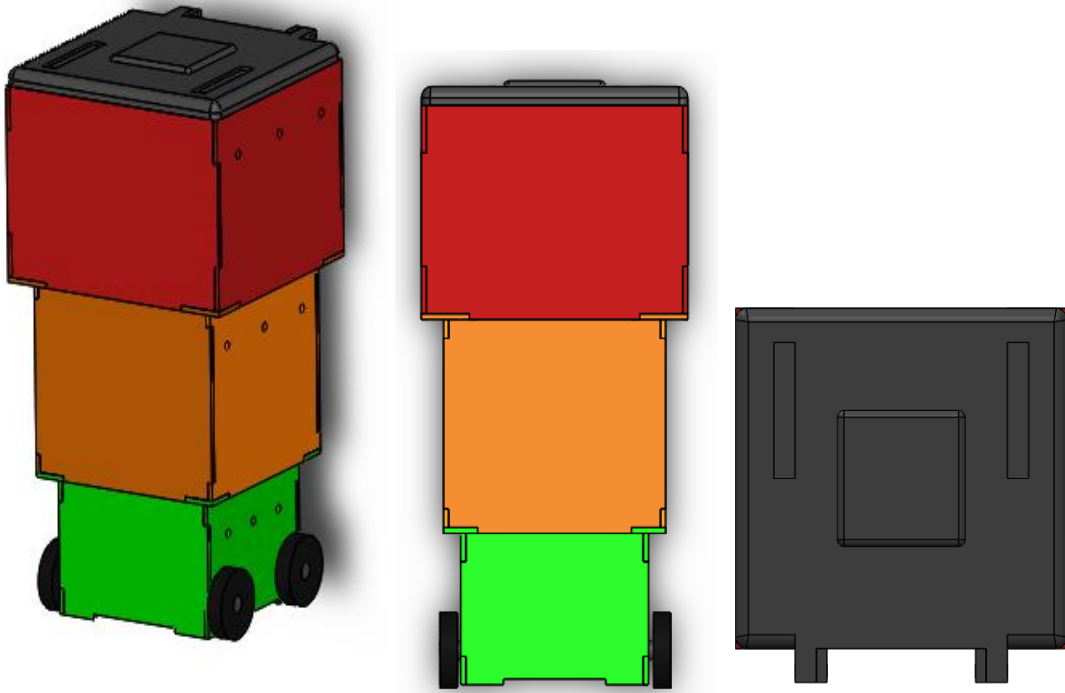
Materials- Our model is made from birch plywood and MDF. These materials were used for ease of manufacture and availability. In reality we would use Polyethylene which would be injection moulded to achieve the tiered shape

Aesthetics- We feel that our design is aesthetically pleasing and appeals to children and young people. We believe that by encouraging recycling at a young age this will progress through to adulthood

Ergonomics- Our bin is operated like a standard bin with a swinging lid. The lid dimensions are currently the same as the standard wheelie bin.

Safety- We have added two additional wheels for ease of movement. This does not mean that the bin cannot be tipped up like the traditional method. We have considered adding a brake for bins placed on uneven ground.





Bangor Grammar

Award given for Top Overall Design

The Bangor Grammar design team carried out extensive user research to develop a set of design criteria for their new landfill bin. The teams designed a survey which was sent out to teachers, parents and students to understand the needs and frustrations with the current bin. They also brought a full size bin into the school foyer and conducted usability testing. During this testing, the team found that the bin wasn't designed with accessibility in mind as one of the students trying to use it was in a wheelchair and struggled to lift the lid. Following this testing, the team decided to focus on the bin lid improving usability whilst also reducing the size of the bin by tapering the lid. They also cut small holes in the bin which were covered in transparent plastic to see the amount of waste being added.

Both the research and design of this bin impressed the judges who then rewarded the team with first place.



Rathmore Grammar

Award given for Best Individual Presentation

The Rathmore Grammar design team focused on three aspects of the landfill bin design. Firstly the bin is transparent to encourage competition between households. Knowing that your neighbour is throwing away more or less than you. The second design component was a kick-stand which was added to the design after a member of the team observed an elderly relative struggling to move her bin to the road because it was too heavy to tip onto the wheels. The third design feature was a rotating lid which only allowed smaller items to be added to the bin. Encouraging the public to bring larger items to their local recycling centre.



Conclusions

John McMullan, CEO Bryson, was extremely impressed with the quality of the designs and saw how they could be adapted for Bryson recycling receptacles. They were to be shared with the R&D team for further development.

Annex 1

Innovation Lab Design Challenge

Briefing Document

Design Challenge

‘Rethink landfill - Design the next generation of landfill bin for Northern Ireland’

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Team

Your team should have a minimum of 3 and a maximum of 5 members.

Each team should aim to have members who fill the following roles:

- Visionary
- Perfectionist
- Producer (project manager)
- Finisher

Timescales

Project run time: January 2017 – April 2017.

Final project submission: 6th April 2017

Final presentation date: 6th April 2017

Specifications

The bin should -

- be designed and manufactured to meet all weather conditions
- be frost, rain and sun proof
- not deteriorate in quality at temperatures within a range of -20°C to 40°C.
- be easily moved by the user at any weight

Sizes

Dimension	Minimum	Maximum
Width mm (W)	448	665
Depth mm (D)	530	880
Height mm (H)	975	1,115
Payload kg	40	144

Prize

Prize 1 – Best Prototype (£500)

Prize 2 – Best Individual Presentation (£250)

Prize 3 – Best Display (£250)

Innovation Lab Workshops

At the start of the project the innovation lab will take you through workshops on:

- User-Centred Design
 - User insights
 - Idea generation techniques
 - Prototyping techniques
- Co-Design
- Behavioural Insights

Contacts

Need help?

Please contact Rebecca at the Innovation Lab.

Email: rebecca.walsh@dfpni.gov.uk | Tel: (028) 90816973 | DD: 76973 |

Tips

Try to take pictures and record your learning during the project. This will make your project report easier to put together.

Please feel free to tweet pictures and updates of your projects @ilab_ni #ilabchallenge