**British Council** 

# THE RIPPLE PROJECT RESPONSIBL PLASTICS PROJECT. for and ENVIRONMENT

Falmouth University, UK

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# **Project Outline**

The RIPPLE Project was funded by the <u>British</u> <u>Council</u> as part of the A.R.C. Malaysia Challenge, a cultural programme of activities that took place in the build up to the United Nations Climate Change Conference of the Parties (COP26) in Glasgow.

It was a collaboration between undergraduates from the Graphic Design and the Sustainable Product Design courses at <u>Falmouth University</u> in Cornwall, UK and an environmental design and social enterprise in Malaysia, <u>Biji-biji</u>.

The project aimed to identify meaningful design opportunities to escalate the value of plastic waste through product innovation, behavioural shifts and novel manufacture. Sustainability and partnerships underpin the educational philosophy at Falmouth University: working on real world challenge based learning with industry and communities.

The nature of learning around the globe has been radically affected by the global pandemic and students and staff have had to deliver much of this educational experience online. Yet this project has shown how we can still strive to be ambitious, collaborative, and connected through our online tools and tackle these huge issues collectively.

Drummond Masterton Falmouth, Dec 2021

### Project team



Drummond Masterton



Steven Bond



Gary Allson





Bryan Clark

The RIPPLE Project bought together an international team working across a wide scope of disciplines. All with the collective aim of creating a rich learning experience for the cross-course students as they tackled real world problems with innovative and realistic solutions.

#### Biji-biji Initative

Juliana Adam\_*Project Manager* Rashvin Pal Singh\_*Strategic Director* 

### Falmouth University

Gary Allson\_Lecturer Steven Bond\_Lecturer Bryan Clark\_Head of Graphic Design Drummond Masterton\_Head of School, Architecture and Interiors



Rashvin Pal Singh



#### **Project partners**



'I wanted to say a great big thank you for letting us be part of the project. The students are wizzes and it's really cool to see how the students are trying to combine issues in some places: like the biodiversity boosting pollinator product, tapping into local Malaysian culture with the Rattan weaving or the sustainable footwear idea. It was really inspiring to listen to their ideas.'

> 'Working with the University is an excellent way for us to collaborate with

energetic and skilled people on the

both at a local and an

international level. It's

Clean Ocean Sailing

all the same sea!'

Steve Green

crucial issues of plastic pollution and

climate change and the positive steps we can take to tackle the problems.

Vera Koch Precious Plastics Cornwall





'Being involved with the precious plastic project was a joy. Observing the how the students responded to the challenges, and seeing how this project was benefitting not only the environment. but also social and economic values in Malaysia was inspiring. A great module for the upcoming designers.'

**Niall Jones** CEO. Bethos Buttons



**Cornwall Council** 

Paul Martin





We worked with a wide range of organisations, from SME's to Alumni business start-ups to international companies.

Their input into the project was extremely valuable, bringing both expertise and critique.

And it worked both ways; all involved felt energised by the experience of working with the students, and hopefully that this generation would be able to tackle these global problems with the urgency and innovation that is needed.

'Working internationally on this project was really fantastic. It really allowed the Biji-Biji team to expand our skillsets, expand our horizon and form long lasting collaborations with Falmouth and the larger British Council network'.

**Rashvin Pal Singh** Strategic Director Biji-biji Initative



'It felt really positive to be part of this project, the students were engaged and passionate about the environment, wanting to learn more about how we manage our plastic waste here in Cornwall and the initiatives SUEZ have been involved in to promote a circular economy.'

Natalie Chard Recycling and recovery, SUEZ



# Collaborative work space

The Padlet platform provided an online digital sharing environment that enabled everyone in the group to be able to showcase and feedback. View the page in its entirity by going to: bit.ly/3m4ZmCk



### Context and research



#### THE CIRCULAR SOLUTION: CHALLENGES



#### The Plastic Problem in Malaysia

- Malaysia as a dumping ground for plastic waste from other countries
- 70% of Malaysians believe its the governments responsibility to champion recycling
- Malaysia has the highest annual per capita plastic use, at 16.78 kg per person compared to China, Indonesia, Philippines, Thailand and Vietnam
- Poor recycling infrastructure & facilities. Amongst the 7 main types of plastics, only Types 1, 2 & 5 are 99% recyclable in Malaysia
- As of 2020, nationwide ban on single use plastic straws
- Complete ban of single use plastic bags in certain states, but most states still provide single use plastic bags at a small fee

#### THE CIRCULAR SOLUTION

# To create behavioral change through:

#### Arts, Culture, Education & Design



Partnerships

Livelihood opportunities







The inital briefing from Biji-biji was the base from which the students built their responses. By outlying all the major challanges – be they economic, environmental or cultural – Juliana and Rashvin gave the groups areas to focus on.

The presentation detailed the array of challenges facing their aims to create circular solutions in their communities: from lack of power supply to a lack of skills, and from limitations on product designs to a poor understanding of the concept of sustainability.

They explained about their outreach work and the many community projects they have implimented – some of which also have the same Precious Plastic machines that Falmouth University have gone on to build.

This synergy is a key element of the global Precious Plastic community: as their machines are built from a uniform set of parts and instructions, they will be consistent and easy to duplicate wherever in the world they are used.

Thus a shredder built in the UK should be very similar to one built in Kuala Lumpur, and any ideas from the students here could correlate with what was possible for those groups that would be operating the same Precious Plastic machines in Malaysia.

## Primary research









Steve Green from COS weighing another days haul from a Cornish beach. They've picked up over 50 tonnes of plastic waste since they started 3 years ago.





Students wanted to empathise with plastic pollution in a local context. They collaborated with Clean Ocean Sailing, who clean the coasts of Cornwall under sail, and raise awareness about ocean pollution.

They were surprised by the diversity and volume of material collected on a daily basis.

This helped reinforce the need for more responsible design principles and encourage sustainable behavioural change through the projects solutions and end products.



## Design sprints and ideation



48 students from Graphic Design and Sustainable Product Design worked in mixed teams to rapidly iterate, communcate and vision design ideas that tackle the various climate issues that were relevant to Ripple.

Methods such as Mindmapping, Near/Far/ Further, Personas, and Empathy mapping were employed, all framed by the Design Council's Double Diamond Methodology of Discover > Define > Develop > Deliver.

A mid-week review with the project team helped provide feedback and direction to fine tune the responses.

Student teams created final presentations of their design visions to the project team providing the launchpad for the next phase of the project.



# **Digital prototyping**



The product design teams learnt new skills in digitally modelling their concepts in the CAD program Autodesk Fusion 360. Being able to transform their sketches into 3D models enabled further design detailing and more professional communication images to be produced.

Digital workflows were extended through a suite of digital manufacturing tools available at the Falmouth University workshops, including 3D printing. Having physical models to hold and use assisted the evaluation processes and helped the teams understand the performance and viability of their designs. Feedback loops between 3D CAD, testing and 3D printing enabled the rapid iteration of the designs.

Students received feedback on their digital models from Biji-biji and the project team after 3D printing their design ideas. The feedback enabled students to better understand the potential viability of mouldmaking their 3D designs using the precious plastic injection mould machine, widely used by Malaysian community groups already engaged with Biji-biji.

# Moulding and prototyping







Sustainable Product Design students gained a richer understanding of how to refine their 3D CAD designs in order to achieve successful manufactured products.

Computer Numeric Controlled milling was used to create two part injection moulds, with negative impressions of the designs enabling the students to test how hot plastic would flow into the negative space.

Mould Tool designs were edited in 3D CAD to better enable the liquid plastic to flow evenly and for gases to escape.



#### Branding and identity











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As well as making models and evaluating the technical elements to the design ideas, the students gave much consideration to the visual communication of the products.

They considered who is the audience, how best to communicate the product to that audience, and how to build and package the product by applying the most effecient and responsible methods and materials.

Notions such as nudge theory and concious consumption were explored in discussion, with students considering what impacts could be reduced by engaging consumers through sustainable behaviour change.



# The final products



Wet Suit Hanging Hook Plastic upcycled: 106g polypropylene <u>George Pope and Anna Micheal</u>

Two versions. The more complex hanger has slots so that accessories can be added. It has two boot and two glove hooks that attach on with a jigsaw shape. The design has a detachable lower bar allowing you to take it off, put your wetsuit over it, then reattach. The strong construction means a long lifetime and if it does break it can be returned and reused to make more hooks.



Bag Security Device Plastic upcycled: 3.4g polypropylene Rhiannon Tilah, Liling Warwick and Honey Postle

A safety product which keeps valued items secure from theft, specifically pick-pocketing related to the tourism industry. The product would enable plastics to be valued more and incorporated within a circular economy.



Living Hinge Sunglasses Plastic upcycled: 9.5g polypropylene <u>Charlie Ruck</u>

A desirable yet functional product with the soul purpose of up-cycling and product disassembly within the use of built-in design strategy and end of life. Traditional frames are comprised of petroleum based composite plastics with additional hardware built in during two-part mould manufacturing, which foreshortens their end of life solutions.



#### Bee Pod

Plastic upcycled: 250g Polypropylene Marcie Russell, Nicole Stephens, Sander Randoja, Mathias Koski and Emily Woodall

Hexagonal shaped solitary bee habitat. Can be hung with a rope by itself or attached onto other units to achieve modularity. Using this bee pod not only helps encourage and facilitate bees to nest but also helps combat plastic waste.

### **Project legacy**

The development and manufacture of the three <u>Precious Plastic</u> machines (the Injector, the Shredder and the Extruder) on campus creates further opportunities to enable the capture and reforming of waste plastic.

This includes to plastics that are traditionally not recycled in the UK due to lack of facilities, such as soft plastic and non-identifiable (No SPI code) plastic waste, and those that are more commenly recycled such as PET, PE-HD and PP.

Biji-Biji and Falmouth University also plan to further the dissemination and impact of the project by sharing the created assets with the public at a number of events in 2022.

The videos that were created by Steven Bond and Jasper Fell-Clark, along with the design report and physical artefacts from the four completed designs, will be exhibited at the Penryn Campus in January 2022 as part of a sustainability themed exhibition open to all staff and students.

Conversations to transfer the exhibit to larger audience venues in the South West such as <u>The Eden Project</u> are planned.



There remains great potential to continue to work between Biji-biji and undergraduates in targeted briefs that directly respond to climate challenges.

The activity that Drummond and Juliana mapped out as part of the future funding pitch offers a model for expanding this one-to-one relationship to a larger audience.

For example, a symposium and exhibition with a partner site, <u>Newquay Community Orchard and</u> <u>Maker Space</u>, is being planned for Spring 2022 to provide further engagement and dissemination /impact to local community and companies.

This event will also provide an opportunity for staff, students and Biji-biji to present and discuss the project aims, process and outcomes with a broad network of Cornish companies, designers and makers.

Further UK students will benefit from the knowledge exchange activity as the project will be used as a case study for courses that deliver sustainability focused curriculum, such as the Sustainable Product Design and Graphic Design courses, and through the new sustainability module, due for validation in 2022.





