

DELIVERABLE 5.2

Case Study 2 (KWMC) – Stage 1



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**“ParCos – Participatory Communication of Science”
A HORIZON 2020 RESEARCH AND INNOVATION ACTION**

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SUMMARY

Deliverable 5.2 – Case Study 2 (KWMC) Stage 1 – provides an overview of the outputs of Stage 1 of Case Study 2 in the ParCos project, which is led by Knowle West Media Centre in Bristol, UK. It is the output of Task 5.2 in Work Package 5 (WP5) – Case Studies and Communications. This report contains an introduction to ParCos, describes the purpose and role of this deliverable, describes how the three case studies in ParCos worked together to plan their case studies and then describes the UK case study set up, the outputs of stage 1 of the UK case study, design insights for ParCos and planned future activities. An updated version of this deliverable report will be published in August 2022 (month 32 of project) which will expand upon this report and integrate the outputs and learning from Stage 2 of the case study.

TABLE OF CONTENTS

1	Introduction	6
1.1	The ParCos project	6
1.2	Purpose and role of this deliverable	6
1.3	Case Studies Planning.....	7
1.3.1	Goal	7
1.3.2	Methods.....	8
1.3.3	Planning.....	8
1.3.4	Case Study Scoping Session 1	9
1.3.5	Case Study Scoping Session 2	12
1.3.6	Case Studies Stage 1 Sharing Session	13
2	UK Case Study Set Up.....	14
2.1	Goal	14
2.1.1	ParCos objectives	14
2.1.2	Principles of citizen science	15
2.2	Who is involved?	16
2.2.1	Knowle West community.....	16
2.2.2	Identification and Framing of Issues.....	16
2.3	Methods	19
2.4	ParCos Tools	20
3	UK Case Study 2 - Stage 1	21
3.1	Activities undertaken	21
3.2	Data and information collected	23
3.3	Content produced	25
3.4	What has been learnt so far.....	31
3.4.1	Reflection on RRR workshops and activities.....	31
3.4.2	Reflection on Stage 1 of UK Case Study.....	33
4	Design Insights for ParCos.....	34
4.1	Informing development of ParCos Methods and Tools.....	34
5	Planned Future Activities	35
6	References	36

1 INTRODUCTION

Deliverable 5.2. (D5.2) provides an overview of the outputs of Stage 1 of Case Study 2 in the ParCos project, which is led by Knowle West Media Centre in Bristol, UK. It is the output of Task 5.2 in Work Package 5 (WP5) – Case Studies and Communications. This report contains an introduction to ParCos, describes the purpose and role of this deliverable, describes how the three case studies in ParCos worked together to plan their case studies and then describes the UK case study set up, the outputs of stage 1 of the UK case study, design insights for ParCos and planned future activities. An updated version of this deliverable report will be published in August 2022 (month 32 of project) which will expand upon this report and integrate the outputs and learning from Stage 2 of the case study.

1.1 THE PARCOS PROJECT

Participatory science and engaging activities are key to ensuring science communication increases public engagement in science. This can be achieved through collaborations between scientists and the non-scientist public. However, concerns about public science literacy are on the rise. The EU-funded PARCOS project will work to create participatory science stories that link to source material that the public can interpret for themselves. The project will explore ways to ensure diversity and inclusion in science participation and communication. It will also discuss the creation of engaging stories for the public that include the public in science activities and the interpretation of the outcomes. By disseminating stories alongside evidence, the audience will be invited to tell their own stories using the ParCos tools.

1.2 PURPOSE AND ROLE OF THIS DELIVERABLE

This deliverable sits within WP5 ‘Case Studies and Communications’ which is being conducted over a 28-month period (June 2020 to October 2022). There are 3 case studies within the ParCos project in three different countries – Belgium, Finland and the UK. The purpose of Task 5.2. within WP5 is to implement and evaluate Case Study 2, which is the UK case study, which is reported on in D5.2.

There are 2 stages to the ParCos case studies:

- Stage 1: focuses on the methods of conducting science and collecting data that are relevant to the framing of the case study and to their local context. Each case study will use an appropriate scientific method for collecting data, either predetermined within the case study description or selected by the case study participants in the early stages.
- Stage 2: the case study participants receive training (prepared in WP4) for creating participatory science stories and participate within a participatory design process to create participatory science stories and to integrate methods for communicating these stories to their wider communities and the general public.

Common activities that are being conducted in the context of the three ParCos case studies are:

- a) Identifying and/or collecting data for science stories
- b) Exploring data using ParCos tools
- c) Creating and communicating participatory science stories designed to prompt further engagement by the public

This first version of D5.2 is published in month 16 (April 2021) and focuses on the implementation of Stage 1 of the UK case study. An updated version will follow in M32 (August 2022) which integrates Stage 2 of the UK case study and the evaluation. The final version of D5.2. will be published on the ParCos Platform and The Bristol Approach website <https://www.bristolapproach.org/bristol-approach/>.

1.3 CASE STUDIES PLANNING

1.3.1 Goal

The goal of ParCos is ‘To improve science communication with the public by creating participatory science stories that link to source evidence that the public can interpret for themselves and then build new science activities on top of this using popular forms of broadcast media and VR/AR technologies. As shown on Figure 1, ParCos is developing participatory design models, methods and tools which are being tested within three case studies in Belgium, Finland and the UK. Each case study has a different focus, in terms of the science topics and the group of participants it is working with, but the learning is then brought together and feeds into the creation of the ParCos models, methods and tools.

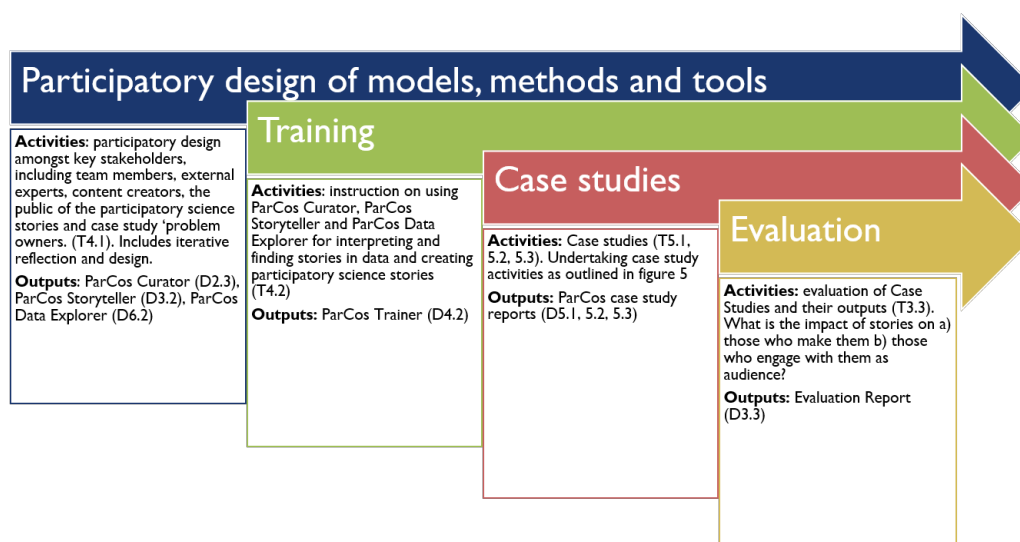


Figure 1: Overview of the ParCos Methodology

Each case study will focus on a different set of stakeholders, who are using data as evidence and who want to tell a story with the data to reach a wider audience. ParCos understands that data is experienced in subjective ways. The case studies will explore participatory approaches to data analysis and the use of arts-based methods to build empathy to data and support discussions about conflicting ideas or interpretations of data.

A brief summary of the three case studies is provided below:

- **Case Study 1:** design explorations based on weather or astronomical data to guide innovative storytelling in broadcasting (Belgium)
- **Case Study 2:** local communities, collecting and using data to address issues of importance to them, and communicating findings in personalised, intelligent and accessible ways including using immersive technologies (UK)
- **Case Study 3:** science in schools, looking at how schoolchildren can use the research data generated by universities and contextualise it to their own context and use through and share with others through documentaries (Finland)

1.3.2 Methods

At the heart of the ParCos project is the development of the participatory design methodology - The Bristol Approach to Citizen Science and the use of arts-based methods. Each of the ParCos case studies is using and testing elements of The Bristol Approach as a methodological framework to guide their citizen science communication activities. There is a particular focus on empowering citizens in communicating the outcome of citizen-led science initiatives, drawing upon the work within WP3 (Finding and telling stories from science data, the ParCos Storyteller), which is using arts-based methods for participatory sense making of science data, and WP6 (ParCos Platform).

1.3.3 Planning

As part of Task 2.1. in WP2 (Supporting community-led science practice), the ParCos project partners received online training on The Bristol Approach on 16th April 2020 as described in the D2.1. report (Hudson et al., 2020). KWMC (who developed the original version of The Bristol Approach) is supporting the three case studies to use the methodology in their own contexts. This has included supporting each case study to identify its project boundaries (i.e. guided by resources, timescales, criteria in bid, challenges such as COVID-10 restrictions) and providing advice to how to engage with potential participants (citizen scientists). Project partners are also working together to agree common terminology and its use within the ParCos project, which was an issue discussed within the consortium monthly meetings where we settled on the idea of creating a glossary of terms. In September and October 2020 KWMC led two Scoping Sessions to support the case study leads in starting to plan their citizen science projects. In November 2020, VRT organized a workshop to share ideas about the immersive technologies that could be used in the different case studies, previously discussed in D4.1.

1.3.4 Case Study Scoping Session 1

KWMC ran an online ParCos Case Study Scoping Session 1, using Microsoft Teams, on the 9th September 2020 (09:30-11:00 UK time) which involved all the project partners. The session covered the following topics:

- a) What are we trying to achieve in our case studies?
- b) Activity: barriers, opportunities & boundaries (JamBoard)
- c) Principles for diversity and inclusion
- d) Belgium, Finland and UK case studies – Activity: Our citizen scientists
- e) Planning our next steps – timeline

1.3.4.1 What are we trying to achieve in our case studies?

In the first part of the session, we explored the different elements of the ParCos project and how they linked to the case studies and would feed into the development of The Bristol Approach. This is illustrated on Figure 2, a diagram used in the session. The pink box shows how the steps of The Bristol Approach align with the timing of the case studies. Whilst the blue circles show the key elements of the ParCos case study approach. Concepts mentioned in different work packages are captured in the green circle and the yellow squares are selection of the key performance indicators. The text on the right-hand side links back to the European Citizen Science Association (ECSA) ten principles of citizen science which is discussed in the report - D2.1. The Bristol Approach for Citizen Science (Hudson et al., 2020).

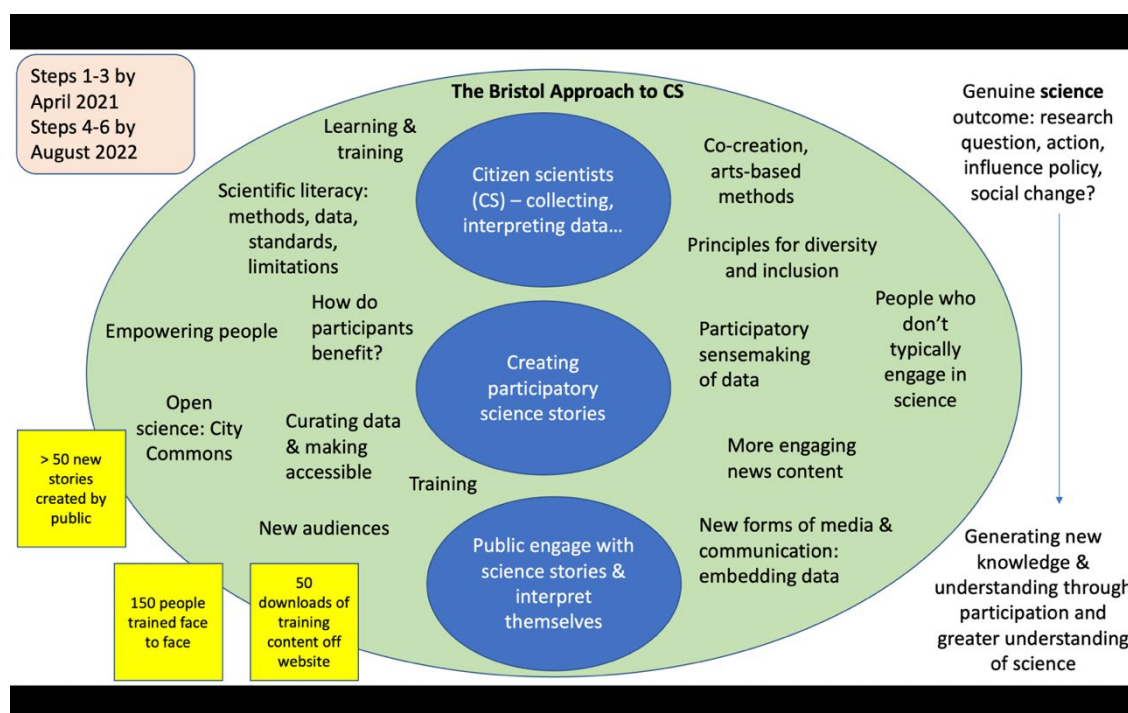


Figure 2: Key elements of the ParCos Case Studies and The Bristol Approach Development.

1.3.4.2 Barriers, opportunities and boundaries

As ParCos is being undertaken at a time when many of the countries involved are in lockdown due to COVID-19, where people have been asked to stay at home and not mix with others in person, we recognised that this posed a significant challenge for all the project partners. So we captured the barriers different partners envisaged in co-designing and implementing their ParCos case studies by posting them on a Google JamBoard, as shown in Figure 3. We then discussed how to address the barriers, what the opportunities may be and how we should establish boundaries for each of the case studies which we would need to review over time.

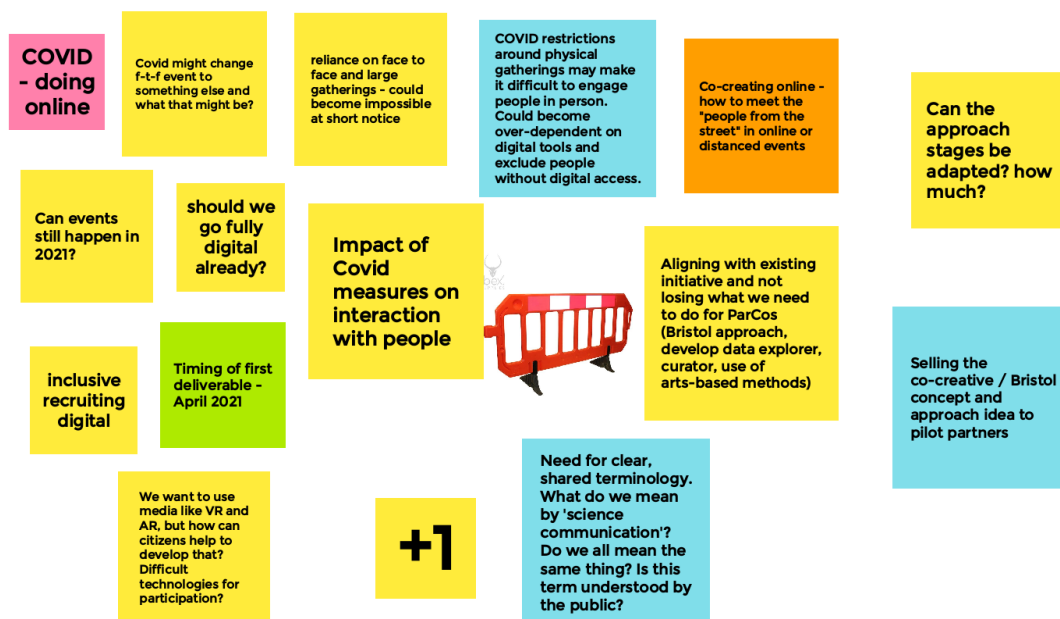


Figure 3: Barriers in implementing the ParCos case studies

Figure 3 shows that there were concerns about whether we should decide at this point to take the activities fully online, as face to face interaction and working with large groups of people in person was unlikely to be feasible due to national restrictions in each pilot country. However, we also discussed concerns about how inclusive using just online interaction would be in terms of who would be likely to attend. We decided to try and use a blended approach i.e. a mix on online and offline activities within the case studies. We recognised that we would need to be flexible with scheduling events, as there were likely to be delays due to COVID-19 and we would need to make changes to plans at short notice. However, as a consortium we agreed we would still work towards completing Stage 1 of the pilots by April 2021 (Deliverables 5.1., 5.2. and 5.3.).

An opportunity of the COVID-19 crisis is that by digitising events a more diverse audience can be invited. It is for example possible that consortium partners join workshops and lecturers in other countries.

We also discussed the need for shared terminology across the pilot in terms of defining how we understand terms such as science communication, co-design etc and decided to create a glossary of terms. Due to the many restrictions the project partners faced, we decided the

case studies should build upon existing activities the project partners were working on with their communities, so they were more likely to happen. But that in doing we recognised it was important not to lose the ethos of ParCos e.g. it would be important to ensure the activities contributed to methods and development of tools we had committed to create in the ParCos bid, such The Bristol Approach to Citizen Science, ParCos Data Curator, ParCos Data Explorer etc.

1.3.4.3 Principles for Diversity and inclusion

Activities in Task 2.2. (WP 2 – Supporting community-led science practice) of ParCos will lead to the development of a set of principles to support diversity and inclusion in science activities. Therefore, our next activity in the workshop was to discuss how this was relevant to the case studies so that each case study could consider this within their case study design. This involved thinking about what the terms diversity, inclusion and accessibility mean and partners also watched the video <https://www.youtube.com/watch?v=hArUbSpQC1g> ‘Bristol Living Lab – Diversity and Inclusion’ created as part of the dissemination work in ParCos. This video details how KWMC are implementing diversity and inclusion within their wider work and the learning that is feeding into ParCos.

1.3.4.4 Belgium, Finland and UK case studies – Activity: Our citizen scientists

Next each project partner talked about their ideas and current plans for the ParCos case studies. We also discussed how we would start the engagement and recruitment of participants within each case study, covering the issues shown on Figure 4. The detail of how each case study has progressed with this work can be found in the Case Study Stage 1 Reports (D5.1, D5.2 and D5.3). So for the UK Case Study this is in Section 2 below.

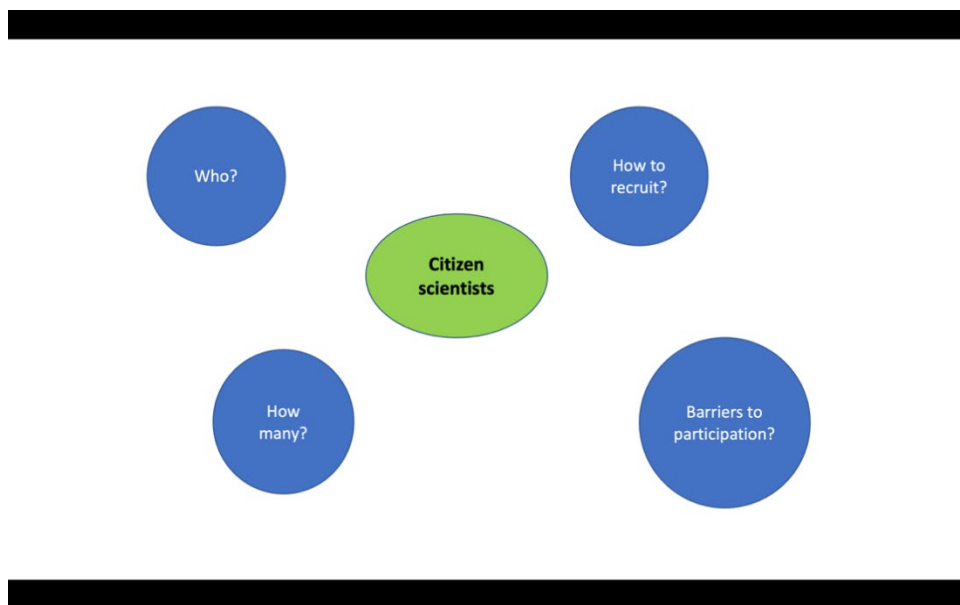


Figure 4: Issues to consider in deciding who would participate in the ParCos case studies

1.3.4.5 Planning our next steps

Finally, we agreed on our next steps for developing the case studies and decided to hold a workshop as part of the Consortium meeting in October 2020, and that each case study would bring further details of their plans to this next session.

1.3.5 Case Study Scoping Session 2

The 2nd case study scoping session took place online via Microsoft Teams on the 13th October 2020 (13:00-15:00 UK time) and was attended by all ParCos partner organisations. The session covered the following topics:

- a) Case Studies - Aims, objectives, outputs, outcomes, data collection
- b) Individual Case Study presentations
- c) Co-creating with Communities using The Bristol Approach and aligning case study activities
- d) Co-creating online + offline: sharing best practice
- e) Aligning case study activities with ParCos deliverables

It was an opportunity for each case study lead organisation to share how the plans for their case studies were developing and how they linked back to the ParCos project aims, objectives, outcomes, tools, deliverables etc. We also agreed to complete the Miro board summarising the plans for our case studies, which is illustrated in Figure 5. We also shared learning between partners identifying opportunities to collaborate over the next few months as well as to discuss how we could address the ongoing challenges individual ParCos partners faced in project delivery due to the COVID-19 restrictions. We shared our experiences of delivering blended activities using a mix of online and offline activities. Zoe Banks Gross from KWMC shared her experiences of co-creating with communities in another EU Horizon 2020 project REPLICATE¹ and we discussed how the learning from that could feed into how we work with communities in ParCos.

¹ <https://replicate-project.eu>

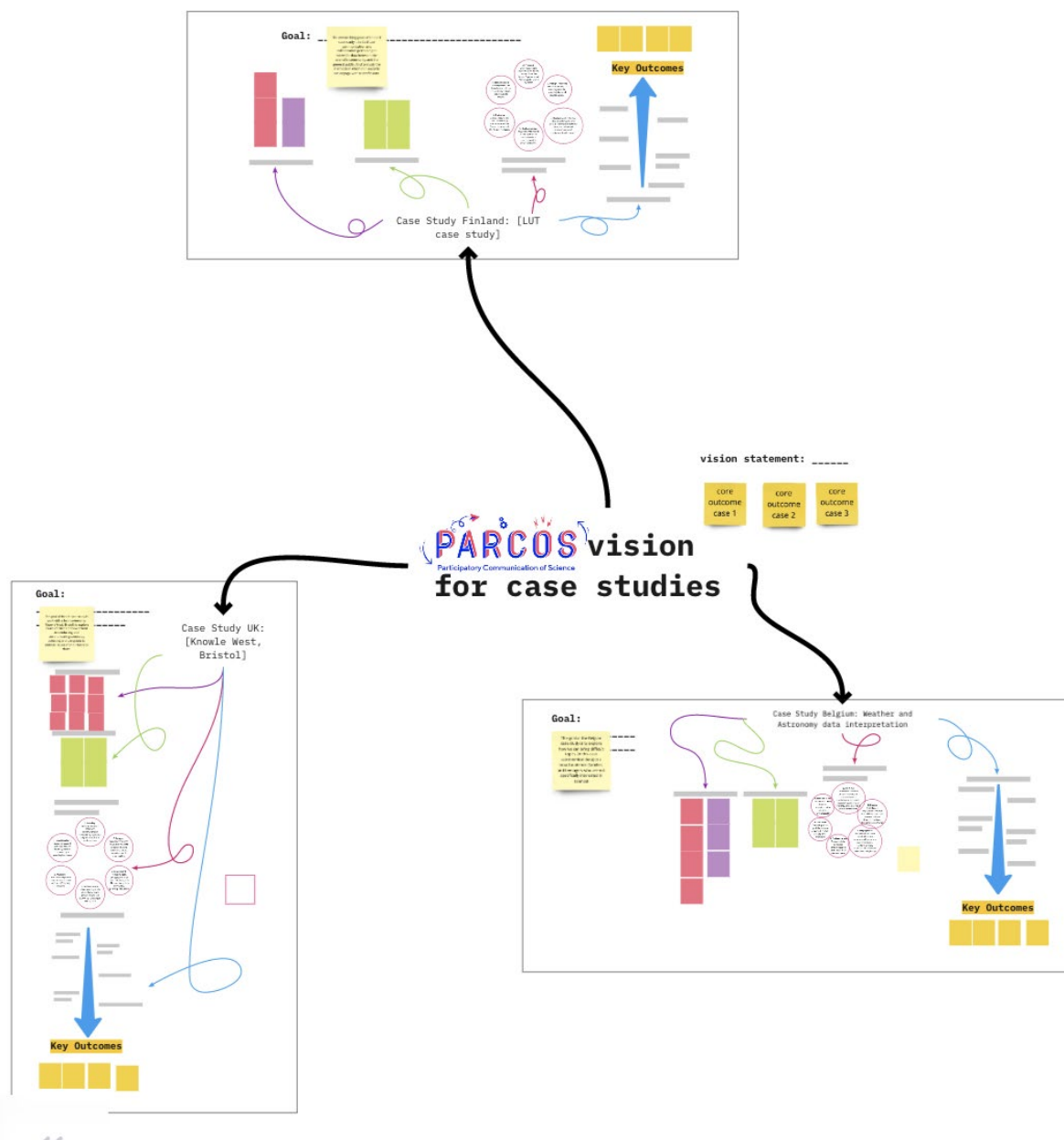


Figure 5: ParCos Vision for Case Studies on Miro Board²

1.3.6 Case Studies Stage 1 Sharing Session

Between November 2020 and April 2021 each of the case studies have secured their relevant ethical approvals and focussed on implementing Stage 1. The first version of D5.1, D5.2 and D5.3. presents the information of on the activities undertaken to date. In May 2021 KWMC is organising a Stage 1 sharing session to bring the case study leads together to reflect on the activities and their future plans, to share learning and experiences, to use this as an opportunity to feed this into the methods and tools development in ParCos.

² https://miro.com/app/board/o9J_klznvDI/

2 UK CASE STUDY SET UP

2.1 GOAL

The goal of the UK (KWMC) case study is work with a local community (Knowle West, Bristol) to explore issues of citizen empowerment in conducting and communicating science by collecting and using data to address issues of importance to them. Within the scientific literature science communication has traditionally been divided into two paradigms. The first view is as the one-way transmission of information from ‘expert’ scientists to the general public. Whilst other models view it as a dialogue and discussion between the public, experts and decision-makers (Holmen and Kappel, 2019). ParCos focuses on participatory science communication and experimenting with novel forms of partnerships and alternative models of citizen led knowledge production.

Within the UK Case Study local residents are the citizen scientists and they are collaborating with other stakeholders (e.g. scientists, artists, local businesses) on science communication activities. The learning is being used to inform and develop The Bristol Approach for Citizen Science, which has a focus on understanding how a people and issue led approach supports finding and telling stories in data and how this may lead to differences in the types of stories diverse communities want to tell from data. At the heart of The Bristol Approach is the City Commons, where resources, tools, expertise and technologies are shared and used for common good.

2.1.1 ParCos objectives

The main objective of the ParCos project which was outlined in the project bid is ‘to improve science communication with the public by creating participatory science stories that link to source evidence that the public can interpret for themselves and then build new science activities on top of this using popular forms of broadcast media and VR/AR technologies’. This has 3 underlying objectives shown in Table 1 which we have then translated into aims and objectives for the UK case study.

Table 1: UK Case Study aims and objectives and alignment to wider ParCos objectives

ParCos Objective	UK Case Study Aim	UK Case Study Objective
Objective 2: To improve interaction between difference science stakeholders through participatory approaches to science communication	1) To increase Bristol resident’s engagement with science through participation in science communication activities with other stakeholders	(a) To recruit > 30 Participants (particular focus Knowle West residents) to take part in ParCos Case Study (b) To run participatory science communication activities with the >30 participants in the ParCos Case Study (c) To work with Case Study participants to create at least 3 Participatory Science Stories
Objective 3: To develop pedagogical approaches and to deliver teaching of new practices for communicating science to both professional and non-professional users	2) (i) To train Bristol residents in participatory science communication methods and tools developed in ParCos (ii) Disseminate learning about ParCos to wider Bristol stakeholders	(a) To run face to face training on science communication methods with at least 50 members of the public (b) To hold a Showcase Event which shares learning from the Case Study within Bristol at an event with at least 100 visitors (c) To share learning from ParCos Case Study with > 100 people
Objective 1: To increase trust in science outputs through making underlying evidence and its interpretation more transparent	3) To increase Bristol residents’ confidence in science communication through the creation of participatory science stories	(a) To support Bristol residents to create at least 17 science stories that reuse material from Participatory Science Stories created in the project

2.1.2 Principles of citizen science

The UK Case Study is also guided by the European Citizen Science Association (ECSA) ten principles of citizen science (ECSA, 2015). Below we outline how The UK Case Study will meet those principles:

1. Participants (citizen scientists) will be involved as collaborators and co-creators.
2. The genuine science outcome of the UK Case Study is community (resident) led action on environmental sustainability Bristol, with a particular focus on Knowle West, and how the residents communicate their findings and share learning with other communities.
3. We are taking into consideration how the citizen scientists and other stakeholders (including professional scientists) benefit from taking part within the design of the activities
4. Citizen scientists can participate in multiple stages of the scientific process
5. Citizen scientists will receive regular feedback on the project activities

6. The case study limitations and biases will be considered and controlled as part of the planning
7. Project data and metadata will be made publicly available and where possible the results published in an open-access format
8. Citizen scientists will be acknowledged in project results and publications
9. The case study will be evaluated for its scientific output, data quality, participant experience and wider societal output
10. KWMC as leaders of the case study are taking into account legal and ethical issues i.e. copyright, intellectual property, data sharing agreements, confidentiality, attribution and the environmental impact of the activities.

2.2 WHO IS INVOLVED?

2.2.1 Knowle West community

The location of the UK case study is in Bristol with a particular focus on working with residents and people who work in the neighbourhood of Knowle West. KWMC is an arts centre and charity and we have been based on the Knowle West estate since 1996. We support people to make positive changes in their lives and communities, using technology and the arts to come up with creative solutions to problems and explore new ways of doing things.

Knowle West is in the Filwood ward of the City of Bristol and in 2019 the population was 13,900 according to the Statistical Ward Profile published by Bristol City Council (2020) and there are around 5500 households. The area has lots of families, as the typical housing stock is 3 bed homes. According to the ward profile it has a significantly higher proportion of young people aged 0-15 years. They make up 25.1% of the population compared to 18.5% on average in Bristol. Therefore, the UK case study has a focus on working with local families.

Filwood is in the top ten indices of deprivation for England and has high levels of child poverty (Bristol City Council, 2020). 44.8% of the community are disadvantaged in terms of Education in Filwood, which is significantly worse than the Bristol average of 27.8% (Bristol City Council, 2020). Most citizens who participate in citizen science are well educated (Haklay, 2018) and finding ways of engaging less educated or less privileged participants is an important goal if citizen science genuinely wants to move towards involving everybody. Therefore, the UK case study has a particular focus on working with people who are typically underrepresented in citizen science.

2.2.2 Identification and Framing of Issues

Step 1 of The Bristol Approach is to identify the issues of interest to the local community and the change they want to bring about, which is further discussed in 2.3. Methods. The three ParCos case studies all build upon existing activities the partner organisations are involved in. KWMC was established and has been based within the community of Knowle

West for 25 years and we work closely with local residents co-designing projects that address issues of interest to them and supporting them to make positive change.

On the 21st July 2020 (2-3pm), KWMC held an internal online ParCos UK Case Study Planning Session on Microsoft Teams. As part of this we mapped the local groups and science related issues we had already started to work on with local residents and that we could potentially build upon within the UK ParCos case study. In this session we used the Science Council definition of science which is ‘the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence’³. The outputs of this activity were captured on JamBoard and are shown in Figure 6. We grouped the suggestions around two themes one on circular economy, which had a particular focus on waste and sustainable materials, and the other on green infrastructure issues.

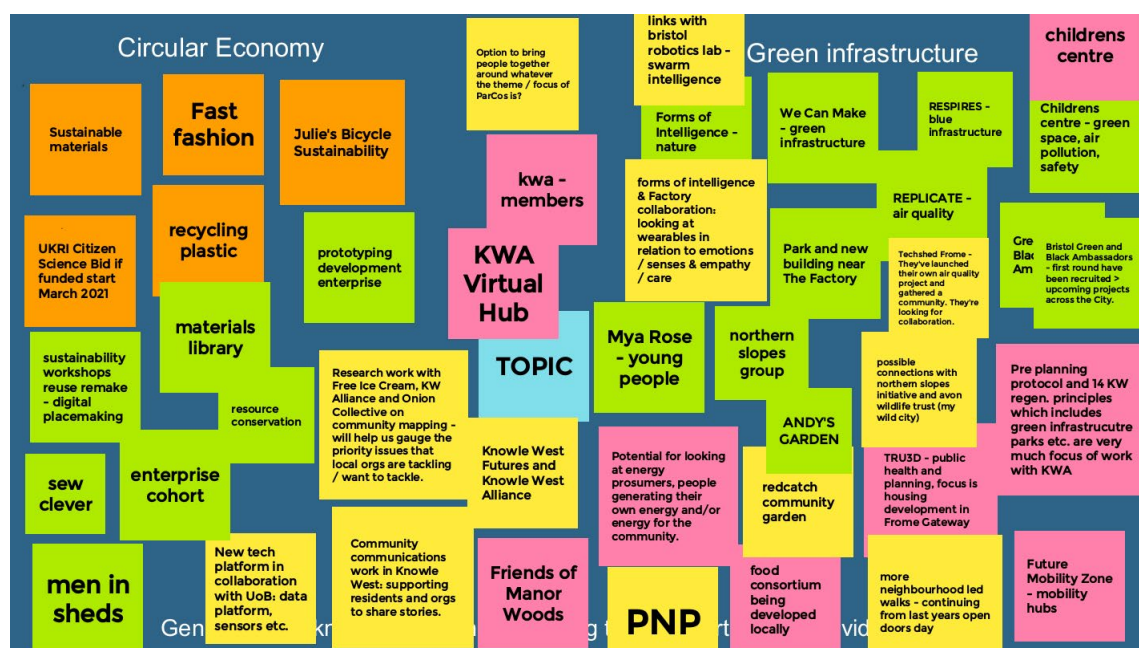


Figure 6: Identification of science issues and groups to work with on the Case Study

We also discussed and mapped ideas for who we might work within the community and what would be important to consider in how we work with them including any barriers. The information collated is shown on Figure 7. We decided it would be important to try and engage with a diverse group of people through the case study, including those who are less likely to engage with science which can include those from low-income backgrounds and Black, Asian and other visible minority ethnic communities. But that we should also consider the needs of individuals such as neurodiversity and consider who could benefit the most from being involved. We also recognised it would be good to collect data so that we could explore how successful our engagement was, for example through equalities monitoring data and evaluating the activities. In designing activities, we identified that it would be important to consider factors such as the use of language so the activities are inclusive and the fact the word ‘science’ can actually put people off. Also that we would frame the

³ <https://sciencecouncil.org/about-science/our-definition-of-science/>

activities as fun topic-based activities rather than marketing it as a citizen science initiative. We also recognised that Covid situation presented challenges, in terms of needs to make the activities relevant to a community who already face significant challenges. We decided to deliver the activities as a blended offer (e.g. a mix of online and face to face).



Figure 7: Who and how we work with people in the Case Study

On the 17th September we held a second online KWMC case study scoping session (10.00-11.30am). In this session we further explored the aims and objectives of the ParCos case study and we did some further planning. We made the decision to focus in on sustainability, as we knew from our work and earlier discussions that this was an issue of interest to the local community in Knowle West. 94% of the Filwood residents who responded to the 2019-20 Bristol Quality of Life Survey said they thought street litter was a problem locally (Bristol City Council, 2020). Whilst only 44% of them were satisfied with the quality of parks and green spaces locally, with around half of them visiting the parks and green spaces at least once a week (Bristol City Council, 2020).

Our case study focuses on generating new knowledge and understanding on household waste in Knowle West - with the local community collecting data and using this to explore creative solutions to address the problem, including through the use of sustainable materials. In addition, there was also interest in how the ParCos case study could align with a fledgling project creating a community market gardening scheme that is part of We Can Make, a community led housing scheme in Knowle West. In particular ways in which the community could be supported to collect and use data in relation to growing and green spaces. We hope to be able to develop this aspect of our case study as we move into Stage 2.

In the UK case study, we are working with residents in Knowle West on undertaking science and science communication activities with a particular focus on working with local families. Within the case study Knowle West residents are collaborating with other people in Bristol,

including artists and businesses interested in the same issues, and sharing learning with other communities.

2.3 METHODS

At the heart of ParCos project is empowering citizens for participation in research and innovation using participatory citizen science. The UK Case Study is guided by the Bristol Approach – which is a methodology with six steps, as shown on Figure 8. The starting point for The Bristol Approach is the belief that citizens should have a leading role in imaging, designing and building their future. It provides opportunities for those least often heard to share their knowledge and wisdom and it has people and their everyday experiences and knowledge at its heart (Stewart-Hall and King, 2018).



Figure 8: The Bristol Approach – The 6 Step Framework (The Bristol Approach, 2020)

Stage 1 of the UK case study is focused on activities which are both guided by Steps 1, 2 and 3 of The Bristol Approach and the learning is feeding into development of The Bristol Approach for Citizen Science. Whilst Stage 2 focuses more on steps 4-6, although there is inevitably some overlap between all the stages.

We are using arts-based methods within the UK Case Study and the learning will feed into the Guidebook on the use of arts-based methods (ParCos Deliverable 3.1). In particular we are undertaking creative workshops with families and individuals, working in a consistent and open collaborative style with a wide-ranging group of people who are typically underrepresented in citizen science. We are using arts-based methods for creative problem solving, ideation and prototyping, for sense making of the data collected and for telling stories with the data.

Within citizen science projects it is important to consider issues of power, exploitation (in this context treating them unfairly) and commitment to engagement. Participation should be meaningful and adjusted to participants’ own interests, histories and ways of thinking and learning. It is important to understand what the project will ask of participants and understands why they want to get involved and how they will benefit from participation. The learning from the UK case study will bring new perspectives and new forms of knowledge generation to science and science communication using a participatory and arts-based approach.

2.4 PARCOS TOOLS

Stage 1 of the UK case study focuses on the methods of conducting science and collecting data that are relevant to the framing of the case study and the local context. The resources, tools and learning developed during the ParCos project will feed into future training and presentations about ‘The Bristol Approach to Citizen Science’ in action. They will be shared on the ParCos project website and also an updated version of The Bristol Approach website (www.bristolapproach.org) where there will be a UK case study. We are also identifying wider ways to exploit the outputs through the ParCos Exploitation Plan (Deliverable 7.4 led by VRT).

The learning from the UK case study and the formalisation of the knowledge will lead to the development of Principles for Diversity and Inclusion (Deliverable 2.2. led by KWMC). As part of the UK case study activities, we are collecting equalities data so we are able to understand who participates within the activities and we will use this information to report against the project objectives. We will also be evaluating people’s experiences of participating in the activities, capturing personal and community narratives although much of this will occur in stage 2. ParCos recognises that it is important to understand who holds the power in undertaking and communicating science, how this power can be given to the hands of the public and how better practices for sharing scientific data can be developed.

ParCos is creating new science communication tools that can be used in the creation of participatory science stories through the activities below:

- curating data sets (ParCos Data Curator in WP2 – led by LUT)
- finding stories in data (ParCos Data Explorer WP6 – led by LUT)
- turning data stories into narrative visualisations (ParCos Storyteller WP3 – led by VRT)

In Stage 1 of the UK case study, we are starting to feed our learning into the development of these tools. In particular we have tested the Prompt Cards designed by LUT as a first prototype of the ParCos Data Curator. These were tested against the ReThink ReMake ReCycle activity which we describe in Section 3 and KWMC provided feedback to LUT. There is also a plan to share further learning from each of the case studies and to explore how this informs the science communication tools at a Stage 1 Case Study Sharing Session in May 2021.

3 UK CASE STUDY 2 - STAGE 1

3.1 ACTIVITIES UNDERTAKEN

During Stage 1 of the UK Case Study, KWMC have been collaborating with people in Bristol to understand the scale and impact of household waste and explore creative solutions to the problem. This has been guided by Steps 1, 2 and 3 of The Bristol Approach as described in Section 2.3. The activities described below align with:

- ★ **Step 2: Framing** - exploring the issues identified in Step 1 in detail with the community and considering how data might be helpful to address them
- ★ **Step 3: Design** - experimenting with creative methods to collect and curate data on the issues, to visualise it and understand it

We have also started to collect data on who participates in the activities which feeds into the evaluation in Step 6: Outcome. Due to COVID-19, and the lockdown restrictions in the UK, we ran the Stage 1 activities as a series of online workshops accompanied by offline activities where the families and individuals involved were provided with workshop packs to undertake activities within their homes.

We designed an activity called ‘ReThink ReMake ReCycle’ (RRR) which was facilitated by KWMC: The Factory (KWMC’s making and innovation space). The aim was to investigate the scale and impact of common household waste materials, such as paper and plastics, by unpicking the data behind what we waste. We followed a process of online learning (workshops) and hands on making to explore sustainable solutions and alternatives. Then we worked together with participants to tell stories using the data collected and communicate what was learnt (participatory science stories).

The RRR activities were structured around the three key themes:

- ⇒ ReThink - Think carefully about how we can reduce or repurpose our waste
- ⇒ ReMake - Make DIY alternatives that are reusable or use more sustainable materials
- ⇒ ReCycle - Recycle our waste back into useful materials and objects

Arts-based methods were central to the design of the activities; we used design thinking as an approach for creative problem solving, ideation and prototyping, we also used creative approaches for sense making of the data collected and for telling stories with the data. We

collaborated with Lisa Cole, a sustainable designer who is based in Bristol⁴, on the RRR activities.

KWMC organised and delivered three RRR online workshops:

- Workshop 1 - 26th November 2020 (13:00-14:30): Kick Off Session - How does waste affect our planet?
- Workshop 2 - 1st December 2020 (13:00-14:30): Plastics - Exploring recycled and bio plastics
- Workshop 3 - 3rd December 2020 (13:00-14:30): Paper - Tackle waste through Design Thinking (with sustainable designer Lisa Cole)

In designing the RRR activities it was important for us to consider why the participants would want to get involved, what they would want from the process and how they would benefit from taking part, which aligns with Step 2 in The Bristol Approach. From our experience of working with the local community in Knowle West, we knew there was lots of interest in sustainability and the project would be likely to attract people who were interested in reducing waste. We were also aware that due to COVID-19 lockdown restrictions we needed to create something that would be fun and easy to engage with at home, as our target audience was families. We also recognised that people would probably have different levels of experience in using digital platforms such as Zoom. Therefore, we tried to design activities that would be fun and simple for all the family, providing them with an opportunity to socially engage with others and meet new people whilst in lockdown. We designed the activities so they could be engaged with at different times, in case not everyone could make all the online sessions.

We promoted the opportunity to get involved in the RRR workshops/activities through KWMC’s local community networks and social media in November 2020. Our aim was to engage with families in Knowle West, as well as the surrounding neighbourhoods in South Bristol, but we also received interest from people living in other areas who also got involved. To manage the process of recruiting participants, and to deal with research ethics and data protection issues, we created an online Workshop Registration and Consent Form using AirTable. This also linked through to an additional (optional) anonymous KWMC equalities monitoring form.

In advance of the workshop sessions, participants were sent an activity pack which contained all the materials they needed for the sessions, Figure 9 shows the packs being put together. Where possible we hand delivered these packs. The sessions were held on Zoom and recorded in case participants could not attend a session or only make part of it. All the hands-on activities were designed so they could be done in their own time, following the video tutorials and/or step by step instructions.

⁴ <https://www.lisa-cole.co.uk/about-lisa-cole/>



Figure 9: RRR Workshop packs being put together in KWMC: The Factory

3.2 DATA AND INFORMATION COLLECTED

22 households signed up to participate in the ReThink ReMake ReCycle workshops which included 48 people in total, 34 adults and 14 children. 13 of the households were in South Bristol, 3 households in other parts of Bristol and 5 households in other parts of South West England and one in the Midlands.

The lead participant for each household was asked to complete an online KWMC equalities monitoring form, which was a voluntary process. It was completed by 20 people and of those 18 identified as female and 2 as male. Figure 10 illustrates that 55% of our lead participants were aged between 35-49 years and just under a third were between 20-34 years old.

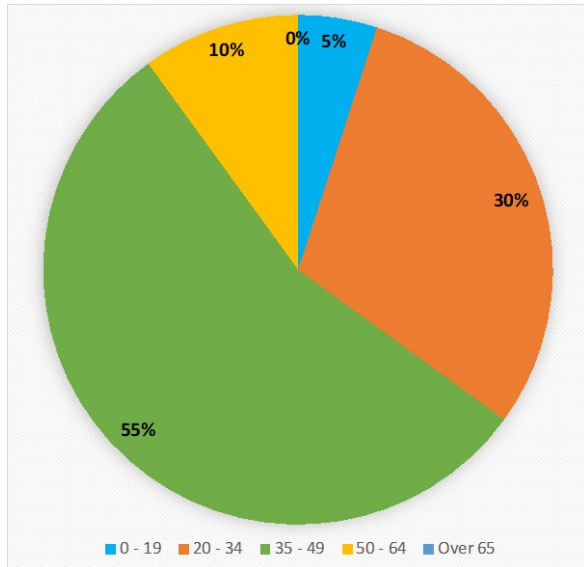


Figure 10: Distribution of RRR lead participants by age group

In terms of cultural heritage just over half (55%) of the lead participants identified as White British, we also had participants who identified as Indian, White and Asian, White and Black African, Eastern European and 25% of participants said they were not sure of their cultural heritage or preferred not to say (see Figure 11). 16 of the participants reported they did not have a disability, 3 reported they had a disability and 1 selected the prefer not to say option.

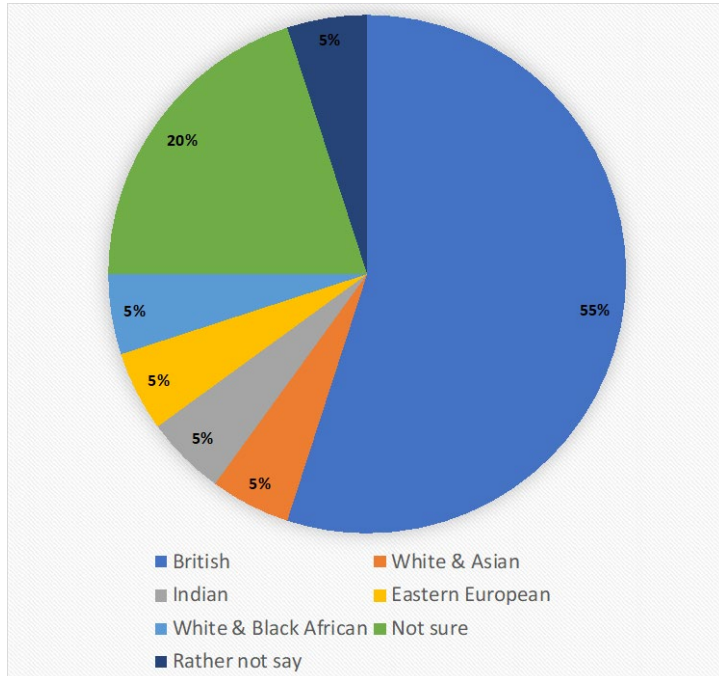


Figure 11: Distribution of RRR lead participants by cultural heritage

3.3 CONTENT PRODUCED

The online activities for RRR commenced on Thursday 26th November 2020 during the European Week for Waste Reduction⁵, with a workshop looking at the impact of paper waste globally and locally. This was followed by a second workshop on December 1st 2020 looking specifically at plastics, including recycling plastics and bioplastics. Then the third session focused on paper on December 3rd 2020, working with Lisa Cole who introduced the participants to a design thinking approach to think up and prototype creative solutions to tackle paper waste.

Participants received their workshop packs in advance of the firsts workshop (see Figure 9) which included the following:

- ⇒ Printed ‘waste audit’ sheets for measuring household paper and plastic waste
- ⇒ Joining instructions for each of the three workshop sessions
- ⇒ Ingredients and tools for making ‘bioplastic’ pine resin pots, and ‘gelatine-based’ plastic with agar agar
- ⇒ Safety clothing for the bioplastics activities
- ⇒ A sewing kit, fabric and towel for making a washable, reusable cloth
- ⇒ A laser cut keyring made with from recycled plastic sheet
- ⇒ Links to video tutorials for the bioplastics activities, washable cloth, and techniques for sustainably wrapping gifts



Figure 12: Where you see Waste & What waste you see JamBoard - RRR Workshop 1

⁵ <https://ewwr.eu>

During the first RRR workshop, participants discussed their reasons for signing up to the RRR programme, there was a strong narrative around wanting to learn more about sustainability, zero waste and sustainable materials. We had an open discussion and ideas were shared about issues that mattered to the group. People shared their thoughts, concerns and experiences of working towards leading a more sustainable life. People also shared where they saw waste and what types of waste, this was captured on JamBoard (see Figure 12). They talked about how they see waste in open spaces such as parks, fields, and in the streets. And they reflected on the fact that as people are spending more time outside in local spaces due to lockdown, rubbish bins have been over-spilling. People also mentioned the issue of fly-tipping, the illegal dumping of rubbish in field gateways and other places.

After the first session people were challenged to fill out the waste audits to record how much paper and plastic they wasted in a week. The aim was to create a community data set which they could then explore and tell stories about. Figure 13 shows a copy of the paper waste audit sheet participants received in their workshop pack.



How much paper do you waste?

This is a list of disposable items containing paper - many of these items cannot be recycled, particularly if it is used for personal care or has stains from food, grease, paint or dirt.

We'd like you to record how many of these different items you use and throw away in a week (7 days) in your household. Tally them up as you pop them in the bin or recycling. You can add your own additional items in the blank spaces if you have them. If you are counting teabags and wipes, you could also add them to plastic as they often contain plastic:

Wet wipes: <https://friendsoftheearth.uk/plastics/wet-wipes-keeping-them-out-our-seas-and-sewers>

Teabags: <https://www.bbc.co.uk/news/uk-50260687>

Personal Care		Total
Example		8
Make up wipes		
Face pads		
Toilet rolls		
Tissues		
Wet wipes		
Cotton buds		
Packaging		
Sun screen wipes		
Soap packaging		
Nappies		
Sanitary towels		
Tampons		

Food		Total
Example		14
Cardboard food boxes		
Paper straws		
Greaseproof paper		
Paper bags		
Kitchen roll		
Kitchen wipes		
Tea bags		

Out and about		
Takeaway cartons		
Card coffee cups		
Paper wrappers		
Paper bags		

Cleaning		
Floor wipes		
Polishing wipes		
Window wipes		
Cleaning wipes		
Packaging		
Dryer sheets		

Home		
Newspaper/Magazines		
Envelopes		
Junk mail		

Grand total of items	

less stuff  This waste audit is adapted from an original design from less-stuff.co.uk and The Frugal Family



Figure 13: Example of the waste audit sheet

In Workshop 2 participants explored recycled plastics and bioplastics. They shared information about plastic waste they had recorded in their waste audit so far (see Figure 14). During the session participants also watched a video on how you can recycle plastic offcuts into new sheets. They also explored what could be done at home to reduce plastic waste. Two video tutorials were also published after the session: (i) Make your own ‘bioplastic’ pine resin pot and (ii) Make your own ‘gelatine-based’ plastic with agar agar.

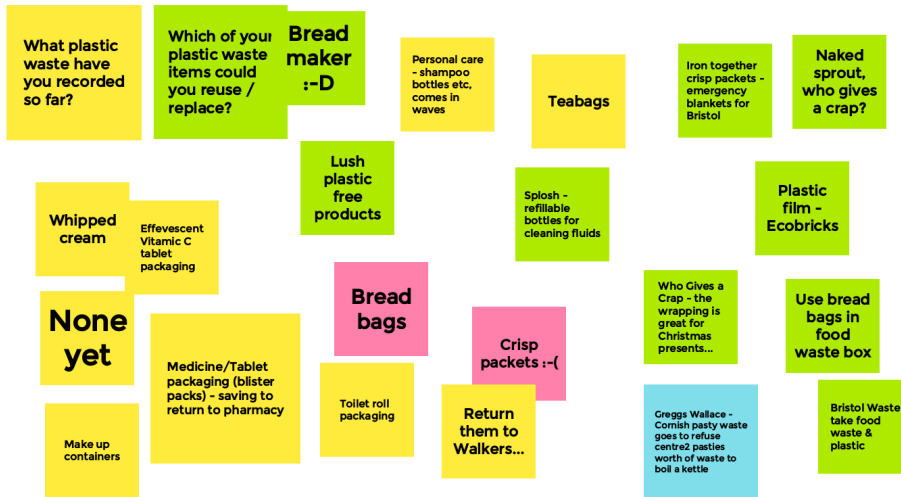


Figure 14: What plastic waste have your recorded JamBoard - RRR Workshop 2

In workshop 3 participants explored how to tackle paper waste collaborating with sustainable designer Lisa Cole. They reviewed how much paper they waste, reflecting on their household waste paper audit (see Figure 15), and used a design thinking approach to create ideas and prototype about how to tackle waste (see Figure 16).

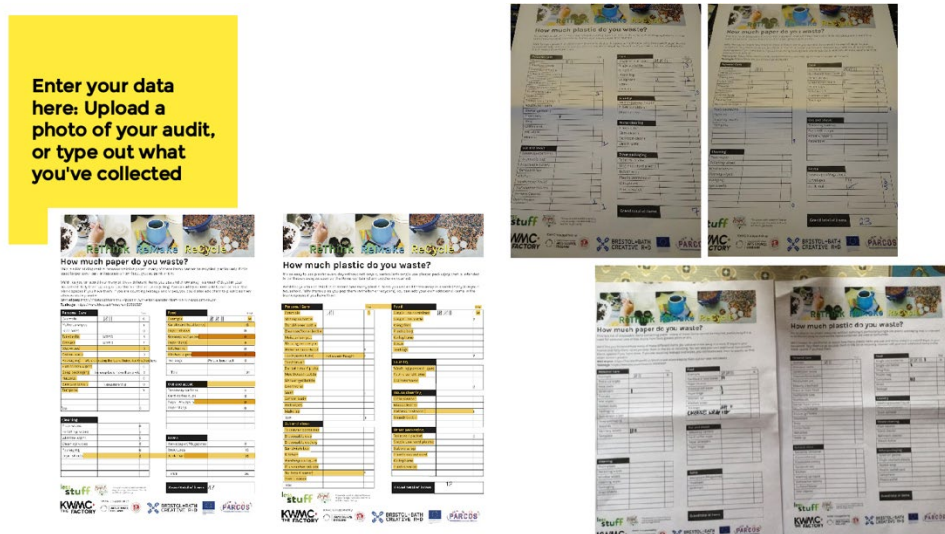


Figure 15: Examples of waste audits that participants shared in RRR Workshop 3



Figure 16: Solutions participants came up with to reduce paper waste in RRR Workshop 3

Within the KWMC project team we considered ways in which we could work with the RRR participants in creative ways to collate the data and tell stories from the data (participatory science stories) and communicate the findings. From November 2020 to early February 2021, we were joined by Chelsea Galloway (a recent university graduate) who was doing a communications internship with KWMC. Chelsea suggested creating an interactive Zine, rather than a formal report or static webpage, in order to “document the sessions, gather participants’ contributions and collect data from waste audits in a fun, visual way.” There was lots of enthusiasm for this idea and so we set out to work with RRR participants to create the ‘ReThink ReMake ReCycle Zine’; as a way of communicating what participants discovered, to hear people’s stories and advice for reducing waste, and to share a range of tutorials, activities and puzzles inspired by the project. As part of the ParCos project we also undertook an evaluation activity with Chelsea, who reflected on her experiences of working with the participants and below we incorporate some of her thoughts which were also published in a blog on the ParCos website⁶.

Figure 17 shows a picture of the front cover of the RRR Zine that was created, which is available at <https://kwmc.org.uk/wp-content/uploads/2021/03/ReThink-ReMake-ReCycle-Zine.pdf> The 36-page zine is a digital document that can be saved and printed at home. It contains content from the sessions, quotes and thoughts from Jamboard, links to tutorials and videos shared with group, interactive elements (spot the waste puzzle, unpick the data quiz) boxes to type in, facts, images/ illustrations and images from participants. The digital version is interactive: this means people can click on the framed boxes and type their own notes, and access other online resources via the links throughout the document and in the Resources section.

⁶ <https://parcos-project.eu/2021/04/exploring-community-data-to-rethink-remake-recycle/#more-217>



Figure 17: ReThink ReMake ReCycle Zine front cover

Chelsea reflected that “people’s words shape[d] the content” of the zine. For example, the zine incorporates the notes and reflections that participants recorded on a shared Google Jamboard, and the data, tips and stories they shared. It also contains their creative ideas for reducing paper waste, things participants already do at home to live sustainably, and the items they threw away in a one-week period collected through their waste audits.

As well as sharing data and stories in an accessible, family-friendly way, the zine offers a starting point for readers to explore their own experiences. Chelsea explained that the zine was designed to show what the participants had explored together and pose the question, “what are you up to?” – highlighting that people are “on different sustainability journeys.” She also added: “the interactive elements of the zine enable people to join in – either typing directly into the digital document or printing the zine at home to write on by hand.”

Readers are also encouraged to engage with participants’ waste data and draw their own conclusions. On the final page of the zine, the data is represented visually in the form of a puzzle so readers can count the items and interpret the data themselves. This is also shown below in Figure 18.



28

Finally, can you sort through this waste data?

On the left we have visualised the data collected by two households in one week.

The objects falling into the recycling bin are the objects that the households recorded most frequently on their waste audits.

Can you count how many of each object there are and record the number in the table below? (Answers on page 33)

Object	Amount
Envelopes	
Toilet roll tubes	
Single use plastic bottles	
Junk mail	
Surface Cleaner	
Cardboard packaging	
Toothbrush tubes	

Ending on this note...

"There is a risk that there will soon be more masks than jellyfish in the ocean as single-use masks and gloves are washing up on shorelines." - [The Guardian](#)

29

Figure 18: RRR Zine – waste sorting game

The RRR Zine was launched on 18th March 2021 to coincide with the Global Recycling Day⁷, an annual event organised by The Global Recycling Foundation. It was launched at the KWMC: The Factory members meet up on that day and was also shared via KWMC website and social media accounts. The zine has been featured in a range of blogs and e-newsletters which focus on community action and sustainability.

We also used a number of other communication tools alongside the activities and creation of the Zine. We established a Facebook group as a place to share ideas and content (13 participants joined the group). We shared social media content (visuals, facts, quotes) using #ReThinkReMakeReCycle. We also used emails to try and collect more data and information. We have also shared learning for our ParCos case study at two external events so far. On the 18th January we were invited to give a masterclass for the Schools as a Living Labs EU funded project⁸, where we talked about ParCos and the case study. We also gave a presentation about the RRR activities at Maker Monday⁹ on the 1st March 2021.

3.4 WHAT HAS BEEN LEARNT SO FAR

3.4.1 Reflection on RRR workshops and activities

On the 17th December (9.30-10.30am) the KWMC ParCos team held an online RRR Debrief Session to reflect on the RRR workshops and activities to date. Figure 19 shows a JamBoard

⁷ <https://www.globalrecyclingday.com>

⁸ <https://www.schoolsaslivinglabs.eu/2021/01/18/sall-masterclasses/>

⁹ https://twitter.com/Maker_Monday

we used to capture the KWMC’s teams' thoughts on what had gone well. We were pleased with the number of participants who had signed up, which suggested the marketing had worked well, and the workshop registration and ethics process had worked well using AirTable. The participants were excited to receive their activity packs, where possible these had been hand delivered and the people had enjoyed that element of human interaction. The structure of the sessions had worked well and participants had got well with the digital tools – Zoom and JamBoard. We also received positive feedback on social media.

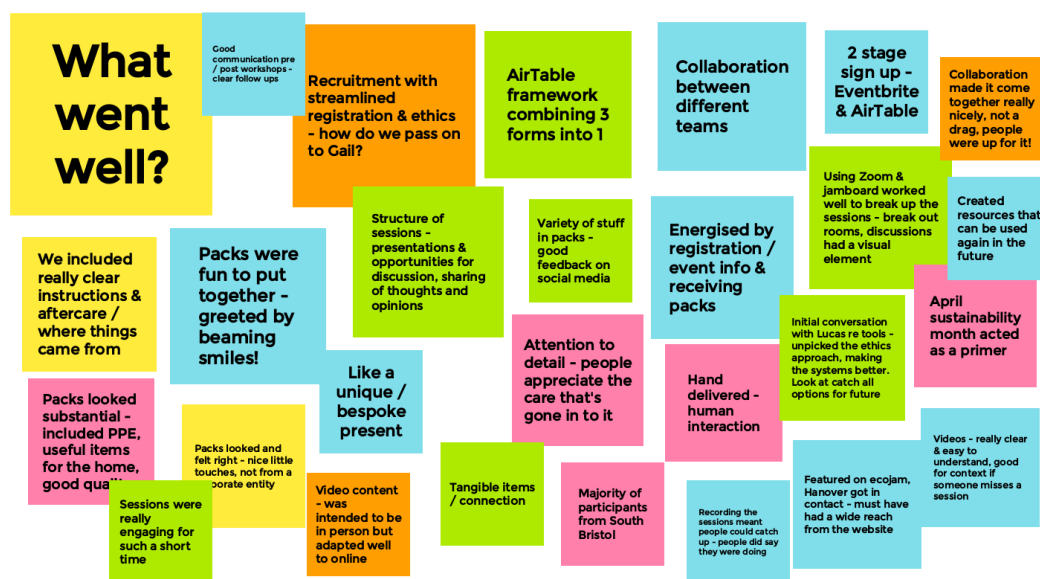


Figure 19: KWMC’s reflections on what well with RRR Workshops and Activities

We also reflected on what didn’t go well, or where we faced particular challenges, and what we could do differently (see Figure 20). Some the challenges were operational, due to the regularly changing UK COVID restrictions designing the content for the workshops and activities was done in a short space of time to enable things to be delivered in a blended approach. We reflected that the timing of the workshops had been difficult for some participants and the 3rd workshop felt a little rushed. In the future we think it would be better to run one workshop per week and build in more time for preparation.

There were some interesting insights into the challenges of working with participants around data. We found it hard to get people to share data from their waste audits, but they were keen to participate in the discussions and making activities during the workshop. We decided to follow up with participants again in January and encourage them to share their waste audits by posting a photo on JamBoard. We were mindful that some may have not had enough time to complete them as the workshops were close together and December can be a busy time with Christmas coming. But we also think this is an interesting insight that we plan to experiment more in future activities and test more creative ways that people can collect and share data and think more about the questions we ask to encourage people to explore the data sets. We also think this aspect may be easier to facilitate when people meet in person and do the activity together. People were also less keen to

participate in the Facebook page than we initially thought they would be and only a few shared photos.

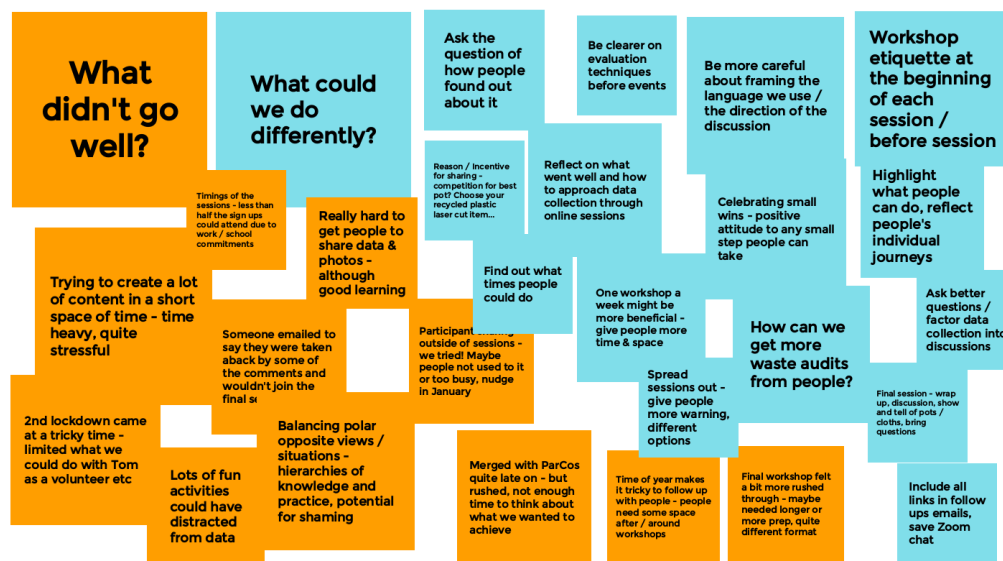


Figure 20: KWMC’s reflections on challenges and what we could do differently in RRR Workshops and Activities

Another interesting insight was around facilitating the discussions and how to deal with participants who have had very different views on the topics being discussed. We found this especially tricky within a digital space. Our participants were at very different places on their journey to becoming more sustainable. Some held very strong views about topics such as being Zero Waste, which did upset one participant who then choose not to attend a later workshop. We reflected that in future we should have a discussion about workshop etiquette at the start of the sessions, and that in digital spaces it can be difficult for participants to get know each other and for trust to form. In future we could think more about how to frame sessions to prepare for issues such as this.

3.4.2 Reflection on Stage 1 of UK Case Study

Stage 1 of our case study has focused on methods of conducting science and collecting data that are relevant to the framing our case study - working in collaboration with the Knowle West community to collect and use data to address issues of importance to them. We have found it was relatively easy to engage with the local community and get sign up to our activities. Hence we are making good progress towards ParCos objective 2 and our local UK case study objective to recruit more than 30 participants to take part in our case study activities (see Table 1). The registration and equalities data we collected indicated that we were successful at engaging with our target audience of families and that we attracted a diverse group of people to participate in terms of age and cultural heritage.

Participants enjoyed receiving activity packs and participating in the online activities using an arts-based approach. We found that presenting data in a context that was relatable to the audience and of relevance to them (e.g. it was about exploring household waste and collecting their own data through a mini experiment) was a successful approach. However,

we found it difficult to get participants to share the data from their household waste audits, so we can't be sure that they all completed this activity. In Stage 2 there are opportunities to look more at how we engage people around data sharing. The Zine worked well as a creative and engaging way to collate, communicate and share a community data set. Participants were really creative in the objects they created as part of the making activities and the ideas they shared.

4 DESIGN INSIGHTS FOR PARCOS

4.1 INFORMING DEVELOPMENT OF PARCOS METHODS AND TOOLS

The outcomes of Stage 1 of the UK case study will help to inform the development of The Bristol Approach for Citizen Science. As this is the first time KWMC have used The Bristol Approach as a blended approach (with the engagement aspects delivered largely online complemented with at home activities) there were some interesting insights, as discussed in Section 3.4. We will be collating the learning from the Belgium and Finland case studies in Stage 1 as well through the sharing workshop in May 2021 to feed into the methodology update being developed by month 30 (June 2022).

Our learning from Stage 1 of the UK Case Study will also feed into the development of the Principles for Diversity and Inclusion (D2.2). Embedding anonymous equalities form into the workshop registration process proved a very useful way of collecting information about participants to enable us to evaluate how successful we were at attracting a diverse group of people. We will be developing our approach further as part of Task 2.2. and embedding and testing this in Stage 2 of the UK case study.

With regards to Task 3.1. (Arts-based methods for participatory sense making of science data), we will be feeding our learning from Stage 1 of the UK case study into the Guidebook on the Use of Arts-based Methods. In particular our learning from (i) using creative and design thinking approaches to support participants to collect their own data through the blended activities (ii) how KWMC: The Factory worked with participants to prototype and make physical items in the RRR activities linked to waste reduction and sustainable materials as part of the process of exploring data on these topics and (iii) creating zines as a method of participatory storytelling.

In Stage 1 of the UK case study, we tested the Prompt Cards designed by LUT as a first prototype of the ParCos Data Curator. These aligned well with some the approaches we took in our case study design. The Context Principle aligned well with the design of our sessions e.g. by presenting data in a context that is relatable to the data explorer this reduces the burden on the data explorers to find out information on the context as well as exploring the data. The STEAM (Science, Technology, Engineering, Arts, Maths) Principle also applied – which suggests taking a STEAM approach by working collaboratively on creative activities alongside practical ones. We found that pitching the workshops as creative/making activities worked well at attracting a diverse group of people who may have been less likely to have joined a workshop pitched as a science activity. We also tested the Mini Experiment

Principle – our waste audit was designed as a mini experiment that involved collecting and analysing data. Here we faced some challenges trying to conduct this experiment as part of online workshop and at home activities, as we were unsure how many households fully completed this as people didn't seem keen to share their results online. The creation of the RRR Zine had some similarities with the Comic Strip Principle e.g. creating a fun output for the public to engage with, but perhaps the name of the principle needs to be broader.

5 PLANNED FUTURE ACTIVITIES

Stage 2 of the UK ParCos case study will build upon our ReThink ReMake ReCycle activities. In particular we will focus on the following steps of The Bristol Approach. The overall learning from each of these steps will feed into development of The Bristol Approach for Citizen Science which will be published in month 30 (June 2022) of the project.

- ★ **Step 3 - Design:** experimenting with creative methods for participants to collect and curate data on issues of importance to them, to visualise data & make sense of it. Learning will feed into D6.2. ParCos Data Explorer led by LUT.
- ★ **Step 4 - Deployment:** continuing to work with participants around collecting/curating data, telling stories with data and exploring the role of immersive technology in storytelling. This will be informed by Task 3.2. (Telling stories through different media) which is led by VRT which will result in D3.2. ParCos StoryTeller.
- ★ **Step 5 - Orchestration:** The case study participants will receive training (prepared in WP 4 led by KUL) for creating participatory science stories and it will be an opportunity for other members of the public to engage with the data collected and reuse it to create their own participatory science stories. At this stage we will also celebrate what has been achieved and share learning and tools with others. This will include organising a and through wider dissemination activities.
- ★ **Step 6 - Outcome:** At this stage we will evaluate the project outputs & outcomes, and access whether we meet our case study goals. Activities here will be guided by Task 3.3. (Evaluation methods) led by KUL.

In stage 2 we will be continuing continue to run activities until summer 2022. We will collaborate with our existing RRR participants, as well as engaging with more people from the local community, to explore recycled and biomaterials through further family friendly workshops. We hope that some of these can take place in face-to-face workshops during the summer months of 2021, when Covid restrictions are due to lift in the UK and the KWMC: The Factory space reopens to the public. These could include exploring topics such as mycelium, paper pulp, acrylic sea glass, fabrication systems using plywood scraps, plastics recycling and injection moulding. Together we will be researching and prototyping engaging and interactive ways to collect, visualise and communicate local data surrounding household waste, recycling and repurposing. There may also be opportunities to link in with the fledgling project creating a community market gardening scheme that is part of We Can Make, a community led housing scheme in Knowle West. In particular ways in which the community could be supported to collect and use data in relation to growing as KWMC: The

Factory is also involved in some aspects of this including using recycle materials to build planters. Participants will receive training, that KWMC will design with guidance from the development of D4.2. ParCos Trainer, for creating participatory science stories allowing them to engage with the data collected and create their own participatory science stories. This will include experimenting with telling stories using immersive technology which could include embedded technology, interactive games, animatronic or digital installations.

We also plan to organise a Bristol showcase event to share learning from the case study with interested stakeholders in summer 2022 as well sharing learning more widely through other dissemination activities including presentations at events such as the European Network of Living Lab (ENoLL) Digital Living Labs Days.

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