

#FLOWCELLULAR EVALUATION REPORT

January 2022



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Credits

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RMR would like to thank staff at The Wellcome Sanger Institute and The Saturday Museum, for their help in compiling this report, in particular Beth Elliott, Becky Gilmore, and Lucy Steggals.

To get a fuller picture of the project readers should visit the project website <https://genome.gallery/exhibition/flowcellular/>

About this report

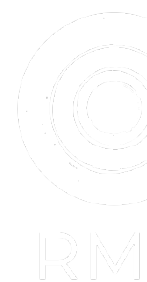
This is an evaluation report covering the learning from the #flowcellular project developed by Wellcome Sanger Institute and the Saturday Museum. The project ran from early 2020 through to September 2021 with adaptations made due to Covid 19 related lockdown. This report has seven sections:

- Section 1 summarises the outcomes and learning
- Section 2 sets out the background to the project and the evaluation
- Section 3 describes the process undertaken by the artist and her experience of the project
- Section 4 explores impacts on public participants
- Section 5 considers impacts on researcher participants
- Section 6 investigates how the project has affected thinking and practice in public engagement in science
- Section 7 sets out conclusions, learning and recommendations

As well as the analysis and learning from the evaluation, the report includes stories, moments, quotes, photos and artwork developed through the project to illustrate and honour the generosity and wealth of creativity shared by all participants.

“The joy of science and art coming together, people of different disciplines, not fearing science and making it everyday”

Lynne, public participant



1. Summary of findings and recommendations

2 Artists • 5 Researcher Participants • 10 Public Participants Experimental recipes + conversations + visual creations

#flowcellular was a collaborative project between Wellcome Connecting Science, The Wellcome Sanger Institute's Cancer Ageing and Somatic Mutations Programme, The Saturday Museum and public participants. It explored the science behind what happens in our DNA at a cellular level as we age.

Over a year, the project brought together (via Zoom) scientists and public participants, some of whom had lived experience of cancer, in their kitchens, to explore culinary metaphors for scientific concepts, have discussions, share family recipes and connect during a time of social distancing. This collaboration aimed to provide a space for participants to explore the themes of the research in dialogue with people's lived experiences, and to share that learning with others.

Artists from The Saturday Museum curated, held and facilitated a space of equality where everyone was viewed as an expert in their own right. This arose from The Saturday Museum principles of:

- **Flow and iteration** – Holding the process together so it worked and included dialogue, trial and learning – and felt like a shared endeavour for everyone involved.
- **Play and curiosity** – The linking of play and experimentation opened up a safe space where everything is valuable learning and where hierarchies were removed.

- **Co-creation and generosity** – Where ownership, shared creativity and reciprocal kindness was encouraged from every participant.
- **Human space** – Where the space for authentic conversation and intimate dialogue was generated.
- **Materiality and embodied learning** – Continuously considering the importance of tactile experiences and material outputs as memory holders and celebratory 'assets'.

Evaluation was embedded into the project and included dialogue to support the co-creation of understanding alongside the Public Engagement Team. Evaluators and the Public Engagement Team were seen as partners and participants in the sharing process throughout this project.

Findings

Public participants demonstrated a **greater understanding of and confidence in science and the research**. They grew to **value themselves as experts** within the discussions around science, sharing their own lived experiences of cancer, ageing, life and creativity.

They greatly **valued the project, gaining personally, socially and creatively** from it. They found **joy in exploring the artistic process alongside the scientific process**, feeling a **greater sense of vitality**. And most were **keen to share the learning** from this project more widely.

Researcher participants really **enjoyed the dialogue** with public participants, recognising the **value of their expertise**. This has helped them develop **skills and confidence in communicating** their research to public and science audiences, moving from a didactic model of communication to **a more equitable position of knowledge exchange**. They felt a **sense of validation** from hearing someone's interest in their research.

And some have shown a **shift in their thinking**, valuing creativity and reflecting on and questioning their own insights. Reach beyond direct participants – into research groups and wider – was slower than intended. This was in part due to researchers not working in their labs through lockdown which reduced the chance of informal sharing.

Audiences to the sharing events **enjoyed the experience**. They felt that they had learned more about the science and the approach this project has taken in supporting dialogue, sharing and learning.

Project partners saw the value of the approach, provoking them to **reflect on their own professional practice** particularly around how to **creatively use digital participation, embodied learning and how to bring arts and science together, all of which they intend to build into their own work**.

However, as a result of the Covid 19 lockdowns, **project ambitions for wider networks and partnerships were not realised** meaning a limit on both the impact on other organisations and size of audiences. In addition, not being able to physically hand out materials in community venues, along with the limitations of who was prepared and able to take part in an entirely online project, meant that **recruitment to the project was not as broad as initially hoped for**.

Public engagement has progressed at the Wellcome Sanger Institute and learning from the project is now informing approaches to future public engagement work at Wellcome Connecting Science. In particular, using embodied experiences, in depth collaboration to generate rich and intimate dialogue, as well as delivering blended learning opportunities. The project shows the crucial value of working with expert artist facilitators/curators who combine these skills and to building in more time and giving permission for reflective practice.

There is ambition to support researcher participants to continue to shift their science communication practice and share their learning into the wider research community. And there is the potential to share these new approaches more widely and develop new partnerships further.

Recommendations

Crucial

1. Address the intended longer-term outcomes by **effectively communicating the approach, outcomes and processes** to internal and external audiences.
2. Further **embed the reflective, responsive and adaptive** approaches already developed in this project.
3. Remember the **importance of the approach and the skills of the artist** facilitator.
4. Continue to support **researchers to develop empathetic communication, engagement and relationship building techniques** and **share their learning** more widely.

5. Continue to collaboratively **explore the use of accessible and common language around art and science** so that people are more likely to engage.
6. **Keep using (and re-using) the resources created** for wider engagement programmes at the Genome Gallery, online and through the learning programme.
7. **Continue to develop blended approaches to public engagement** and don't be afraid of 'all-digital' programmes and projects.

Desirable

8. Increase the **involvement of participants who have lived experience** of cancer to promote the value to hospital patient groups.
9. Extend the reach and therefore the wider social return on investment by **recruiting from a wider demographic and geographic range**, including marginalised groups.
10. **Involve partners earlier in the planning process** to develop shared aims and ambitions and make sure that the learning sticks.

Developmental

11. **Build legacy support for young people, partners, audiences and patients advisory group members** involved in these projects to train and act as role models, disseminators and advocates to their peers.
12. Consider some **light touch longitudinal evaluation** of the way that partners/organisation have embedded new approaches.
13. Further **refine the structure and format of future online events**. And develop more opportunities for **hybrid and blended** format events and programmes.
14. Consider using the **creative approaches developed to target and engage marginalised groups**. Further targeted audience development work is required for this.
15. Increase the **involvement of participants who have lived experience** of cancer to promote the value of the 'patient expert' role to hospital patient groups.

Poems from Mike, Public Participant

On insults

Insulting your organs is fine
If more could be ordered online,
But that you can't do
Even if you renew
Your account with Amazon Prime

On mutations

A Mutation's lifespan can vary
Which makes some researchers quite wary
But stick to it guys
Because otherwise
The future for us is real scary

In Memoriam (with apologies to EJ Thribb)

So. Farewell then, Telomeres
When I was younger
You kept my chromosomes happy.
But now you're getting shorter and
They're unravelling.
You remind me of:
Feet, which stop your legs from fraying at the ends
Or A and Z, which keep all the other letters in
Or knots at either ends of a rope
Or bookends
Or wheel nuts.
For, without you,
My wheels
Will eventually
Fall off.



2. Introduction

2 Artists • 5 Researcher Participants • 10 Public Participants
Experimental recipes + conversations + visual creations

This section details the background to the #flowcellular project which took place between November 2020 and April 2021. It was initiated by Wellcome Connecting Science and was facilitated by the Saturday Museum in collaboration with fifteen participants, both members of the public and researchers at the Wellcome Sanger Genome Campus.

2.1. About the project

#flowcellular was a collaborative project between Wellcome Connecting Science, The Wellcome Sanger Institute's Cancer Ageing and Somatic Mutations Programme, The Saturday Museum and public participants, exploring the science behind what happens in our DNA at a cellular level as we age.

Wellcome Genome Gallery, Wellcome Genome Campus' exhibition space, wished to develop new ways of working. To achieve this they commissioned an artist to work with researchers, patients and the public to develop a creative output (an exhibition) which could engage a wider audience. The theme was how DNA changes over our lifetime due to a variety of factors.

Originally this was to lead to a physical exhibition which would pose questions, encourage conversation and develop public understanding. It would also include ongoing opportunities for the public to engage with this theme of mutation.

Lucy Steggals and George Moustakas of the Saturday Museum were invited to join this project. The aim was drawing together researchers and public participants to experiment, explore and understand the science around somatic mutation, cancer, ageing and our DNA changes over time. The process was designed to challenge accepted narratives around the connections and gaps between art and science, and create spaces to ask questions.

This art and science collaboration began in February 2020 with a view to exhibit in the Genome Gallery later that year. As a result of the global pandemic, the gallery was forced to close to the public and seek alternative virtual platforms for connecting project participants.

Unable to meet in person, or inhabit the same labs or studios spaces, the project found new online spaces to share during lockdown. Lucy brought together the scientists and public participants, some of whom had lived experience of cancer, over a period of a year via Zoom in their kitchens to explore culinary metaphors for scientific concepts, hold discussions, share family recipes and connect during this time of social distancing. This collaboration aimed to provide a space for participants to explore the themes of the research in dialogue with people's lived experiences, and to share that learning with others.

2.2. About Wellcome Connecting Science

This project was commissioned by [Wellcome Connecting Science](#), whose mission is to enable everyone to explore genomic science and its impact on research, health and society. Drawing on the

ground-breaking research taking place on the Wellcome Genome Campus, Connecting Science inspires new thinking, sparks conversation, supports learning, and measures and understands global attitudes and perspectives. They connect researchers, health professionals and the wider public, creating opportunities and spaces to explore genomic science and its relationship with people, and the world around us.

2.3. About the Saturday Museum

The project was facilitated by [The Saturday Museum](#), a collaborative project between artists Lucy Steggals and George Moustakas. It is a mobile museum exploring different models of co-creation and gentle ways to play with existing systems and infrastructures.

The Saturday Museum is interested in connecting people locally, nationally and internationally. It starts by generating 'Flows' on a theme. Flows are flexible frames, soft structures and playful spaces that allow for something haptic and collaborative to evolve. Flows are triangular, combining lived experience, digital dialogues and physical outputs.

2.4. About the participants

2 Artists • 5 Researcher Participants • 10 Public Participants

Researcher participants came from the [Cancer, Ageing and Somatic Mutations Programme](#) at the Wellcome Sanger Institute.

They brought their different research expertise as well as personal interests to the groups including:

- o Alex – Animal genetics, laser capture microdissection, somatic evolution, paternal age mutations, art and illustration.
- o Sarah – Identifying novel preventable causes of cancer, mutational signatures, reading and cats.
- o Ellie – Investigating patterns of somatic mutation caused by chemotherapy drugs, cooking and dancing.
- o Jannat – Structural variants in genes, 3D genome, what happens to DNA when it experiences a significant trauma, and baking.
- o Tim – Breast cancer, genomics, circulating tumour DNA, gaming, treasure hunts and slow cooking.¹

The public participants ranged in age from their early 20s to their early 80s. Some participants had lived experience of cancer, others had experience within their family and friends. They came through connections and areas of interest identified early in the project by the researchers:

- o A number of the researchers wanted to connect with patient populations and gain experience engaging with people with lived experience of cancer, which led to them reaching out to Addenbrookes Cancer Patient Participation Group.
- o One researcher was keen to work with artists and creative communities which led to them reaching out to Wysing Arts Centre and Kettle's Yard's group of young creatives called Circuit.

¹ Interests as given to Lucy for the #flowcellular website

- Another researcher had links in her research collaboration to King College researchers which led them to reach out to Science Gallery London and their Youth Leaders.
- Only one researcher's connection could not be realised because of the pandemic. They had originally hoped to connect with London Zoo/Whipsnade Zoo volunteers which was not possible, but they did manage to connect with Zoological Society London later in the project on the wider events programme.

Some participants had an existing interest in art and creativity, with three generating creative responses to the conversations happening within the clusters using poetry, photography and visual art outside of the project meetings. The participants' knowledge and perceived interest in science differed, with some having a keen interest in scientific research, some studying science at degree level and some suggesting initially that they had no experience of science research at all. They also brought their experience and interests² to the project:

- Aless – Medicine, Twitch broadcasting and science communication.
- Ana – Communications in arts and science, dancing, taking film, photos and experimenting with 3D.
- Charli – Chemistry, yoga and science communication.
- Ken – Science communication, discovering science and arts in daily life as an economic naturalist, photography, curating and cooking.

- Lynne – Marmalade making, travelling and meeting people, photographing everything including lichen, painting, reading crime, dogs and people watching.
- Mattie – Curating, art-science collaborations and creative writing.
- Melody – Abstract photography, the story of radiation, kintsugi and baking.
- Mike – Cryptic crosswords, language and languages, travel, making abstract art and Google threads.

2.5. The clusters

During the first phase of the project participants were grouped into carefully curated clusters based on interests and experiences.

- Mike and Tim
- Alex and Melody
- Sarah and Lynne
- Jannat, Mattie, Ken, Gabby and Izzy
- Ellie, Aless, Ana and Charli.

² Interests as given to Lucy for the #flowcellular website, Gabby and Izzy were part of the Circuit Group and took part in some of the early sessions with Jannat. Due to their other commitments they were not able to stay for the duration of the project but their early contributions fed into the project.

2.6. About the evaluation

This evaluation explores the impact of the process on the stakeholders of the project. The groups of stakeholders were:

- The researcher participants from Wellcome Sanger Institute
- The public participants, who brought different expertise and perspectives on the subject
- The Public Engagement Team at Wellcome Connecting Science
- The artists working on the project
- A group of partner organisations
- The wider visitor audiences to the exhibition and satellite programme of events.

The evaluation was based on a Story of Change (see Appendix 1) that sets out the outcomes and learning that the partners of the #flowcellular project hoped to gain. This was developed in a workshop with the artist, and representatives from the Wellcome Connecting Science Public Engagement Team. It wasn't possible to include any public participant voice in this as they weren't recruited

at this point. These outcomes form the basis for our analysis, but we also allowed unexpected learning to emerge during the project.

The initial methodology – including in-person research around the planned exhibition – needed to pivot sharply because of Covid 19. There was more focus on observation at online events and online surveys, alongside continuing the direct engagement with artist and participants.

The core of the evaluation was an artist embedded research approach which involved regular conversational interviews between evaluator and artist, co-creating an understanding of the learning of the project. Fitting closely with the practice of the artist, these conversations fed into the design of the project, as well as the evaluation. In addition, we carried out focus groups and interviews as appropriate with all participants over the duration of the project.

As a result of this commitment to iterative learning and the small number of participants, this evaluation is not representative but rather gives some indication of impact and reach of the project.

Moments from the experiments

#flowcellular was built on a series of dialogues, taking place in the repeated sets of sharing created at the heart of the project. The 'moments' below pull out and share the essence of this dialogue-based approach.

Fruit Animals

“Why then, if we are made up of the same cells does this mouse live for 2 years and this elephant lives for 80 or 90 years?”

Melody and Alex made elephants, mice, tortoises and two fictional creatures called a slugcumber and a charot out of different fruit they had in their kitchens. Through this they explored ideas around learning through process, the lifespan of different creatures, why some animals live longer than others, how size can affect lifespan, that cells age at different rates, the variations in the number of mutations in a mouse vs elephant and how to grapple with vast unknowingness.



Flat Bread

“If we’re taking the normal dough as a healthy human cell or series of cells, and then suddenly, something goes wrong. Some kind of break happens... The green is an unhealthy or harmful mutation. That now can’t sort itself out.”



In this experiment Jannat, Ken and Mattie explored how harmful somatic mutations behave by baking flatbread with different dyes in it. They discussed how cancer gives cells an advantage and makes them very effective in reproducing themselves and how, without intervention, mutations can lead to more mutations.

They also reflected on the fact that in the time taken to do their experiment, mutations could be occurring in their bodies, that you can have a lot of mutations in your cells which don't have any harmful effects, that these are called neutral mutations, that all mutations that happen after fertilisation are known as somatic mutations and that in this field of research there are a lot of unknowns.

Iced Biscuits

“... the sequence of bases is important for how your body knows how to make the proteins that do everything in your cells. You have two strands of DNA, two parts of biscuit, these will be paired up in the right way.”

“... so when it gets chaotic... you’ve got this chemotherapy drug coming in influencing all of this, how does it go back together if it can? Or is there a point where it’s never going to rejig itself?”

In this experiment Charli, Ana, Aless and Ellie were using sandwich biscuits (representing DNA) to explore the different types of mutations that can occur and how chemotherapy drugs can cause changes to our DNA. They also discussed the future of food, their preconceptions about ageing, the importance of curiosity, organoids, the value of mistakes and when repair works and doesn't work.



Pistachio Cookies

“I like this idea of combinations because my understanding of cancer treatment, is that each person needs a slightly different combination. So, it’s almost like each person needs their own recipe for treatment.”



In this experiment Mike and Tim explored Tim’s family cookie recipe as a metaphor for genetic mutation. These cookies can be made with finely sifted or rough cut un-sifted ingredients. Tim and Mike discussed how if the sieve represents the TP53 gene that makes the P53 protein, which protects the cookie from potentially harmful mutations, then the absence of the sieve leaves the cookie more prone to harmful mutations. They also discussed the complexity and uniqueness of individuals, is a maraschino cherry really a cherry? What is the normal level of abnormality? And the challenges of statistics and fears around cancer and remission.

Gingerbread People

“We are looking for differences in the different mutations that these people have, different patterns... combining that information with all the information that makes up that person. Trying to get an idea of what may have caused the cancer in this person.”

“I like the idea of the gingerbread because like we were saying earlier behind each of the tumour genomes there is a person and all that person’s identity, hopes and dreams. They are not just epidemiology data.”

In this experiment Lynne and Sarah explored mutations, break and repair and cancer sequencing, through making gingerbread men. Lynne added cranberries and raisins into the dough, some hidden, some visible, as a metaphor to think about what is inherited and what is environmental. Whilst doing this experiment, Sarah and Lynne discussed the challenges of classification, rough cut marmalade, the complexity of cancer, food as care, broth, and how patients and researchers relate differently to research.



2.7. Project timeline and impact of Covid 19

The project officially started in February 2020, just as Covid 19's spread was becoming recognised. As a result, the project was adapted in two ways:

- o For the development of the work, meeting in labs or cultural venues moved to online engagement via Zoom.
- o The final output went from a planned 'live' exhibition staged in the Genome Gallery to an online exhibition, a publication and a digital events programme.

It is worth noting that this decision to keep going was rare and 'risky' in itself, as most public engagement work stopped completely during the 2020 lockdowns.

Phase 1 – Development/kitchen conversations

May to October 2020

Five 'clusters', each containing one researcher participant and one or more public participants, held 'kitchen conversations' using their own kitchens as a shared space (through Zoom). Food was used to develop metaphors to understand how DNA breaks and repairs, and how somatic mutations relate to cancer and ageing. Each cluster focused on a different aspect of research within the Wellcome Sanger Institute's Cancer, Ageing and Somatic Mutations programme (CASM), although common themes emerged.

Each cluster met 5 to 7 times. The Zoom meetings were recorded. The experiments and recipes were shared on social media (via the

#flowcellular hashtag on Instagram³, for example), and via the social media accounts of the participants, the artists and Wellcome Connecting Science.

Phase 2 – Sharing events – Webinars/Engage

November 2020 to August 2021

The results of the kitchen conversations and experiments with food were shared with wider groups connected to the partner organisations. This was to engage a wider range of voices and perspectives in the project.

There were eight sharing events between November 2020 and August 2021 which included two presentations at Engage Conference 2020 and a total of six events across five of the satellite partner organisations. The sharing events were attended by 87 people.

There was also an online #flowcellular Christmas party at the end of November for everyone involved in the project.

Phase 3 – Content development– film/recipe book

February to April 2021

From February to April, the clusters and Lucy worked together on visual work for the online exhibition and publication (recipe book and cards) which are the virtual and physical outcomes of the project, deciding on the content that would go into both.

³ [#flowcellular hashtag on Instagram](#) • Photos and videos

Phase 4– Exhibition and Genome Lates conversations

April to May 2021

The publication formed part of an online exhibition which ran between April/May 2021 and is still available on the Genome Gallery website⁴. Between the launch, 26th April and the last event on the 23rd August the #flowcellular online exhibition received 1470 page views, and 828 unique pages views (equivalent to visits)

A public programme of events ran alongside the exhibition and included the #flowcellular launch event on April 26, 2021, and three Genome Lates⁵ to which everyone across clusters was invited.

For the launch event the clusters shared their experiences of the project and explained more about the food experiments and the impact the project had had on them.

The Genome Lates programme was an opportunity to delve deeper into the science at the heart of the project in a conversational panel format, where audience members were encouraged to engage and participate through 'question and answer' on the Zoom webinar platform. The number of attendees to the public programme events was 340, with around 200 subsequent views on YouTube at the time of writing.

⁴ <https://genome.gallery/exhibition/flowcellular/>

⁵ [Events – Genome Gallery](#)



3. The process and outcomes for the lead artist

A huge part of the success of the project arose from the way it was facilitated and held by artist Lucy Steggals, who led the project with her colleague George Moustakis, as The Saturday Museum. This was explicitly an art practice, and one which Lucy has evolved over many years, so it is hard to talk about how it can be replicated in other projects.

One of the artists' aims for the project was to develop their artistic process further. As an artist-led project, it is important to see this practice as being at the heart of how the project and understand why it made the differences it did. In this section we analyse the key approaches used and how these affected the outcomes the project had.

The approaches used are loose, changing and interconnected so are hard to fully define, but we have grouped them under the following five principles:

- Flow and iteration
- Play and curiosity
- Co-creation and generosity
- Human space
- Materiality and embodied learning

In section 7.2 below exploring 'what works', we make clear that these approaches were essential to the success of the project. The principles arise repeatedly within the findings.

3.1. Flow and iteration

Lucy had the central role in the project, she made the initial relationships then held spaces to let them develop. Figure 1 below gives an impression of the approach taken – initial triangular clusters of artist, researcher participant and public participant(s) spent time together developing ideas, language and playing – initially on a weekly basis.

These clusters were brought together on a monthly basis – along with the Public Engagement Team and evaluators – to create a whole cohort super-cluster, where cross-fertilisation of ideas could take place. George's role added in another element to the flow and iteration. He developed the concepts he and Lucy had worked on and she had iterated with the participants, creating visual content, images and GIFs.

These clusters and the super-cluster were the co-creation spaces in which the process developed. This was initially tested through sharing events with a wider (but still small enough to be interactive) audience, then shared publicly through the book and the website.

This locus of the co-creation of the process within the clusters meant the authorship for the artistic outcome was clearly shared among participants and artist, rather than sitting with the artist alone.

But this was never a linear process, the flow was back and forth, iterative and adapting to moments, insights and accidents. The "to and fro" of conversations was central and is honoured in the recipe

#flowcellular

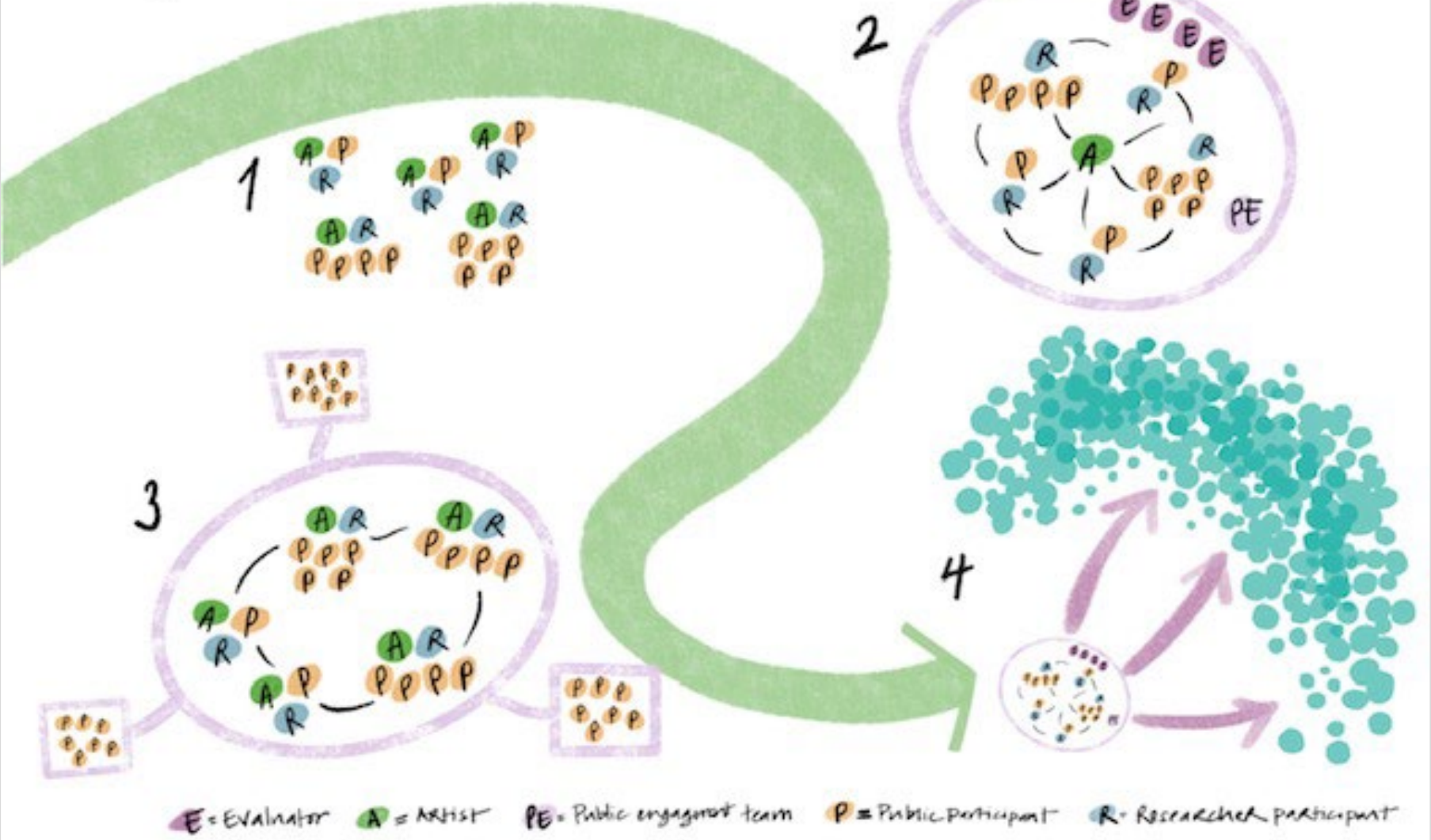


Figure 1: #flowcellular cluster and sharing model

book where extracts of the co-creating conversations are shared to show their value. This was the space of ideas, what Tim called 'spitballing'. There were other iterative opportunities which The Saturday Museum embedded in the flow:

- o Lucy and George's relationship, itself via Zoom due to location, was a space of playing with ideas back and forth
- o Lucy regularly discussed the project and learning with Beth from the Public Engagement Team
- o The evaluation approach included monthly reflection sessions between Lucy and Ruth Melville which were another space for ideas development.

Flow was also present in the initial outputs of the work. The GIFs produced as creativity and reflection aids by George had movement and flow and iteration, and were embedded in the way the 'recipes' come together, fall apart and recombine.

Lucy's embedding of flow within her practice was also evidenced in the redesign of the project to deal with the constantly changing timetable of Covid 19 lockdowns. There was a constant need to replan and adapt, but there was never a sense of 'stop start' or any jarring for participants – the project seemed to naturally flow, with each new phase feeling natural.

3.2. Play and curiosity

Play and playfulness have a huge role in the project. The linking of play and experimentation opened up a safe space where 'failure' didn't exist, everything was valuable learning. This echoes the lab environment, so was instrumental in helping the researchers understand the rules of the game and allowed them space to try things that might not work in the way intended.

It also brought an element of equality. The public participants were inevitably out of their comfort zones in talking about science. But by making the researcher participants think on their feet, play and mess around, there was an element of vulnerability. Having to make food analogies and come up with experiments from what was in their kitchen was playful – and quite fun in the end – but it also moved them out of their professional role very effectively.

Furthermore, play is in itself valuable – it inspires ideas, gives space and value to curiosity. A central part of every session was around playing with words and genomic science concepts. Lucy shared her curiosity about science but in a playful way. This created a space where everyone felt able to play with these ideas, ask questions safely and see what sparks emerged – even if these were simply more questions.

"... [we] succeeded in generating more questions than we had when we started."

The Saturday Museum

3.3. Co-creation and generosity

Co-creation is utterly integral to the practice of The Saturday Museum. This commitment is both written and enacted, with there never being the sense that Lucy would see herself as the 'author' of what was created. This was not discussed at all by participants, but this is in itself a sign of how embedded it was. Lucy's role isn't at the fore in participants' conversations, it is taken for granted, assumed. This is not because she wasn't there, but that she made herself part of the flow, rather than centring herself in the process.

As a result of this, the project has a clear and shared authorial voice which sits with all the participants and Beth from the Public Engagement Team. This isn't asserted, but it doesn't need to be. It

is probable that most of the participants have never considered it, because they never needed to, but this is extremely rare in arts and is a sign of the generosity of Lucy's practice.

We believe that this creation of a space of generosity brought out a reciprocal generosity from all the participants. The sharing of time, knowledge, creativity and creations, personal details and stories is incredible and threads through the project.

In discussions on methods, Lucy characterised her role at times as 'the hover', being around when needed but not inserting herself when not. This avoids dependency, but also allows for different relationship moments. This was particularly clear in the clusters where there was only one public participant. The intensity and two-way nature of the relationship between researcher and public is visible, unique and strong. Yet Lucy was in almost all their meetings so it was in theory a triangular relationship.

3.4. Human space

The importance of the human, of warmth and safety, flows through the way in which Lucy manages the spaces in which the work takes place. This again enhances the equality within the project – participants might be cancer researchers, or patients (or even evaluators) but they are all humans, with lives and concerns, with feelings and needs.

This return to the human, and valuing human needs and moments was enhanced by the project location. But valuing this, and also making it safe to talk about personal issues or sensitive research topics, came from Lucy's approach to the sense that people matter.

"Like we were saying earlier, behind each of the tumour genomes there is a person and all that person's identity, hopes and dreams. They are not just epidemiology data."

Public Participant

The effect of this commitment and humanity was to build a feeling of being part of a whole, allowing sharing and intimacy. It allowed the relationships to be authentically collaborative, with participants fully valued as humans and experts in their experience – whether that expertise came from lived experience or years of study – rather than a transactional approach with the public as passive recipients of engagement. But it also created a space where it was safe to be creative, where you wouldn't be judged, which was welcomed by more than one of the researchers, as well as participants.

3.5. Materiality and embodied learning

The 'artwork' at the centre of the project was the process, the 'shared language' as Lucy refers to it. Not a lexicon but a way of communicating, experimenting and creating understanding together. Audiences at the sharing events could see there was something different happening, and wanted to give it a try and have a play themselves.

Obviously, this is a very intangible piece of art, and it was co-created within the digital sharing environment of Zoom. However, the project was incredibly rooted in the tactile and material – which arises from Lucy's commitment to materiality as a method.

This can be seen in two key ways:

- The tactile nature of the project and experiments themselves – playing with food in your kitchen. The tactile feel of dough in the

flatbread recipe of Jannat, Mattie and Ken, or the feeling of blowing bubbles with Alex and Melody, or Mike moving scrabble pieces around to make word puzzles. Audiences at sharing events were invited to go and get items from their kitchens and play alongside while watching the session – getting material feedback and also joining in the process. This commitment to tactility and material – as well as digital engagement – ran through every aspect. At the Christmas party, all project members were sent a party pack to make a drink (smell and taste) and a pot pourri orange (smell and touch).

- The second way in which materiality threaded through the project was in Lucy's determination to produce a physical output. This wasn't an obvious choice with the level of digital and the fact that most of the work was digital in itself – films, GIFs, photographs.

This physical output was the recipe book – available as a digital download and sent to all of the project participants as a real book. It is important to recognise that this recipe book is not the artwork itself, but is more of a memory holder for the work. The gallery

calls it the 'exhibition guide' on the website, but perhaps more apt is Lucy's description of it as:

“A memory holder, like the seashell you take from the beach to remind you how you felt on holiday”

This materiality is also rooted in the everyday. The book is a recipe book to be used, made dirty, annotated with comments about how recipes did and didn't work – the invitation to make it messy and 'used' is explicitly included. The project 'gift' of an apron was also featured thought out. With a picture of a broken and repaired broccoli on the front, it recalls the kitchen at the heart of the co-creation, but also emphasizes the everyday, the messy and real-life nature of the concerns of the project – people are diagnosed with cancer every day, are living with it alongside their everyday lives. And ageing is so everyday that we don't even think about it most of the time.



4. Impact on public participants

“It’s always nice to know what’s going on inside”

Public participant

This section explores the impact on the 10 public participants who are involved at the heart of the programme within each of the clusters described in section 1.5 above. The intended outcomes for them were around their knowledge and understanding of research; they feel valued and have a sense of purpose; they have a creative outlet, enjoyment and a chance to play; and they gain a sense of connection and shared understanding and co-develop a shared language around science communication.

We find that public participants:

- Demonstrated a **greater understanding of and confidence in science** in relation to cancer and ageing and in the research process happening at the Wellcome Sanger Institute.
- Grew to **value and share their own expertise** in their lived experiences of cancer, ageing, life and creativity.
- Had a **clear sense of purpose and their value and agency** in the project and were keen to share the learning and the project outcomes to help others.
- Developed a **strong sense of connection with each other, with researcher participants and the artist** and, trust in the space

created online, which supported them during the isolation of lockdown.

- **Enjoyed their experiences** from a creative and social perspective and found ways to share and contribute through their own creativity.
- Found **joy in exploring the artistic process alongside the scientific process**, feeling a **greater sense of vitality and being authentic** with themselves.

“The joy of science and art coming together, people of different disciplines, not fearing science and making it everyday.”

Public Participant

4.1. Greater understanding of and confidence in researchers and in science

Participants felt that they had learned a significant amount about the research happening at Sanger, the science of cancer and ageing as well as a better understanding of their own bodies.

“it’s been fun, fascinating... and I love the idea of science but I’m not a scientist. It’s been a real eye opener into what’s really going on in the body.”

Public Participant

“... It’s been life changing for me, I didn’t expect it to be such an amazing project... I started to look at things in a

completely different way. When I heard about the [Covid 19] vaccines the first thing I wanted to know is how do they work? ... I want to know the science behind it. I wouldn't have thought of that before..."

Public Participant

For most, the science of ageing was new and across the groups it was clear that there was a growing recognition that this was something that they all shared. Facts which had some relevance to their own experience often resonated with the group – for example, that all animals have the total capacity for approximately 3000 cell mutations within their lifespan.

"... A mouse uses its mutations up in 2.5 years, the elephant uses up 3000 in 18 years, but a tortoise has 150 years before it uses up 3000. Using the 3000, that's your lifespan! I am slowing down to become the tortoise!"

Public participant (aged over 80)

Generally, participants didn't expect the research processes or outcomes to change because of the project, although it was a shared long-term ambition shown in the Story of Change in Appendix 1. They felt it was more likely that researcher's attitude towards their own research, and towards the patients behind their research, might shift.

"I'm not sure it would change what Ellie does each day in lab. Not processes so much but perhaps how they think about it and talk about it."

Public Participant

The project resonated with all participants whether they had direct lived experience of cancer or not, with every participant talking

about understanding the processes going on inside their bodies better.

"It has changed the way I think and the way I perceive my body."

Public Participant

There were indications of a greater confidence in research and in 'the researcher'. And greater empathy with researchers who are often at the forefront of scientific breakthrough but more often behind a microscope looking at cells. They also felt that the project gave them more of an emotional insight into these 'researchers'.

"Connecting the people behind the stories... I have never actually met the people who look at my scans and it makes me want to cry and say thank you. I know people who have been working on new things behind the scenes now."

Public Participant

The project has generated further curiosity in different treatment options. Those experiencing cancer felt more positive about engaging with treatment generally. Participants in the group with personal experience of cancer started to feel less alone in their experience of the disease and reassured they could see people out there working to help them. They were also proud to feel that this project might in some way influence research, practice or thinking about cancer.

"I have found this whole experience really helpful, cathartic ... and hopeful because people [researchers] are so clever. You think, they are going to crack this, and I really feel part of that... That has been empowering for me. I didn't really expect this... to stop being a recipient

and become part of something important about treatment."

Public Participant

4.2. Sense of purpose and value in the project and in the promotion of public engagement further

The clusters individually and collectively discussed what some might perceive as extremely sensitive issues: life and death; normal and not-normal; mutation, break and repair; visible and invisible. The authenticity and openness of their discussion and experimentation was liberating and levelling for all, but also served to de-mystify some of the science.

Several participants discussed the triangular relationship between artist, scientist and public participant as being a particular strength of the project, each bringing their own area of expertise and knowledge to the partnership. This was stronger in the three person clusters (with only one public participant) but was also noted in the slightly larger groups:

"The dynamic between artist, researcher and us was really great. Lucy brought curiosity out in us. Ellie was always really keen to help us to explore our own ideas and helping us validate this afterwards. She brought confidence to us, and would bring the science to it all..."

Public Participant

There was a tangible shift in the dynamic, and in perceptions of expertise, across the duration of the project. Early in the project public participants tended to defer to the researcher as the expert.

As the project progressed, and with the levelling effect of working in the kitchen, public participants felt a greater validation as experts in their own lives and experiences of cancer. In a similar way, the intergenerational aspect of the project was new for most participants and took a while to settle, but was very much valued.

"The balance of equality - there is still an expert in the room, but we all feel equal in that space. I've lived it, Sarah's researched it, Lucy is documenting it and it's an equal conversation."

Public Participant

"I have always been in awe of researchers, and I imagine them to be serious so [it's] nice to see they have a fun side. Alex's illustrations are so beautiful – I've seen a different side to the idea of a 'researcher'."

Public Participant

This sense of equality was further helped by recognition that the researchers valued their skills as well as life experience:

"Alex is an artist anyway so he follows me as a photographer its very much a two-way thing."

Public Participant

Public participants saw themselves as having a role in sharing the learning they'd experienced beyond the project. They had gained more of an understanding of public engagement with science and had a strong desire to ensure a legacy through the creation of a concrete outcome of some sort. The idea of a book that would incorporate ideas, experiments, imagery, quotes and personal stories was a strong way of bringing all the participants' experiences together.

There was a tangible sense of pride and purpose at the launch of the online resource and recipe book. For most, a physical exhibition would have been the icing on the cake. There was an urgency to share their experiences and learning with peers and wider audiences. Participants ideally hoped the final output would elicit the same chain of reflection and change that for them had flowed through the project:

"I want this to be in the public domain – a constant living thing. I will be so proud"

Public Participant

"I want audiences not to be frightened of asking difficult questions and finding out more. I've come from this nowhere base and I didn't feel I could question, but now I feel confident and not scared to ask questions of science..."

Public Participant

For some of the younger public participants, public engagement is already a part of their career plans, whether as science or arts specialists. Several noted improved public engagement skills and expressed an interest in sharing their experiences and new ideas with peers.

"I've come away with a whole new way of exploring cancer and talking about science."

Public Participant

This indicates a potential for projects like this to impact on the evolution of professional practice and further spread the learning in much the same way it could for the researcher participants. Further

examination is needed to see the longer terms impacts on these participants' professional practice.

"It's really changed my idea of what curating could be, from just images on the wall where there's... a big separation between an artist or curator and the viewers, it feels like this project has almost merged all these different elements together. "

Public Participant

4.3. Wellbeing and sense of connection to others

The project was a real lifeline during lockdown, generating an improved sense of wellbeing and reduced feelings of isolation. This was particularly the case for participants who were vulnerable and isolating due to current treatment programmes.

Several long-term friendships and connections were made, particularly from the three-way partnerships.

"I have a friend in Tim. It's been a really pleasant experience but not what I expected."

Public Participant

"I was a bit worried about [the] science element, but Lucy convinced me! It's the best thing I've ever done. It's just been phenomenal. It's given me a new lease on life. I knew it would be online, but I live alone and it's just wonderful to be connected in this way."

Public Participant

Younger participants also noted that they recognised, valued and were more open to cross-generational friendships now.

I dreamt last night of a time when we can gather again under smells of freshly baked bread, of rosemary and olives. Young and old kneading together, flour like a snow flurry blanketing the wooden surfaces. A grandmother shows her grandchild how to flip and roll, to bring air to the dough, to help it grow and change under the hot oven.

“Do we change too?”, the grandchild asks, squishing sprigs of rosemary and olives into the bread. “Yes, our cells mutate so often, it’s part of growing old, ageing, passing on wisdom.”

The dough enters into the hot oven and we wait until it’s crispy and brown. We bring it out to share, a communion in a time when the virus mutating isn’t causing harm, and we can nourish ourselves without fear.

Poem produced as part of the project by a Public Participant

We found that the whole cohort felt very supportive of one another. There were several references to participants feeling validated in their own experiences and humbled through listening to the experiences of others.

The use of social media to share project imagery, updates and films worked well in connecting and updating most participants. One public participant found that sharing her journey on Instagram significantly enhanced her experiences and wellbeing, and encouraged her to further experiment with her own photography.

“With photographs – I’ve never had so much fun. Social media has made my life better and is getting me through lockdown. It’s given me a platform and excuse to try

making connections between weird things. This is really unexpected.”

Public Participant

Despite initially being a social media novice, another public participant decided to develop technical skills to join the group sharing.

However, this does highlight how future projects need to be mindful of being inclusive for those who do not want to use social media or who may not have the digital technology or skills available.

4.4. Enjoyment and creativity

It was evident from our research that all the public participants thoroughly enjoyed their experience on the project. None had expected the experimental, hands-on nature of the discussions and activities, but all were pleasantly surprised. This embodied approach to experimentation, learning and sharing was in stark contrast to learning in a lecture theatre. Many of the younger participants suggested that they had learned much more about cancer and aging within the short space of the project than in the lecture theatre.

“It is different to normal learning about cancer. [E]xperimental hands-on nature is a good thing and really practical way of talking about these things that are quite conceptual and are happening at such a small scale... Using food around recipes really contextualised the subject and it’s been a lot of fun.”

Public participant

They were excited to meet 'real' researchers and see the humans behind the research. They were often surprised by the creativity shown by the researcher participants:

"I was most surprised by... how creative researchers are at expressing their science from the poetry, the fire to the illustrations. ...Seeing everyone's different approach to this complexity."

Public Participant

Several participants were inspired to develop their own creative work outside of workshops: one public participant experiencing treatment at the time, began exploring scientific concepts behind cancer and aging and new perspectives the world through photography on Instagram; one created poems and artwork for the first time; one shared new writing; one developed 3D photography renderings; and another has been documenting the process through photography.

The creative process has given many of the participants a new way of looking at themselves, their surroundings and other people. Using creativity that started in the kitchen led to more experimentation, which led to more discussion, which led to more insight and shared understanding.

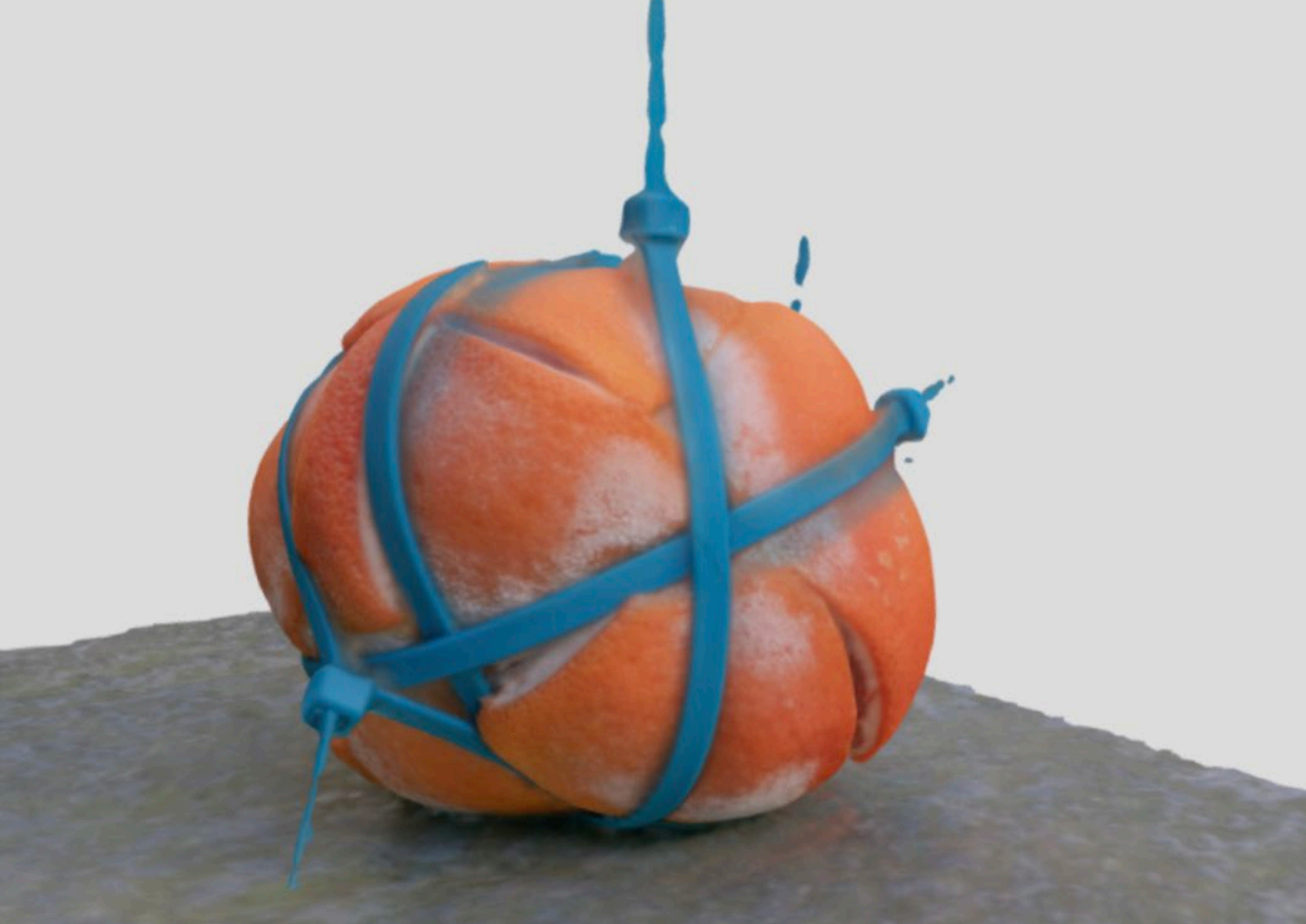
Despite the initial framing of the art and creativity as a way into understanding the science, discussion also touched on the way that science can help us understand creativity and art. Art and science have been described within this project as informing one another, as parallel processes and as the same entity.

"Art and science are not a separate entity... I love the connection with the art and science."

Public Participant

"I have lots of friends who in the same way say they don't get art - but actually the stuff we were doing they wouldn't think it was art they would say it was experiment - works the other way around scientific aspects of art."

Public Participant



5. Impact on researcher participants

The intended outcomes for researchers were around their connections and shared understanding of those with lived experience, research insights and sense of purpose in their research, new approaches and communication skills. There was also a desire to impact the wider scientific community, initially via their research group, CASM.

We find that researcher participants:

- Immensely **enjoyed the process** and **benefited from personal connections** in a difficult time.
- **Valued the direct contact and exchange** with public participants and valued their **expertise and the insights** they brought to communicating research.
- Felt an increased **sense of purpose and validation** in their research from seeing how it was valued by people directly affected by cancer and ageing.
- Gained **ideas, techniques, language for and confidence in communicating** their research to non-experts, both public and within the wider scientific community.
- Demonstrate **few examples of research insights** but had started to **question assumptions** about their research and how they view their roles.
- Demonstrated a **shift in perspectives and thinking**, particularly in how they communicate their research. It is likely that a this will lead to a longer-term legacy in terms of practice.

5.1. Creativity at the right time and in the right way

All the researcher participants greatly enjoyed the process and felt the group sessions were fun, warm and distracting. Initially some of the researchers were uncomfortable with the model, which was explicitly open and playful. There was recognition later of the value of the creative approach and the 'bodily sensation of making'.

"Using the creative muscles in my brain in a way that I don't frequently do in science... it was fun but could be a bit exhausting as well."

Researcher Participant

The pandemic and resulting lockdown reduced access to the labs and stopped most other public engagement activity. This meant that they had more time than usual to commit to something which would usually be viewed as an 'optional extra'. As post-graduate and post-doctoral researchers, they were a transient group, on short term contracts and potentially without strong social networks in the town. For those living alone, with work lighter and the normal lab interactions missing, this was a challenging time. The project with its regular focussed social interaction and fun was extremely valuable for wellbeing.

"In the lockdown setting, in any given day that was the only interaction I had with someone outside my household... it was a nice break. Whereas doing it

before/after a traditional workday might have been more taxing.”

Researcher Participant

The researcher participants felt committed to the process with a sense of value that increased over the course of the project. This is further evidenced by their continued high level of involvement over what was a long period. They all supported the dissemination of the work and the evaluation several months after their main work ended, and coinciding in two cases with PhD deadlines.

5.2. Valuing public participants as partners in developing understanding

By the end of the project, it was clear that all the researcher participants valued the direct contact and exchange with public participants, valued their expertise and the insights they brought to communicating research.

All researcher participants talked warmly about their relationships with public participants and the artist. They were particularly pleased to get the chance to meet them in person at the end of the project when this became possible.

The types of relationships differed over time, and between the different group types. Most notable was the depth of connection between the three individual pairings where three very different relationships formed, which reflected the characters and interests of both researcher and public participant. In all three cases this was a mix of an older member of the public, with lived experience of cancer and a younger researcher, working on cancer and/or ageing. This shared interest and experience was the jumping off point for the conversations. But it didn't define the relationship, with all six

people feeling like they had made a real connection, albeit in different ways, with their cluster partner.

The two clusters of a single researcher participant with a group of younger members of the public (these were a similar age to the researchers, approximately 18 to 30) naturally formed a different dynamic. There were multi-way relationships and the researcher had more of a group management role. In these clusters there was a lack of an immediate and direct link into the subject matter, however in all groups people shared their lived experience of cancer and issues around ageing.

The role of the artist in facilitating the groups meant that the researcher could act as participant. All researchers used and recognised this to a degree, some immediately recognising themselves as being 'in the process', sharing and co-creating learning. In most cases this was a growing appreciation as although they started with a real respect for non-scientists as people and were keen to meet and speak to people with lived experience of cancer, they initially saw themselves firmly in the role of imparting knowledge.

“At the beginning there was a sense of me preparing stuff to show them...”

Researcher Participant

Over time, this shifted to the cluster being a place of equal relationships, of creating a shared language and new approaches in communicating about research, a subtle but potentially long-term impact. There is no doubt that by the end of the project all the researchers felt they had gained a huge amount from their interactions with the public participants and saw them as full members in creating that shared language.

One of the ways which felt particularly important was in thinking about how to address emotionally challenging subject areas.

"... researchers are somewhat desensitised to it because we think about it all the time. But you have to kind of remember particularly talking to people who have a lived experience that it is actually a really personal and really scary thing for them"

Researcher Participant

All the researchers felt they had gained skills in their ability to pitch the tone of their language so as to inform and express scientific learning while not upsetting audiences/participants within a trusting space – held as safe by the artist.

"It was interesting to see how people respond when I explain to them about what the project is... this is useful for when we start to publish... as the conversation is two-way, I can tweak my descriptions [of an emotionally difficult research area]."

Researcher Participant

5.3. Sense of purpose and validation

Researchers spoke of the way they felt an increased sense of purpose and validation in their research from seeing how it was valued by people directly affected by cancer and ageing. This in turn helped them feel more connected to the human aspect and impacts of their research.

"Really satisfying to be talking to people who have lived what you are researching and talking about."

Researcher Participant

All the researchers felt validated by the level of interest shown by the public participants in their research which they feel could be seen as intense and often fairly abstract. This outcome was clearly a surprise to the researchers, and a couple reflected on how rare it is that they feel members of the public really care about what they do.

"I had always wondered... how well understood what I do is by the general public."

Researcher Participant

"Selfishly, anytime someone ...says 'that's really cool, keep up the good work' that feels good. That's not how science works, people don't tend to remind you that your work has value and is interesting..."

Researcher Participant

This was enhanced by the amount of time allowed for quality dialogue in this project. They spent hours together with someone they would never normally have spoken to, puzzling things out together, joking, and taking risks with ideas in a safe space. There was a depth of connection demonstrated by the warmth of the relationships at the sharing sessions. Researchers could mention a range of areas and see which seemed to interest their cluster. Or they could respond to questions like "I've always wondered about..." in a way that just isn't possible in the usual public engagement delivery model.

5.4. Ideas, techniques, language and confidence for communicating research

Having space to try out new approaches to communicating their research was the most positive outcome for all the researchers, apart from the general wellbeing benefits of the connection. All the researchers already valued public engagement and had at least a little experience of it. However, none had experienced the level of engagement which the project offered, or the types of approach taken:

“I was most surprised by... how can you use food to talk about science? I think of myself as quite open-minded, but I was like well, how is food going to work?”

Researcher Participant

They welcomed the chance to get feedback on what is working and what isn't when they communicated an idea, and the back and forth of generating understanding. At least one researcher, came to the project with the explicit aim of engaging with the public to try out new approaches for future science communication.

The use of food as an analogy really worked for trying out ways of communicating their work in a safe space – to play with ideas, whilst providing a stretch beyond the usual comfort zones.

“I've loved taking part in this project. My favourite parts have been doing some of the practical aspects and thinking creatively about things like food to demonstrate complex concepts – helping people to visualising this more easily”.

Researcher Participant

It also had a levelling effect, which, along with the respect they had for someone's lived experience, led to a very different way of communicating their work:

“I generally find if I am talking to someone in a public engagement setting, I come in with a specific agenda, there's a reason I am there, there's something they came to learn, so I might take questions to judge baseline of understanding, or a game to get specific concept across in a couple of different ways.

With people with lived experience, you need to let them guide the direction... I take the role of being a resource, rather than a teacher...”

Researcher Participant

The sense of 'safety' gave them a freedom not to have to explain everything perfectly. One researcher particularly noted the pressure they usually feel to be scientifically accurate and 'get the communication right' first time. They felt this project had given permission to take a risk and try something which might not work – but on the other hand might work and provide a new insight.

The value of these new approaches to communicating their research goes beyond communicating to a non-science audience. Several research participants commented on how they could use the insights from this project to support communicating to scientists in other disciplines, and even to those in their discipline but outside their research group:

“I've already used some of the concepts developed in the group when talking to people who aren't biologists when I needed to explain what I do”

Researcher Participant

5.5. Longer term impacts on science thinking and the wider scientific community

In terms of influence on scientific research itself, the impacts are yet to be felt and may not be as explicit as set out in the original Story of Change.

There were few examples of researcher participants questioning assumptions about their work. The only obvious example of direct 'research insight' was the following:

"I've been thinking of new experiments to do because of this project. When we were doing the fruit [break and repair metaphor] we were talking about how some repair mechanisms are better than others, and then that made me think well, how much better are they than others? We know some are better, but not quantifiably... so I've been starting to think about how to design an experiment to test how much better one [mechanism of DNA repair] is than the other.... Playing around with things helps you think outside of the box, and it helps you to ask questions you might not have asked otherwise."

Researcher Participant

Most researchers felt that there hadn't been any specific research insights and indeed we only identified that one. This is because there is so much scientific scaffolding behind the specific research questions, making it is hard for someone from outside their research discipline to raise something not already considered.

There may be more impacts in terms of shifts in the mindset with which researchers approach their work, but these are difficult to track at this stage. One researcher highlighted pointed out real value in thinking in a new way, offering space for your brain to

work on problems which you aren't concentrating on. She noted that researchers gain insights from all sorts of everyday places and spaces, where some juxtaposition sparks off an idea related to something they've been puzzling over. Thus naturally, thinking and acting creatively, dialogue with others and playing with ideas will generate a similar space for new ideas and perspectives to develop.

"I think it's really important to talk to other people about what you do, because you don't really know what you don't really know, until somebody asks you a question that you haven't thought of."

Researcher Participant

So far there has been relatively little communication about the work with the wider research community. This is still partly because of lockdown's effect on lab time together and on the other spaces for sharing. However, it was clear that the (early career) researchers who were involved in the project did not see public engagement as a priority for more senior scientists in the field, and felt that the approaches used and impacts of this project would be of less interest to this community.

In the few areas where sharing had been encouraged, there was definite interest and/or intention to share what happened in the project and ideas of how to communicate the findings of the research. Sarah's work on Mutographs embodies a mission to engage with the public – so this project has modelled a type of practice that she feels they can take forwards.

During the sharing event with the wider CASM research team, the value of the food analogy was immediately grasped by the other scientists. Those who attended, although initially slightly bewildered by the discussion about food, within the hour had really

begun to engage in thinking about how they would represent their work through food analogies.

The wider sharing at the launch, and through the book, produced some interest and attendance from senior team members. There is potential and the need to think about how to keep that space for sharing open and active.

The legacy of this project will almost certainly be most strongly seen in the wider range of language, skills and approaches to science communication adopted by the five researcher participants. This will be shown in how they communicate their work, and in the relative value they give to science communication throughout their careers.

They have gained in skills, confidence and creativity in science communication as well as shifting their view of what is possible, and desirable, in terms of involving the public in the process.

As discussed above, they have new techniques and analogies – as well as approaches – to develop new types of conversations. Added to this is a co-created understanding and real determination to think how to use them. Although at present, they may be unsure how this will work within the usual delivery mechanism of public engagement.

“I always knew the value of engaging the audience, it is nice to have ways of doing this... seeing what’s possible will help me structure things to be more like this in the future”

Researcher Participant

Furthermore, there appears to be a subtle shift in their thinking about the value of play and creativity within their work – the recognition of the value of allowing space for intuition and ideas. This shows a valuing of intuition which has the potential to shape how they operate as a scientist and the way they approach their work – the scientists they will grow into.

“Part of what was unique was that it was designed as it went along... it is good not have a template... if I did it again, I’d definitely just get into pairings and see what comes of it... This is a new realisation for me – you don’t have to have a plan at the beginning and that is more inclusive for non-science participants”

Researcher Participant



6. Impact on public engagement

A key aim for the project was to try out and explore new approaches to public engagement with science. In particular, to look at how a more meaningful cross disciplinary participatory practice could be developed and shared across the public engagement sector. This would play out initially within the Sanger Public Engagement Team, but also hopefully with other organisations specifically working in science communication and public engagement in science.

We find that:

- This project provided the **space and permission for the public engagement team to reflect deeply and experiment with practice.**
- As a result of this project, the Public Engagement Team will in future **shift their projects to emphasise the following aspects more:**
 - Using embodied and in-depth collaboration where possible
 - Maximising opportunities for blended learning
 - Emphasising and embedding the skills of the facilitator – particularly their skills in ensuring the project’s focus on participants needs and experiences
 - Building in time for reflection and planning projects to ensure that they work for the participants
 - Embedding openness about risk-taking and talking about sensitive topics with people with lived experience
- Create more opportunities for intimate and rich dialogue.
- **Audiences enjoyed the experience and felt they had learnt something.**
- **Partners saw the value of the approach** and it provoked them to reflect on their practice particularly around:
 - How to creatively use arts and science together
 - Participatory engagement practices
 - The use of digital within participatory work.
- There are some areas that require **more investment to maximise impact:**
 - Audience members from the research community are potentially key advocates for sharing the impacts of the project at senior levels within the Sanger Institute. More formal support for internal advocacy is crucial.
 - The Public Engagement Team now have a documented process for new participatory practice. Further regular reflective practice will make it more likely these approaches are embedded in future programming.
 - The outputs developed as part of the project are an excellent creative resource for use in wider public engagement programmes for schools and Open Saturdays.
 - Partner organisations show evidence of embedding ideas from this project into their own engagement practice.

Further research and support needed to support this process.

- Partners are generally committed to working with Sanger Institute in the future but want to be involved at an earlier stage.

6.1. Redefining participatory practice and public engagement at the Genome Gallery

The unusual circumstances under which this project has been delivered provided the space and permission for the Public Engagement Team to reflect deeply and experiment with practice.

The project gave the team live experience of a more immersive type of public engagement stretching traditional definitions of the term. This is likely to be embedded in practice going forwards, in particular, the community co-creation approach to exhibition and project planning.

“Dialogue is increasingly becoming important in care – how can we make more opportunities for this within treatment and care spaces? When designing cancer hospitals?...”

Public Engagement Team, Wellcome Connecting Science

The characteristics of a ‘good artist project facilitator’ have been explored in relation to the way that Lucy from The Saturday Museum co-constructed, adapted and developed the project with a keen focus on participants’ needs and experiences.

“Lucy ... through her practice was critical to start the combustion of the relationships. She’s not just a facilitator she has reflection that she brings to the process. We need to build in thinking about this in future projects.”

Public Engagement Team, Wellcome Connecting Science

The team are now reflecting regularly on how this will affect the way they approach participatory projects in the future – building in enabled, embodied and in-depth collaborative approaches as far as possible. They have been able to consider how this project will affect future recruitment, programming and strategy, as well as dismantling traditional models of science engagement.

Moving to online engagement has meant developing new practice and policy including GDPR requirements, effective online engagement and facilitation methodologies. The team frequently noted significant developments in their understanding of blended learning opportunities. Future decisions about whether to use physical and/or digital learning spaces will become criteria for project planning. The team feel more confident some projects could now be entirely digital whilst still engaging participatory and embodied learning.

They have also noted a change in the way they programme, hold space for and deliver projects by valuing risk taking in approaches and in involving other people with lived experience to talk openly about sensitive issues.

Furthermore, they are looking at new ways to explore the interactions, similarities and processes of art and science together.

6.2. Interpreting and sharing results for a wider audience

As the project moved into its second phase, the team grappled with interpreting the learning for a wider audience. The team recognised that the close relationships built through the cluster work meant that outcomes were very individual and personal. Therefore, the leap to making this relevant and exciting to a wider audience would be challenge.

“It’s not easy to articulate cancer and ageing and turn into a soundbite... What I’m struggling with is interpreting it for a wider audience without losing nuance – it’s really complicated and as soon as you boil it down you lose the authenticity so I’m trying to find the balance.”

Public Engagement Team, Wellcome Connecting Science

In the same way they were recognising that the personal nature of the project was its strength and a likely connecting point for others. The powerful examples of shifts in perception and thinking were equally important.

“When we started this the idea of a tangible change in how someone approaches their research question seemed like a long shot. But... this has happened, and therefore is possible!”

Public Engagement Team, Wellcome Connecting Science

Extracting the approaches to sharing that have worked well and the messages conveyed is an important focus moving forwards. The team must spend time on sharing the impact internally as well as externally.

6.3. Audience profile⁶

- People attending the events programme-varied in age from under 18 to over 74, more or less equally in each decade up to a higher number in their 50s and 60s, showing the appeal of the events to all ages.
- Most people heard about the events through the Genome Campus newsletter and the next largest source seemed to be Eventbrite.
- A large proportion have an ‘ongoing’ interaction with science,⁷ 40% worked or used to work in science, with the former being the much larger proportion. A third of answers showed respondents had interest in science which was not based on occupation. The survey answers also included people who had lived experience of cancer (5%) and science students at some level (14%). To some degree this suggests a more receptive audience and perhaps the wider test of impact will be working with groups with no prior scientific knowledge or experience of cancer.
- Attendees were somewhat more likely to self-identify as female (57%) than male (37%) or non-binary (4%). 63% described themselves as being from British/English/Welsh/Northern Irish

⁶ The information on this page is indicative rather than representative of impact due to low sample sizes

⁷ This came from a sample of 42 and varied from 17% up to 63% for the ‘Animal Secrets’ event.

ethnicities. Other self-identified ethnicities included Chinese, Indian, Latin American, Bangladeshi, Nepali and Mixed/Multiple ethnic background, amongst others. Around 10% of attendees joined the events from locations outside the United Kingdom demonstrating wide reach.

6.4. The art and science dynamic

It is clear that when done well, wider sharing may have impressive outcomes, despite the challenges the project faced.

34% of people said they had learned something new about science, and 10% said they had learned something new about art (or animals, dependent on the other main topic of the event that day). The largest group said they had learned something new about both (39% of respondents).

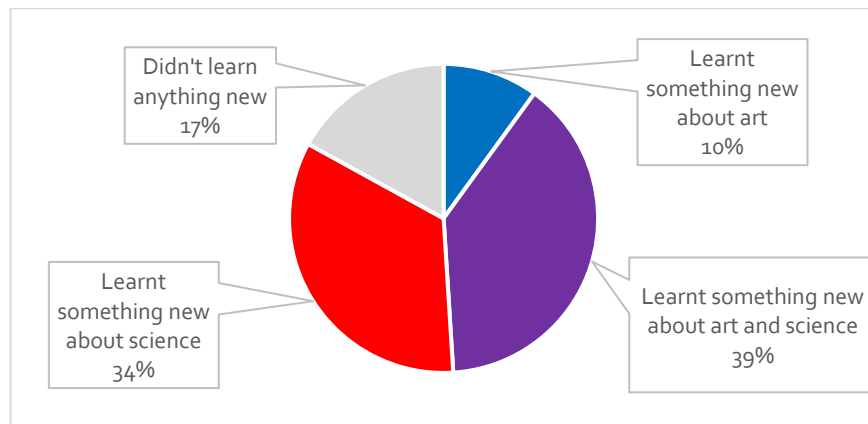


Figure 3: New learning arising from Sharing Sessions

People tended to comment on the complexity of the scientific process, content and research. Audience members often mentioned being impressed by the skills and knowledge of the

researchers and demonstrated positivity about the progress being made in cancer research.

There were some reflections on the way that the project made good connections between artistic and scientific processes. However, some attendees were still unclear whether the artistic process was simply used as a tool to explain the science or had a purpose beyond that.

"In advance, I had thought that the event content would be focused on teaching the viewer about the science, but once it began, I realised the format was focused instead on shedding light on the explorations of the artists, practitioners and scientists involved. Celebrating the project and the unions it created. I really enjoyed this, and I actually spent much of the event in my kitchen inspired to cook whilst listening."

Audience Member, #flowcellular Launch Event

"Quite often when you think about art and science it feels like one feeds the other but actually when they come together they can make things quite magical happen"

Curator at Wellcome Collection

Audiences generally felt that the project was a useful, simple, and interesting way to help people understand a complicated condition. They valued the way that this approach might help remove some of the fear associated with the experience of cancer.

"Seeing the bond that developed, putting a face to the researcher and the patient and taking that with you going forwards."

CRUK Audience Focus Group

Feedback from attendees indicates that a number of audience members at online events were inspired to find out more about the subject area, use some of the techniques and ideas in their own future research, or to attend similar events in the future.

“I definitely feel inclined to do more research after listening to the speakers discuss the mysteries of cancer on the global aspect as well as the mutations.”

Audience Member, Genome Lates 'It's in the genes'

When asked what would stick with them, many audience members also commented on how enjoyment within the project had played such an important part in the process.

“The sense of the fun you all seemed to have had being part of the project.”

CRUK Audience Focus Group

Partners and wider audiences at the events were consistently inspired by the creative approaches used to explore potentially sensitive and complex scientific concepts and by the strength of the relationships between and within the clusters.

Partners suggest that they feel differently about the way that art/science collaborations can be used to engage groups in a fun way and make complex scientific concepts easier to understand for non-scientists. One attendee who identified as learning disabled stated that the visual element and experimental approach to this project would appeal to the learning disabled communities as language around science is often a barrier.

6.5. Broadening impact for legacy

“We now feel like we have a new tool (Zoom) to consider when designing engagement. We are aware of its benefits and drawbacks and acknowledge that this is not a 'model' we can recreate, but our experience will help us to ask new questions next time we approach setting up a project such as where are we having the conversations? What space? People's homes? The lab?...”

Public Engagement Team, Wellcome Connecting Science

Involving key influencers at the sharing events has had some impact and is likely to generate interest at a more senior level if followed up. Julien Raynor, Director of Connecting Science at Sanger was particularly impressed with one researcher participant's new insights into questioning their own practice and recognises the potential wider impacts of that. His role in the organisation means that positive messages about the impacts of the project are likely to be shared more widely.

However, the question of how to build the kudos and convey the impact of the project to a wider audience, and in particular senior research faculty, have not yet been resolved. At present the project is not presented in a language, or with a process, that scientists are necessarily familiar or comfortable with.

The outputs created – films, GIFs and 'recipe book' – are a permanent resource for the team. They can be used as stimuli for Open Saturdays and schools' programmes to generate an open dialogue about science. This could bring a significant legacy because of the high numbers reached by the schools programme.

This legacy of resources will be useable across different faculties and teams at the Institute. It is likely to lead to better

collaborations between researchers and engagement teams across campus.

Future programming will draw from new approaches, methodologies and facilitation techniques developed. Future work is also likely to have greater researcher involvement, particularly from those who were involved in this project.

There was a general agreement that the project had made some short-term impacts on partners' own group members. The sharing events served to open up the possibilities of participatory engagement for those with a public engagement role in similar science centres or other arts/cultural organisations. One person pointed out that the digital approach was new to them, and several others noted that they will be using some of the approaches and group structures described in future work. It would be valuable to revisit partners/organisation to see whether some of these approaches have been embedded longer term.

Some partners, who brought young people to the project, felt that it was helping them to develop new audiences for the longer term. In addition, it enabled them to offer something to their existing audiences at a time when their venues were closed.

Partners and sharing event audience members are clearly potential advocates for the work and have a deeper understanding of process and outcome. The team would benefit from empowering these people to share the messages from the project and support

development work. There is potential to invest time in bringing them together to explore their own practice, share new ideas and approaches, and to develop clear messages about impact to share with their peers.

Partners demonstrate a commitment to longer term partnerships, despite some uncertainty about their own futures. Some have a clear opportunity and desire to share the learning from this project with their own contacts, including public engagement colleagues and researcher networks. Partners who are linked to hospital patient fora are keen to utilise #flowcellular approaches and get patients involved in future projects.

"I've already had conversations with other public engagement enablers within the university about this project and enabling creative engagement on digital platforms. Would happily share any evaluation reports across our King's Engaged Researcher Network."

Partner, Kings College, London

Emerging partnerships with CRUK and the Science Gallery London have become more established. CRUK is interested in the team sharing and exploring new engagement practice with their Patient Advocate group to support care and recovery.



Musli
Cakes

...go wrong and keeps well.

Double pure

- 6 1/2 oz (180 g) plain flour
- 2 level tablespoons cocoa
- 1 level teaspoon bicarbonate of soda
- 1 level teaspoon baking powder
- 5 oz (150 g) caster sugar
- 2 tablespoons golden syrup
- 2 eggs, beaten
- 3/4 pint (150 ml) salad or corn oil
- 1/2 pint (120 ml) milk

- 100g
- 2 oz (50 g) butter
- 4 level tablespoons cream, sieved
- 1 tablespoon milk
- 1 oz (30 g) icing sugar, sieved

Heat the oven to 325°F, 160°C, gas mark 3 and grease and greaseproof paper the bases of two 8-inch (20-cm) sandwich tins.

Sift the dry ingredients into a large bowl and then make a mound. Add syrup, eggs, oil and milk. Beat well and pour

Bake in the oven for 30 to 35 minutes or until the cake is when lightly pressed with the fingertips. Turn out on a remove the paper and leave to cool.

Double
2 1/2 - 1 1/2

...the oven to 350°F, 180°C, gas mark 4 and greaseproof paper two 8-inch (20-cm) sandwich tins.

Making time about 5 minutes
Baking time about 35 minutes

- 4 oz (100 g) soft margarine
- 4 oz (100 g) caster sugar
- 1 large egg
- 1 oz (30 g) self-raising flour
- 1 level teaspoon baking powder
- 4 oz (100 g) drinking chocolate

Heat the oven to 350°F, 180°C, gas mark 4 and greaseproof paper two 8-inch (20-cm) sandwich tins.

Place all the ingredients together in a bowl and beat the mixture between the two tins, smooth the tops, and bake about 35 minutes until the cakes have risen and shrunk sides of the tin.

Turn out, remove the papers, and leave to cool on a wire rack. Spread with chocolate butter cream and sprinkle the top with sugar.

Chocolate Butter Cream

- 2 oz (50 g) soft butter
- 4 oz (100 g) sieved icing sugar
- 1 oz (25 g) drinking chocolate

7. Conclusions and Recommendations

In this section, we summarise the outcomes of the project, the answers to key research questions and explore whether it achieved its ambitions.

These are outlined in the #flowcellular Story of Change carried out at the beginning of the process and shown in Appendix 1.

Section 7.1 summarises whether the project has delivered the planned outcomes for different stakeholders following the Story of Change outcomes.

Section 7.2 outlines the learning arising from the approaches taken by the project – the ‘how’ and ‘what’ of the Story of Change.

Finally Section 7.3 lists our recommendations for future development of the Wellcome Connecting Science programme.

7.1. Conclusions Summary by Story of Change Outcomes

Overall our evaluation has found:

- Deep, short-term impacts on a core group of participants
- Lighter effects on a wider group of audience members and partner organisations
- Potential for longer-term impacts on public engagement practice and policy for Wellcome Connecting Science and the Sanger Institute.

Developed a shared language between the public, arts and science

Within the project there is no doubt that a shared language emerged. The artist, and the public and researcher participants have begun to take this into their wider work and lives. This shared language reinforced the connections, similarities and value of working across art and science. It appears to have become embedded in everyday language for the participants, meaning that it is likely to continue to affect them.

Audiences at sharing events also engaged with this shared language and co-created meaning making across researchers and the public.

Developed knowledge and understanding of science, and confidence in engaging with science

Public participants and artists all noted a huge increase in knowledge, confidence and understanding of science. This was evidenced in the way they articulated the research carried out by the researcher participants, and for some in how they described their own cancer progress.

Not only did they become comfortable using scientific terms, they developed a deeper understanding of the processes in play. This led to them feeling able to ask questions about other aspects of biology, showing a growing confidence in the validity of their voice and interest.

This was also evident among wider audiences in attendance at the various sharing events of various. For example, 73% of respondents to the audience survey felt they’d learnt something about science.

Developed understanding of the role and value of public engagement

There was an increased understanding of the role, value and potential of public engagement amongst all participants. The researcher participants, who were already warm to public engagement, saw further potential for its use in broader ways. The public participants gained a greater understanding of its value and confidence in their value to it.

Given a sense of value and purpose to participants

One clear outcome was the increasing sense among the public participants of the value of their role as experts in the public engagement process alongside the researchers. In addition, the researcher participants gained a sense of value of their work by seeing it through outside eyes. This allowed them to go beyond simply an intellectual understanding of the work's importance. They developed a personal sense of satisfaction through receiving feedback from someone to whom the work mattered.

Developed creativity

The project developed creativity in multiple senses:

- The whole project encouraged new thinking and new approaches – researcher participants developing new and creative ways to express their research, the artist and project team needing to be creative to adapt to the limitations imposed by lockdown
- The approach taken was fundamentally to raise the value of creativity, risk-taking and play within the 'spaces' of the project. This meant that the sessions in themselves developed creativity as part of taking part.

- Individual researcher and public participants within the project were inspired to be more creative, whether in stretching existing practice or trying photography, poetry or other creative practices out for the first time.

This was all enhanced by the way in which the artist's practice explicitly valued and shared these moments and outputs within the project as an integral part of the work.

Developed social and human connectivity between public and scientists

The project undoubtedly connected the people at the centre of the project. It enhanced their understanding of each other as 'fellow humans' rather than 'scientists' or 'cancer patients' or 'students'. This connectivity between individuals has also shifted the perceptions of the two groups, with public participants expressing how they now see scientists differently, and vice versa.

Developed research insights

The project has supported shifts in researcher thinking and perspectives on research. However, to date this hasn't led to more than one explicit new insight into their research. It has also not yet reached extensively into the research sector. It is possible that both the reach and effect will extend with time as the researcher participants develop in their careers and have further opportunities to share.

Developed communication skills among researcher participants

The project has definitely developed communication skills among researcher participants:

- Increasing their confidence in communicating
- Expanding the range of communications techniques and approaches they have at their disposal

- Challenging them to try out more creative and potentially 'risky' approaches which might leave them open to making a mistake, but equally could be more effective at getting ideas across.

Challenged assumptions and models of engagement

The project challenged assumptions and models of engagement for researcher participants (as discussed above) and the Public Engagement Team. They recognised the value of taking a more open and fluid approach to their programmes, and to using a mix of different delivery styles.

Improved artistic processes

The project gave space for the Saturday Museum as artists to develop new practices using a co-creation approach. These have been shared within the website and recipe book to be further developed and built upon in future work.

Developed insights and new practice in public engagement within the arts, cultural and public engagement sector and among funders

The approaches and outcomes of the project have been shared in a range of groups, for example:

- Reaching other public engagement organisations and potentially interested arts organisations through sharing at the ENGAGE conferences in 2020 and 2021
- Sharing sessions with partner organisations from a range of sectors.

Feedback from those who chose to engage with the evaluation shows that this has sparked ideas around how to use artistic and online approaches for public engagement. Further time is needed to see how far this impact will spread.

Developed new connections and new audiences for public engagement

The project enabled Wellcome Connecting Science to begin to engage with new interested partners. However, within the lifetime of the project there wasn't time to build these fully or see what outcomes they might bring. Likewise, although it succeeded in engaging with the public across a wide range of age groups, it has not yet reached out to diverse communities or those with little prior knowledge or experience of science.

Longer term outcomes

These impacts may have farther reaching effects on attitudes, values, thinking processes and professional practice that are currently hidden but may manifest in those participants who are early in their careers, at a later date.

We recognise that this project had to operate in a particularly difficult environment for sharing, and many of the potential outcomes have not been realised yet. However, there were some missed opportunities to maximise the value arising from the incredible work and commitment given to this project through building in routes for sharing learning within the design, particularly considering resourcing legacy work to embed good practice internally and share it widely.

Taking a leaf from the project's use of analogy, perhaps our hope is for a rhizomic spread of the project's impacts – we can't yet see the manifestations of the shift, but that doesn't mean that small moments of flex and insight aren't the early symptoms of further change spreading. For full value, this would need to happen not simply among a group of already aware and committed scientists, but in their networks. It is more likely to affect views and commitment to public engagement than research itself. As these

researchers and young public participants progress to more senior roles, the realisation of the value of these moments of connection and creativity may shift the relative value they place on public engagement. This would have long lasting impacts on both them and their work. Connections between science and art come to be seen as not just 'giving back' to the public, but as a dialogue which can refresh their thinking and increase the ways of communicating their learning to colleagues, the media, and the public.

7.2. What worked well

7.2.1. Quality

The quality of the artist facilitator is repeatedly mentioned as crucial to this project by all participants and the Public Engagement Team. There has been regular reflection on the fact that other artists wouldn't have enabled the space in the same way that Lucy did. The quality of the project and depth of impact flows from the carefully curated, protected and expertly facilitated space for authentic and equal discussions.

The project also relied on Lucy working in a flexible hybrid and iterative way, responsive to needs and continuously changing context and challenge presented by Covid. She was extremely skilled in bringing a sense of empathy, creating and holding a space, supporting dialogue, and ensuring that all groups felt safe and supported. Future recruitment or commissioning processes must take all of these skills into account.

The format of online events was generally praised for inclusivity, an empathetic and sensitive approach, and forging connection with the humans behind the research. Audience members pointed out the importance of the visual, especially for those with learning disabilities or English as a second language.

"Great to have contact with the people actually doing the research/looking after the data, instead of science journalists who are not necessarily specialised in a particular area of activity."

Audience member, Sharing Event

The presenters/speakers at the live events, format of the event, subject and the platform were all rated very highly – more than 4.4 out a maximum of 5 – with the quality of presenters/speakers gaining the highest ratings. The #flowcellular launch attracted more comments around the format of the event.

"I really enjoyed how everyone taking part had fun and sparked ideas off each other, the platform and format did well, considering the restrictions of the Covid restrictions on meetings or gatherings."

Audience member, Sharing Event

7.2.2. Management, communication and adaptability

Keeping momentum and commitment across the cohort was managed very well despite being online. Participants noted that regularity of contact with Beth and Lucy kept things on track. Keeping the sharing events going helped in interpreting their work for the public.

The impact of Covid and enforced isolation saw the project completely pivot in terms of its delivery. The project team was agile in responding to this challenge. They maintained the project's momentum and evolved plans in response to the restrictions, participants needs, and the reflective discussion within the team about purpose, direction, and outcomes.

As much as it presented a challenge, Covid also created the opportunities for online engagement. This was a real 'leveller' in terms of the power dynamic between the different stakeholder groups. It was also an opportunity to engage those who may not have been able to attend a physical project.

Because weekly meetings were online, participants were limited to joining with whatever device they had available. In some cases, this was by phone or iPad which meant that the social and visual element of larger group meetings was lost. Accessibility, platform, and user device should be a consideration in future digital programmes.

7.2.3. Co-creation, play and embodied learning

We find the terms 'co-creation', 'experimentation' and 'playfulness' frequently mentioned as positive aspects of the project. The power of co-creating the process and products – bringing researcher participants together with public participants – has been an exciting and different way of working. The interdisciplinary nature of conversations meant that breakthroughs in perception and thinking processes came out of the play and experimentation.

This was a project that embraced embodied learning, with hands on activities happening live in each other's kitchens. Key to the project was Lucy's ability to maintain tactility within the process. Devising the kitchen experiments as part of this was seen by participants as really clever and showed the value of her commitment to materiality.

“The doing of it has a much deeper impact than someone just telling you about something. This is the uniqueness of this practice.”

Public Engagement Team, Wellcome Connecting Science

7.2.4. The cluster approach

The formation of small group clusters (see [Figure 1](#) above), was effective in generating deep discussion and reflection, personal journeys and learning as well as wider group sharing.

The project sought to ensure that public and researcher participants felt equally valued in their own lived experiences. Some clusters achieved a sense of equality earlier than others. In the first phase of the project, it was common to observe public participants deferring to the researchers' 'expertise', but this definitely shifted over the duration of the project.

“Tim is a really keen cook so he was an ideal partner! Did they curate the partnerships because they have worked well?”

Mike, Public Participant

7.2.5. A human approach

Participants and wider audiences commented on the humanity, warmth, honesty, and empathy with which the conversations flowed. For those having had or currently experiencing cancer, this was particularly liberating where there was a sense that previously conversations about cancer had been swept under the carpet. Several participants noted that the biggest barrier to connecting with public is that the public don't want to talk about what can be deeply emotional issues. Lucy suggested that humour was also a crucial success factor in levelling the group and the subject area.

Through the comfortable and familiar topics of cookery and food, this project enabled participants and audiences to find an easier way to talk about cancer and ageing.

"It will happen to one in every two of us. Removing barrier of fear if in public space and talking in a non-clinical way makes it accessible and human to all."

Public Participant

Finding a unifying object, action and space (food, cooking and the kitchen) that everyone could relate to was crucial to the success of this project. Using food as an analogy to the experience of cancer and ageing has worked as a leveller between participants, as well as demystifying some complex scientific concepts. All participants, and many audience members and partner organisations, have found resonance in this analogy. Our findings suggest that this also helped to remove the 'fear factor' for those struggling with illness.

"Being on that kitchen table, where you're all sat on one screen together, really got rid of those boundaries - everyone was just a person instead of the role they were meant to be."

Public Participant

The personal touches that were integrated into the programme were also much welcomed by participants including:

- Postal "surprises" that were sent by Lucy several times throughout the project such as the #flowcellular aprons with imagery of one of the break and repair broccoli experiments.
- Opportunities for more informal socials online. The Christmas social was a poignant event for some participants for whom it was their one and only social event in many months.

7.2.6. Physical versus virtual engagement

The impact of Covid meant that an element of the physical was lost and despite a continued desire to hold an exhibition, it was not possible. A final get together in September was the only time that many of the participants had met.

Throughout the project there was much reflection about the benefits and disadvantages of physical versus virtual engagement. The conclusion was that these two engagement methods should not necessarily be viewed as alternatives to each other but as complimentary to one another.

Most participants feel that the connection that you get online falls short of what you get in person. Several mentioned that the connection to the research and gallery context was missing and it would have added great value. However, all agreed that the digital platform provided for a more democratic exchange, presenting an opportunity for more prolonged and sustained engagement with researchers who were able to commit more time to due to Covid.

"We did have a wonderful moment when Alex was able to do the virtual lab tour on his first visit back. There was real excitement from the participants to see this working space and it would have been great to bring them to open lab. However, if that had been possible at the beginning the temptation and default model would have been to introduce the lab right at the beginning of the project and maybe that's something to learn from... that we rethink the order of things and challenge the norm."

Public Engagement Team, Wellcome Connecting Science

In person marketing approaches were not possible but social media was cleverly used as an engagement tool, building curiosity in

wider audiences and commitment from the core participants. Future programmes must consider digital access and literacy to ensure inclusivity.

7.2.7. Sharing the learning

Following an intense period of collaboration, play, engagement and participation, the core project team moved to thinking about how to best interpret the project activities and outcomes for a wider audience. As planned, this was initially through sharing events but the ambition to reach wider audiences through an exhibition was honoured and online channels were explored. This sharing happened through the creation of an online 'exhibit' (web pages) and the downloadable recipe book resource. These documented the process and the individual conversations and journeys of participants. This reached a wider audience than an in-person exhibition might have done, although it is hard to tell the depth of engagement. None of the visitors completed the website survey so it is impossible to comment on their experience.

All these individual components built the holistic experience for participants and a proper closure to the project.

Sharing event attendees mentioned the success of the conversational format used for these events. Several comments relate to feeling welcomed as an observer into a round table conversation rather than being presented 'at' or 'to'.

"You're being given an opportunity to have an insight into a dialogue and exchange that's happening between artists and between two entities rather than you're being spoken out to – I think that's something which I definitely would take forward into what we're doing."

Audience Member, Sharing Event

Around 65% of the attendees to the Genome Lates sharing events felt that they would now like to attend more events of a similar nature. 57% said they would like to find out more about the subject matter, and a similar proportion said the event led them to think differently about the subject matter.

When asked what kind of future event format they would like, by far the largest group (67%) said they would like a 'hybrid' event where they had the option to attend in person, where it was safe to attend, or virtually – with both positive and negative comments given for both options. Virtual/hybrid formats were seen as enhancing accessibility, although one respondent did comment that they felt this affected participant engagement.

On reflection the sharing events were hard work, and had low attendance figures – partly by design as the intention was to invite a particular specific audience to share in an intimate conversation. This meant that wider sharing of, and building audience for, the project outcomes was a challenge. The team regularly reflected on how best to communicate such complicated, sensitive and personal subject matter to the public and never quite solved that challenge. The nuanced nature and impact of the project also meant that creating a clear, targeted marketing message for a wider audience was a real challenge.

7.3 Recommendations

Recommendations

Crucial

1. Address the intended longer-term outcomes by **effectively communicating the approach, outcomes and processes** to internal and external audiences.
2. Further **embed the reflective, responsive and adaptive** approaches already developed in this project.
3. Remember the **importance of the approach and the skills of the artist** facilitator.
4. Continue to support **researchers to develop empathetic communication, engagement and relationship building techniques** and **share their learning** more widely.
5. Continue to collaboratively **explore the use of accessible and common language around art and science** so that people are more likely to engage.
6. **Keep using (and re-using) the resources created** for wider engagement programmes at the Genome Gallery, online and through the learning programme.
7. **Continue to develop blended approaches to public engagement** and don't be afraid of 'all-digital' programmes and projects.

Desirable

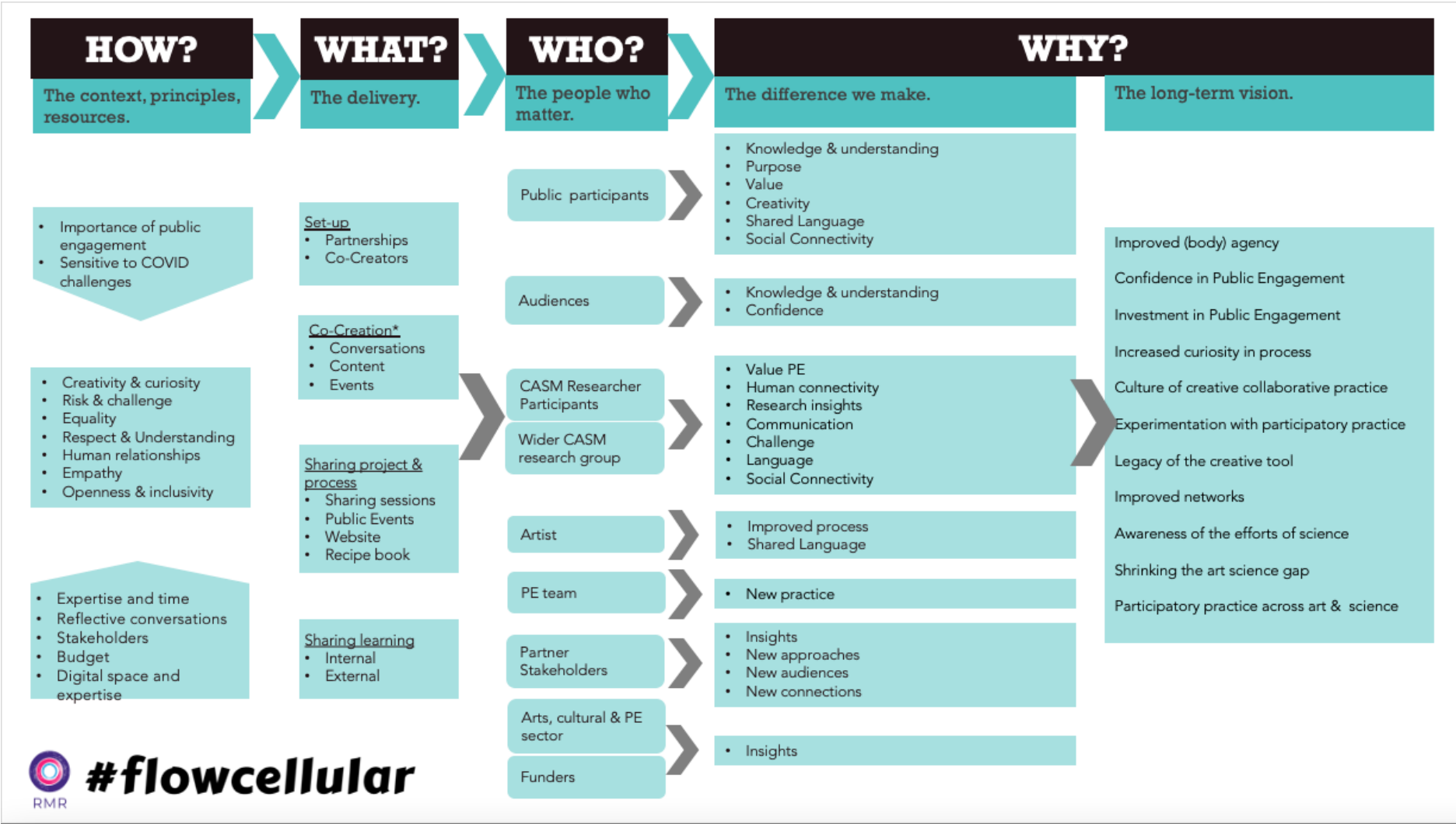
8. Increase the **involvement of participants who have lived experience** of cancer to promote the value to hospital patient groups.

9. Extend the reach and therefore the wider social return on investment by **recruiting from a wider demographic and geographic range**, including marginalised groups.
10. **Involve partners earlier in the planning process** to develop shared aims and ambitions and make sure that the learning sticks.

Developmental

11. **Build legacy support for young people, partners, audiences and patients advisory group members** involved in these projects to train and act as role models, disseminators and advocates to their peers.
12. Consider some **light touch longitudinal evaluation** of the way that partners/organisation have embedded new approaches.
13. Further **refine the structure and format of future online events**. And develop more opportunities for **hybrid and blended** format events and programmes.
14. Consider using the **creative approaches developed to target and engage marginalised groups**. Further targeted audience development work is required for this.
15. Increase the **involvement of participants who have lived experience** of cancer to promote the value of the 'patient expert' role to hospital patient groups.

Appendix 1 – The #flowcellular Story of Change



Appendix 2: Links to the online material and methodology

More information on the project can be found at <https://genome.gallery/exhibition/flowcellular/>

Our methodology can be accessed here: <https://sphelps.dyndns-home.com:9000/index.php/s/VwnRSgvvZKFGY6n> or <https://tinyurl.com/2p86nurz>