

Making Connections Long term Impact report



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Executive Summary

This is a summary of an evaluation report on the longterm impact of the British Science Association's Making Connections Programme. This Programme enables members of [the UK Science Festivals Network \(UKSFN\)](#) to work with community partners to develop projects to engage underserved audiences with researchers and research.

Since its launch in 2017, the Making Connections Programme has focused on:

- ▶ Engaging young people in Key Stage 3 (aged 11-14) from low socioeconomic and BAME (Black, Asian and Minority Ethnic) backgrounds
- ▶ Promoting science and research awareness
- ▶ Providing 'safe' spaces for researchers to test public engagement activities
- ▶ Fostering longterm partnerships between science festivals and community groups

In 2019, the aims broadened to include a focus on non-university towns and cities; and in 2021, the target age range was expanded to 11+.

Making Connections projects include young people from a socioeconomically deprived area of South London developing and performing escape rooms about the climate crisis, LGBTQ+ young people in Nottingham designing fantasy figures and using them in a Role Playing Game, migrant and refugee families in Glasgow taking part in a Harry Potter themed science fair, and South Asian Muslim families in Rochdale creating science busking activities inspired by workshops with scientists and engineers.

The evaluation uses data from 48 in-depth interviews, 29 carried out specifically for the new report and 19 with some of the same people conducted between 2019 and 2022. They include Festival Organisers, Community Partners, Researchers, and Project Participants, drawn from all four countries of the UK, urban and rural areas, and university and non-university towns and cities. In addition, visits were made to community science activities in Bristol, Nottingham, Oxford and Rochdale.

1. Making Connections projects support equitable public engagement

Making Connections projects can be as different as a group of young people in Nottingham working with engineers to design a skate park and people of all ages going to a series of evening science discussions at their local parish church in Merthyr Tydfil. However, they have three features in common which mark them out from the bulk of UK science engagement.

First, they aim to make research more representative of and relevant to underserved communities. At Bristol's Festival of Nature, Ellie applies for Making Connections grants every year. They use these to "focus on and work with an audience that we maybe wouldn't ordinarily attract or work with" by "putting in time resources and linking up with a partner organisation." Their 2021 project with the Black Seeds Network worked with minoritised local community leaders who organise on the environment. From it, they learned to "showcase other amazing community work that ... people of different backgrounds are actually already doing, ... rather than very white organisations swooping in and saying you should do this."

Second, these projects work to mitigate and transform the power relations that give greater status to researchers and science festivals than to communities. Festival Organiser Dane (IF Oxford, 2020) tells researchers to avoid a "mechanistic we-want-to-extract-something-from-the-community" approach. There are community groups that "we protect the relationship with quite carefully. ... And when someone comes in, through our brokerage, they have to be on brand." Projects can also shift power through reciprocity in their design and delivery and by taking place in spaces where communities feel ownership, such as mosques and shopping centres.

Third, Making Connections projects are anti elitist. Their premise is to make wonderful experiences with science and research available to all, rather than reserving them for those deemed 'Gifted and Talented' or as able to 'progress' in STEM fields. This is about social justice. As Megan (Festival Organiser, Nottingham Festival of Science and Curiosity) explains: "it's important for the children that we work with to know about the world that's out there. ... Because a lot of the areas we work in a lot of the time they won't know anybody in their family that's a researcher."

Making Connections projects set out to change all their participants, not for impervious researchers to deliver knowledge and skills to, and inspire aspirations in, others. While not all of the projects take such inclusive and reciprocal approaches to public engagement, that so many do, going against the mainstream, indicates that these are fostered by the Programme.

2. Making Connections projects build community science capacity

Making Connections projects grow the capacity of festivals, communities and researchers through building relationships, skills and experience. To understand what these projects do, we need to focus on their impacts on Festival Organisers, Community Partners, and Researchers, as much as on the people we generally think of as their 'audiences'.

Making Connections funding allows Festival Organisers to build relationships and to increase their understanding, confidence and skills for working with communities and researchers.

Mohammed (Rochdale Science Extravaganza) says: "It's taken years, but today I feel very

comfortable [talking with researchers]. ... I'll say it how it is and how I see it. And you accept it and work with it or I'll just move on." Similarly, Fathema who now volunteers with Rochdale Science Extravaganza, had no experience of science beyond school before getting involved with it. Now she is "speaking so comfortably and confidently about climate change. That's not a subject that Asians speak about. ... It's always scientists and white people." The Festival of Nature, IF Oxford, and Nottingham Festival of Science and Curiosity have borrowed FailSpace from the BSA to honestly review their community collaborations, and Nottingham has introduced their own community grants programme.

Making Connections funding allows communities to extend their networks, to develop as community leaders and to increase their understanding, confidence and skills for working with science and research. Amrish at The Bristol Rainforest went from "not even knowing [funding's] there" to applying successfully for grants. Navpreet, who first volunteered with SMASHfest as an undergraduate and is now a paid researcher, reflects that "even if I wasn't to work with SMASHfest on their projects directly, I know I will always have comrades, and the connection with Wyn [Festival Organiser]. And we'll ... build that community of design activism and community activism." Oxford community dance teacher Sophie kept her link to embryogenesis. When her five year-old daughter recently asked "when did you become a person?", the question brought: "this whole beautiful, vision in my head of the rhythms of how the heartbeat starts ... So that was just a wonderful moment where I was like, Oh, yeah, I never would have been able to answer that question like that three years ago. And now ... I have in my body a feeling of what the rhythm was, and the movement of it, because I'm a dancer, and that's how I have tried to express it."

In Making Connections projects, when Researchers talk across difference and find ways to share their work, it makes them better communicators and changes their understanding of the world. In some cases, this led them to use different media and to activism. Graeme (University of Glasgow) has participated in Glasgow Science Festival for over a decade. He vividly recalls conversations three years ago with refugees at the Kinning Park Complex: "The thing that stuck with me the most ... was chatting to three people, two women ... were biomedical scientists, and the man was a nuclear engineer. And these were people who were refugees and asylum seeking people who had no right to work here. So I think that stuck with me because they felt that they were forgotten about. People assumed what kind of work they did. And then when you spoke to them, it turns out they were scientists just like me." This led him to do science outreach with adults and to volunteer with migrant and refugee communities. It was part of an "awakening" about the impact of the arms industry as someone who had previously worked in it.

Funding is crucial for all participants. Given the lack of resources, community organisations are overstretched and heavily reliant on volunteers, and researchers who make community outreach central to their work struggle to gain institutional recognition for this and often do unpaid engagement work.

3. Making Connections projects have longterm impact on communities

In addition to building community science capacity, Making Connections projects create longterm impacts in three main ways: leaving a legacy of resources in communities, acting as a support to or proof of concept for other funded projects, and initiating and nurturing ongoing relationships between communities and researchers.

Some Making Connections projects leave a legacy of resources. These include: online videos, a photography exhibition, a livestream of sound from a National Trust site, and portable motion capture technologies that allow disabled people to be included in the digital realm. Skate Nottingham replaced a disused and derelict space in the centre of Nottingham with the Tram Line Skatespot. They would have done this without their two Making Connections grants but that funding enabled students in the adjacent college to work with Researchers to contribute to its design. Chris (Community Partner, Skate Nottingham) views Tram Line as “[very much an outcome from that co-design process](#)” and two of the Researchers who took part in their Making Connections projects have “[been consistently involved ... ever since.](#)”

Making Connections projects have more impact when their organisers are able to combine multiple funding streams or to secure significant follow-up funding. Interviewees spoke about the role of luck in securing funding, how the metrics used to assess ‘value for money’ work against community outreach, and how funders want to set the agenda for, rather than listen to, communities. A collaboration that emerged through an IF Oxford Making Connections project had most of its impact because Researchers Tomoko and Shankar (University of Oxford) secured a Wellcome grant of £188k allowing them to continue collaborating with community dance groups and choreographers. Tomoko explains that Shankar’s Wellcome research gave them a chance to apply for a linked public engagement scheme: “[It was much easier to get this funding than any other public engagement grant ... So we were just lucky.](#)”

In addition to funding, longterm impact relies on having local leaders who nurture relationships, holding people and projects together. Festival Organisers play a critical role, acting as brokers between communities and researchers. Festival Organiser Ellie, at Bristol Festival of Nature, says, “[from working with the Black Seeds Network and being involved in that space, and also](#)

in those [minoritised] communities, we've then been able to share news of other events and activities, that we're a bit more trusted in that space." Nottingham Festival Organiser Megan's words echo through the data on the need for longterm funding to build trust with excluded communities and vulnerable groups: "Especially with the very young people that we're working with, there's a lot of chaotic-ness in their lives, and structure is really helpful. You know that for some children, it takes a long time to build up trust. ... When you finish something, it always, it leaves me with a sense of, Oh I wish we could do more. ... You don't like to leave children once you've started something, let them down. Because there's lots of people letting people down all the time".

This evaluation points to some principles for good practice

1. Projects must put community needs first and grow community capacity.
2. The greatest collective good is achieved through reciprocity and humility, by everyone participating in shared activities and shaping joint goals.
3. Projects can address power differences by how they allocate resources and by developing activities that build on everyone's skills and expertise.
4. There must be open discussions within project teams about communities' experiences of inequality.
5. Payment, research ethics, and other processes must be straightforward, quick, transparent and accountable.
6. Community and research participants need payments that recognise their expertise and that contribute to their organisations' core costs.
7. Festivals and community organisations need support to share and maintain the resources they create.
8. Funders must give communities control of grant spending and significantly redistribute funding from research to outreach.
9. Funding cycles, and metrics need to change to make sustainability more possible when people want to continue collaborating.

1. Introduction

1.1 Programme outline, aims and outcomes

Traditionally, science festivals attract people who are already interested in science and who seek out such cultural activities. In this way, they increase inequality by channelling resources towards those who are already relatively privileged by social class, ethnicity, dis/ability and gender. This is part of a pattern whereby, in a time of increased public engagement and science communication, some groups are systematically underserved. They are usually the same groups who, as the [Report on Equity in STEM Workforce](#) shows, are under-represented within science and research overall and are more likely to be found in lower status STEM sectors and in more insecure jobs.

The Making Connections programme seeks to change this. It has run annually since 2017, delivered by the BSA with funding from UKRI. It enables members of [the UK Science Festivals Network \(UKSFN\)](#) to work with community partners to develop projects to engage underserved audiences with researchers and research. Throughout, the Programme has focused on:

- engaging young people in Key Stage 3 (aged 11-14) from low socioeconomic and BAME (Black, Asian and Minority Ethnic) backgrounds
- promoting science and research awareness
- providing ‘safe’ spaces for researchers to test public engagement activities
- fostering longterm partnerships between science festivals and community groups

In 2019, the aims broadened to include a focus on non-university towns and cities; and in 2021, the target age range was expanded to 11+. The Making Connections Programme has always encouraged people to try new approaches which may not succeed in conventional terms. In 2022, a collaboration with [FailSpace](#) made that commitment more explicit. Alongside this, the BSA are doing more to [share learning from the Programme](#) across the sector.

The Programme fits within the [BSA’s 10-year strategy](#), launched in 2021, to work for a future where science is more relevant, representative, and connected to society. The 10-year strategy is broken down into a number of sub-objectives and those to which the Programme contributes include:

- Provide engagement activities that effectively reach and engage underserved audiences with science, and use these activities to understand and disseminate good practice.

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- Enrich young people's experience of science in a way that encourages more of them to see science as relevant to their lives and to study/work in science.
 - Partner with communities to enable them to conduct, influence or apply science and research in their work with their audiences.
 - Understand and address structural inequalities in science engagement.
 - Advocate for the adoption of a more participatory and transformative form of science engagement.
 - Improve diversity and inclusivity at the BSA and throughout the sector.

This evaluation identifies Making Connections' longterm impact, assessing how far the Programme meets these strategic goals. It also contributes to the BSA's strategy through three case studies, a report and an executive summary that seek to impact the sector, by identifying challenges and good practice for projects in this space.

Since Making Connections started, the UKRI has also launched a new strategy. [Its strategy for 2022 to 2027](#) sets out to realise the government's ambition for the UK to become "a global science superpower and an innovation nation". It focuses on shifts in diversity, connectivity, resilience, and engagement. An [engagement strategy](#) followed in November 2022, which acknowledges: that many feel excluded by research; that we need a "significant shift in how the research and innovation community thinks about engagement and the process of creating and applying knowledge"; and that "generating knowledge in partnership with the public can improve research and innovation by making it more relevant and more useful".

The five objectives of this evaluation are:

1. To identify longterm impacts of Making Connections on science festivals, community partners and participants, and researchers and their universities, and what enables and supports these. This includes assessing the ability of Festivals to act in a brokerage role, connecting universities and communities.
2. To assess the 'success' of Making Connections in terms of its contribution to the BSA's strategy to make science more relevant, representative and connected. This includes identifying what Festivals can offer as distinct from the [BSA's other community engagement programmes](#).
3. To contribute to achieving the BSA's strategy through a report and case studies that amplify voices missing from science-based conversations and that advocate for participatory and transformative public engagement.

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4. To further contribute to the BSA's strategy by identifying best practice for ongoing projects in this space, highlighting the ingredients that can help to support connections between researchers and communities.
 5. To provide resources that can be used to shape the UKRI's engagement strategy so that it develops authentic collaborations between researchers and communities.

Public engagement is usually framed as progressive, for example, as democratising knowledge production and decisions about research agendas. But, it often defaults to legitimating pre-existing agendas or recruiting publics to citizen science projects over which they have no meaningful control. Similarly science communication can default to attempts to proselytise on behalf of science both to ensure compliance with public health and other science messaging and to recruit the next generation of STEM workers.

Making Connections attempts to challenge top down approaches to public engagement and science communication in order to realise the rhetorical commitments to dialogue and equity.

Reflecting the BSA's transformative aspirations, the evaluation attends to what models of public engagement are operating within Making Connections projects, to where the power lies and how power is negotiated in the relationships between Festivals Organisers, Community Partners, Researchers and Project Participants.

1.2 Evaluation methodology

Making Connections was initially evaluated quantitatively. The Audience Agency attended activities to collect statistical data on who attended, estimating the reach of the projects and profiling those taking part. In 2019, I began collecting qualitative data for the evaluation by interviewing Community Partners. From 2020, I also interviewed Researchers and from 2021, I also observed three activities and spoke to Project Participants there. In addition, survey data from Project Participants are collected by most Festival Organisers. This shift towards qualitative evaluation reflects the BSA's wish to understand what happens through the projects and how it happens, and to use this to shape the Programme. In line with that, this evaluation uses a qualitative approach drawing mainly on in-depth interview data.

Table 1 provides an overview of all the Making Connections projects 2017-2022 drawn from previous evaluation reports, organised alphabetically by Festival. The 2023 projects were ongoing when the data for this evaluation were collected so are omitted. AlgoMech, Basildon Street Science, Curiosity Sussex, Great Exhibition Road, Midlothian Science Festival and Swansea Science Festival are not currently members of the UKSFN.

The others were contacted for this evaluation. Seven completed a short questionnaire about the impact of their Making Connections project/s: Cheltenham Science Festival, Darganfod Science Festival, Bristol's Festival of Nature, IF Oxford Science + Ideas Festival, Norwich Science Festival, Nottingham Festival of Science and Curiosity, and Rochdale Science Extravaganza. All except Norwich and Cheltenham agreed to be interviewed as did SMASHfestUK. Bristol, Nottingham and Rochdale hosted visits where I observed their work. Through University of Oxford Researcher Tomoko, I visited an activity she did with Community Partner The Parasol Project that grew out of a Making Connections project. I also contacted 14 UKSFN members to ask why they have not applied for a Making Connections grant and five who applied unsuccessfully for a grant about the process. I got seven and two replies respectively, but these were brief with nothing of relevance to this report.

Table 1: An overview of Making Connections projects 2017-2022

Festival	Year	Location	Community partner/s	Target age
AlgoMech	2017	Sheffield, Northern England	Not apparent from available documentation	Primary school children
AlgoMech	2019	Sheffield, Northern England	Young Minds Together, Rotherham	Young people and the wider community
AlgoMech	2021	Sheffield, Northern England	Grimesthorpe Family Centre	Children, young people and their families
Basildon Street Science	2018	Essex, Southern England	Not apparent from available documentation	Young people
Basildon Street Science	2020	Essex, Southern England	The Next Chosen Generation	Children and their families
Brighton Digital Festival	2017	Brighton, Southern England	Not apparent from available documentation	Young people
Brighton Science Festival	2019	Brighton, Southern England	The Bevy community pub and others	Young people and the wider community
Cardiff Science Festival	2020	Cardiff, Wales	Girlguiding	Young people
Cardiff Science Festival	2021	Cardiff, Wales	ACE Cardiff	Educators
Cheltenham Science Festival	2017	Cheltenham, The Midlands	Not apparent from available documentation	All ages
Cheltenham Science	2022	Cheltenham, The	Cheltenham Community	Adults

Festival		Midlands	Garden and other venues	
Curiosity Sussex	2020	Sussex, Southern England	The Crew Club	Children and young people
Darganfod Festival	2021	Wrexham, Wales	KIM Inspire, GO Wales, Digging Deeside, and Quality Education with Care	Adults
Darganfod Festival	2022	Wrexham, Wales	Healthy Mind UK	Children, young people, and their families
Edinburgh International Science Festival	2017	Edinburgh, Scotland	Not apparent from available documentation	All ages
Edinburgh International Science Festival	2018	Edinburgh, Scotland	Not apparent from available documentation	Young people
Festival of Nature	2017	Bristol, South West England	Not apparent from available documentation	Secondary school students
Festival of Nature	2018	Bristol, South West England	Not apparent from available documentation	Young people
Festival of Nature	2019	Bristol, South West England	Avon Wildlife Trust	Young people
Festival of Nature	2020	Bristol, South West England	Avon Wildlife Trust	Secondary school students
Festival of Nature	2021	Bristol, South West England	The Black Seeds Network	Community leaders
Festival of Nature	2022	Bristol, South West England	The Bristol Rainforest	Adults
Festival of Tomorrow	2021	Swindon, Southern England	Swindon Junior Street Reps; The Harbour Project	Young people
Festival of Tomorrow	2022	Swindon, Southern England	Prime Theatre	Young people
Glasgow Science Festival	2017	Glasgow, Scotland	Concrete Garden and Back Gardens	Young people
Glasgow Science Festival	2018	Glasgow, Scotland	Concrete Garden and Back Gardens; Kinning Park Complex	Families and young people

Glasgow Science Festival	2019	Glasgow, Scotland	Kinning Park Complex	Children, young people, and their families
Glasgow Science Festival	2021	Glasgow, Scotland	Kinning Park Complex	Children, young people, and their families
Glasgow Science Festival	2022	Glasgow, Scotland	Community Circus Paisley	Children and young people
Great Exhibition Road Festival	2020	London, England	North Paddington Youth Club	Young people
Great Exhibition Road Festival	2021	London, England	North Paddington Youth Club	Young people
GreenSTEM Festival	2021	London, England	Afyah organisation and other community contacts	Secondary school students
IF Oxford Science + Ideas Festival	2018	Oxford, The Midlands	Leys CDI	13-15 year olds
IF Oxford Science + Ideas Festival	2019	Oxford, The Midlands	Leys CDI	Young people
IF Oxford Science + Ideas Festival	2020	Oxford, The Midlands	The Parasol Project	Young people
IF Oxford Science + Ideas Festival	2021	Oxford, The Midlands	The Parasol Project	Young people
IF Oxford Science + Ideas Festival	2022	Oxford, The Midlands	Leys CDI	Young people
Lancashire Science Festival	2018	Lancashire, Northern England	Blackburn Youth Zone	Young people
Leeds Festival of Science	2017	Leeds, Northern England	Not apparent from available documentation	Secondary school students
Leeds Festival of Science	2019	Leeds, Northern England	Damasq	Young people
Merthyr Science Festival	2019	Merthyr, Wales	Merthyr Tydfil Parish	Secondary school students and the wider community
Merthyr Science Festival	2021	Merthyr, Wales	Merthyr Tydfil Parish	Adults
Merthyr Science Festival	2022	Merthyr, Wales	Merthyr Tydfil Parish	Adults

Midlothian Science Festival	2017	Midlothian, Scotland	A local football club and school	Families and young people
Midlothian Science Festival	2018	Midlothian, Scotland	Mayfield Community Centre, Dalkeith	Young people
Midlothian Science Festival	2019	Midlothian, Scotland	Midlothian Scouts, Brownies and Guides; the Bill Russel Woodburn Youth Project; Y2K youth club; Easthouses Boxing Club	Young people
Northern Ireland Science Festival	2020	Belfast, Northern Ireland	The Nerve Centre	Young people
Norwich Science Festival	2019	Norwich, The Midlands	Recast Music Education	Young people and the wider community
Nottingham Festival of Science and Curiosity	2017	Nottinghamshire, The Midlands	Not apparent from available documentation	Young people
Nottingham Festival of Science and Curiosity	2018	Nottinghamshire, The Midlands	Not apparent from available documentation	Children, young people, and their families
Nottingham Festival of Science and Curiosity	2019	Nottinghamshire, The Midlands	Helping Kids Achieve	Young people
Nottingham Festival of Science and Curiosity	2020	Nottinghamshire, The Midlands	Skate Nottingham	Young people and adults
Nottingham Festival of Science and Curiosity	2021	Nottinghamshire, The Midlands	Skate Nottingham	Adults, young people and organisers
Nottingham Festival of Science and Curiosity	2022	Nottinghamshire, The Midlands	Upstart Projects	Young people
Rochdale Science Extravaganza	2020	Northern England	Rochdale Youth Service	Young people
Rochdale Science Extravaganza	2021	Northern England	Aspire to Inspire	Children, young people, and their parents
Rochdale Science Extravaganza	2022	Northern England	Bangladesh Association & Community Project	Children, young people, and their families
SMASHfest UK	2017	London, England	Not apparent from available documentation	Secondary school students
SMASHfest UK	2018	London, England	Somerville Youth/Play	Young people

			Provision; the Deptford Vietnamese School	
SMASHfest UK	2019	London, England	Riverside Youth Club Drama Group	Young people
SMASHfest UK	2020	London, England	Tramshed Youth Theatre and 'Riverside Youth Club	Young people
SMASHfest UK	2022	London, England	Two local youth groups	Children, young people, and their communities
Swansea Science Festival	2017	Swansea, Wales	Circus Eruption	Young people
Swansea Science Festival	2018	Swansea, Wales	Circus Eruption	Young people

The main data consists of qualitative in-depth interviews with Festival Organisers, Community Partners, Researchers, and Project Participants. I set out to get a geographical and organisational spread, including projects in England, Scotland, Wales and Northern Ireland, and in urban and rural communities, aiming for half in non-university areas, and to involve festivals that had just one grant and festivals that had multiple grants. I intended to focus on projects up to 2020 to focus on any longterm impacts during the 3+ years since they finished.

Difficulties collecting data mean the spread is not as great as intended and some interviewees had only taken part in post-2020 projects. The key difficulty was a lack of contacts. I had none from 2017 and 2018, limited contacts from 2019, and no direct contacts with any Project Participants. Some email addresses no longer worked and most Community Partners and Researchers who I invited to take part did not reply, including all but one of those from 2019. I interviewed all of those who did agree and where possible, used their participation to secure interviews with their collaborators. In retrospect, it would have been helpful to offer payments to community participants for their time. This would likely have increased take up and, as discussed later, been a way of valuing their expertise. My email inviting people to take part stressed that I also wanted to hear about projects where there has been little or no longterm impact, and a few people agreed to interviews on that basis. But many Community Partners and Researchers do multiple similar activities and will have struggled to remember one project from three or four years ago which had relatively little funding attached to it. Although a higher proportion of the Festival Organisers that I contacted, agreed to interviews, these are skewed towards those with stronger relationships to Making Connections, as serial applicants are over-represented.

Despite these difficulties, the sample of 29 interviews covers all four countries of the UK, urban and rural communities, and university and non-university towns and cities. Interviewees had experience of between one and seven projects. As the next four chapters show, these data are rich in insights on the diverse ways that Making Connections projects have impacted people and organisations, building relationships, changing practice and inspiring new collaborations. They also evidence missed opportunities to build on the energy, links and ideas that projects generate. Because I was using past contacts, I could look at longitudinal shifts. All 16 people who I had interviewed for previous evaluations, gave me permission to review my notes from these interviews for this evaluation (I had deleted the audio-recordings due to data protection). My analysis of these and the other data are also informed by the recent visits I made to Bristol, Nottingham, Oxford and Rochdale, by four years of speaking to people who have taken part, and by my parallel evaluation of the 2023 Making Connections Programme.

Table 2 lists the 29 interviewees and the organisations through which they took part in Making Connections. The 19 earlier interviews with 16 participants are listed by the relevant person giving the year of the Making Connections project to which they relate. These dates are given in parentheses when I quote from them. Although I only occasionally do so in the report, looking at them alongside the new interviews makes my analysis more robust. Table 2 uses the categories: Festival Organiser, Community Partner, Researcher, and Project Participant. Each encompasses a range of experiences. For example, ‘Researcher’ Alex is a choreographer; Chris and Gnisha have both done research but were involved in Making Connections as Community Partners; and Abdul and Navpreet had less research experience than SMASHfestUK Festival Organiser Wyn when they acted as Researchers, initially as undergraduates and then as graduates, and before becoming Project Participants in the 2023 project.

Table 2: The people interviewed for this evaluation

Name and organisation	Festival and year of project	Role	Past interviews
Abdul Mohamud SMASHfestUK, London	SMASHfestUK, 2018, 2019, 2020, 2022, 2023	Researcher/Project Participant	-
Alex Whitley Alexander Whitley Dance Company	IF Oxford Science + Ideas Festival, 2020	Researcher	-
Amrish Pandya The Bristol Rainforest	The Festival of Nature 2021, 2022	Project Participant / Community Partner	2022
Chris Lawton	Nottingham Festival of Science	Community Partner	2020, 2021

Skate Nottingham	and Curiosity, 2020, 2021		
Dane Comerford IF Oxford Science + Ideas Festival	IF Oxford Science + Ideas Festival, 2018, 2019, 2020, 2021, 2022, 2023	Festival Organiser	2021
Dawn Pavey Xplore! Science Discovery Centre, Wrexham	Darganfod Science Festival, 2021, 2022	Festival Organiser	-
Donna King (pseudonym) University of Bristol	The Festival of Nature, 2021	Researcher	2021
Emma-Jane Greig The Parasol Project	IF Oxford Science + Ideas Festival, 2020	Community Partner	-
Ellie Turner-Wallace Festival of Nature	Festival of Nature, 2021, 2022, 2023	Festival Organiser	-
Fathema Ali Rochdale Science Initiative	Rochdale Science Extravaganza, 2021, 2022, 2023	Community Participant	2021
Geraldine Cox Imperial College London	Rochdale Science Extravaganza, 2022	Researcher	-
Gnisha Bevan The Black Seeds Network, Bristol	Festival of Nature, 2021	Community Partner	2021
Graeme Eddolls The University of Glasgow	Glasgow Science Festival, 2017, 2018, 2019, 2020, 2021	Researcher	2020, 2021
Jerusa Da Silva SMASHfestUK, London	SMASHfestUK, 2018, 2019, 2020, 2022, 2023	Researcher / Project Participant	2021
Kevin Burke Institute of Engineering and Technology	Rochdale Science Extravaganza, 2020	Researcher	2020
Koichi Samuels Queens University, Belfast	Northern Ireland Science Festival, 2020	Researcher	-
Lily Banks Ignite / Upstart Projects, Nottingham	Nottingham Festival of Science and Curiosity, 2022	Project Participant	-
Martin Scaiff Recast Music Education, Norwich	Norwich Science Festival, 2019	Community Partner	2019
Megan Shore Ignite, Nottingham	Nottingham Festival of Science and Curiosity, 2017, 2018, 2019, 2020, 2021, 2022, 2023	Festival Organiser	-

Melanie Wheeler Ignite, Nottingham	Nottingham Festival of Science and Curiosity, 2023	Festival Organiser	-
Mohammed Rahman Rochdale Science Initiative	Rochdale Science Extravaganza, 2020, 2021, 2022, 2023	Festival Organiser	2020, 2021
Navpreet Kaur Singh SMASHfestUK, London	SMASHfest UK, 2018, 2019, 2020, 2022, 2023	Researcher / Project Participant	2021
Rob Johnson Skate Nottingham	Nottingham Festival of Science and Curiosity, 2020, 2021	Community Participant	-
Simon Foster Imperial College London	Great Exhibition Road Festival, 2020	Researcher	2020
Sophie Stanley The Parasol Project	IF Oxford Science + Ideas Festival, 2020	Community Partner	2020
Tom Critchley Goldsmiths University of London	Nottingham Festival of Science and Curiosity, 2020, 2021	Researcher	-
Tomoko Watanabe University of Oxford	IF Oxford Science + Ideas Festival, 2020	Researcher	2020
Wyn Griffiths SMASHfestUK	SMASHfestUK 2017, 2018, 2019, 2020, 2022, 2023	Festival Organiser	-
Yewande Adesida Imperial College London	Great Exhibition Road Festival, 2020	Researcher	2020

The new interviews and festival visits took place between October 2023 and January 2024. The interviews were audio-recorded, with the exception of Rob's, where a conversation in his skate shop evolved into an interview. Only Donna did not give consent for her interview data to be used in a public report so her interviews are used only as background. The interviews took different directions depending on the project/s, but focused on people's memories, and whether any learning from them has changed how they work and how they personally relate to science, research, festivals, public engagement, and communities. I also asked interviewees to track how the relationships that made their project/s work have developed since, and for information on any new activities arising from these.

In analysing the data, I do not seek to present these projects as Road-to-Damascus conversions for their organisers and other participants but to understand them as one element in a process of change for people and the spaces in which they work. The data analysis is organised in three chapters on: the Programme's model of public engagement, how it builds the capacity for community science, and how it creates longterm impact.

2. The Making Connections model of public engagement and science communication

This chapter covers how far Making Connections projects make science feel relevant to and representative of underserved groups. It analyses the models of public engagement operating within projects, where power lies in these, and to what extent the projects are participatory and transformative.

2.1 Relevance and representation

All seven festival organisers interviewed want to create activities that are engaging and relevant to underserved audiences. However, there is a spectrum from Rochdale Science Extravaganza and SMASHfestUK for whom this is their driving ethos, through the community-oriented Nottingham Festival of Science and Curiosity and Bristol's Festival of Nature, to more 'traditional' science festivals, IF Oxford Science + Ideas Festival and Darganfod Science Festival.

Mohammed set up Rochdale Science Initiative (RSI) in response to his experience of visiting museums with his son and being the only South Asian family there. He wants to change ideas in his community that science takes people away from their faith. They visited museums in their 2022 Making Connections project and often look at Islamic science and involve Muslim Researchers. Project Participant Fathema, at her first Making Connections project, identified the best part as: *"to see people from different ethnic backgrounds that are in these jobs, engineering, so there's women with hijabs which is very inspiring to see"* (2021). Two years later she says: *"Without faith, I wouldn't know much about science. The more I look into my faith, I see science in it."* Researcher Geraldine worked on RSI's 2022 and 2023 Making Connections projects. She parallels the community's faith-based understanding of the world as *"a gift given to us"* with scientists' appreciation of beauty, both of which open up *"conversations of what it means to be human in this beautiful world and our responsibilities to it."*

When Wyn set up SMASHfestUK, a *"starting maxim"* was *"in the community, with the community, by the community."* Each year, over half of those taking part are *"new audiences, ... people who never, or only once a year, go to science or engineering based things or arts based things."* Their work is *"narrative led"* based in stories:

“related to the communities, and related to the geographical area, ... and representative of the personalities in there. And interwoven within these stories is all the science, engineering, social insight, historical insight that you could need, but not siloed into into limiting subject areas.”

Decentering STEM avoids the “self exclusion [that] comes from that: This is not for me, or we don’t go to science things.” SMASHfestUK Researcher and Project Participant Navpreet (2020) has seen how narrative brings “ownership and [young people] putting themselves in the shoes of the scientists and the explorers.”

Ellie coordinates the Natural History Consortium’s Festival of Nature, bringing together their 14 partners. She explains that: “Collaboration has always been at the heart of the Festival.” It is about “the ecological emergency, and no one organisation has got the answer about how to improve things, it’s going to take everyone.” Like RSI and SMASHfestUK, they apply every year for Making Connections grants. They use these to “focus on and work with an audience that we maybe wouldn’t ordinarily attract or work with” by “putting in time resources and linking up with a partner organisation.” Their 2021 project with Black Seeds Network worked with minoritised local community leaders and their [2023 project with Emma Geen created festival activities that are accessible for disabled adults](#). These are “pilot events” that they evaluate, sharing the learning with partners and using them to shape future provision. From their 2021 project, they learned to “showcase other amazing community work that ... people of different backgrounds are actually already doing, ... rather than very white organisations swooping in and saying you should do this.” Following their 2023 project, “we’re putting in some applications next year to continue running sessions as part of the festival for disabled people.” Megan and Melanie at Ignite who organise the Nottingham Festival of Science and Curiosity, use Making Connections similarly.

Dane sees IF Oxford as “a political tool” (2020), and he too applies every year. He uses the grants to develop longterm relationships with community groups and to build science capital: “What do people do when they have access to the scientific arena? Where does science happen? Who owns it? Who gets to go to participate in it? Who gets to talk about it?” Dawn who organises the Darganfod Science Festival in Wrexham is the only interviewee who speaks of a dissonance between their Festival and Making Connections. She credits Making Connections with reducing the white male dominance of their main programme and as a factor in their take up last year of Reaching Wider’s offer to fund tickets for people from deprived areas. But neither that nor their Making Connections projects engaged the numbers they had hoped.

As well as collaborations, interviewees spoke, as Wyn and Navpreet do above, about creativity and interdisciplinarity as ways to make science and research feel relevant. Typically, Melanie (Festival Organiser, Ignite) says: “Art helps the science to become relatable” giving it “a different kind

of narrative or a different way of explaining that's less intimidating." Tomoko (University of Oxford) who researches fetal heartbeats, felt that working with humanities researchers, enabled their partners "to ask questions. It made us softer. ... And then that opened them up to take us in." Choreographer Alex (The Alexander Whitley Dance Company) relates sciences and arts via their methodologies: "we go through similar processes of setting something like a hypothesis or having an idea in mind, testing it, developing ideas to test it out, getting feedback on those ideas, ... and refining your ideas," with artists focusing on "speculating on the possibilities of what might be according to that process you've been through, or posing questions as opposed to providing answers". Turning science into dance:

"can really help open people's minds to connections that they might not have appreciated before. ... Making these interventions early in young people's lives is really important for ... helping them hold open these possibilities and options in terms of their futures."

Koichi and his fellow Queen's University PhD students at [JAM 4](#) used a "music making activity [as] a medium to allow us to have dialogues about sustainability issues" with young people. Science can do similar mediating work. Martin (Community Partner, Recast Music Education) talks about using science with vulnerable young people as:

"a way of getting to those difficult subjects without having to approach them head on. ... It gives you like a language to talk about something else that they can get on board with, which isn't just directly confronting the fact that they're adopted ... or the lack of trusting relationships with other adults."

When people have urgent concerns whether family violence, their migration status, or poverty, science must speak to those. Relevance is inseparable from representation.

All Making Connections projects seek to change who participates in science and research and to make these fields more representative. Previous evaluations document that they reach more working-class, minoritised and disabled people than traditional science festivals. Community Partners and grassroots festivals like SMASHfestUK and Rochdale Science Extravaganza have a "network which is perhaps not accessible or not visible normally" (Kevin, Researcher, IET, 2020). If and how they shape STEM fields is explored across this report, but undoubtedly much of their impact is invisible and when people's trajectories do change it is usually due to multiple factors, with Making Connections as just one element.

SMASHfestUK's 2023 Making Connections project involved four graduates who have been involved for six years, beginning as undergraduates. They are pictured right with Festival Organiser Wyn (source: Wyn Griffiths' LinkedIn). Three of the four – Abdul, Jerusa and Navpreet – were interviewed for this evaluation. As Wyn says, they are “representative of the communities [with which we work] and



the situation of many young people within communities of being unemployed, struggling, struggling with finances, struggling with life, in terms of the various discriminatory things that run through our society.” The project was an opportunity “to extend their practice in co-design and co-production, to develop their practice in participatory action research and to develop their understanding and therefore practice of public engagement.” When Jerusa took part, she had “rejection depression” after three years applying for design jobs without success, “it’s been a turmoil.” She felt unsure how to define herself, “but now that I’m working in SMASHfest, ... when people asked also what do I do, I speak about it, and then it boosted my confidence that okay, I’m doing something in design, per se.”

Through SMASHfestUK Abdul has come to understand:

“the importance of lived experience. ... Sometimes you try to silo those, where it’s like: This is my professional career. And then this is what my community thinks. And sometimes they go against each other. But I think having that lived experience and having those questions and thoughts around me is really important to think about and not just discard ... [as] the thoughts of a minority.”

As well as the support they gained, they offered a point of identification for the younger Project Participants. Abdul explains, his presence meant “that when the children went into the rooms or other participants took part in the experience, they saw people that look like them,” who is relatable, shares some of their ways of being, and “is still trying to figure it out and still trying to learn.” As Wyn says, the 2023 Making Connections project helped them build up the experience and networks needed to work in design, a field “dominated by middle class and above middle class white males” who “have the networks, they have the financial support that gives them time to spend putting together folios, the chats with their mum or dad’s friend, who’s managing director of this place.”

Allowing Abdul, Jerusa and Navpreet to gain the connections and experience they need to have careers in design and to do this in a socially-engaged way, has the potential to change the field. However, there are limits to how far Making Connections projects can directly challenge the dominant model of STEM. Graeme (Researcher, University of Glasgow), through his environmental activism, encountered indigenous peoples and their sciences. He described his resulting “unease” with the idea that we must “follow the science ... because it’s one particular type of science that we have and it’s Western science and it’s driven by predominantly white people, predominantly affluent people.” This science sees itself as “so successful” that it does not need to engage with other groups “who’ve been impacted most” but who “haven’t formalised their knowledge in a context we can understand.” Given these power relations, public engagement and diversity work “is still a tick box” and “it’s a talking down, it’s a pacifating of those voices rather than actually genuinely including them because to do that would require funding we don’t have” (2021).

2.2 Power relations

Interviewees recognise that society gives greater status to researchers and to science festivals than to communities and that these power relations shape their collaborations. They work to mitigate, disrupt and transform them. For Festival Organisers this is strategic. Dane (IF Oxford, 2020) tells researchers to avoid a “mechanistic we-want-to-extract-something-from-the-community” approach. There are community groups that “we protect the relationship with quite carefully. ... And when someone comes in, through our brokerage, they have to be on brand.” Wyn (SMASHfestUK) says that, too often, what researchers are “looking for is individual build to their career pathway, personal fame, personal satisfaction” rather than meeting communities’ needs. As discussed more later, Festival Organisers address this extractive power dynamic by building longterm collaborations. As Megan says, at Ignite, “we’re not just popping in and out. We care.” This starts with collaborative planning so you “design things that respond to what those organisations know about the needs of the people that they work with. ... Like families won’t wake up till 11 o’clock, so there’s no point having something that starts at 9.” They use shared documents, meet in person in community spaces and they listen, seeing themselves as “the middleman between what the funders want or what the researcher is trying to do, and then what the young people want, so trying to ... find a middle pathway through the not always competing, but sometimes competing, desires.” Dawn (xplora) was the only Festival Organiser to centre STEM and Researchers. As a subsidiary company of Wrexham University, their starting point is: “Who are the researchers that we want to work with? And then we tailor it to them, their area of expertise, rather than the other way around.” This has a logic as “there’s no point deciding to do something on chemistry, if the chemistry lecturer isn’t interested in engaging,

isn't the right person for it." But, as a result, engaging communities is less about changing Darganfod Festival than about "getting these people to value it, and to see that it is going to be a great day out and actually come along."

The collaborations that interviewees valued most are characterised by reciprocity. The Convergent Pulses project led by IF Oxford, created a short VR film based on the movements of disabled and non-disabled dancers at The Parasol Project inspired by Tomoko and Shankar's research at the University of Oxford. It led to a bigger Wellcome-funded collaboration: Shaping Destiny. Dane, IF Oxford's Director, who brokered the first project, said that, "there's an equal amount of power" with Community Partners as with Researchers: "they've got their own agenda and their own lived experience" (2020). Community Partner Emma-Jane wanted:

"to bridge that gap ... between town and gown, ... to expose both the University of Oxford to a different group of people, and ... for them, to test different ideas of how they communicate, ... as well as an opportunity for my young people to be part of something weird and wonderful and magical."

The Researchers' humility was key to creating a space that was "inclusive and safe and supportive. ... Everyone coming into the space, coming into a primary school hall, it's got the remnants of the lunchtime dinner on the floor, ... that's our community space, and no one batted an eyelid." Tomoko is aware that a project that works with disabled people "ticks a box" for universities and funders. She is sure that, being in Oxford, Parasol Project have been used by researchers before and "was mindful not to do that."

There was also reciprocity in The Festival of Nature's collaboration with the Black Seeds Network. Gnisha who coordinates the network talked about how minoritised communities are positioned as lesser in the field of environmental research and practice. In 2021 she explained how big institutions want to be inclusive but ignore:

"what's really happening in the communities ... how they're already doing incredible work. ... You can't just open your doors and say everybody's welcome because that doesn't work. You have to find out why people are feeling unwelcome and then you have to change what's going on."

She ensured the Natural History Consortium were willing to have "awkward conversations" about race and to pay community leaders' for their time. Payment compensates for loss of income, recognises expertise, and addresses structural inequalities which position people of colour as unremunerated unofficial "diversity consultants." In 2023, she elaborates the histories of colonialism and slavery within which "working for free, for some black communities, ... reminds them of their ancestors being forced

to work for free.” If big institutions are not “able to reach into our communities, ... you don’t have the necessary skillsets. ... So let’s look at framing the skillsets of our community leaders differently,” recognising their networks, understandings of community politics and how to get things done, and their expertise in “equalities and environmentalism.” Echoing Wyn, she says that environmentalists are too often “relying on the work of our community leaders” for “building their organisation’s work, building their own profile, building their careers.” Instead, the Natural History Consortium used their networks and their status as an organisation to support the Black Seeds Network’s work during the project.

It is common to contrast how power operates in Making Connections projects with outreach in schools and other institutions. Melanie (Festival Organiser, Ignite) explains, it is “less of a hierarchical thing. If you’re in a school, a teacher’s got you to come in and you instantly take on a teacher role.” It is more difficult for young people “to voice their ideas,” to adapt the project in response to their interests, and to explore outside of the curriculum. Simon (Researcher, Imperial College London) notes that, compared to school, “it’s less rigid at a youth centre ... I can be a bit more relaxed and they certainly can. ... They bomb in and out” rather than having their movements subjected to adult surveillance and control. This is apparent at all the activities I observed where adults and young people all use first names, and can take part, eat and drink, go to the toilet and leave at will.

More generally, Making Connections projects share power by taking activities to communities and holding them in places where they feel ownership, be that a mosque or a shopping centre. Navpreet (2020) connected her own experience to SMASHfestUK’s commitment to taking science into communities:

“when you’re working-class families, parents always busy, it’s hard to go places all the time. And I’m one of four as well so it’s expensive as well, going to The Science Museum every weekend. So when there was events nearby, ... it’s the things that really stood out to me in my childhood.”

Graeme (Researcher, University of Glasgow) speaks about the importance for adults of getting STEM out of universities “into the streets.” It has:

“a massive impact on drawing people in who wouldn’t otherwise come. ... Then if they ask more questions, you could say, Well, the Festival is going on just up the hill. You’re more than welcome. It’s free. It’s open to everybody.”

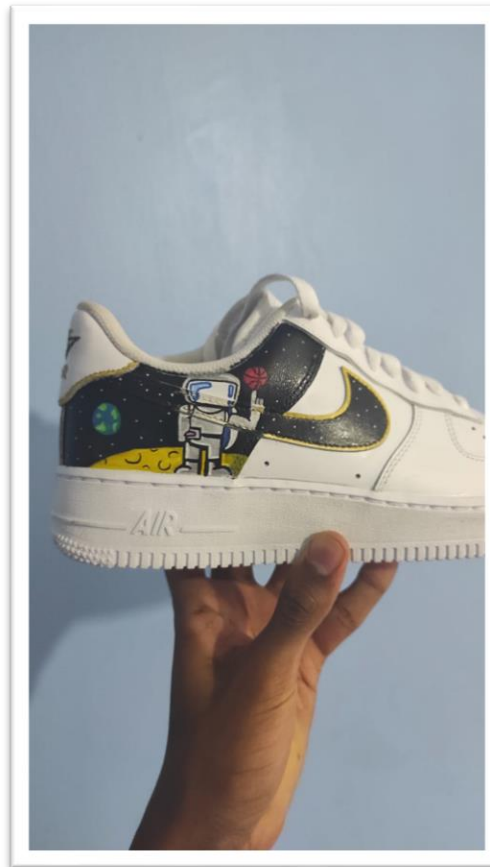
He cautions that going into communities, “You’re an outsider. They don’t know who you are. And it can lead to suspicion as well. Why are they coming here to do this event? What is it they’re gonna get out of it?” To address this, Debbie, the director of Glasgow Science Festival:

“would look for community events that are already happening. ... So this stall that’s come in, that’s the random Science Festival stall, they know they’re not just random outsiders that they’ve been invited or they’ve applied and the local community said: Yes, please come to our festival.”

Finally, Making Connections projects address power dynamics through humility and reciprocity in their delivery. Megan (Festival Organisers, Ignite) offers this guidance:

“Never do PowerPoint. Never stand up. ... If we’re sitting around a table, sitting next to somebody. ... You’re just sharing this conversation. And that kind of humbling yourself, ... Not being: I’m here to provide the information, and then you do that creative thing. [Rather:] I’m gonna do one too. This is what I’m thinking. What are you thinking?”

The topic around which you bring people together can also help balance power. Simon (Researcher, Imperial College London) does not “want to end up like Moses coming down with the tablets ... Here you are, you plebs, this is what God Science is telling you and you’d better listen.” At North Paddington Youth Club, “it was more 50/50.” Simon discussed his research with club members, they they used it as inspiration to design trainers (pictured below, source: Simon Foster): “I didn’t want to talk about fashion ... It wasn’t my area so I was nervous. I think they had the flip side. ... They had no idea of the science and they weren’t so comfortable in that.”



Tom (Researcher, Goldsmiths University of London) speaks about a shared enthusiasm for skateboarding connecting people in the 2021 Skate Nottingham project: “you’ll just know straight away that ... everyone’s going to be on the same level, everyone’s gonna be super kind. Everyone’s gonna be super welcoming.” Gnisha (Community Partner, Black Seeds Network) observed a love of nature bringing Researchers and community leaders together: “I noticed that in the first workshop, people came from quite different perspectives, but by the end, they were all speaking the same language” (2021).

2.3 The role of public engagement

Concerns about recruitment drive policy on STEM engagement. Policymakers and researchers also increasingly see outreach as a means to gain support for the public funding of research. Both these rationales are mentioned by a few interviewees. Notably, Kevin (Researcher, IET) is entirely focused on promoting engineering as a career and Dawn (Festival Organiser, xplora) wants to ensure that “even if they’re not the one doing the science research that they are still going to be supporting that.”

However, pleasure and equity are cited more often. Dane (Festival Organiser, IF Oxford) focuses on “sharing awe and wonder” and on “the democratic argument that people just should be able to have access to this sort of stuff.” He viewed the idea that we want to move people towards scientists as a “deficit model. ... Actually, we want the academics to go the other way” (2020). Geraldine (Researcher, Imperial College London) says, “I don’t care about [recruitment]. I do care about everyone feeling they can be a scientist,” connecting this to her working-class background. She got involved in science communication to share “the sheer beauty and wonder of the world.” Kochi (Researcher, Queens University Belfast) describes outreach as “a way to empower” young people.

At its most basic what distinguishes Making Connections projects from much science engagement is their anti elitism. Instead of reserving such opportunities for those deemed ‘Gifted and Talented’ or as able to ‘progress’ in STEM fields, wonderful experiences with science and research are for all. Dane (Festival Organiser, IF Oxford) puts it simply: “Everyone should have a stake in it.” Graeme (Researcher, University of Glasgow) underlines this inclusivity: “most fundamentally, from a purely humanity point of view, ... it allows people to ask those questions,” and to feel “the childlike wonder that I think every single person I’ve ever met has.” This is about social justice. As Megan (Festival Organiser, Ignite) explains:

“it’s important for the children that we work with to know about the world that’s out there, and to have experiences of different opportunities. ... Because a lot of the areas we work in a lot of the time they won’t know anybody in their family that’s a researcher.”

The projects also oppose an elitism that elevates science over other subjects: “it could be football, we could be talking about what’s going on in *EastEnders*, or we could be talking about quasars. So it’s just an interesting thing that’s in the world” (Dane, Festival Organiser, IF Oxford). Thus, with interdisciplinary work, “the art isn’t there to explain the science, it’s more to provide a different layer of experience in relation to that subject” (Alex, Researcher, The Alexander Whitley Dance Company). And the boundaries that institutions create are called into question: “you’re a scientist by doing science so just go out and look at the weather, ... go out and study nature, you don’t need these barriers” (Simon, Researcher, Imperial College, 2020).

As discussed in the previous section, in Making Connections projects, outreach is a reciprocal process with a role in shaping researchers and research. There are lots of examples of Researchers learning from interactions across the years – such as a vaccine doctoral student who met a group of young people none of whom wanted to have the COVID vaccine. The public acts as “a sense check. ... I think there’s something in that of being humbled or kept in check by young people” (Megan, Festival Organiser, Ignite). Graeme (Researcher, University of Glasgow) found that through outreach, “you just learn the lives of other people” and “find connections that you have with them,” and “that gives you an understanding of why somebody holds this view, ... and I think that has to have an impact on your own world view and politics” (2020). For him and others that process has made him “a better scientist and a better communicator, a better writer, better at conducting science as well. Because of having to find ways of explaining difficult concepts to a variety of different people with a variety of different backgrounds.”

Researchers talk about the pleasures of doing outreach and how it motivates their research and gives them new perspectives and ideas. After working with Parasol’s dance teachers, Tomoko (University of Oxford) described it as “a great opportunity for us to get out of the lab and appreciate other people appreciating our science. It really energises us. It makes us happier” (2020). She described her and Shankar’s response to the video inspired by their research on embryogenesis: “It is the dynamic movements in developing hearts that captivate us to study them, and expressed in another medium to share our wonders was a great experience” (2020).

Tom’s (Goldsmiths University of London) doctoral pathway is the clearest example of Making Connections impacting research. The Making Connections panel at 2021’s Skateboarding in the City Conference “felt like the start of my academic career. ... It was actually, looking back, probably the most constructive” presentation he did. Instead of everyone in the room having a PhD, “everyone

in the room was a skateboarder. ... When it got to the discussion it was really fruitful. ... Everyone was just talking to each other, ... pitching in and sharing ideas.” His PhD focus came out of the first question to him at that panel:

“around power dynamics, and going to Palestine or Jamaica or something to build a skate park. Basically, talking about white saviour-ism. ... I was a year into my PhD, and I hadn’t really thought about it like that. ... Now, the whole PhD is about that.”

This interaction was not the only reason for the shift but “it definitely played a role.” His first academic conference presentation was a collaboration with the Community Partner in that project Chris at Skate Nottingham. It was in Tampere, Finland. Their engagement with that city’s local skate culture shaped Skate Nottingham, “and we wrote a paper as well afterwards, which was my first published bit of work.”

Making Connections projects set out to change all their participants, not for impervious Researchers to deliver and inspire knowledge, skills and aspirations in others. While not all of the projects take inclusive and reciprocal approaches to public engagement, that so many do, going against the mainstream, indicates that these are fostered by the Programme.

3. How Making Connections builds community science capacity

This chapter covers how Making Connections projects grow the community science capacity of festivals, communities and researchers through building relationships, skills and experience. To understand what these projects do, we need to focus on their impacts on Festival Organisers, Community Partners, and Researchers, as much as on the people we generally think of as their ‘audiences’.

3.1 Festival capacity building

Most of the Festival Organisers interviewed work on festivals that align with the ethos of Making Connections and who apply regularly because the grants provide a way of funding what they already want to do. SMASHfestUK create two-year story cycles based on big themes – plague, wildfire, flood. Wyn “piggyback[s] grants, because they’re too small to do anything meaningful,” trying to “satisfy what the funder needs.” Making Connections, “unlike most of the funds, its intent fully aligns with what we’re trying to do.” Dawn at Darganfod Festival in Wrexham is the exception. Their two Making Connections projects:

“have been quite separate from the Science Festival. And although there’s always been that hope that people attending one and getting to know us would then follow on and attend the main Science Festival, ... or that the outcomes ... would then be displayed and showcased at our Darganfod Festival, it hasn’t really worked in quite that way.”

There are tensions with the “commercial aspect of the main festival” which focuses on ticket sales. Unsure how to proceed, they did not apply to Making Connections this year. Even when the values align, if the timing is wrong, as it is with February’s Nottingham Festival of Science and Curiosity, Megan has found it impossible to bring Making Connections projects into their main festival. “But because at Ignite we deliver programmes all year round, it’s not been a huge barrier for us,” and they apply every year because “we’re always looking for funding” and it “fits really well” with their focus on “community engagement, and bringing in opportunities for young people to work with experts and learn about what research is.”

After money, the Festival Organisers most often cite building relationships with new audiences as a way that Making Connections grants grow their capacity for community

science. Ellie (Natural History Consortium) says that by working with “a trusted person within that community” or a trusted group, they can do things, when a direct approach would lead to questions, such as: “Who are you? What relevance has this?” This has “started relationships that we’ve been able to continue and build on.” By collaborating with the Black Seeds Network in 2021, as mentioned in the last chapter, they learnt about “respecting everybody as an expert in their area,” and have become “more aware of the potential power imbalance and people feeling a bit observed. And so there’s things that we’ve been able to put in place to avoid that.” holding a community meeting to co-design projects, participating in shared activities, and paying for people’s time. Dane too has developed a series of longterm relationships with Community Partners. He talks about how IF Oxford has learned from “the way that the [Community Partners] activities function over something like the school holiday programme” when they design Festival zones because in both cases “the kids have to want to be there.”

Making Connections also develops Festival Organisers’ understandings and skills. Melanie is relatively new to Ignite and their 2023 project is her first experience of Making Connections, She already feels more confident discussing research: “any academic work, it already seems like people shouldn’t look at it. ... But as soon as you read it, it’s ... just ideas, and people proving ideas or researching ideas.” Festival Organisers also praise the Programme’s flexibility and that it provides “an opportunity for us to test something out” (Megan, Ignite). The ability to make changes mid-project was useful to the Festival of Nature when no researchers engaged with their 2022 Forest Centre pop-up. They added an informal Making Connections lunch which was so successful at engaging new researchers and connecting them to communities that they repeated it the following year. The Festival of Nature, Ignite, and IF Oxford, have borrowed FailSpace from the BSA to look honestly at their community collaborations. Megan has also introduced Ignite’s own community grants programme “because we know that there’s communities that aren’t coming forward.”

Rather than waiting for Festivals to reach out to them, Mohammed and his community established their own. Through Making Connections and the UKSFN, Rochdale Science Extravaganza has become part of the UK science festival sector. Mohammed recalls that he was not initially confident to apply for a grant, but crucially a BSA staff member contacted him and strongly encouraged him to do so. He submitted an application on the day of the deadline and she called the following day to advise him on how to revise it. Once he had done that, she called to confirm that it had been approved.

When he started RSI, Mohammed had been a chef for 20 years and had done no science beyond his own schooling and supporting his son’s studies. Early on, as he developed his organising capacity, RSI focused on challenging stereotypes showing: “You wearing a hijab could be a scientist or you,

young man with a beard, could be a scientist. ... Now it's about tackling serious problems." He wants a permanent base for RSI where "we can provide services seven days a week," taking on other issues through STEM. His four Making Connections grants (the 2023 project is pictured on the next page, source: RSI social media) are part of a bigger relationship with the BSA that has helped them to look "more professional" (2020) and that gave him peer support through the Community Leaders Programme. He recalls how he used to "get all worked up" the day before online meetings with researchers:

"I still consider myself to be a layperson. ... So my first huge obstacle was to establish meaningful relationships with academics, to feel comfortable in an environment alongside an academic. It's taken years, but today I feel very comfortable. ... I'll say it how it is and how I see it. And you accept it and work with it or I'll just move on."

When he took part in the BSA Community Buddies Programme, Mohammed spoke about how he had stereotypes of academics before being paired with a researcher and building a relationship with her. Similarly Project Participant Fathema had no experience of science beyond school before getting involved in RSI and now she is "speaking so comfortably and confidently about climate change. That's not a subject that Asians speak about. ... It's always scientists and white people."

The main limitation for Festivals is that Making Connections grants are relatively small and short-term; and this is exacerbated by broader funding cuts. Martin's (Community Partner, Recast Music Education) contact in Norwich Science Festival disappeared after "they had big funding issues, like everybody did with COVID." Graeme (Researcher, University of Glasgow, 2021) spoke for many when he said:

"To create a sustaining network and relationship with a community, you need to have that definitive funding to say that you'll be there in five years time and you can take people from that community and you can employ them and they can then become science communicators but you just can't do that right now."



3.2 Community capacity building

Funding is also key to building Community Partners' science capacity. Sophie (The Parasol Project) talks about the Wellcome grant that Researcher Tomoko secured to follow up their project, enabling them to pay for “a nice hall rather than the cheapest one we could find,” a live percussionist, and T-shirts, and to ask support staff “to commit to the whole project, which makes a huge difference to I think the quality of the experience of the [disabled] young people.” The importance of being able to pay people recurs in the interviews. Megan (Festival Organiser, Ignite) mentions “not expecting people to do stuff for free,” and Navpreet (SMASHfestUK, Project Participant) that “it’s just nice to get money” enabling her to “really immers[e] myself in it because I felt like, this is a job for me.”

Amrish a Project Participant in 2021 and a Community Partner in 2022, emphasises that for both projects, the Festival of Nature “paid us properly.” As discussed in the last chapter, this was at the insistence of their 2021 Community Partner Gnisha (The Black Seeds Network). For Amrish, this led to a shift from doing all his Bristol Rainforest work as a volunteer to “the fact that I now value my time enough to say, actually, this has got to happen. And it’s got to be funded.” He went from “not even knowing [funding’s] there” to applying successfully for grants (the image shows him at his first funded project – vertical growing vegetables in a primary school, source: The Bristol Rainforest website.). He now insists on paying participants, having learned that:



“if we want to truly engage with the people, you need to be truly meaningful to them on their terms. ... Unless you’re willing to go out and meet and connect the way Gnisha connected with me by saying: Come and here’s some money to make it happen, to make you feel good about. So that was my first experience of being paid for something I thought I’d never be paid for. So that has stuck.”

The impact on Amrish is not solely about funding but about how that is embedded in and supports relationships. This applies more broadly. Navpreet created a project:

“inspired by SMASHfest ... to get students in the local school next to Middlesex University more in touch with their green space. ... So even if I wasn’t to work with SMASHfest on their projects directly, I know I will always have comrades, and the connection with Wyn [Festival Organiser]. And we’ll ... build that community of design activism and community activism.”

SMASHfestUK has shaped her activism with No Sweat. Their project to educate people on the fashion industry including its systemic racism, now has as its “main mission ... to try and get people from marginalised communities to raise their voices.”

Amrish and Navpreet are examples of Making Connections grants contributing to them becoming community organisers within and beyond STEM. Dane (Festival Organiser, IF) talks more generally about how he sees these grants developing community capacity:

“What I often find is, organisations that are doing that very much hand-to-mouth kind of working, find it very difficult to get out of that pattern of behaviour. And so when we come in with our generic learning outcomes, and our science capital models and our FailSpace measuring techniques and our lesson plans, it’s an example of ... how professional organisations work. Professional organisations work with science because it’s not scary. ... So when they work with us, and this has happened a few times, after programmes are finished, we get this tail end emulation of work that is a little bit more programmatic, has a little bit of science activity bedded into it. Not a huge amount. ... But they’ve now been somehow captivated by the notion of science as a plaything.”

Dane’s account points to how Making Connections grants can have longterm impacts on Community Partners’ relationships to science. We can also see this in their interviews. When Martin (Recast Music Education) partnered with Norwich Science Festival in 2019, he got links to acoustic ecology, and started working with UEA. In 2024, he says his relationship to science has “definitely” changed as a result. His work with UEA has expanded and he would like to do an MA in conservation to feel more confident with the science. In 2020, Sophie (The Parasol Project) listened to Tomoko “describing the onset of mammalian heartbeats and the formation of the heart. And ... it sounded like a dance.” She “was just captured by the fact that we didn’t know the basics of how we began.” Sophie enjoyed transforming this scientific research into a choreographic language that she could use in a community setting. Seeing Tomoko and Shankar’s “genuine amazement” at “how their work could translate through different minds and bodies ... was quite restorative, that surprise and delight from people whose work I really respect and I hadn’t felt any connection to previously.” Years later she has maintained that connection. When her five year-old daughter asked “when did you become a person?”, the question brought:

“this whole beautiful, vision in my head of the rhythms of how the heartbeat starts. ... So that was just a wonderful moment where I was like, Oh, yeah, I never would have been able to answer that question like that three years ago. And now ... I have in my body a feeling of what the rhythm was, and the movement of it, because I’m a dancer, and that’s how I have tried to express it.”

There are many anecdotes that speak to impact on Project Participants, shifts in their interest in science, ideas about the future, and confidence. Megan (Festival Organiser, Ignite) describes seeing, during conversations with researchers, a “change in understanding and perception of young people about who this person is and what they do and what their discipline is.” Crucial are that “they’ve come to you” and “they’re on equal pegging. ... The young people have a voice in it.” Koichi (Researcher, Queen’s University Belfast), who helped young people develop a soundscape about sustainability, thinks that recording and composing and the experience of being in a lab and a 3D sound environment “maybe open[ed] their eyes, if they’re interested in pursuing music or music technology in the future, ... to what’s out there. And what they could learn about and what they could perhaps research.”

The impact is clearer when people speak about participants with whom they have an ongoing relationship. Sophie saw confidence and professionalism in how the Parasol participants responded to the VR scanning session: “they were doing quite challenging things ... and dancing really beautifully and the staff members were crying. That was quite a special day.” There is also evidence in the interviews with Project Participants such as Amrish and Navpreet discussed earlier. I experienced a difference in Jerusa between her two interviews about a year apart. Her replies changed from short and hesitant to lengthy and fluent. She says, she is now:

“more hands on with the project from the start to the finish. ... I class myself as a bit of an introvert so I find it really hard to socialise and have conversations with other people. ... And SMASHfest, it has helped me, all my confidence, put myself out there, testing me and making me practice my skills in my own time. ... I know what I’m doing know, how to get on with it.”

Fathema, mentioned earlier, is a working-class Bangladeshi woman. RSI’s 2021 Making Connections project was her first. At one session she explained:

“I got inspired because my children have been coming for months. At first, I just let them come. But I noticed and I realised that it’s affecting their lives in a good way. ... I got into it thinking, this is good knowledge that I can pass on to other mothers. ... It’s got us questioning things that we didn’t even think about.”

She hoped it would be a step towards working with young people and had started studying to that end. As part of their 2022 project, Fathema led an activity for the first time. She is now trustee at another communal organisation, runs a women’s group and a girls’ group and works at a leisure centre. But RSI is “where my heart is. ... where I’m going to try to make a change for the future for the children.” Her son has gone from C to A grades in science, they leafleted and took part in a protest on climate change, which “was quite daunting” but “it opened my eyes,” and they got to be in a play in

Manchester: “I think we all grew as a family. ... If we weren’t involved in Rochdale Science Initiative, we wouldn’t have got all these opportunities.”

3.3 Researcher capacity building

As mentioned in the last chapter, when Researchers talk across difference and find ways to share their work, it makes them better communicators and changes their understandings of the world. Megan (Festival Organiser, Ignite) finds that, in such conversations, “you can see the researchers figuring out how to communicate what they do to that person. ... You can see it in real time, those skills developing.” Prior to his Making Connections project with RSI, Kevin (Researcher, IET) had done no outreach with South Asian communities and had little interaction with them. He learned from an online session and a later in-person workshop in Rochdale where “I was actually immersed in their community.” He created a session on Islamic aerospace engineers “that made me aware of a whole raft of things that I simply wasn’t aware of previously and I wouldn’t have researched if I’d not tried to put this session together.” Now he is more comfortable with South Asian Muslims, can create appropriate activities for them, and understands their perspectives.

However, Kevin is not typical as Making Connections Researchers are disproportionately from underserved groups and they cite their social class, gender or ethnicity as a motivation for taking part. Typically, Yewande (Imperial College London) was one of 10 women out of 80 on her undergraduate programme:

“There was one other black person. ... It’s very rare for me to come across someone that looks like me doing a PhD. ... There are barriers in the system but then there’s the barrier of ... not thinking you can do it because you don’t see someone that looks like you. ... I guess that’s also why I’m interested in doing the engagement ... because I know that people seeing me will make them think differently about what they can achieve.” (2020)

Community Partners talk about the importance of Researchers being relatable because of how they look, speak and behave. But this risks siloing responsibility for community outreach with people from underserved groups within academia. Graeme (University of Glasgow) is critical of his white male peers: “I think it’s too easy for scientists, because of the way we are regarded in society,” good salaries, elevated status, to feel: “I don’t need to think about these other things, because they’re not important to me, they’re not related. And that I think, leads to the huge disconnect between academia and local communities.”

While often the Researchers who signed up for Making Connections already had experience of and a commitment to community outreach, some, particularly students, came to it through the

Programme. Graeme (University of Glasgow) has participated in Glasgow Science Festival for over a decade. It “exposed me to a different type of engagement” (2020) and “helped foster my passion for adult outreach.” This “break[s] down the barriers in the ivory tower to show that people are still allowed to ask questions, to still learn, to be curious, to make mistakes, because we do that all every day as scientists.” Three years on, he vividly recalls conversations with refugees at a Making Connections collaboration with Community Partner Kinning Park Complex:

“The one defining memory from that project was not only how much the kids enjoyed it, but how grateful the parents were to be able to be involved in stuff and feel like people had thought about them. ... The thing that stuck with me the most though was chatting to three people, two women ... were biomedical scientists, and the man was a nuclear engineer. And these were people who were refugees and asylum seeking people who had no right to work here. So I think that stuck with me because they felt that they were forgotten about, people assumed what kind of work they did. And then when you spoke to them, it turns out they were scientists just like me.”

He suggests that this led him into activism with migrant and refugee communities and describes it as part of an “awakening” as someone who had worked in the arms industry, “realising that ... in Glasgow people were living in some cases less than a kilometre away from the industries that potentially displaced them.” Koichi (Queens University Belfast) says that for his fellow doctoral students, “technologists or coders,” who had “never considered working with young people,” using sound to explore sustainability, “was really eye opening for them to think: Well, actually, yeah, we can use our skills to engage young people in important societal or global issues.” Koichi is now working as the sustainability lead for the Department for the Economy in Northern Ireland. The project “was a stepping stone in that trajectory.” There are parallels with how Abdul, Jerusa and Navpreet’s relationships to SMASHfestUK evolved. Abdul, like the others, as an undergraduate, initially “saw it more as a task that needed to be completed for the university course.” Through working directly with young people “and seeing how engaged they were, ... it made me feel closer to what SMASHfest was trying to achieve. ... This isn’t just artefacts that we’re designing, these are memories that we’re designing for these children.” He, like Jerusa and Navpreet, is committed to co-design: “giving autonomy to the communities because the people you’re working with are experts in their day to day lives.”

In these and other examples, we can see how making science relevant to communities, leads Researchers into activism. Before RSI’s 2023 Making Connections project, as above, Geraldine’s (Imperial College London) “main drive was just the sheer beauty and wonder of the world.” But through curating the project, she has learnt about climate change and “I cannot ignore what’s going

on.” She has joined XR. Going outside of universities where “you feel very isolated because nobody else is talking about it” into activist spaces, “it’s very relieving.”

Making Connections also opened Researchers to using different media. Before he took part in the trainer design project, Simon, now outreach lead for Imperial’s science department, “didn’t think it was going to work” (2020). Looking back, he recalls his fear of trying to be “‘the cool person’ and looking really rubbish basically.” He was impressed with the designs and has since run two public engagement workshops based around T-shirt design. Until that project, “I’d forgot but [when I was young] I was more hands-on and drawingy than maths. ... I enjoyed looking at the pictures. ... That’s what sparked my imagination.” Through it, he rediscovered an idea of science as “daydreaming and creativity.” Tomoko did her project as a postdoc at the University of Oxford. It allowed her and Shankar to build a track record in community outreach. They “wanted feedback into our research which is extremely difficult with basic science,” in contrast to some other fields, like health and the environment, where public consultation on and participation in funded projects is possible. They now have an ongoing collaboration with their Community Partners and with choreographer Alex, “without Dane [at IF Oxford], we wouldn’t have met Parasol, we wouldn’t have the credentials to work with Body Politics or even Alex.”

Given the lack of status and funding for community outreach, Researchers who make it central to their work have different careers from their peers and do unpaid engagement work. At the end of Shaping Destiny, Tomoko (University of Oxford) feels:

“I can’t abandon the people. So I’m scrambling to find money. ... I feel like I don’t fit in with a normal standard university seed fund or even the standard science communication. ... The easiest most short-term impact thing is ... you give a workshop to sixth formers, you go to the Science Festival, you make a pipe cleaner mosquito.”

She is aware that it is difficult to justify projects like Shaping Destiny as ‘value for money’. As Simon said (Imperial College London), the metrics used to measure the impact of outreach push towards traditional large festival activities, whereas “we need to do less [of those] ... because actually you just get the usual suspects there, you get people who are engaged with science anyway” (2020).

Wyn set up SMASHfest because “of the ineffectiveness of so much of the cultural sector and technical sector’s public engagement and communication strategy.” Like Tomoko he was lucky to be in a supportive institution, SMASHfestUK is outside of Middlesex University, but the University offered a small amount of funding and a larger amount of in-kind support, it was “interwoven, but it didn’t have the same limiting constraints of the university, ... the domination of activity by tick-box procedures and the scale of things ... and the timescales of things” that make university-community collaborations

difficult. It is unusual to have university backing: “even with all the pronouncements about diversity and community engagement, most institutions don't really mean it. I've just been lucky,” with “visionary and open minded” line managers and supportive colleagues. Despite his luck,

“it was and continues to be a battle. None of my time is really funded, I divert the funding to the activities. So for the first 10 years of work, I did all of SMASHfest work on top of my full time work in the University. ... The external funding structures and the internal funding metrics of universities do not support this work at all. It's entirely dependent upon an individual to add to their workload to do it.”

Tom (Goldsmiths University of London) is less established than Tomoko and Wyn. He wants to do community projects, to “get funding, bring lots of people together, have a good time, and also, do important stuff – seems like a bit of a win-win.” When I ask if the community engagement he does is valued by Goldsmiths he says no and laughs like it is a joke.

“I don't think many people know at Goldsmiths what I actually do I think they're just a bit confused. ... That's why having these connections with Skate Nottingham and stuff is precious, because you're around people who value what you do, and are supporting each other”.

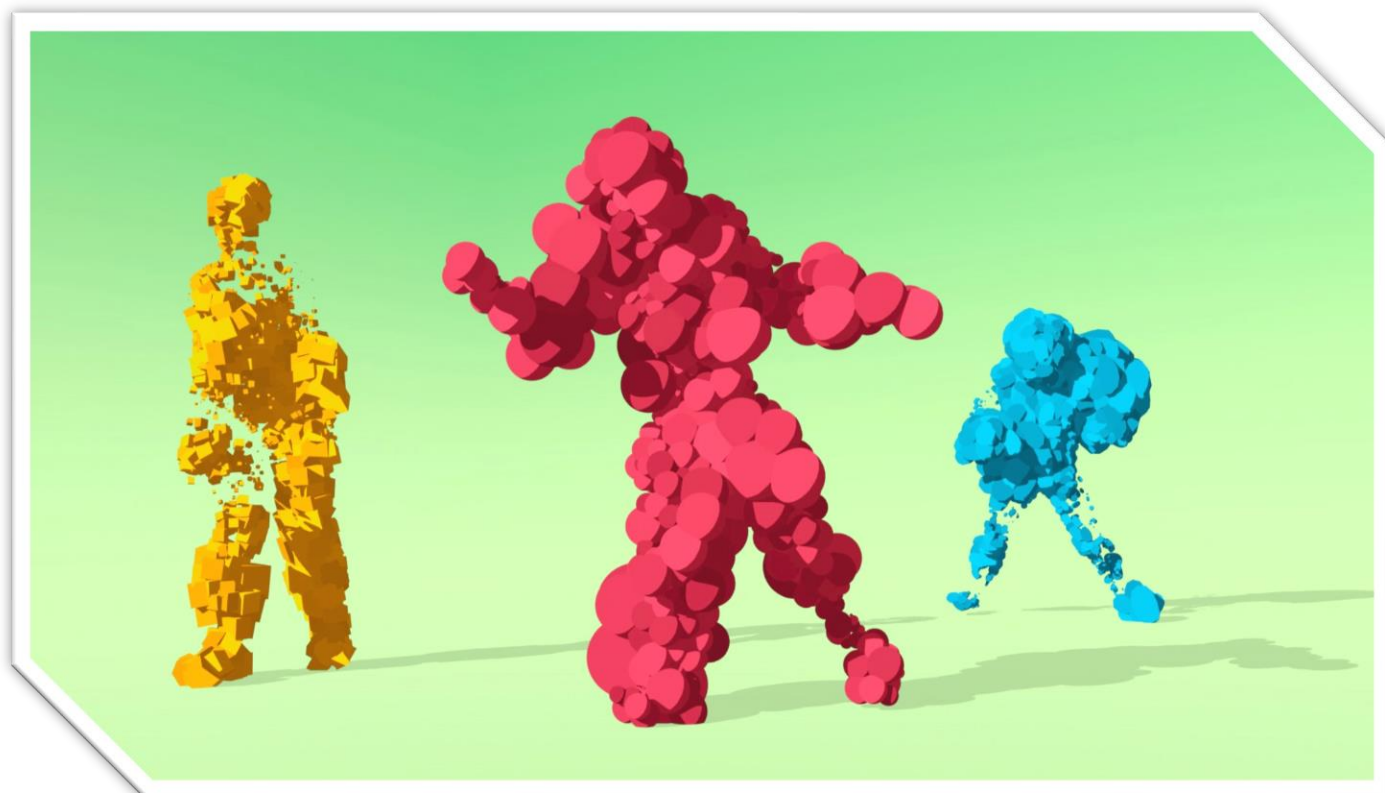
There are also pleas from Community Partners for universities to do more. Emma-Jane regrets that Parasol's disabled and Body Politic's working-class dancers did not perform inside the University of Oxford: “That's when real magic and change will happen, is when those young people step inside and go, Wow, this is cool. ... What can I do to get here?” Amrish (The Bristol Rainforest) asks universities to: “support us, work with children, work with communities, so that you can actually make sense and be meaningful to this area of our societies.”

4. How Making Connections creates longterm impact

This chapter builds on the previous analysis to focus on what longterm impacts and collaborations look like and what enables them to develop. It contrasts examples of when these have developed, with instances where they could have but did not. It also identifies best practice for Festivals, Community Partners, Researchers, universities and funders.

4.1 Creating and sustaining resources

Making Connections bring resources into communities. Kevin (Researcher, IET) travelled to RSI in Rochdale to do an in-person session after the online project during lockdown, bringing “boxes and boxes of resources which I left with them to do” and sharing the principles of construction “which they can always draw on if they wish.” He remains part of RSI’s network and, when I interviewed him, was about to send them a funding opportunity. As tracked in this report, such intangible relationships are the most important longterm impacts of the Programme. However, projects also often create concrete resources that go beyond their immediate communities.



Some projects create resources like videos that can capture experiences and reach new audiences. Although their main value is in the process, the learning and relationships developed through making them, they also take projects to new people, opening up conversations about research. Lily (Participant, Ignite) shared Creating Notts' film about arts and mental health with her mother and grandparents. "It gave them more perspective," and there was a recognition: "They were: Oh, arts really helped you growing up." The [Convergent Pulses dance video](#) (see still image below, source: IF Oxford website) was viewed by IF Oxford Festival Organiser Dane as "a solid asset" (2020). Researcher Tomoko agreed: "we can use that to inspire other researchers to try out their own different things" (2020). Three years on, Community Partner Sophie describes it as "a very enjoyable piece of art. ... I still watch it occasionally."

This beautiful thing come out of a "chaotic and disjointed" lockdown project which "was all about ... when was a safe time to deliver props." Community Partner Emma-Jane recalls the online festival event, [available on YouTube](#), where we "got to talk about it again, which was really, really nice to hear that process and that side of things." Collectively creating a beautiful artwork stimulated their desire to collaborate again. Their subsequent two-year Shaping Destiny project has video outputs and live performances (available on their [website](#) and [YouTube channel](#)). Sophie offers an example of how their dance performance spoke to people. Two friends who attended sent her articles and a podcast about science:

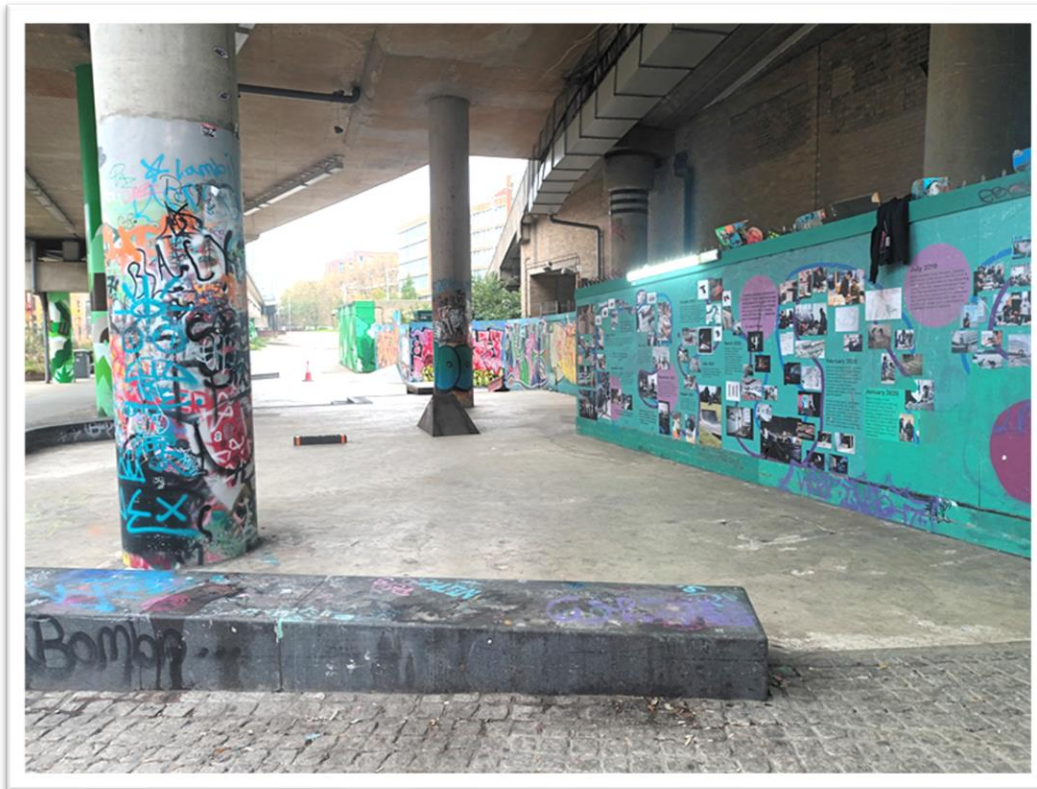
"They both said: It just reminded me of the performance you made. And I just thought it was really cool, because it was a group of adults with disabilities showcasing a dance and they had become part of this complex interesting scientific conversation and then people were making connections."

In both my interviews with her, Gnisha (Community Partner, Black Seeds Network) spoke about how the nature photographs taken by researchers and minoritised community leaders became an exhibition that "went out into communities" (2021), being shown at Easton Community Centre, City of Bristol College, the M-shed, and Bristol Museum and Art Gallery: "There's so little representation from our groups anywhere. And then for people to be making their own contact and getting that out in different locations ... was really wonderful." This exhibition is [preserved on YouTube](#), along with [short videos about the community contributors](#).

On a few occasions projects leave reshaped spaces, leaving physical legacies whose use goes way beyond the original participants. Shaping Destiny has developed new portable motion capture technologies, so that disabled people can be included in the digital space. Two other examples are from a 2019 Norwich Science Festival project and Nottingham Festival of Science and Curiosity's projects in 2021 and 2022. Martin (Community Partner, Recast Music Education)

collaborated with Norwich Science Festival to put microphones into three local nature reserves to livestream sound. At the time, with people listening across the world and giving “loads and loads of positive feedback,” he hoped to keep them in place for a year. Two of these livestreams “didn’t materialise into anything longer” due to lack of funding. But [the microphone at the National Trust site](#), where “I just happen to have a good relationship with some of the people that work locally,” is still in place over four years later, and they are in discussions to extend that for two more years with an expanded educational programme. This has led to interest from other organisations, enabled Martin to run independent sound walks, and required technical innovation to manage “seasonal variables, weather, ... microphones that have been deliberately cut by passers by, ... animals eating bits of equipment, and stuff like that.”

Skate Nottingham replaced a disused and derelict space in the city centre with the Tram Line Skatespot (pictured on the next page, source: researcher photograph). They would have done this without Making Connections grants but that funding enabled students in the adjacent college to work with Researchers to contribute to its design. Chris (Community Partner, Skate Nottingham) views Tram Line as “very much an outcome from that co-design process” and two of the Researchers who took part have “been consistently involved with the project ever since.” Its story, exemplifies the need for support to sustain resources. “It very quickly became a hangout for street drinking and weed smoking for college students.” Skate Nottingham organised litter picking. But, in the absence of policing and institutional concern, “skateboarding can only do so much.” They had hoped “to create both an outdoor laboratory for learning” but “that all hit hard against lack of resources,” and just days after Chris said this, [Nottingham Council declared itself bankrupt](#). Nottingham Trent University “were the only partner that engaged significantly throughout the process.” But their engagement is limited to undergraduate, masters and doctoral projects. There is funding for a PhD but not “to do anything at the space. ... Or even in-kind support, volunteering students offering to litter pick. There’s been none of that to actually keep the space open and rolling on. It becomes a little bit vulture like.” Beyond the crisis in the city, the main problem is “the lack of eloquent, committed leadership that engages with research. ... I’m frustrated that a lot of the opportunities haven’t been grasped.”



Both Festival Organisers and Community Partners spoke like Chris did about a desperate need for core funding, exacerbated by over a decade of ‘austerity’ cuts. It is rare that people can do as Chris did and combine multiple funding streams into the same project and rarer still that, like Tomoko, they can secure big follow-up funding. Making Connections projects would have greater impact if those happened more often. In particular significant and longterm funding is essential to build trust with vulnerable groups. Martin (Community Partner, Recast Music Education) says of the project that he hopes to do with the National Trust to use sound to create secure and supportive environments for looked-after children:

“We’re trying to build long term stable relationships with those children. And we can’t do that if we’ve just got constant short term funding or short term ideas. Building trust with adults particularly, but anybody, is a problem. ... The project has to be reliable so that we can become adults that they can trust.”

4.2 Funding, resources and infrastructure

As noted above, longterm impact often relies on additional and greater funding than Making Connections provides. Skate Nottingham raised £50k to create the Tram Line Skatespot, mostly

from National Lottery and crowdfunding, with only about £4k from their two Making Connections projects. The collaboration that emerged through Convergent Pulses had most of its impact because Tomoko (Researcher, University of Oxford) secured a Wellcome grant of £188k allowing her and Shankar to continue collaborating with The Parasol Project, Emma-Jane, Sophie and Alex, and to involve a videographer, evaluator, humanities researchers and Emma-Jane's dance company Body Politic. Tomoko recalls, they had finished Convergent Pulses with a “sense of there was more we could have done” and a desire “to be in the same space as the others.” Emma-Jane and Sophie “only knew Alex as a big shot choreographer from London” who makes something out of their videos of Parasol dancers. Within Shaping Destiny they observed his process. Tomoko ascribes their funding to being in “the right place at the right time.” Shankar's Wellcome research gave him a chance to apply for their public engagement scheme: “It was much easier to get this funding than any other public engagement grant ... So we were just lucky.”

Luck recurs in the data, particularly around funding. When Mohammed (Festival Organiser, RSI) and Geraldine (Researcher, Imperial College London) first talked, they had wanted to work together but this was only possible because she already had funding. In contrast, Koichi and his fellow PhD students at Queens University, Belfast, did no more community engagement after Making Connections. It is “amazing work to do. But I think the barrier is funding. ... Our time was compensated for running that project. So yeah, we weren't able to, we didn't think about doing it off our backs”. Money is the top thing interviewees say would enable more festival-community-researcher collaborations and this should not be reliant on luck. As Graeme (Researcher, University of Glasgow) said, we need to pay doctoral students for outreach as “money is always tight;” and for researchers in salaried posts, it must be “integral to the role of that individual” (2021).

The need for funding was felt most acutely by Community Partners. Gnisha (Black Seeds Network) looking back, reflects:

“what could have been helpful is if UKRI, for example, are really happy with how things have gone, almost opening up a door and saying, Hey, there's another opportunity here, would you be interested in applying? ... Rather than us going, Oh, that was good. I hope they liked it, don't really know. Shall we try again? Oh, I'm busy.”

Community Partners are stuck in a cycle “project focused, start, stop, start, stop. And when it stops, there's more of a panic mode of ... how are we going to get this money?” People in small organisations are at capacity and cannot invest the time in developing bids that are unlikely to be funded and doing other unpaid work in the hope of future opportunities, as some larger organisations can. Echoing others, Gnisha warns that if we do not find “ways to support communities in an ongoing manner, ... certain groups are gonna get left behind. ... I'm really worried that's going to put us back

decades and entrench inequality.” When community groups disappear you can lose “decades of work and all that IP, all that organisational knowledge” and “when people are really struggling to make ends meet and keep things going, ... the chances of burnout become higher, and you’ll lose people that way.”

Interviewees discussed the need for funders to change, to become less hard to reach. In 2020, after his Making Connections project with RSI, Kevin intended to go to the IET (Institute of Engineering and Technology) “and talk to them about this experience and say how valuable it is.” He wanted to change their practice of evaluating grant applications based on how well written they are which advantages big organisations. He planned to suggest “if it’s from a grassroots, give them a bit of slack and just let’s look behind it.” Speaking in 2023, Kevin says he has not changed the IET. He has filled in forms registering his RSI activities with them but had no feedback: “It will have counted towards some numbers somewhere. It’s a much bigger machine the IET ... and I understand that and I accept that.” But because “we’re responsive, not proactive, ... we are missing those hard to reach areas.”

Interviewees identify problems with funders’ metrics, motivations and political will. Wyn (Festival Director, SMASHfestUK) refers to them “following tick-box metrics.” While some are “trying to change things. Many aren’t. Many are just: We need to put this in because this is required practice at the time, and we’re not really going to follow through.” Grants are not high enough to cover researchers’ time and funding cycles do not give people time to build relationships:

“So if you’ve got a six month project, or a three year project, same happens as always happened. Lots of lots of people from privileged positions come in and say: Hey, we’re going to do transformative things with you. And they start them, they look really great, and then they bugged off. And they leave people in exactly the same position as they were before. ... The whole funding structure ... is inimical to the claimed aims. ... It’s about reinforcing the current practices and supporting the current practitioners, their current researchers really.”

Graeme (Researcher, University of Glasgow), concurs: “It’s still an ivory tower in that regard, because they don’t trust or they don’t think communities know what they want. So it’s very much still centrally administered. It’s here’s what we think is good for you” rather than talking to communities and giving them control of the resources. IF Oxford Director Dane said that applying KPIs and detailed reporting to Making Connections projects would make you:

“do something quite mediocre and middle of the road because you know you’re going to have to achieve those goals. Whereas to do something truly innovative and slightly bonkers and shift the field, you’re necessarily going to have to take risks and some of that’s going to fail.” (2020)

In addition to researcher-community and institution-grassroots hierarchies, in funding, there is a science-arts hierarchy. Choreographer Alex (The Alexander Whitley Dance Company) says:

“It often seems as though these kinds of funds are directed more towards the science and higher level institutional areas. They’re opportunities for researchers to find artists to work with, as opposed to artists to discover researchers or to look at opportunities around engaging with science”.

Like community groups, most “artists lack the institutional support and resources to put together these big funding applications.” There are disciplinary hierarchies which elevate STEM fields, which often leave the arts “being instrumentalized in a way that they’re just a vehicle to deliver impact for other things, as opposed to being seen as an end in their own right and of having inherent value.” He problematises the need to:

“show you’re engaging with x number of people, and, I guess, quantifying the impact in a way that justifies the investment that’s being put into it, rather than just appreciating that these processes are inherently valuable in themselves for the people engaging with them.”

Wyn similarly rejects a “biased and corrosive mindset, ... as if the arts and design were merely a mechanism for the important stuff to be done: STEM is the important stuff.” The examples in this report evidence a rejection of this mindset. Many Making Connections projects work non hierarchically across art, science, music, technology, dance, politics, design, engineering, history, and sport; they are playful and conversational. Some STEM Researchers discuss the damage done to their work and to our society by cuts to arts, humanities and social sciences.

Beyond money, there are some other ways of resourcing this work, by offering training and support, and by framing community engagement in ways that fit job requirements and make it easy to take part. Some people lacked opportunities. Yewande (Researcher, Imperial College London) in 2020, after the project with North Paddington Youth Club, spoke about enjoying youth engagement and how it had renewed her interest in her doctoral research; and she expressed a desire to do more. Looking back in 2023, she says, “I don’t think it made a big difference to me.” She had done just one other outreach activity:

“I signed up ... because I enjoyed the [Making Connections] sneaker project and I wanted to be able to talk to more young people about being in science. I think if there were more opportunities, I would, but I haven’t actively gone out to do that, if that makes sense. ... I haven’t really thought about the sneakers project that much. And then your email popped up. And I was like, Oh, yeah, I did this thing. So it was nice to have that reminder. But yeah, it seems a shame that I don’t really think about it or haven’t done as much.”

One reason for this is that Emma who had the link to North Paddington Youth Club and who had recruited Yewande (and Simon) to the project, left Imperial College. As discussed in the next section, people like Emma are critical to making and maintaining connections.

4.3 Community leadership and relationship nurturing

Researcher Tom (Goldsmiths University of London) recalls how sending a blog post to Community Partner Chris (Skate Nottingham) led to an invitation to take part in their 2022 Making Connections project, then to other skateboarding collaborations. Tom now visits Nottingham five or six times a year, “I just get on with Chris really well. And he’s very supportive in my career. ... And he really believes what I’m doing is good for skateboarding.” **Longterm impact relies on people nurturing relationships. The data are full of examples of leaders like Chris who hold people and projects together. Often, as the remaining examples suggest, it is Festival Organisers who play a critical role, acting as brokers between communities and researchers.**

Dane (Festival Organiser, IF Oxford) used his connections to bring together The Parasol Project and its dance teachers Emma-Jane and Sophie, choreographer Alex, and University of Oxford researchers Tomoko and Shankar. Alex says: “It was a really great group of people that were brought together who I think were genuinely really excited and interested in working together.” Sophie thinks that Tomoko was:

“particularly interested in keeping going, and having another go, because she felt quite, I think that she hadn’t really provided enough support for how we could access their research during the first round. ... That is incredibly important to her actually, that integrity of maintaining relationships, and not letting people down.”

For Emma-Jane, Tomoko “really held all of those relationships and held it together for everyone. ... she really she made myself, Parasol, feel really valued and as valuable as Alex and Kostas [VR programmer].” Her “passion is infectious” and her “making the time to talk to you and find out about what you do. ... It didn’t ever feel top down.” Sophie explains why longevity matters at Parasol, “for the dancers, ... because I think people and faces and those interactions are ... what resonates with them;” and for staff, “it’s a difference between somebody who is just interested in working with the demographic of people that we work with and somebody who’s genuinely interested in exploring a partnership.” Through Shaping Destiny, their relationships have become self-sustaining beyond the need for ongoing funding. Emma-Jane and Tomoko are friends and Tomoko’s son attends her dance classes. For Sophie too, “the friendship is there. ... Something will happen again in the future. I’m not sure what. It’s a sturdy connection” made through:

“an accumulation of small happenings: ... visiting a rehearsal, coming to ... the art experience, ... or delivering ... a thumb drive of some photos into the office at Parasol. Just loads of little things. It’s not just about finding money, delivering a project, and then quietly looking for money for the next thing and then calling another meeting when that happens.”

Tomoko was humble and generous in her interactions with me, highlighting others’ contributions and downplaying hers. But she did discuss the relational work she does “to manage expectations,” because “a few times, I thought I would lose a partner.” Her partners have multiple commitments, she asked herself, “How do we inform them without imposing? ... How do I keep their interest? How do I maintain the connections? ... I didn’t want them to feel like they were used by the project.” A £3k university grant had allowed them all to paid to plan Shaping Destiny together, building mutual understanding “that really helped to keep people going when things started stalling.” Once again, she ascribes this to her being “extremely lucky” to have institutional support: “That’s very unusual.” There have been and are tensions. She has had three years away from her research bench: “I couldn’t recommend this to a postdoc who’s aspiring to be a scientist. It’s not something you can do both with the demands of scientific research and the amount of care you need to pay both of them.” Again, she feels “lucky” to have colleagues “accepting what I do. They could have been: Oh you’re useless. You’re not doing science.” She questions: “What is our role? ... Is it really worth it? Is there a point to having that kind of relationship?”

In Oxford, Dane brokered and Tomoko nurtured the collaboration. Mohammed in Rochdale does both. He is trusted by members of his community, by researchers with whom he has worked, and by local institutions such as the council and the literary festival. We can see in his interactions with Researcher Geraldine and Project Participant Fathema how he builds relationships. Geraldine read about his work on the IOP (Institute of Physics) website and emailed him. He recalls that she: “came across as a person who was genuinely looking for someone to work with.” They had a Zoom meeting to talk through ideas and she did an online workshop about the sun. They met in London twice when Mohammed came to talk to the BSA’s Community Leaders. Geraldine wanted to contribute to 2022’s Rochdale Science Extravaganza and [they developed a visual approach to evaluation](#). For their [2023 Making Connections](#) project, Mohammed needed experts to shape a climate change project. He contacted Geraldine despite her not specialising in this field because “she understood where we’re coming from,” and “a lot of trust was there.” With Fathema, Mohammed had seen her and other parents in the background of Zoom sessions “encouraging their children. ... I wanted not to just design things for young people. I wanted the parents to be involved.” Their 2021 Making Connections project was RSI’s first targeting parents as well as children. Fathema attended all the sessions. She recalls that Mohammed and she initially, “didn’t speak. ... Within our traditional

cultures, females shouldn't be intermingling with males." When they did, they found that they shared a route to RSI through their children. He involved her in more activities until, as already noted, she became an advocate for RSI giving talks in schools and mosques.

For Festival Organisers to do this relational work they need, like Mohammed, to be embedded in communities. University of Glasgow Researcher Graeme has had a relationship with Glasgow Science Festival since he volunteered as a first year undergraduate in 2010. He:

"began to know the team quite well. So then we developed a relationship whereby I was, even when there was non festival events on, I would do outreach for that. And then eventually, helping manage volunteers ... Then generally developing a relationship with the director of the festival [Debbie] so that I was always there as a resource."

Without Debbie and the Festival "training me into exposing me to different groups of people, into having to do outreach in areas outwith my own field, ... I wouldn't be doing science communication today, for sure." The Festival also opens up networks, within science and other disciplines, in universities and beyond because unlike much outreach it brings a core of people together allowing you "to develop a real relationship with people, that gives them confidence, you feel like you know each other, and they are able to reach out to you." As with the loss of community organisations:

"if it was shut down and some other festival started up, the first couple of years would be an absolute mess. ... Debbie knows exactly how to do it. She knows how to engage with people, ... what needs to be moved where and when, the logistics of it, the practical side, the accessibility of it, how to reach communities that you wouldn't otherwise normally be able to reach. ... That's invaluable."

As discussed, funding schedules make ongoing relationships difficult. For Wyn (Festival Organiser, SMASHfestUK) "one of the frustrations has always been ... the impossibility or seeming impossibility of continuity." With Abdul, Jerusa and Navpreet, he struggled "to find a way, within a short project cycle funding landscape, where I can continue this relationship and build through over six years." It is the first time:

"I've succeeded in managing to link up each little burst of funding in a way that gives them continuity of experience. ... It's still episodic. ... I would love to be able to gain enough funding, so that I could employ them full time."

Instead they are working nights, or piecing together hourly-paid gigs. As explained in Chapter 2, for Abdul, Jerusa and Navpreet, this pathway allowed them to stay connected to design after graduating despite not getting secure jobs in the field. Wyn has mentored them tailoring what they do to their interests and to building their employability.

Dane (Festival Organiser, IF Oxford) wants to see an option to apply for two-year Making Connections projects. He already works on that basis with the hope they will secure funding the following year:

“I think repetition of community spaces with a particular demographic and their relationships with science is important ... When you’re working with an organisation that has low science capital and doesn’t see science activities as something for them, sometimes you just need to get them on the same page before you do the activity.”

When these relationships last: “it’s nice actually. ... So we might go back to the charity and work with them again. It might be that we do a bit signposting.” Similarly, The Festival of Nature’s projects have grown out of each other, with Amrish a Project Participant in their 2021 project being their Community Partner in 2022; and one of their community collaborators in 2022 became their 2023 Community Partner. Festival Organiser Ellie says, “from working with the Black Seeds Network and being involved in that space, and also in those communities, we’ve then been able to share news of other events and activities that we’re a bit more trusted in that space.”

The impact of longterm community engagement is greater than of short projects, but this is also about social justice. Ignite Festival Organiser Megan’s words echo through the data collected for this evaluation:

“Especially with the very young people that we’re working with, there’s a lot of chaotic-ness in their lives, and structure is really helpful. You know that for some children, it takes a long time to build up trust. ... When you finish something, it always, it leaves me with a sense of, Oh I wish we could do more. ... You don’t like to leave children once you’ve started something, let them down. Because there’s lots of people letting people down all the time”.

5. Conclusions

Making Connections projects are collaborations, across a few months, between Science Festivals, Community Partners and Researchers. They target groups that are underserved by STEM outreach. At their conclusion, their organisers talk about how much they have learned and express a desire to keep working together. The annual Programme evaluations are full of potential longterm impacts. This evaluation set out to identify when these are realised, when other unimagined impacts happen, and what enables or prevents these. It drew on data from 48 interviews with 29 participants, 29 carried out specifically for this report and 19 with some of these same people conducted between 2019 and 2022. The data are not representative of all Making Connections projects, as people with a story to tell and a strong commitment to community science were more likely to take part, and I used snowballing to recruit participants. In the end, 22 of the 29 participants were drawn from just five festivals. But the sample also contains: a Festival Organiser, Dawn, whose Making Connections projects were disappointing; a Community Partner, Martin, who started the interview talking about the impact of a completely different project; and two Researchers, Simon and Yewande, whose project left a strong impression despite there being no follow-up.

Having data skewed towards impactful projects that align with the Programme's ethos, makes them rich in models of good practice and examples of what is possible when festivals, communities and researchers work together. These projects include young people from a socioeconomically deprived area of South London developing and performing escape rooms about the climate crisis, LGBTQ+ young people in Nottingham designing fantasy figures and using them in a Role Playing Game, migrant and refugee families in Glasgow taking part in a Harry Potter themed science fair, and South Asian Muslim families in Rochdale creating science busking activities inspired by workshops with scientists and engineers. They are prefigurative in that they indicate what an inclusive Science Festival sector could be like if the Making Connections practices of sharing power, co-design, reciprocity and doing science in community spaces, were to move from the margins to the centre of the sector.

Alongside this report, three case studies from the evaluation foreground voices often missing from science-based conversations, including members of under-served groups and STEM professionals who have oriented their work towards communities. These voices advocate for participatory and transformative public engagement, based in the right of everyone to take part in fun, creative and inspiring activities, and to shape research. These case studies, and this report, use stories not numbers to capture the impact of such projects.

This evaluation points to some principles for good practice (which echo and extend those set out in the [The Common Cause research](#) on university collaborations with minoritised communities).

- The examples discussed in this report underline the need to move from extractive projects where communities serve a research impact agenda to ones that put community needs and wants first and that grow community capacity.
- The greatest collective good is achieved through reciprocity and humility, through everyone participating in shared activities and collaborating to shape joint goals.
- Wider power relations – including, sciences vs arts, research vs community, and gender, social class, race and disability – make equitable partnerships difficult. Projects can proactively address power differences by how they allocate resources and by developing activities that recognise and build on everyone’s skills and expertise.
- Transparency and accountability are essential in payment, research ethics, and other processes. In addition, these processes must be straightforward and quick if they are not to inhibit or block community engagement, and make separate vehicles like SMASHfestUK necessary.
- As well as transparent, simple and timely payments, interviewees want to see communities in control of grant spending and a significant redistribution of funding from research to outreach. Rhetorical commitments to community engagement are only meaningful when backed up by money.
- Payments that recognise people’s expertise and contribute to organisations’ core costs are important for both community and research participants. If researchers are not paid at FEC (full economic cost), or sometimes at all, outreach will remain lower status within academia than research.
- In instances where people find a way to keep working together, the understandings, skills and relationships developed are richer. There are many examples in this evaluation, including Festival Organiser Debbie and Researcher Graeme at Glasgow Science Festival, Community Partner Chris and Researcher Tom through Skate Nottingham, Rochdale Science Initiative Festival Organiser Mohammed and Project Participant Fathema. Funding cycles, and metrics need to change to make sustainability more possible when people want to continue collaborating.

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- To address structural inequalities, in addition to the things already mentioned, such as paying participants, and a commitment to learning from each other and to co-designing activities, there need to be open discussions about communities' experiences of inequality.
 - Festivals and community organisations are often stretched to the limit. Even when resources are created by Making Connections, from videos to skate parks, they need support to share and maintain these. For example, to help projects develop ways to communicate what they do, funding or other resources, such as a film maker or web designer, could be offered.

Festivals are key networks for science communication in the UK; they act as local hubs bringing hundreds, and often thousands, of people together. Thus, although the BSA has other community science programmes, it is important that Making Connections exists to directly target festivals, supporting them to make science and research relevant, representative and connected to audiences who do not attend their main programme events. Because of the local aspect of Science Festivals and the relationships that their organisers build up, they can broker partnerships across universities and communities, avoiding the trawls through university websites and unanswered emails that many community organisers experience when trying to connect to researchers. However, when key individuals move on, relationships can be lost, and when festivals are more oriented to research and researchers than to communities, partnerships can be a struggle.

Making Connections also provides regular funding to grassroots festivals like Rochdale Science Extravaganza and SMASHfestUK. Rather than projects being an add-on, they are 'Making Connections' festivals as all their activities are participatory and engage underserved audiences. Alongside offering Making Connections grants, the BSA's mission would be served by increasing the number, capacity and reach of grassroots festivals within the sector.

Longterm impact too often relies on luck – in securing follow-up funding, in having supportive peers and managers, and in there being someone who has the time, skills and care needed to keep people and projects going. If we as a society want ongoing and enriching festival-community-researcher collaborations we should not leave these to chance. Researchers who focus on communities are currently disadvantaged in academia, meaning that few will commit to this work and those that do, as in Making Connections, are more likely to be from underserved communities, so that the low status of outreach exacerbates other inequalities. However, if significantly more money is directed to projects like those in this evaluation, there is a risk of spawning a new infrastructure of tick boxes, and of grants going to academics who are good at getting funding but without the experience and the will to build equitable collaborations. Funders can develop strategies to avoid these risks, for example, by allowing communities to determine with whom they work, using festivals as brokers between communities and researchers, developing longterm relationships with communities and community

organisations, assessing ‘success’ differently, measuring and auditing less, and attending to the principles above rather than to quantitative metrics.

Finally, Making Connections projects are only possible because of the UK’s rich infrastructure of groups for young people and for disabled people, community pubs and community gardens, networks of parents and of refugees, informal education in dance and in science, mosques and churches, libraries and museums, and so on. Two decades of government funding cuts, compounded by COVID and the rising cost of living relative to wages, has weakened this infrastructure. Defending this infrastructure and securely funding it must be a priority for anyone wanting there to be more projects like those discussed in this report and wanting those projects that do happen to endure.