EXPLORE YOUR UNIVERSE

INCLUSION HANDBOOK

A guide towards equity and inclusion for informal science learning practitioners

Association for Science and Discovery Centres

UKRI Science and Technology Facilities Council

CONTENTS

ABOUT THE PROJECT

> Phase 4 of Explore Your Universe signalled a radical and brave departure from the previous phases of this STFC-funded project.

Jen DeWitt, Senior Research Fellow, UCL Institute of Education,
Research and evaluation consultant

Explore Your Universe Phase 4

Explore Your Universe Phase 4 is ASDC's national strategic STEM programme in partnership with the Science and Technology Facilities Council (STFC).

What initially began as a two-year national programme in 2012 working with 10 science centres, became a network of 23 science centre and university partners reaching across the UK. In the first phases of Explore Your Universe over 380,000 children and adults took part in bespoke workshops, family shows and activities that celebrated the amazing stories and technologies of STFC.

In 2019 the fourth phase of Explore Your Universe began. Explore Your Universe Phase 4 (EYU4) was now on a mission to matter to families who don't come through the doors of science centres and science museums, and for people who don't necessarily feel that science is 'for them'. With no numbers in its success criteria, STFC funds supported time to build equitable partnerships and allowed for learning to uncover the strategies and methods that truly involve our more under-served and marginalised audiences.

This programme was taking a risk. It did not commit to reaching hundreds of thousands of people across the UK. It gave science centres permission to fail-fast and learn-fast, to try different approaches and share what was not working. A huge enabler to this was the trusted relationship of long-term work between STFC and ASDC, built over a 10-year relationship, alongside a 'line-in-the-sand' commitment from STFC to work with '*Wonder*' audiences and commit their pubic engagement resource to communities who identified as under-served or marginalised by current science engagement activities.

> Through working in partnership with the ASDC, Explore Your Universe has successfully engaged with audiences who have not previously engaged with Science Centres. Building effective collaborations with community groups, young people and families has provided a fantastic opportunity to inspire all, by sharing the amazing stories of science and technology supported by STFC.

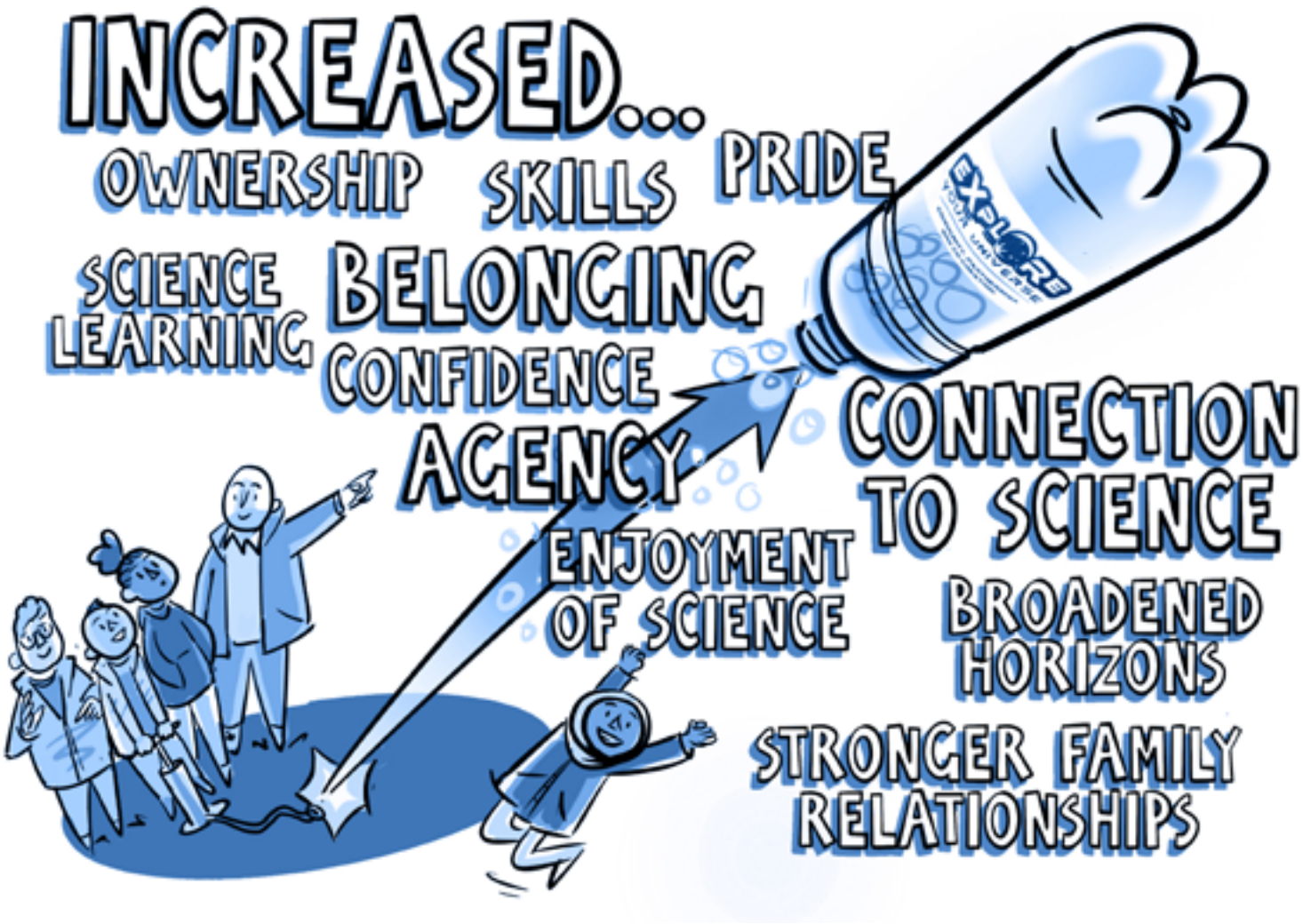
Neville Hollingworth, Public Engagement Manager, Science and Technology Facilities Council UKRI

The foundation of the engagements within EYU4 was the building of relationships, understanding and trust between science centres and community partners. In addition a commitment to a multiple-engagement model – engaging with the same families many times for more sustained impact – enabled science centre practitioners to step out of the usual routine of scripts or set shows, and use their knowledge and exceptional skills in science engagement to take a more co-developed and participatory approach. The aim was STFC science engagement that was audience-centred and relevant, driven by the interests, experiences and ambitions of the participants.

The programme aimed to support the dimensions of science capital for families taking part, where outcome measures focused on aspects of inclusion such as agency and belonging, identity and connection to science.

> "EYU4 defines good and meaningful ways to engage the community with science... rather than 'parachuting in' with some STFC science, it is the opportunity to focus on how to build genuine relationships with communities."
>
> Practitioner, Techniquest

For science centres, the project provided clear methodology and requirements that platformed the EDI agenda amongst a maelstrom of competing strategic priorities, particularly during the project period that spanned the 2020 pandemic lockdown. Evaluation and reporting promoted reflective practice for practitioners – with their community partners and across science centres – in order to identify and nurture positive change and learning for the whole organisation.



> "In the UK, EYU4 represents a giant leap in the progression of science centres here toward being equitable, inclusive spaces/organisations where individuals and families from a range of communities and backgrounds can feel welcome and participate in science on their terms, being supported to take action on issues that matter to them."

Jen DeWitt, Senior Research Fellow,
UCL Institute of Education

Explore Your Universe leveraged the assets and expertise of the science and discovery centre network. Resourced not only with accessible and captivating exhibitions, activities and professional communicators of science, science centres are also values-led and purpose-driven organisations. Embedded in their regions, they connect science industry, education, policy and communities with partnerships that have been built through years of place-based understanding.

> "EYU4 has enabled a focus on depth rather than breadth of engagement and on outcomes that orbit inclusion, rather than diversity metrics. It acknowledged that we can never have all the knowledge, skills, experiences and imagination to engage meaningfully with all young people and families, but through strong partnerships we can achieve greater things together."
>
> Shaaron Leverment, Chief Executive,
> Association for Science and Discovery Centres

Our responsibility now rests with evidencing depth of impact, advocating for inspiring practice, and sharing our learning – warts and all! This is where our Inclusion Handbook comes in. Our programme focused on science centre / community partnerships and the learning from this 3.5 year programme is distilled here into four main areas that we believe have relevance beyond our distinct sector:

- Why community engagement? (page 11)
- Working in partnership (page 17)
- Evaluation in practice (page 31)
- Strategies for engagement (page 45)
- Catalysing organisational change (page 63).

> "There is an ambition among science centres, which could also serve as a model or vision for the wider field, to build upon the place-based knowledge and partnerships developed in this project to become true community resources – meaningful in their regions for those who do not feel that science currently is relevant or something 'for them' and pushing towards a far more equitable STEM landscape for the future."

Jen DeWitt, Senior Research Fellow, UCL Institute of Education

WHY COMMUNITY ENGAGEMENT?

> As science engagement professionals, we see STEM not only as a potential career choice, but as a valuable life skill, a force for social good and an essential part of culture. Science enhances lives and should be accessible for all for the benefit of individuals, society and for the validity of science itself.

Shaaron Leverment, Chief Executive, Association for Science and Discovery Centres

Science centres, museums, universities and informal science learning organisations need to carefully consider who we work with.

According to the BSA audience model, the "Not interested" (seeing science as not for them) and "Inactive" (interested but make no particular efforts to engage) audience segments make up three quarters of the UK population. Similarly, according to the 2019 Public Attitudes to Science survey, only about a fifth of the population felt actively connected with science or scored as having high science capital. If an organisation such as a science centre or university only works with those who are already coming to events and engaged with science, this is not a neutral decision.

Building on years of research on science capital, researchers have emphasised the importance of changing 'the field', and have called for placing young people, their families and communities at the centre of programmes to value them for who they are.

Inclusive science engagement is about equity of opportunity as opposed to equality of opportunity.

The usual offer may attract those who are already easily engaged, but targeted interventions, tailored access, support and specific invites are needed to work with other groups.

> One of the guiding principles I try to consider is thinking about the fact that if we're not closing the gaps, we are fundamentally maintaining them.

Lewis Hou, Science Ceilidh

Improving how we approach more inclusive science communication and engagement with our local communities not only enhances our ability to deliver educational programmes that have meaning and relevance to a more diverse audience, but also empowers young people and members of the public to have influence over decisions that affect them and their communities.

> Unless we want to remain complicit in creating resources for only those most dominant groups in society – who already have plenty of resources – we have to transform the field. What on earth is the point of our work otherwise?

Emily Dawson, Associate Professor, Department of Science and Technology Studies (STS), UCL
Speaking at the ASDC national conference

WHAT DOES SCIENCE BRING?

Informal science learning and education spaces are being called to move beyond inspiring and exciting people in science, towards supporting more equitable outcomes, such as critical STEM agency, or using STEM practices and knowledge to take action on things they care about.

Within Explore Your Universe Phase 4, STFC science was used as a vehicle for nurturing curiosity, critical thinking, building confidence and agency, learning new skills, building a connection to science and broadening horizons. Community partners spoke about gains in confidence experienced by their young people; confidence that they could engage with science, confidence that they could do the activities involved, and pride in what they had accomplished. STFC science was also found to strengthen family relationships through positive experiences together.

Learning from the WIDER SECTOR

Prioritising these more equitable youth outcomes in a research paper "Fun moments or consequential experiences? A model for conceptualising and researching equitable youth outcomes from informal STEM learning", Louise Archer et al. (2022) propose a model that prioritises these more equitable youth outcomes, including Grounded fun, STEM capital, STEM trajectories, STEM identity work and Agency.

> "We can't ever take credit for the STEM options young people choose for their own lives and their future, but with programmes like Explore Your Universe, we can start to give them back the choice..."
>
> Shaaron Leverment, Chief Executive, Association for Science and Discovery Centres

Case Study from Explore Your Universe

Skills beyond those traditionally associated with science were supported for young people from North Cambridge Community Partnership (working with Cambridge Science Centre) who developed skills related to research and writing. Young people from youth groups engaging with Science Oxford, as well as those participating in sessions at Dynamic Earth, improved their presentation skills. Other community partners, particularly those working with autistic individuals, referred to the social skills that had been supported through engagement with science, as well as their ability to focus on tasks.

> "They did things that they probably wouldn't have thought of doing before but some of the kids were really into it and they were saying "I'd love to do this as a job when I get older", so that was a magic moment. The kids were that engrossed by it that they're actually thinking "when I grow up, I would like to do something like this", so that's great."

Community Partner working with W5, Belfast

Learning from the

The Curiosity programme explored whether there is anything unique to science itself as a tool within youth work. A report outlining findings from 32 projects from the first round found science brought positive differences in terms of:

- *Opportunity to engage for young people who are not so excited by other activities*
- *Encouraging young people to develop their problem-solving skills in ways that other activities don't*
- *Enriching other non-science activities, such as the arts and sport, by incorporating a scientific element.*

Within the second round, some early indications from Science Ceilidh and People Know How suggest science can particularly help develop resilience to failure.

> "Our aim was to link STFC science back to everyday life experienced by the young people to translate families' existing cultural resources into science capital."

Practitioner, Xplore! Science Discovery Centre

TOWARDS EQUITY, INCLUSION AND PARTICIPATORY PRACTICE

The Association for Science and Discovery Centres (ASDC) has a vision of a society where science is accessible, inclusive and valued by all as a fundamental part of everyday life.

ASDC is not alone in this vision. Within the wider sector a drive towards diversity, inclusion, equity and science as part of culture is clear. The vision of the British Science Association is of a future where science is more relevant, representative and connected to society, with a mission to 'transform the diversity and inclusivity of science'. Within international networks of informal science learning (for example the Austrian Science Network, VSC in the Netherlands and the Association of Science and Technology Centers (ASTC) based in the USA) the foregrounding of inclusive practice and science for all is a clear requirement for any forward-thinking organisational strategy.

Learning from the WIDER SECTOR

"Reimagining publics and (non) participation" by Emily Dawson (2018) is a great first paper to read to raise awareness of the exclusion that can be experienced in informal science learning spaces by participants from low-income, minority ethnic backgrounds.

During Explore Your Universe we used STFC science to...

"...inspire young people living in one of the most deprived areas of Wales to feel that astronomy and space science is 'for people like me'."

"...encourage young people with autism to regularly attend sessions."

"...bring families together in a safe and positive environment."

> The BSA have put equality, diversity and inclusion at the heart of our strategy – recognising that for too long, science has not done enough to engage and involve people from all backgrounds. Achieving our vision of science as more representative, relevant and connected to society requires all of us to reflect on how we work, and who with. Projects like Explore Your Universe 4 help us to learn from historically marginalised communities, and from the organisations who work with them, to help make that vision a reality.

Clio Heslop, British Science Association

Science centres, museums, universities and informal science learning spaces have the opportunity to challenge deeply ingrained stereotypes of science, and create safe, welcome and accessible environments where diverse knowledge, experiences and culture are highly valued and included.

Participation in science can expand young people's sense of possibilities for themselves. It can increase their awareness of experiences that are 'out there' in the wider world – beyond their immediate and current experience – to broaden horizons.

Participatory practice is not only the right thing to do, but there is also an increasingly sound business case for it. Being embedded in our community, and addressing that community's needs, are key elements in attracting sustainable support and funding. Many funding bodies now expect organisations such as museums, galleries and science centres to actively involve diverse communities. In some cases, the only solution to declining funds has been to switch to an explicit policy of community participation, which is seen as essential for financial sustainability. It's not just about current visitors, but about future, more diverse audiences, and the long-term sustainability, reach and impact of science centres.

Learning from outside the sector

"US arts organisations have a financial set-up which, despite additional funds in comparison to the UK, receive no state funding. This situation is analogous to that of the majority of science centres in the UK.

These organisations felt a mandate to make themselves more financially sustainable and recognized that they needed to become more relevant to those who weren't well represented in their current audience base in order to survive."

Quote From S. Lee and K. Gean 'The Engagement Revolution' (page 24).

> Participatory practice is now well embedded in the science engagement sector. Participatory practice can be defined as doing things 'with' people, not 'for' people. It's about ensuring that the science engagement offer is available and accessible to everyone – to all sectors of society – and not just a select few, and recognising that it's a two-way relationship, as communities often have resources, knowledge and perspectives that supplement those of the science centre.

Piotr Bienkowski, Director of Our Museum programme, cultural consultant

WORKING IN PARTNERSHIP

Equitable partnerships are fundamental to good, community-based informal science learning and engagement.

Relevance to life experience, personalisation and localisation are key elements of STEM engagement. Working in partnership ensures your activity suits the needs of the participant and avoids a 'parachuting in' approach where communities are talked 'at' by STEM engagement professionals and the content and approach is decided for them.

Partnership is also essential for research, ensuring we tackle real community needs, challenges and interests for novel research areas. Close community relationships enable more diverse research participation, public acceptance and involvement, and promote clinically relevant outcomes. Ultimately community participation improves the science itself.

Great partnerships are active, open and generous relationships, built on trust with shared values. They recognise and bring together diverse expertise and connections for the greater benefit of all parties.

Partnerships need time to evolve, to understand each other, to share values and to build trust.

FINDING THE RIGHT PARTNERS

Strong partnerships with community organisations enable the co-production of programmes which work with and for our diverse communities.

Before seeking out new community partners, consider why you are looking for partnerships. Is it simply to meet the current needs of your own organisation? Exploring community needs, challenging inequity, and becoming an active part of your local community are important and valuable. Thinking beyond the immediate project to explore ways in which, in some form, you can continue your relationship into the long-term for mutual benefit, should also be your goal.

Are you already working with one community partner?

Ask your community partner who else they work or collaborate with. There may be community organisation meetings or steering groups you can be invited to attend. Perhaps you already have someone working or volunteering with you who represents or works with a community you don't yet know? Individuals at your organisation have their own personal assets beyond their own expertise. Meaningful partnerships have often grown through wider partners (members or volunteers) who are not currently at a strategic, decision-making level. Personal connections and word of mouth are friendly and powerful ways to reach out and network.

Who else can I ask?

Other organisations and wider national networks are often pleased to help. Why not ask to connect with partnership or community liaison professionals working in science centres, universities, museums or other arts and cultural organisations? You can network within your local region or learn from practice in other parts of the UK. You may also want to reach out to funders who have experience and knowledge of UK-wide grants that support community-based programmes.

Do some research

Groups who work locally, regionally or nationally can be found online, through community message boards, libraries and schools etc. Leverage the experts. You don't have to do it all yourself! Go to the local council or meetings with other community learning or development organisations (such as local social workers, youth workers, teachers, or existing EDI groups etc.). There are always others who know what needs exist and can put you in touch with suitable partner organisations.

When researching groups to work with, consider what you hope to achieve with the partnership and find out about their objectives and values as an organisation. Think on how this aligns with your own core values. If your values don't align, building a collaborative partnership will quickly become difficult and this will then almost certainly jeopardise your intended objectives.

Why not take a walk in the neighbourhoods and communities you want to be a part of? Look at ways in which you could support or align with current services.
Drop in at a community centre and have a conversation, join networks and groups, and aim to become a more embedded and interested participant in your local community.

You could plan an open day for community organisations to come to get to know you.

For more ideas to ignite your first steps into partnership working, visit diversci.eu

If your values align, you will often find you can combine objectives to develop a greater, shared vision for what you want to achieve together.

CREATING A WELCOMING SPACE

It is vital that your community partner and participants feel comfortable and welcome. If they have not visited your organisation before, or have reservations about travelling or accessing the building, don't rush them into your space. Suggest holding your first meeting (and subsequent sessions, if appropriate) at the community partner's venue or in a place they already feel at home.

> "For the kids that are up here... school isn't always a positive environment for them. ...they've got a very good relationship with [youth leader], they trust her, they feel comfortable with her... And it's just a really safe space."
>
> Community Partner, Oxford

The details make a difference

When community partners and participants are visiting your venue, it's the details that can make a difference. You can help participants feel welcome at your science centre, museum or university by making sure you don't miss important details. For example, you can:

- Think about how they are getting to you. How can you support your community partner with the travel?
- Be aware of cultural and religious holidays when planning a visit
- Welcome the group with a familiar face. If you can't be there yourself, be sure to brief front-of-house or security staff on the community partner's arrival so they know they are expected and are welcomed by name
- Ensure you have sufficient staff for the day
- Allow for lateness and/or last-minute cancellations
- Provide plenty of appropriate and familiar refreshments
- Build time into sessions for casual conversation and for them to get to know the space
- Give participants confidence that no question is too silly to ask
- Offer a tour of the building, and include back-of-house to get a behind-the-scenes understanding of who you are
- Where possible and relevant, translate educational materials or maps/signs into participants' preferred spoken languages.

> "It was easy to come along and get involved, so yeah, I felt like I belonged here."
>
> Adult participant, partnership with Dynamic Earth

BUILDING TRUST

> They didn't just come in and get stuck in there. They'd come in and they took time to speak to them and get to know them and get to write down what their likes and dislikes were.

Community Partner, Wrexham (talking about Xplore! Science Discovery Centre)

Start to develop a mutual and increasing understanding of each other's expectations, objectives and assets. Be interested beyond what it means for you in the relationship and focus on the motivations and benefits for your community partner.

Be generous with your time and support them with their requests whenever you can.

If resources allow at the start, set your STEM agenda aside and visit one of your community partners' events. This might be a celebration event, an AGM, or to observe one of their regular sessions. Getting to know them in their context, and the way they work successfully with each other, will help you learn from their expertise and enable you to frame your interactions, as well as showing your commitment to the partnership from the start.

Keep talking, keep listening and keep adapting. A clear emphasis on regular, open communication will allow you to be more flexible and responsive to the needs of your community partner.

Case Study from Explore Your Universe

Edinburgh Young Carers, working with Dynamic Earth, noted that although their work together was 'a priority', other things that happened were simply more urgent. Dynamic Earth (and other science centres who felt they had successful experiences) reported that managing expectations and maintaining flexibility over what partners could realistically commit to was crucial. Internal communication within the science centre, museum or university (e.g. with all delivery staff involved) was also important so everyone interacting with the partner organisation understood their partners' challenges, aims and priorities.

> "Working in partnership we can all work towards transforming the field in ways that support science centres and science museums to become meaningfully inclusive, welcoming and relevant to everyone."

Emily Dawson, Associate Professor, Department of Science and Technology Studies (STS), UCL

Budgets, staff and priorities can change rapidly and dramatically. Within Explore Your Universe, the strongest partnerships were where science centre practitioners were constantly responsive, respectful and adapted around the needs of their community partner.

During Explore Your Universe, building equitable, open and trusted partnerships, that worked for the mutual benefit of all organisations, was the foundational bedrock for the most meaningful and successful participant engagements.

> "Move at the speed of trust. Focus on critical connections more than critical mass – build the resilience by building the relationships."

Adrienne Maree Brown, author, activist

ALLOW ENOUGH TIME

> Building trust takes time and patience: it is a process that cannot be rushed or fast-tracked. Time needs to be built in to allow for trust to grow at its own pace.
>
> P. Bienkowski and H. McGowan, Managing Change in Museums and Galleries, page 87

The shared high activity of a funded project is a great way to develop a partnership through exploring working practices together, but long-term outcomes can go way beyond this, for example, changing representation within your staff team or renewing policies and practice.

The value of partnerships beyond 'reaching a new audience' is explored further in the '*catalysing organisational change*' section.

This point cannot be underestimated and is an important reason to put your cards on the table and find out early on if your aims and objectives align. Partnership building requires an investment of time for both sides that should not be taken lightly, and it should have an organisation-level commitment.

Short-term or pilot community projects often do more harm than good. Science engagement partners can come across as disrespectful or disingenuous if only partnering to deliver to their immediate funding requirements. This can also damage opportunities for future partnerships and trust from the participants.

Working long-term and building trust with a community partner should be the goal for greater depth and sustained impact on both sides. Think beyond projects and embark on partner relationships with an open-ended expectation that it will continue beyond the project delivery.

EQUITY FIRST

As your partnership grows, try to keep unpicking any assumptions about priorities, perceptions and motivations that either party may have made about the other partner. Otherwise, this will continue to impact on how partners feedback and interact.

You may find you need to talk about a shared language. Historical terms commonly used in informal science learning (such as 'disadvantaged' or 'deprivation') are often considered inappropriate.

Challenge power dynamics

It is easy to underestimate, or not be aware of, the implicit power that comes from being an 'institution', both as a venue/space, a nationally known organisation or as a part of the science sector. A science centre, museum, university, or learned society can be perceived externally as being powerful and intimidating.

Arrange for your initial scoping meeting to take place on neutral ground. This could be a coffee shop, library or café. Choosing to meet somewhere neutral removes this possibility of intimidation.

Changes made in response to questions and challenges about power dynamics can be a useful thing to capture over the course of the relationship (see section on Evaluation in Practice) so prioritise putting time aside for shared reflective practice and regular communication. This can help challenge perceived power dynamics and support a healthy and effective partnership to flourish.

> I can't really say that one group is leading the other one, we are just interacting together in a very good way, and we just try to make things happen in the best way possible... we have the experience of how we can run it in the best way in the community and they know how it's best to run it to make it more interesting for local children, so that's a nice combination.

Community Partner, Cambridge

Find each other's superpowers

Each partner brings unique gifts to the partnership. Neither should relinquish all control, but partners should feel able to lead where their expertise lies. With trust and honesty, partnerships should feel able to feedback honestly to each other.

Always develop your partnership from an asset-based approach. Avoid the perception of any partner as being in deficit ('lacking' or 'missing' something). Always consider what you both bring, such as different approaches, ideas, spaces, networks, skills and expertise.

> [the project' was equal but I recognised [science] is their expertise... they're bringing their expertise into our expertise, which worked really well.

Community Partner, Cardiff

What your partner might bring:
Your community partner may bring trusted relationships with individuals, cultural and linguistic expertise, safeguarding training, co-design and evaluation. Working with a partner will bring renewed energy, enthusiasm and expertise in areas different from your own, and add valuable breadth of perspective to your organisation.

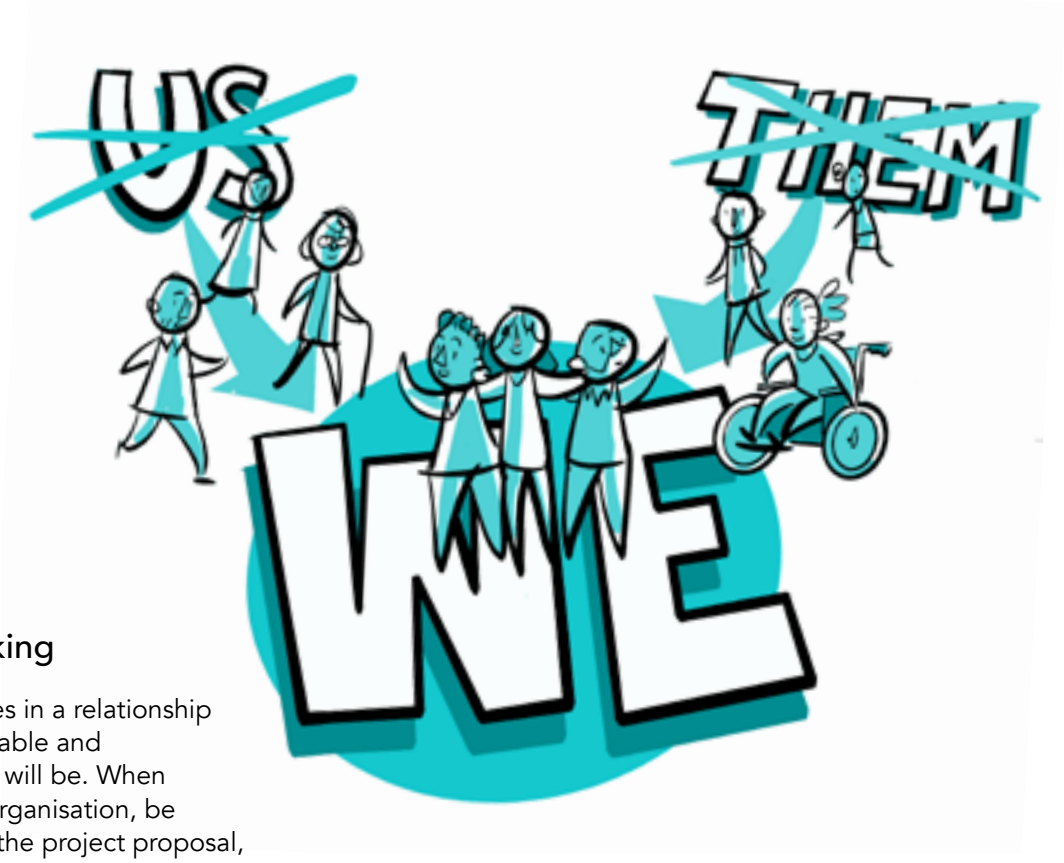
What you might bring:
Informal Science Learning organisations can bring a lot to the partnership beyond science resources and expertise. This could be providing a venue, wider learning resources, advocacy and dissemination, or the opportunity for youth work experience and developing employability skills.

Case Study from Explore Your Universe

Partnerships were supported when science centres could meet community partners' needs in other tangible ways. During EYU4 engagements, Techniquest were able to offer their science centre space to a community partner who did not have the necessary space available to them. This was a great example of being responsive and adaptable, going beyond the goals of the project to develop a true partnership.

> All partners have resources and assets, and an effective partnership creates a resource pool that every partner can draw on. Museums have successfully partnered with libraries, schools, churches and other cultural institutions, to cooperate and share resources and spaces rather than compete.

P. Bienkowski and H. McGowan, Managing Change in Museums and Galleries, page 61



Equity in decision making

The way we position ourselves in a relationship will pre-determine how equitable and collaborative our partnership will be. When approaching a new partner organisation, be transparent. Share a copy of the project proposal, including the budget line, so that your partner understands the aims of the project and what support is available. Equally, when making important decisions, ensure that the community partner has the same number of representatives as you. This prevents you from dominating any discussions. Keep asking the question – at each decision-point – who has representation, who does not have a voice, who is not in the room who should be in the room?

Learning from the

Developed by the Youth Equity+STEM (YESTEM) project, The Equity Compass is a valuable resource to help you adopt a social justice mindset across multiple dimensions of equity (represented by eight segments of the compass). It is a reflective tool that is particularly useful when making decisions, designing and developing policy and programming.
A free online Equity Compass course exists to help informal STEM learning, outreach and public engagement people create equitable, participatory STEM programmes. Find this course and more about the Equity compass at:
yestem.org/tools/the-equity-compass/

Case Study from Explore Your Universe

To support transportation to the science centre, Dynamic Earth proposed organising a minibus to bring participants to their centre. However, their community partner advised against this. Instead, they wanted to encourage families to take public transport, since confidence to take the bus was a skill the community partner had identified as a learning need for their members.
In this example an assumption that a particular approach would be preferred could have been made and a meaningful opportunity missed. This highlights that community partners need to be involved in these discussions and lead the decisions that impact their group.

Equity in funding

When sharing the proposal be sure to be transparent and open about the project budget. Withholding information or being unclear shows that you place yourself in a higher position of authority. Funding can cause an uncomfortable power imbalance, so keep challenging yourself and your organisation. A crucial step towards equitable working is to ensure staff costs across all partnering organisations (including volunteers) are valued in the budget. Best practice would be to prepare the funding proposal together. This ensures a more equitable and co-produced delivery, evaluation and budget plan from the very start.

However, it is important to acknowledge that there is a risk to beginning these conversations with new community partners based on a grant application that may not be successful, so be cautious on the depth of your scoping interactions if this is at a cost to your community partner.

Usually a single organisation holds the funding and is the main party leading the application, the budget, and is required to submit the evaluation. They often ultimately decide the scope of the programme and what success looks like unless the funder specifically encourages more active involvement.

The administrative pressure might feel appropriate to be shouldered by the bigger organisation that might be better placed (e.g. having dedicated finance personnel and audited accounts) to help process this. However, in some experiences, this opportunity to hold the funds – if desired by the community group – can help develop a longer-term capacity to hold funding in the future and become more self-sustainable.

Case Study from Explore Your Universe

The Association for Science and Discovery Centres asked for evidence of conversation and consultation between partners at the proposal stage which ranged from co-written proposal submissions to letters of support from partners.

A greater depth of co-production, and more commitment from partners to the project, correlated with the perceived degree to which the proposal and decisions on budget allocation had included both partners.

A challenge for academic or large institutions is how agile that organisation can be and whether the systems, such as the pace of generating invoices, paying community members etc. matches the flexibility needed.
Another option to consider is fiscal hosting when a third-party organisation – not necessarily part of the close partnership - hosts the money. This allows for accountability and simplicity and is often used for activist campaigns for example.

Learning from the

The Ideas Fund (theideasfund.org) run by the British Science Association and the Community Research Network funding, delivered by UKRI (building on research from the Young Foundation), are two initiatives that provide funding to communities to drive their own ideas, partnerships and research and innovation.

At a mid-point during Explore Your Universe Phase 4, funding was allocated directly to community partners to support their ongoing engagement with STFC science. Learning from this explores the power dynamics around who holds funding, the different agendas and opportunities that can develop, and when/why it's often not all about the money.

> "It is important to be aware that funding doesn't solve everything, for example those who might have caring responsibilities, rural communities, small organisations often overwhelmed to deliver services, or community members who aren't doing this as their main jobs. For many, time can't simply just be 'bought out'."
>
> Lewis Hou, Science Ceilidh

Where money is given directly to the community partners, science centres' support around proposal development (e.g. what activities might be feasible and how they could be used) was very valuable. In addition community partners found science centres' knowledge – such as ideas of where to source the supplies and which are high quality – was particularly useful to reduce administrative burdens.

As highlighted throughout this handbook, flexibility on behalf of the science centres was key. As organisations and as a network, their systems and processes could be responsive and nimble to adapt to changing priorities or needs.

The more informal science learning and education organisations are able to serve the provisions, priorities and ambition of their community partners, the more they become genuine community assets.

Case Study from Explore Your Universe

Y Fenter / The Venture in Wrexham received direct funding from Explore Your Universe to facilitate a series of sessions called "Eich Gofod | Your Space". This programme fosters an awareness of the night-time environment at the adventure playground with an emphasis on the observable universe and is being run independently by the play workers through gaining new ideas and knowledge through their partnership with Xplore! Science Discovery Centre.

Learning from the

After an initial pilot with Science Ceilidh, People Know How started running their own science clubs with young people. The youth workers weren't science specialists but had gained confidence from working with Science Ceilidh to have the key message "you don't need to be a scientist to explore science, you don't need to have all the answers, you just need to be curious and explore this together."

Case Study from Explore Your Universe

Edinburgh Young Carers received direct funding from Explore Your Universe to develop STEM care packages. Edinburgh Young Carers took more ownership and leadership within the project, including the administrative burden, with Dynamic Earth now becoming more of a consultant partner. The STEM care packages were a fundamental part of their operations and further strengthened the partnership as they dealt with Covid-19 lockdown.

GETTING TO GRIPS WITH LOGISTICS

Logistical support is essential to engaging participants from marginalised groups. Allow community partners to lead on matters of timing and food and rely on discussions with them to determine what additional support should look like.

Create a relationship action plan

You will need to respect the limited time your partner has available. You will both have time, budget and logistical constraints, so you may want to implement a flexible plan that maps a sufficient series of touch points for ongoing communication.

In order to agree on what level of communication is needed to create and build your partnerships as well as deliver your planned activities (e.g. 'x' number of interactions across 'y' months), you may need to consider whether you should schedule for the following:

1. Do you need commitment from participants for co-creation of sessions ahead of the main delivery phase?
2. Do you require opportunities for engagement with parents/carers or wider stakeholders?
3. Have you made space for reflective practice between yourself and your community partner?
4. Do you have a plan on how you'd like to evaluate the impact of your engagements (e.g. focus groups or interviews)?
5. Have you discussed decision-making processes and your approach to resolution of disagreements?
6. Have you considered when and what a positive closure to the project will be for both of you?

Within your plan for ongoing, open and honest communication, bear in mind that each community partner will have their own preferred method of communication. This may be phone calls, emails, or text messages. See if you can establish your method of communication early on – what is most appropriate and acceptable – alongside working hours to avoid texting a personal number when your community partner isn't working.

If you are working with a new partner, why not put more interactions in the diary than you expect. You can always cancel them if not needed, but most often you need more than expected to build understanding and relationship. Don't forget to book in opportunities to interact beyond the official project period to share learning, celebrate your work together, reconnect and discuss future opportunities.

Plan your first visit with your community partner at a time that is convenient for them. Exploratory meetings can take time, especially if your aim is to build rapport, so keep the rest of your day relatively free from other commitments. You will give the wrong signal if you are seen looking at your watch or have to refuse an invitation to meet with wider practitioners or the participants.

LEVELS OF CO-PRODUCTION

Partnerships can reach all levels and departments within organisations and with wider stakeholders. It is important to agree with your partner what level of participation is suitable for your activity. Each level requires different responsibilities and capacities from partners.

Consider the following levels of participation and note it is not the case that partnerships should have capacity or experience to reach for the deepest levels of participation. Some community partners will have very little capacity beyond their core service and may prefer to be involved at a consultation level. If in doubt, ask your community partner.

Visit the *Case Studies* section of our website – inclusion.sciencecentres.org.uk/case-studies – to explore where science centres and community partners placed themselves with their participatory projects with community partners.

Information: the offer is decided and provided by you as the lead partner and people join to hear information.

Consultation: the community partner/participants choose from a range of options, involving listening, feedback and discussion, but broader project objectives and delivery are led by you.

Deciding together: community partners/participants support the creation and design phase, bringing new options and joint decision-making, but delivery is still led by you.

Acting together: involvement of community partner and/or participants at each stage – from the planning and design, to the delivery and evaluation – sharing decision-making and forming a partnership to carry out the programme.

Supporting independent community interest: supporting partner agency, including offered funding, advice, and support to develop the independent ideas and agendas of the community partner.

> "My ideal aim with my current strategic partnerships is to reach a point where either we enable their 'voice' to lead the direction of travel/ideas or to innovate together. Where we move beyond a more transactional relationship of working together to deliver what we are good at, towards innovation and making the partnership extraordinary – more than the sum of its parts."
>
> Amanda Colborne, Participation Catalyst, We The Curious

EVALUATION IN PRACTICE

> We would've missed so much impact if we hadn't asked them (community partner) how they felt it went!

Practitioner, Science Oxford

Evaluating our work can be seen as a bureaucratic tick box exercise, required to ensure we are accountable for the outcomes of a project when writing reports. Whilst honest accountability is an important goal of evaluation, good evaluation should be embedded at all stages of the programme and should help us do our jobs better, more effectively and impactfully. Good evaluation can also ensure we are being equitable, that wellbeing is accounted for, and that expectations of participants are explored and met.

Enabling all stakeholders to take part in the evaluation process in an open and transparent way is the key to embedding the learning process for all participants. It reduces the risk that participants become subjects of someone else's observation and research or are 'left hanging' at the end of a project without suitable feedback or understanding of their participation.

The first step is to think about who should be involved in the evaluation and learning process, as discussed in the previous partnerships sections. The next step is to find out how we make a start.

Learning from the

A research collaboration led by University College London (YESTEM) identified and explored 'equitable youth outcomes'.

Find their model for Informal STEM Learning at: yestem.org/tools/equitable-youth-outcomes/

Find downloadable examples of pre-and-post tools, reflection journals and other creative evaluation tools at inclusion.sciencecentres.org.uk

STARTING OUT

A strategic, long-term approach to setting up evaluation frameworks can be really useful.

We often put together evaluation frameworks as part of reporting to a funder, and these frameworks are often based on a funder's objectives. Evaluations can also be piecemeal – quite different from one project to the next – but approaching evaluation in a case-by-case basis doesn't necessarily create learning for the whole organisation, beyond the individual project. Be bold! View each project you do as an opportunity to build up a coherent picture over a longer period of time.

For your current project, make sure you have clear aims and objectives. Identify these – perhaps in a simple table for clarity – and take them to discuss with your community partner or participants. Discussing these at the beginning ensures that the project concept and planning meet your original aims, but equally meet the aims of your partner.

If you are able to start this discussion early (even ahead of writing the funding proposal) you can bring shared aims for what you want to achieve together as the focus for your evaluation. Be mindful of time and resource your partner/participants can give at this early stage, but a collaborative approach ensures far greater buy-in from all stakeholders when it comes to capturing the impact and embedding the learning.

How about designing your own evaluation framework based on a long-term view of what you want to know? Ask yourself:

- **What are your 3-5 year strategic goals as an organisation in relation to engagement?**
- **What are your longer-term objectives?**
- **Are there consistent lessons or questions you can ask of everything you do?**
- **How can you include different funders' objectives in this strategic framework?**

Case Study from Explore Your Universe

Dynamic Earth and the Edinburgh Young Carers team identified that one main shared priority was to provide the young people with a fun opportunity for respite and family interaction. "As the sessions progressed, it was realised between us all that there was a lot of cross-over between STEM engagement practices and family development work."

It can be a very useful process to lay out your plan as a Logic Model or a Theory of Change. This can be a very simple document that sets out a list of your aims and objectives, inputs, processes, outputs and outcomes that you can refer back to. It is also worth considering the various influences, assumptions and risks that you should manage.

TOP TIPS

Whether you're making decisions about what you're measuring, how you're measuring them or who you're sharing the results with, keep asking yourself "who should be involved in this discussion about the evaluation process?"

Be prepared for things to change, evolve and develop, especially where the relationship with the community partner is new and/or exploratory. It is worth ensuring you capture and communicate these changes for your evaluation. It is often the unexpected outcomes that provide greatest learning for project holders.

Evaluation is not just about accounting for your work, but also helping you do your job better and giving the time and space to reflect on your work and practice during your project. Keep processes iterative and stay honest and open about changes.

Evaluation is the way in which you can both prove and improve your practice.

CASE STUDIES

Case Study from Explore Your Universe

Unexpected outcomes for Your Space and Xplore! Science and Discovery Centre included the way in which science helped one participant overcome his social barriers.

"At the start of the first session [community partner staff] told us to not expect one of the children to engage with us at all: "He likes to stay in the sensory room and do his own thing." It was such a fantastic surprise when he suddenly appeared next to us in the main space and excitedly took part in programming the robots, chatting to us about how much he loved science.

He remained engaged with all the activities sharing his knowledge and asking questions. At the end of the session [community partner staff] were so happy that he had not only spoken to us but had also interacted with the other children in the group."

LITTLE AND OFTEN

It can be helpful to think about evaluation as a learning journey – making sense of your work – rather than just a requirement for a deliverable. Evaluation requires a lot of thought and planning at the start of the project and is best done 'little and often' rather than just at the end of a project.

Part of this is making sure practitioners have the time and space to reflect on their work both independently and, where possible, with partners. This reflective practice helps support the expertise of the practitioners and also makes reporting the changes and learning across the project much easier. Capturing change within your partnership, such as perceptions of each other's motivations and objectives, can be a very useful thing to reflect upon.

Learning from the WIDER SECTOR

The Fun Palaces campaign involves ambassadors doing year round action research, testing out different ways to support cultural democracy (equal recognition of everyone's cultural expressions and values) in their local communities with participants.

Action Research

An increasingly popular model of science engagement includes incorporating models of Participatory Action Research and/or Peer Research. This involves participants (including lived experience), practitioners and researchers being actively involved in exploring a particular issue and making positive changes.

This framework of enquiry involves iterative cycles of research, action and reflection and helps challenge more extractive models of research and engagement, instead recognising that the communities themselves are best placed to explore, research and enact change in their own contexts.

Learning from the WIDER SECTOR

Science Ceilidh runs an action research project with their youth worker partners to explore how STEM can support wider youth work aims, including increased confidence and better relationships. The youth workers, who are not STEM specialists themselves, deliver this and work with the team to trial, facilitate and reflect, capturing the impact and voice of young people and using this to inform the next cycle of activities.

BEING EQUITABLE, LAWFUL AND TRANSPARENT

It is important to commit to core principles of ethical research, relating to responsibility, accountability, data protection and values of independent research. We have ethical responsibilities to ensure:

- We are inclusive, respecting different interests, values and perspectives
- We uphold the privacy, autonomy and dignity of individuals, groups and communities that we work with
- We conduct all our research with transparency and integrity, employing the most appropriate methods for the research purpose
- We always aim to maximise benefit and minimise harm in conducting and disseminating any project or research.

Always think 'Fair, Lawful and Transparent' but there are three more golden words – 'Voluntary Informed Consent'. Ensure all participants understand what they are being asked to do and how their data will be used. Keep participants informed, using a language and approach accessible to them, and make it clear that they are able to withdraw for any reason and at any time. A critical part of data collection is informing all participants of these rights. Under no circumstances should anyone ever feel coerced into participating or providing their data.

Collecting data ethically

From a moral standpoint, people are providing us with information that allows us access to aspects of their lives. This is a responsibility that is given to us, and we must be respectful of that trust and ensure we don't use it in any way that could cause harm.

At all stages of your project, it is good practice to avoid doing something 'to' communities rather than working 'with' them (see section on Working in Partnership). This is also the case with evaluation. Make sure you involve community partners in conversations about what success looks like to them within the project and this should inform your evaluation approach.

This should be balanced with the fact that many community partners can be very busy delivering services, so you should be mindful and realistic around the administrative burden of any evaluation approach with partners. Having an open dialogue as well as setting and revisiting expectations throughout the project is vital.

Case Study from Explore Your Universe

One example of a co-created evaluation was when Jodrell Bank Discovery Centre partnered with the charity Space4Autism. Space4Autism emphasised that their members didn't like to feel as if they were being scrutinized with paperwork and surveys. So, the developed questionnaire was scrapped in favour of assigning one member of staff at each session to be responsible for observation as a less intrusive evaluation technique.

Don't forget community partners have expertise and experience in working with their participants and stakeholders. They will likely have evaluation tools and approaches that may be particularly suited and already familiar to the participants. They will also be able to raise issues around accessibility (e.g. language) and safeguarding around sensitive or intrusive questions. If it is possible to work with their approaches, and other evaluation needs of the community partners, you are more likely to get better responses. This may require a conversation with funders to change or streamline an evaluation approach where required. Be responsive, respectful and flexible around the needs of your community partner.

Remember, data collection for learning evaluations can often overlap with, replace or simply feel like market research to your participants. So much market research has exploitative connotations for people. The more transparency and co-development you can build into your data generating and analysis processes, the less your partners and participants will feel like you are extracting data for your own unknown or commercial purposes.

WHAT QUESTIONS SHOULD I ASK?

Evaluation should no longer be about numbers alone. A large number of attendees through the door does not capture any understanding about who participates, the depth of the engagement and what they take home.

Consider measuring how your project has supported participants' feelings of agency, achievement, inclusive experience (e.g. feeling they belong), connection to science or confidence (among others).

There are many frameworks for evaluation, but STFC produced a simple toolkit for projects and programmes working with '*Wonder*' audiences. The toolkit rearranges outputs and Generic Learning Outcomes (GLOs) into three areas:

Contextual: What is your starting point? (This could include personal characteristics or pre-existing relationships to science.)

Reactive: What did you think of it? (Gathering immediate reactions following an engagement, including whether they feel welcome, inspired, etc.)

Reflective: What sticks/what will you do next? (This might take time to emerge and looks at more substantial change in interaction, identity or engagement with science, so ideally would be collected after a period of time following the interaction.)

Contextual questions you may wish to capture might include:

- Ages, genders (ensure this is not binary)
- Postcode data (can use alongside the Indices of Multiple Deprivation or understanding % Free School Meals for schools), descriptive details of your community partner
- A pre-existing relationship to science may be captured by the question: "Someone in my family is really into science or works in science" (Yes/No/Don't Know).

Reactive questions you may wish to capture might include:

- Did you feel you were able to join in and ask questions? (e.g. 5-point scale from 'Very much' to 'Not at all')
- Do you want to find out more about something you have learned?
- Did you feel comfortable in this science space?

Reflective questions you may wish to capture might include:

- Do you feel science has relevance to your daily life?
- Do you think science can have a positive impact on our future?
- Are you more or less interested in studying science or working in science?

If you are truly looking for iterative and honest responses, particularly to make tweaks and changes to activities, then consider inclusive techniques that support anonymous answers (e.g. asking for anonymous comments on post-it notes). This helps gather more of the seldom-heard voices from your participants and also helps reduce the temptation of participants to please the facilitator by only being positive, which is a particularly high risk when you have created positive relationships!

Steer clear of biased questions

Think about how to collect data in ways that will make the data meaningful. A key concern is capturing overly positive responses because people are in the middle of having fun and they want to be kind. How might you manage to collect the data you need without making people feel obliged to be positive?

Think about how you frame your questions: "How much did you enjoy your visit today?" or "How much do you love science?" will lead to more biased answers than if you asked more open questions to avoid leading participants or being too subject focused, for example: "Thinking about today, how do you feel? What would you like to share with a friend? What would you change?"

When you finally sit down to look at the data you've collected, try to keep in mind whether there might be any more biases in play that you did not anticipate at the time.

Navigate intrusive questions

The tension between what feels acceptable and welcoming versus requirements for rigorous data capture from individuals representing our most marginalised audiences is an ongoing concern.

If you use a questionnaire or survey to gather this data, be sure it meets the needs of your participants in terms of language, wording and levels of literacy.

> "Science Capital questions, in their entirety, are really personal. When we have to do these surveys, people can start to wonder if we are judging them or questioning their validity to be here."

CEO, Science centre, Audience monitoring and Science Capital report (October 2021)

Case Study from Explore Your Universe

When community partners did not want their participants to be involved in any evaluation personally, this had to be respected. Explore Your Universe therefore used reflection journals as the main requirement for data capture. These journals had to be completed – in part – in consultation with the community partner practitioner, and covered description of the demographics of the participants, whether people were actively involved, and whether there were any moments where participation or behaviour was more engaged than normal (termed 'meerkat moments').

If the planned evaluation feels uncomfortable for you, it's probably worse for your participants. Don't put your relationship and trust at risk. Take your lead from your community partner. There are always alternative ways to capture the data you need (e.g. an interview with your community partner).

HOW TO CAPTURE THE MAGIC

There are many creative and playful methods that can 'gamify' certain questions into activities (e.g. participants returning lab-coats onto coloured hooks based on their answer to how enjoyable they found the session). Different approaches to acquiring the answers you seek can help reduce the need for long questionnaires.

CASE STUDIES

Case Study from Explore Your Universe

Used to strict requirements from project funders, staff from one science centre spent a large proportion of a first session completing feedback forms with the families. The forms needed facilitation and participants struggled with the level of literacy required by the multiple questions, particularly as the forms had not been translated into the participants' first language.

Learning from this was rapid and taken forward to produce far simpler and more creative ways (single questions, stickers, emojis etc.) to capture experience. A flexible approach to evaluation methodology avoids diminishing the activity, experience or relationship when capturing impact.

TOP TIPS

You don't have to rely on a post-event survey form to gather feedback. Questions could be done during ticket sign-ups, as interviews or observations, or embedded into the experience itself.

Co-creating evaluation tools with community partners

Community partners and, where possible, participants should be involved in the design and co-creation of evaluation tools. They will know, for example, whether the language needs to be modified or translated, if the content needs more detail or simplification, or if images are misleading. They can also help their families or young people to fully understand voluntary informed consent.

Before you decide on a particular tool be sure to:

1. Sit down with your community partner and discuss the tools you are using. Explain what they are measuring and why you wish to get these answers.
2. Find out what they wish to measure and settle on commonalities. Avoid adding to the list, instead agree what you really will use to avoid overloading your participants with questions.
3. Think about the methods that are practical and how you can gather the data and inform participants on consent.
4. A balance needs to be struck between asking for the community partners' support and demanding too much of them.

Many of the most meaningful and long-lasting impacts of partnership work are too subtle or awkward to translate into quantitative data (for example, the trust developing over the course of a project between partners). This is where qualitative approaches and case studies can help capture the full story.

TOP TIPS

Keeping a reflective journal is a great tool for qualitative and quantitative data capture. It should be completed after every session and can help capture the 'magic' key moments, the stories of engagements and the unexpected outcomes.

In addition to metrics data (e.g. number of attendees) reflection journals can also capture formative evaluation of all the changes you made along the journey following feedback.

CASE STUDIES

Case Study from Explore Your Universe

At the start of the programme, designed partnership cards were used to share how new relationships were settling in. The cards contained single words such as 'tourist', 'guide', 'pilot', 'passenger' and even 'baggage' as options to choose from! The cards were conversation starters, but pairs did show some interesting dynamics. An exceptional, long-lasting partnership shared 'teammate' from the perspective of both the science centre and community partner practitioners. Whereas a partnership that struggled to meet an equitable balance in the first phase of delivery shared 'passenger' and 'performer' from the community partner's perspective.

Both your own experience and that of your partner should be a valued part of the evaluation picture. It is often your partner who can spot early signs of challenge or draw attention to 'light bulb' or 'meerkat' moments, or other indicators of impact that would otherwise be missed. Including this voice in your evaluation uncovers a wealth of impact and understanding from a different but critically important perspective.

This can be effectively captured using interviews or completing reflection journals together.

> "The reflection journals were a useful tool and the principles of reflective practice that were stimulated through conversation about the journals will be integrated into team planning in W5 going forwards."
>
> Practitioner, W5

> "We do not learn from experience... we learn from reflecting on experience."
>
> John Dewey, Author

> "Interrogating practice with the reflective diaries gave us a new dimension to how we were doing things... Reflective diaries are now central in everything we do at Aberdeen Science Centre. All team members are encouraged to use reflection on a daily basis."
>
> Practitioner, Aberdeen Science Centre

Evaluation is about building a broad picture that can tell a story of impact and learning. There is no single evaluative tool that is perfect by itself, so a good rule of thumb is to collect and triangulate three different approaches to help capture this bigger picture (e.g. reflective journals, practitioner surveys and observations).

Pre and post data

If you are looking at multiple interactions or changes over a sustained engagement, another consideration is whether you want to connect results to an individual (for tracking impact or change). This raises questions about anonymity, but there are creative ways you can anonymously track individuals from pre-to-post, without asking for names or date of birth outright.

Allow enough time

Build in plenty of time to do this properly, not at the last minute when everyone is jumping on the minibus home!

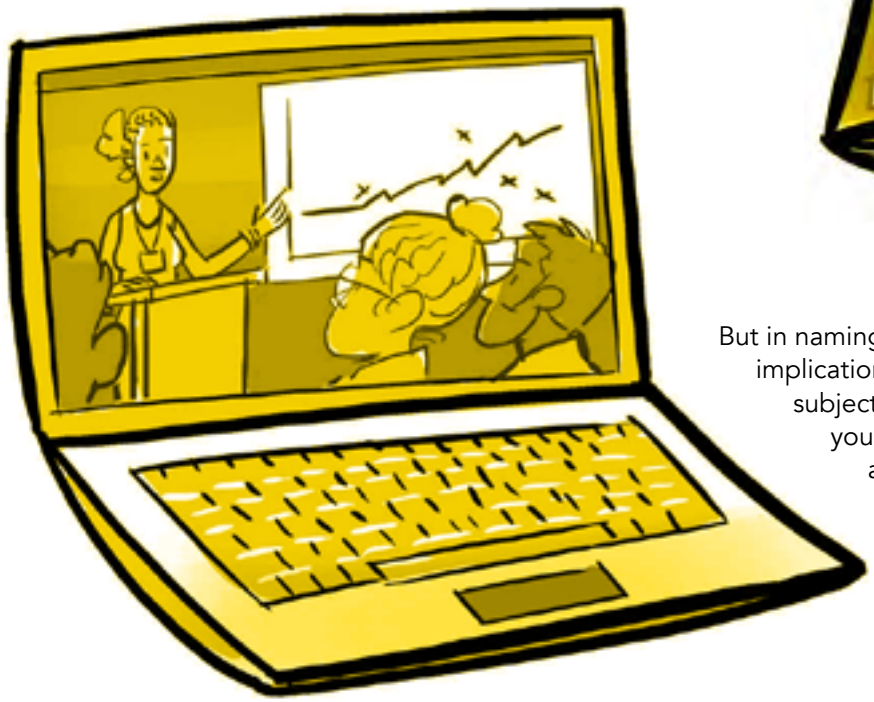
Gathering quality reflections doesn't need to be a formal focus group. Depending on the age and nature of the group, you could gather reflections by having a short discussion, or by asking everyone to think for five minutes before writing anything down on their form. Either way, it is worth encouraging them to take their time.

SHARING YOUR PRACTICE

Dissemination is a crucial part of project work. You and/or your community partner may want to share practice at relevant events or meetings, produce and disseminate digital or physical resources, or publish your outcomes in a journal or online.

Whichever method you choose for your stakeholders, celebrating your success, advocating for inspiring practice, sharing your challenges, and how you may (or indeed may not) have overcome them, is an important responsibility of running any programme of work.

Your community partners may wish to have their achievements or challenges credited or highlighted in your dissemination. Recognition is an important part of the control of the research.



But in naming organisations, does this have any implications for the anonymity of your data subjects? This is a discussion to have with your partner to allow for suitable credits and recognition, while respecting privacy of data.

Stories of change

Particularly important in complex or innovative programmes, look for narratives (a beginning, middle and end) to celebrate your successes, learning and the change that has resulted from your project or programme. They are often used in development interventions – to combine with or supplement quantitative indicators of success – to build up a richer picture and communicate changes in knowledge, behaviours, attitudes and practice that cannot easily be captured in quantitative metrics.

Stories of change are powerful, not just for us to explore the change that has occurred, but also to demonstrate and share learning more widely. Stories of change can bring the project to life for external audiences as they may be more able to identify with the results of the programme through the use of real-life examples. It can equip you with something accessible to convey the value of the programme and provides funders with a tool to communicate the value of the work they are funding to a wider audience.

Crucially, don't forget to share the bits that didn't go well! There are many barriers to sharing mistakes, but inclusive science engagement is inherently a messy science. It is values-led, takes time and requires relationships, understanding, problem solving, training, professional development and reflective practice. Speed bumps and potholes should be an expectation of the journey.

You don't need to produce an open report or website, but consider using different forums (such as creating a 'safe space' conference workshop environment) to share your successes *and* your challenges. It is also far easier to learn from others' mistakes than from a seemingly perfect and inspirational project report. With that in mind, The Association for Science and Discovery Centres, who led this programme of change, is always open to share more about what went well – and what really could have gone better – during Explore Your Universe.

Feel free to contact us anytime: info@sciencecentres.org.uk

STRATEGIES FOR ENGAGEMENT

From the start it should be openly acknowledged that, in many cases, a full understanding of the needs and values of your participants, what type of collaboration would be most meaningful, and what content and resources are most relevant and useful for them can be pushed aside if one partner comes with an inflexible science agenda.

This can often be driven by funding requirements, such as previously written and agreed proposals or strict allocations of resources.

It is also easy to underestimate, or not be aware of, the implicit power imbalance that coming with a science or research agenda can cause. Particularly for individuals who identify as having low science capital or have had previous negative experiences with STEM (Science, Technology, Engineering and Maths), with education or authority.

But, if you are coming to a partnership with a STEM agenda or a STEM funded project, it does not need to result in science engagement being done 'to' participants. Participatory methods, alongside ongoing open and honest communication of time, budget or logistical constraints between partners from the outset – ideally before the project proposal has been written – can be beneficial, even transformational, for all involved.

Within this section we explore some of the learning from different methods of community engagement, that were tried and tested between community and science centres partnerships within Explore Your Universe, alongside learning from outside the sector.

> "I used to like science but then it stopped being fun. I think maybe I like it again now."

Pre-teen participant, partnership with Science Oxford

The balance was not always right first time, but the learning from these strategies for engagement is explored below and continues to emerge.

> "Lots of our children have never tried anything like this outside of school before. You can tell how much they are enjoying it; they didn't want to leave."

Community Partner, Oxford

CO-PRODUCTION IN CONTEXT

> The children are invested from the start because they feel valued and listened to.
>
> Practitioner, Xplore! Science Discovery Centre

One of the biggest challenges to participatory practice can be a strict focus on a specific agenda. For example, in Explore Your Universe Phase 4, sharing the science and stories of STFC is a core part of the programme, but the knowledge base of the community partners related to STFC science was limited. Training them in the science was outside the scope of this project. So, this project grappled with what co-production could and should be.

Learning from

"What we used to do, by and large, was start from a funding stream... What we do now, is we start with the community."

The Lightbox in Woking share the benefits and challenges of 'starting from zero' here: ourmuseum.org.uk/starting-from-zero

For each individual project – with a limited timescale and resource – each partnership needs to find an ideal place along a co-production scale: from simple consultation, through to supporting a community partner's independent interests. For examples of a co-production scale see our Working in Partnership section or visit our Case Studies online at: inclusion.sciencecentres.org.uk/case-studies/.

Within Explore Your Universe, different levels of co-production were chiefly determined by how well the community partner and science centre already knew each other, with greater depths of co-production being reached within the first year of the project for previously established partnerships. Other aspects such as changing contexts, priorities and capacity also played important roles.

It is important to realise when a community partner would prefer light touch involvement. This might change for different stages of your project together. Co-production takes time and resource, so keep listening. Make sure you are nurturing confidence but equally not pushing them too far out of their comfort zone or away from their core priorities.

> "Co-creation is incredibly difficult, but incredibly powerful."
>
> Wyn Griffiths, SMASHfestUK

Case Study from Explore Your Universe

In addition to co-producing the activities and interactions, the co-development of initial funding proposals with community partners was mirrored by a great strength of partnership during project delivery, bringing increased benefits – such as relevance to the young people's experience – of the science engagement activities.

> "I didn't know that counted as science!"
>
> Teenage Participant, partnership with Science Oxford

Learning from the

"It's critical to work in and with the communities we seek to serve, to help lower known and perceived barriers to participation… Our SMASH approach and model focuses on being hyperlocal, free, entertainment-led, community based and with an overarching narrative linked to the local community. Geographical and narrative 'localisation and personalisation' of the stories can shift attitudes in those who might have felt that 'science is not for me', to 'science is for me'".

Wyn Griffiths, SMASHfestUK

WHERE DO I START?

> "Start co-development, co-design, co-production with the principle: 'in the community, with the community, by the community'"
>
> Wyn Griffiths, Smashfest UK

As science communicators and public engagement professionals, we can become accustomed to delivering pre-set sessions, talks or stage shows, making sure to cover particular objectives in set time frames.

> "We've never done this before, we're just going to go in... and if it's a disaster, then we've learnt how not to do it."
>
> Practitioner, Cambridge Science Centre

When working in new environments and with non-traditional audiences, it is important to make the shift from prescriptive and detailed plans to being able to adapt 'on the fly'. This can mean changing your activity at the last minute to reflect a community issue or interest or, if you see that they're not engaging, taking some time to play a game and have a discussion about the types of things they enjoy doing. If you don't manage to cover as much (or any!) of the content you wanted to in a single session, that's OK! The time you spend relationship building will further develop your understanding of the community.

Case Study from Explore Your Universe

The first meeting for Explore Your Universe Phase 4 brought together community partners, school specialists and community engagement professionals for an honest reflection on how science centres can work better with their most marginalised audiences. The following words came up as 'themes' to guide the project proposals:

'Meaningful', 'Skills', 'Celebratory', 'Emotionally engaging', 'Adaptable', 'Flexible' 'Exploratory', 'Modular' 'Something to take away', 'Fun from Day 1', 'Refreshments!'.

Case Study from Explore Your Universe

Every single partnership within this programme resulted in the science centre practitioners stepping out of their comfort zone to some respect. This was often the case when science communicators experimented with the initial co-creation of the activities. The following are all quotes from science centre practitioners reporting on the start of their delivery:

"nervous about unscripted sessions"
"out of their (science centre staff) comfort zone"
"all been slightly scary"
"a steep learning curve"

Below are the same practitioners as they reflected on their experiences:

"content we delivered was far more relevant"
"a great challenge they (science centre staff) are really enjoying"
"engaging and effective"
"exciting and different way of working, we are relishing the opportunity"

Enjoy getting to know your partner's expertise. Find each other's superpower – your gifts you can bring to the project - and leverage this to create the best outcomes for participants together.

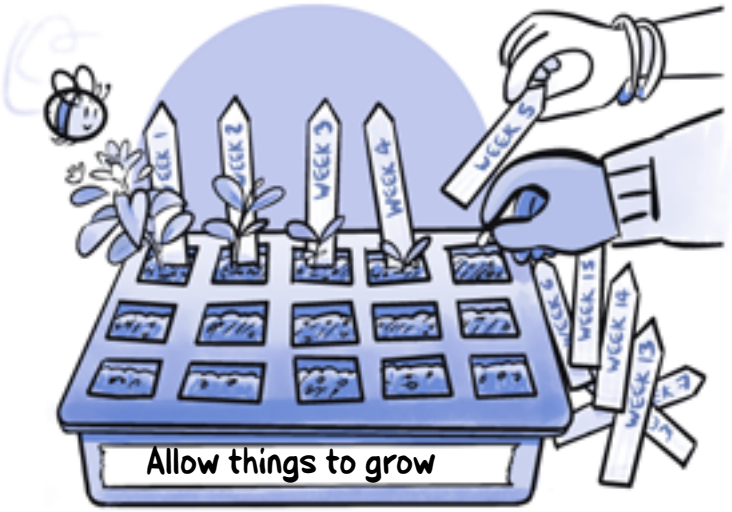
> "Once you start talking to your community partner, ideas will grow ... that's the whole point."

Practitioner, Jodrell Bank Discovery Centre

Having clearly defined roles

Partnerships between STEM practitioners and community partners worked best when each party took the lead in the areas they are most comfortable and experienced with. Co-production in the context of Explore Your Universe looked for equal collaboration to develop activities for young people. But that did not mean that the community partner had to lead the science content. Instead, they often led with their deep knowledge and understanding of the young people and families they work with.

This is not to say that your community partner won't have suggestions for the content, but rather it should not be an expectation that they will feel comfortable or take the lead here. In addition, strictly defined roles can place restrictions on what the community partners feel they can contribute to. Open conversations around roles and expectations should take place regularly to support a strong relationship.



> "Overall Explore Your Universe to date has had a monumentally positive effect in our operations and we hope that this will help us shape everything we do..."

Practitioner, Aberdeen Science Centre

EFFECTIVE METHODS

Emerging from Explore Your Universe came a number of methods for working with diverse and under-served audiences. These strategies may not be applicable to all audiences, but they can be used to understand what level and balance of co-production was found to be most suitable here, to help set expectations when engaging with community partners in this context, particularly for the first time.

> "I'm doing proper science!"
>
> Participant, partnership with Xplore! Science Discovery Centre

A whole lotta stuff

Distribute a range of items and/or activities around the space. Allow participants to explore on their own terms and in any order. The activities they gravitate towards and enjoy can provide insight to guide the development and structure of future sessions.

Be sure to engage informally with participants. Get to know them and take their interests on board. You might want to visibly take notes to capture their feedback and suggestions.

This strategy is particularly successful when engaging with a particular topic where the content is unfamiliar to many children. For example, asking what area of STFC science the students are interested in exploring was unlikely to be fruitful in Explore Your Universe.

A blank sheet of paper can work if facilitated really well or led by your community partner, but it can also be overwhelming and too broad. Similar to being asked to pick any song for a playlist (your mind goes blank or you may be worried about saying the wrong thing) there are many reasons why a blank-sheet-of-paper or a completely open-question approach isn't often the best opener.

Learning from the wider sector

The Horizon2020 EU Funded programme 'Our Space Our Future' also embedded co-production in partnership work with schools. Delivery partners reported:
"We didn't have a lot of time, but wanted to work with their interests. Given complete freedom and a blank sheet, they of course worked with what they knew already: the Moon, Mars, maybe Uranus! But we rarely explored further, so we introduced a section with multiple choice. They could still be in the driving seat, but now have the opportunity to explore a black hole or vote for an astrobiologist as their favourite space career rather than an astronaut."

This problem is summed up in this quote from a participant at We The Curious, Bristol when visiting the café as part of their Curious Researchers project:

> I like apple juice, but if I knew orange juice was an option, I might have chosen that instead.

"What would you like to do next?"

This simple question is more of a consultation level of co-production (or 'co-development-lite' as one practitioner termed it) but it is still very valuable to deepen relationships and is far more collaborative than simply delivering a pre-set series of activities. Your willingness and enthusiasm to draw on the interests of your participants and the expertise of your community partner will strengthen the activity you offer.

TOP TIPS

When the activities take place, if it is not obvious, emphasise areas where feedback has been taken on board to clearly demonstrate to participants that their ideas were heard and valued. Relationships flourish when partners or participants can clearly identify elements where they have had input.

TOP TIPS

Provide a menu of options that participants can choose from based on their interests. Multiple choice options, along with ways to make these choices engaging and anonymous, can help bring out the interests of group members who wouldn't otherwise put themselves forward. Why not try using live polls like Slido or Mentimeter etc, or get hands on with Plickers for the vote?

> I also really liked having the big paper board that I could just write down on because it showed that I was listening to them... next time, I'd bring back that board and go "here's what you wanted to look at, here's what we're doing.

Practitioner, Techniquest

Case Study from Explore Your Universe

Taking a 'co-development-lite' approach Aberdeen Science Centre first proposed a set of activities to their community partner (Fersands and Fountain Community Project). On agreement, and once the initial activity took place, the two partners reflected together and Aberdeen Science Centre took on board the feedback from their partner to inform the following engagement.

The partnership progressed in this way, leading to a series of successful experiences for the young people involved and leaving both Aberdeen Science Centre and Fersands and Fountain Community Project feeling like the experience had been truly collaborative.

Building a rapport

Closely tied to building trust, create opportunities to ask questions or have casual chats, whether around food, during breaks or during activities, to gain wonderful insights into participants' interests and experience of science and what they already value about it.

Not only does this help you get to know them individually, but it can also help you understand what they experienced from the engagements, what worked and what could be improved.

Building relationships and trust is particularly important when working with young people who may have had adverse childhood experiences. They may have been excluded from similar positive learning experiences previously, have a mistrust of authority or innate responses that are deep seated and cause unpredictable behaviours for those who don't know them. So always value the experience of your community partner.

TOP TIPS

In all cases, reflection with your community partner – formal or informal – should take place. This can then feed into the development of future engagements. Reflection can be as easy as a brief chat over the phone. Ask the questions: "What was a really good moment?" "What was challenging?" and "What learning can we take from this?"

Learning from outside the sector

"If something isn't working - modify, change strategy and stay flexible. Stay real, visual and multi-sensory. And above all, you need to be a people person and develop a rapport with the students. Be quick to make those connections and find common ground. This is quite critical to building a relationship."

Science Lead, Notton House Academy (specialised in working with young people with Special Educational Needs and Disability and trauma-informed teaching).

Putting community agendas and ideas in the driving seat

> That kind of openness, asking the question, stating what we have that they can use, but also listening... if there's a whole bunch of people who are saying 'we'd really like thing Y', OK maybe we need to actually think about that because that's something that is going to be useful.

Practitioner, Cambridge Science Centre

Many of the strongest examples of co-production start with openness and questioning, which is something that can easily be adopted by science centres, museums, researchers and other STEM practitioners embarking on this kind of work.

Case Study from Explore Your Universe

A group of young people created an edition of Cambridge Science Centre's 'Open Up Science' magazine. In this case, the theme of the magazine chosen by the participants was 'animals', and pairs of young people worked together to develop pages for the magazine. Although 'animals' did not fall neatly under the umbrella of STFC science, Cambridge Science Centre practitioners knew that the best way to inspire participation was to allow the young people freedom to choose the theme. Then, using their expertise, they could build a narrative into the activity that linked back to STFC science.

> They were asking all the right questions. They wanted to know how to make it, what they're going to do better, and they were open to all suggestions and ideas... That was really refreshing for us all the way through – they kept us involved and asked us – rather than saying 'we're coming in to do this for you', they wanted to know 'how' can we come in and do this for you.
>
> Community Partner, Cheshire

Having objectives, but no preconceptions of what your participants should be interested in, involves fleshing out a plan as you go, through interactions with your community and/or your community partner.

Deeper levels of co-production, where the creation, development and delivery is also led by the participants, are likely to take your engagement or research ideas in new and unplanned directions, so be prepared to get out of your comfort zone and let go of the control!

> It feels a little bit unprepared not to have a plan but actually it's the right thing to do. Don't have a plan, have objectives.
>
> Practitioner, Jodrell Bank Discovery Centre

Learning from the wider sector

Parenting Science Gang, a Wellcome-funded, user-led, online citizen science project set out over two years to enable groups of parents to run their own research in areas of science that interested them. The topics for research were decided solely by the parents during the project and the whole process took place on Facebook.

The parents wrote a long list of parenting questions that they wished that research was providing answers to and then voted on which ones to investigate themselves. With the support of academics, the parents wrote and carried out seven different research studies on subjects ranging from investigating the content of breast milk, to an experiment to look at the impact of gender stereotypes in picture books.

> I feel that if I gave him an idea, he would deliver. He's open to any suggestions, any ideas and times, so flexible, so we can, if we want to improve it a little more we could have another meeting and sit down and put another workshop together...
>
> Community Partner, Aberdeen

Learning from outside the sector

Public Involvement, Imperial College London

Researchers from the Department of Primary Care and Public Health at Imperial College London invited parents and carers to a two hour online forum to share their experiences of accessing healthcare services during the Covid-19 lockdown. Their contributions had a positive impact on the team's research, helping to inform future research directions and reflect on key messaging. For the researchers, public involvement strengthened their motivation to pursue their research goals and highlighted how important the issue was for parents and carers. For the parents, they felt as though they had been listened to, and appreciated being around other parents who had faced similar issues: "I have enjoyed this – it's nice to have some empathy from other parents."

Imperial College London have designed a set of resources for practitioners who want to involve the public in their research, from identifying areas for involvement and applying for funding, to evaluation. Find out more by visiting their website: www.imperial.ac.uk/patient-experience-research-centre/ppi/ppi-resource-hub/

> "What came from not having a detailed plan, developed into conversations that continued throughout the development and delivery and resulted in activities co-produced by the community partner."
>
> Practitioner, Science Oxford

Heading towards an 'end product'

Working towards a shared goal or 'end product' with your community partner can steer the activity in the right direction and give participants a reinforced sense of ownership, agency and pride. An 'end product' could be an activity, a tangible output such as a physical object or exhibit (e.g. a zine, drawing or fabricated item) or a celebration to signify the end of the project.

> "No matter how complicated the research, or how brilliant the researcher, patients and the public always offer unique, invaluable insights. Their advice when designing, implementing and evaluating research invariably makes studies more effective, more credible and often more cost efficient as well."
>
> Professor Dame Sally Davies, Chief Medical Officer for England (2010-2019)

Case Study from Explore Your Universe

For community partners working with Science Oxford, their original 'end product' plan was to develop an exhibition or display for their newly built community centre. Due to Covid and building delays this was not possible, so Science Oxford worked with youth workers to support them and their young people in developing and presenting their very own planetarium show. This show was presented at the community centre, attended by friends and family members. They were the ones deciding what the activities would be and delivering the end product to proud family members.

Learning from outside the sector

Walton Youth and Community Project

Over a period of twelve weeks, Walton Youth and Community Project worked with artists from Tate Liverpool to co-produce an exhibition designed by young people. The project had an 'end product' but there was no plan for how to get there. Asking the young people what they wanted to do in week 1 of the project was counterproductive – some of them had never used pastels or paints before – so choosing a 'medium' to create their art with was an alien concept for them. By listening to the ideas of the young people and letting them experiment with a variety of art materials, both the artists and participants grew comfortable in their new environment and decided upon a theme for their exhibition: transformation and identity.

Despite not having an idea for the exhibit until week 8 of the project, the artists' flexibility and willingness to explore new materials with the young people, without being too concerned about time constraints, helped to develop their relationship and co-create an exhibition that neither party would have imagined was possible during the early stages of the project.

> "Science is making me curious."
>
> Participant, partnership with Xplore! Science Discovery Centre

Supporting autonomy and agency

A key aspect of co-production is supporting the autonomy and agency of participants. Whether you reflect on a previous workshop to inform the next, consult participants about what they would like to do, make changes during the course of a workshop, or direct activities towards a clear 'end product', the significant aspect of all these strategies is building a feeling of ownership into the activities and supporting participants to actively contribute and participate on their own terms.

> "That was something that the children chose themselves, and that's why they took the ownership and they really loved it and they kept working on those."
>
> Community Partner, Cambridge

Case Study from Explore Your Universe

Having never worked with North Cambridge Community Partnership before, Cambridge Science Centre invited their community partner to co-produce an edition of Open Up Science: a free, weekly magazine filled with facts, puzzles, quizzes, and experiments that can be done at home. When the project was completed, Cambridge Science Centre officially launched the edition at a red-carpet ceremony, which families and friends were invited to.

DON'T IGNORE THE LOGISTICS

Consult community partners about the format of the activities and take on board their recommendations.

Working or consulting with a partner who knows the participants' experiences, interests and culture can help make the right decision on the timing or format for your engagements. Timing is crucial, and getting this right ensures the participants can attend and engage, so allow for flexibility in your programme and avoid 'shoehorning' people in at a time that suits you and not them.

Take into account cultural differences, holidays, faith or times of remembrance for certain groups. Ignorance could result in organising large catered events during Ramadan, or providing alcohol or mixed-gender events for adult communities where this is inappropriate.

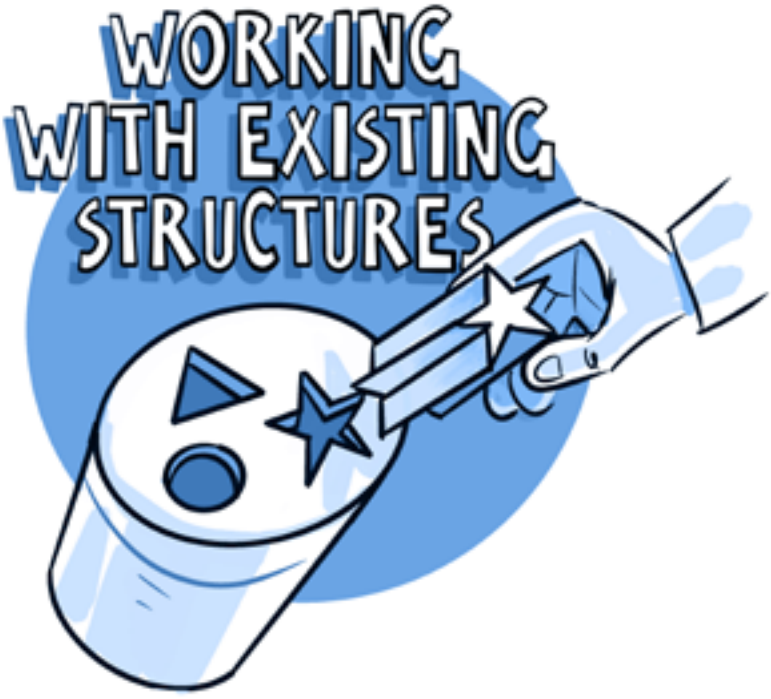
Being culturally educated before you decide on the format of your engagements is critical to avoid jeopardising your relationship with your participants.

TOP TIPS

A willingness to work outside of your venue for part of these engagements will be necessary to enable new audiences to feel welcome and comfortable. Guidance from our consultation was simply that neither 0% nor 100% of engagements should take place at the science centre, museum or university site.

Fitting with an existing provision

Your community partner is likely to be running successful programmes of their own (e.g. after-school clubs, family nights or regular interventions for young people at risk of exclusion). They may have regular communications (Facebook groups or celebratory events) with their families that can be creatively utilised. Building on known, trusted, existing provisions, rather than insisting on a series of new interventions, is more likely to engage your target audience and has the benefit of not adding extra logistical requirements for your participants. This can work particularly well if you have not previously worked with the community partner or group.



Case Study from Explore Your Universe

Aberdeen Science Centre were able to offer their community partners a set of activities that fit well with their existing provision and interests in inspiring and engaging their young people with science, and expanding their horizons. Similarly, Techniquest were able to work with their community partner, who were keen for the opportunity to have someone bring in expertise that they did not have, to build young people's confidence about engaging with science.

What are your partner's priorities?

Of course, as fun and engaging as your engagements are, always stay mindful that your programme often cannot be your partner's most urgent priority. Science practitioners need to be as accommodating as possible, to be prepared for last minute changes to activities, participants, equipment or venues.

You may want to start your partnership by creating a shared vision and a set of shared values. What is it that your organisations would like to achieve that they can aim for together? What will success look like? This could become linked to the 'end product' you or the participants choose.

Case Study from Explore Your Universe

Science centres who managed their own expectations around what their partners would realistically be able to commit to – and complete in the time they had together – felt they had the most successful experience.

"Really trying to get hold of what the group wants to get out of it, what the objectives are for the group, to make sure that, as much as possible you're meeting their expectations and meeting their needs. And then being flexible so that if the first thing that you do doesn't work, or it doesn't go quite how you'd planned or expected, then you've got scope to wiggle it around."

Practitioner, Dynamic Earth

> "I was the familiar face; I could build an actual rapport with people."
>
> Practitioner, Techniquest

Consistent staff are key!

Case Study from Explore Your Universe

For young people and families involved in the programme, consistent staffing was critical. It allowed participants to build trust and begin to form positive relationships with science centre staff. In turn this supported their engagement.

When young people from Your Space visited Xplore! Science Discovery Centre, they looked for the staff members who had led sessions at their organisation. At Dynamic Earth, consistent catering staff serving snacks (a requirement of Covid) was yet another positive point of contact for families from the Syrian Dads Group.

"If we could have the same people, because that's a big thing – don't keep changing your staff"

Community partner, Cheshire

Involving more than one practitioner can be expensive, but there are many benefits. It not only mitigates the risks on the day (e.g. if a colleague can't attend for some reason) and improves the legacy of the partnership (e.g. if someone leaves), it also extends the professional development benefits for more staff, helps with health and safety, and supports organisational learning by reflection.

Through consistent staffing and multiple interactions with the same practitioners, science centres, museums and universities can also become a trusted 'brand'. Beyond simply knowing an individual, participants can feel they know the organisations, which can help individuals – who might otherwise be reluctant to visit – feel more comfortable and willing to do so due to a personal connection.

Case Study from Explore Your Universe

During the final stage of delivery, science centres were able to involve multiple members of staff. While there often continued to be a primary contact, many community partners in this phase experienced positive relationships with more than one science centre practitioner. This added stability to the partnerships, and was a strong enabler in continuing to work together after the programme had come to an end.

Allow enough time...

Time is an essential component of successful engagement and co-production. Build as much time as you can into the process so that activities can be created collaboratively. Time allows for more conversations to take place before engagements start. If you only have one-off interventions with participants, it is still worth building in long lead-times to develop your understanding with your community partner in order to get it right in the time you have. This lead time is even more useful if planning multiple engagements. It supports a stronger relationship for co-production, and gives you more room to be flexible.

> "Ensuring you can arrange a long enough series of sessions that a meaningful relationship can be made. We ran 4 sessions but ideally would have done more if there had been time – I think 4 was the minimum required to build relationships."
>
> Practitioner, Dynamic Earth

> "It's time more than actions I think... like all relationships it's the time of getting to know one another, not in the sense of what you do but who you are and what's going on."
>
> Practitioner, Cambridge Science Centre

CASE STUDIES

Case Study from Explore Your Universe

For some, the pause in interactions due to Covid-19 supported the gradual and organic development of partnerships, without the pressure of an impending activity: 'When they came in on that first [workshop], it was almost like we'd known them for a long time... we'd built up quite a good relationship, even over digital means... they just felt part of the team'.

Community Partner, Oxford

TOP TIPS

If you only have a one-year science engagement programme for development, delivery and evaluation, that also involves co-production of content, key learning from Explore Your Universe would be to work with a community partner you already have a good relationship with.

> "Any genuine ambition to enable more equitable participation in science for previously marginalised communities requires commitment and resource to the time it takes to build meaningful relationships and trust."
>
> Shaaron Leverment, Chief Executive, Association for Science and Discovery Centres

DESIGNING FOR FAMILY INVOLVEMENT

> "I remember one little boy in particular, his mum was there, his nana was there and his auntie was there and when it was his turn to fly his rocket, his family shouted and he was proud and they watched his rocket go off."

Community Partner, Wrexham

Families and peers heavily influence a child's interest in science. Parental attitudes to science are strong predictors of whether a young person will engage with science or aspire to having a scientific career. Involving parents in science activities opens up dialogues between family members. This helps to support scientific literacy and STEM choices.

Working with community partners who already engage with families (rather than being primarily adult or youth focused) was a great fit for Explore Your Universe. However, including parents, carers and wider families still needs to be purposefully discussed and designed in. Consideration and accommodation for siblings (not necessarily in the same activity) alongside clear and necessary roles for the children and the adults supports more regular, deeper family engagement.

Discussions with your community partner are key to identifying which approaches are likely to work better and when. Compromises in timing and scope will likely need to be made. Your partner is also likely to come up with creative ideas of involving families that you would not have thought of. For example, methods used to start conversations at home and create new connections with parents included ideas for home activities, science questions or puzzles on the back of consent and sign-up forms.

Case Study from Explore Your Universe

Families visited one science centre following their children's sessions. It was the end of the afternoon and the families unfortunately didn't stay long enough to see the show their children had contributed to.

In contrast, many families came to Science Oxford's 'family showcase' at a community centre to see their children's presentations.

This difference could have been due to the venue being familiar and local, more suitable timing, or perhaps because they were seeing their children performing, rather than watching a show they had contributed to, but was delivered by the science centre.

> It brings the family together and we learn new things. Also meeting new friends... We've had time together just the two of us. Before the project they hadn't made time for that.

Adult participant, partnership with Dynamic Earth

Across the Explore Your Universe programme, an unexpected outcome was the strong role STFC science played to facilitate bringing families together in positive, safe, fun and welcoming environments.

Case Study from Explore Your Universe

Working with Edinburgh Young Carers, Dynamic Earth created a crèche-like environment, where siblings of participants were provided with their own activity and cared for by other staff. This meant that the young carers could have one-to-one interactions with their parents, something they had rarely experienced in years, if at all.

This was by far the most valuable part of the project for those participants and would not have been possible in an activity which involved the 'whole family' as the parents' attention would have necessarily been focused on the child with needs rather than the young carer.

Case Study from Explore Your Universe

A community partner who had engaged with Techniquest during Phase C of the programme described a young father who had come along to the sessions and interacted with his young son: "He had suffered with mental health and was very, very nervous, and wouldn't engage and was quite nervous about just being involved, … and he actually turned up with his son and became involved, and did things and was talking, and he turned up every day. So, I think from that – I was quite pleased to see him. It was great to see him. And he did look nervous, but he turned up and he came every day, and he had that interaction with his son and things."

CATALYSING ORGANISATIONAL CHANGE

> "The fourth iteration of Explore Your Universe marked a real departure for both STFC and our ASDC partners, placing the wants and needs of local communities front and centre in our work. We are delighted with the community led science engagement it has supported, the rich and enduring partnerships fostered and the learning captured which can benefit the science centre sector and far beyond."
>
> Jenni Chambers, Head of Public Engagement & Skills, Science and Technology Facilities Council UKRI

The shared high-activity of a funded project is a great way to develop a partnership through exploring working practices together, but long-term outcomes can go way beyond this.

Participation, where the local community has agency and influence over decision and action, brings exceptional and wide-reaching benefits for organisations who are open to becoming more relevant, diverse and sustainable science learning spaces.

Benefits of partnership work for science centres involved in Explore Your Universe, beyond simply 'reaching a new audience', included:

- Content and practice development that is more relevant, meaningful and has greater impact and reach with non-dominant audiences
- Practitioner CPD and staff training (run together or with training led by community partners)
- Being 'invited to the table' for ongoing collaborations and wider community discussions, including funding opportunities that are meeting a community need
- Re-shaping polices (such as HR/recruitment), with a view to impacting the representation within staff teams.

> "Impacts on science centres happened at a number of levels: 1) on practitioners developing and delivering engagements and working directly with community partners; 2) across practice within a science centre more broadly, involving managers or departments and those not always directly involved in delivery of EYU4; and 3) at a more strategic level across a science centre (e.g. related to strategy and/or becoming more inclusive)

Jen DeWitt, Senior Research Fellow, UCL Institute of Education,
External evaluator for Explore Your Universe Phase 4

What you can bring?

Universities, learned institutions and informal science learning organisations can also bring a lot to a partnership beyond science resources and expertise such as:

- A venue/space for other activities
- Opportunities to access wider science events, staff and learning resources (such as equipment, technology, activities)
- Evaluation of impact
- Dissemination and advocacy
- Funding opportunities
- Opportunity for youth work experience and developing employability skills.

When community partners feel that the approaches and activities brought through working with science centres, universities and museums can lead to valuable outcomes, this can lead to even deeper impact for participants and partners that embeds activities beyond the duration of a particular programme. Enabling community partners to carry on with activities, should they have the capacity to do so, is an impactful way of supporting science capital.

When legacy is considered from the start, partnership work is about being part of – and building – a community, not just a route to a more diverse audience. Ask yourself, what local challenges can you address through strategic partnerships with your local community?

Learning from

The 'Building a Culture of Participation' handbook (P Kirby, C Lanyon, K Cronin and R Sinclair) discusses the benefits of involving children and young people in policy, service planning, delivery and evaluation. They found participatory practice uncovered practical benefits for the services, increases in children and young people's citizenship and social inclusion, and wider personal development.

Case Study from Explore Your Universe

Over the course of the engagements with Xplore! Science Discovery Centre, volunteers at The Venture in Wrexham became very interested in the sessions and became inspired to deliver science-based activities as part of their regular programming for young people at the adventure playground.

EMBEDDING PARTNERSHIPS BEYOND INDIVIDUALS

Relationships are between individuals, not between organisations. During the first phase of Explore Your Universe, where partnerships were working well a 'key amazing individual' from the science centre came up in every interview with community partners. These individuals were accommodating, flexible, responsive and trusted. Nothing was 'too much to ask' of them, and, importantly, the community partners felt these individuals knew them well and valued, respected and drew on their expertise.

While these relationships provide a firm and necessary foundation on which the partnership and activity can develop further, this also presents a challenge to the legacy of the partnership. What happens when 'key amazing individuals' move on?

TOP TIPS

Staff working with community partners must be given the opportunity to present and feedback their learning experiences to wider staff teams.

CASE STUDIES

Case Study from Explore Your Universe

For two partnerships in Phase A, when the key, motivated contact (who had also written the proposal) left the science centre, the community partnership was also lost and had to be started again from scratch for a later phase of delivery. In contrast for Dynamic Earth, when both key amazing individuals (from the science centre and the community partner) left their organisations during the Covid-19 lockdown in 2020, the partnership continued and flourished. The difference between these examples rested with the mechanisms in place for sharing connections and knowledge within organisations.

As science practitioners in universities, museums and informal science learning organisations, it is our responsibility to take the lead in continuing the relationship outside of the project delivery period. If contact is lost, it is on us as the partner with more funding, time, or job security to pick conversations up again, even if some time has elapsed.

However, no matter how strong the partnership and how valuable the engagements have been, if only one individual holds the contacts, understanding and trust of the community partnership, the partnership is inherently fragile and the opportunity for organisational learning is very low.

A primary, trusted, open and welcoming contact at the science organisation is a prized first step, but strategies should be put in place to create a resilient partnership. The data from Explore Your Universe suggests that the following strategies support embedding of partnerships:

- A 'critical mass' of people from both science and community partnership organisations involved in interactions
- Giving the community partner and/or participants 'multiple touch points' for positive relationships with more than one science practitioner
- Involving partners in more than one programme at the science organisation
- Robust mechanisms for internal staff communication
- Explicit systems to share documentation about project work
- A fit with the organisation's wider direction of travel
- External support (for example from the Association for Science and Discovery Centres) to provide support and advocacy for continuing change.

Case Study from Explore Your Universe

W5 had the ambition of bringing together an audience development plan for their whole organisation which brought community engagement work to the strategic agenda. Jodrell Bank Discovery Centre worked with Space4Autism, involving staff training, mystery shopper visits and feedback about the website, as well as extensive conversations that also tied with their large scale Heritage Lottery Fund project 'First Light'. Both are examples where community partners could be involved in wider projects or programmes of work with high strategic impact for the science centre.

"EYU4 has a focus on co-creation and bringing communities into the heart of what we're doing. Coupled with ASDC this agenda has had a lot more power behind it – more willingness from directors and managers – for all to pay attention and feel motivated to make sure it has the time and attention it needs. In a friendly way we are being held accountable and this gives us, in the community development and engagement team, opportunity to push more for what we feel is important."

Practitioner, Dynamic Earth

PROFESSIONAL DEVELOPMENT OF STAFF

Participatory practice and community engagement offer an increased opportunity for training and reflective practice. This is to enable facilitators to gain new skills, understanding and openly discuss concerns about communicating science with new or challenging audiences, or in unfamiliar environments. A successful programme will require that staff are suitably equipped to deliver the programme with full understanding of the needs of the participants.

TOP TIPS

Experienced staff may still lack confidence for many reasons, such as a fear of going 'off-script' or doing/saying something that is disrespectful, inappropriate or damaging for participants. A great solution is inviting your community partner to come and talk about their participants or even deliver training. Open the opportunity to all staff, including senior managers. A few of you could even visit them for greater context and the opportunity to observe a session and meet the participants ahead of the planned engagements.

Case Study from Explore Your Universe

Xplore! Science Discovery Centre partnered with The Venture in Wrexham, an adventure playground which has the values of playwork at its heart. On completion of the five-week science engagement project, Xplore! Science Discovery Centre could see that their community partner had unique skills that could benefit their practice. Therefore Xplore! invited The Venture to deliver a training session about Playwork Principles at an all-staff training day.

Many community partners have worked with specific participants for a long time. Community partners have well-established trust, relationships and understanding of participant needs, including awareness of intersectionality, interests and characteristics. Community partners will also often have years of training, so working side-by-side with these professionals will not only support engagement with participants, but provides an opportunity for learning, development and practitioner CPD. During Explore Your Universe, science engagement staff relished the opportunity to gain new skills and flourished in their role as participatory practitioners.

Strong partnerships facilitate sharing of expertise, ideas and approaches, bringing new skills, perspectives and ways of working to both organisations.

Learning from the

Developed and led by the needs of the staff, the 'Staff Ambassadors Programme' at Glasgow Museums enabled staff to go on field visits to community arts projects, get involved in live organisations, do work swaps and access coaching and mentoring. This innovative staff training programme helped to develop understanding and skills around community engagement and participation and was key to the success of their change process during involvement in the Our Museum programme.

Case Study from Explore Your Universe

Where comfort zones have been pushed, structural changes relating to content, staffing, policies or accessibility have had to adjust to accommodate needs. The question then is whether the change snaps back? During Explore Your Universe, if the step back to 'business-as-usual' required a clear statement/decision from senior management, in many cases that structural change settled in as a clear organisational shift and progression to promote further opportunities for participatory practice.

CEO AND STRATEGY LEVEL SUPPORT

> If the support for change does not start and stop with the chief executive officer or the executive director, then change will not happen.

Robert Janes, Museums and the Paradox of Change (2013), page 84

The Association for Science and Discovery Centres required that applications to take part in Explore Your Universe included a clear statement of support and commitment from the CEO or senior manager to the vision, mission and goals of the programme.

However a lack of active support and championing by directors and trustees presents a barrier to ongoing participatory practice with local communities, and the relative invisibility of diverse community engagement programmes on impact reports and websites contributes to the perception that Informal Science Learning spaces are only for the privileged and the 'science engaged' public.

One goal of Explore Your Universe Phase 4 was to encourage the formation of ongoing partnerships, advocacy, and advisory panels that operate at a strategic level and remain and evolve beyond the project period. Ongoing collaboration should be equally beneficial to both parties, so with this in mind, science centres planned to be open to legacy from the very beginning and looked to create opportunities to maintain relationships with community-based organisations.

CASE STUDIES

Case Study from Explore Your Universe

Science centre interviews provided evidence that senior management take notice and support this way of working (working with community partners, multiple engagements and work with families/individuals who have not historically engaged with science centres). For example, science communication practitioners were invited to discuss EDI at board level meetings and cross-departmental EDI groups were initiated in a number of centres.

WIDER SECTOR

Learning from the

The Our Museum programme placed mechanisms that enabled community partner involvement at strategic levels of the museums as an indicator of success. The 'Our Museum: what happened next?' report noted different ways that community partners could be involved strategically: community partners sitting on the board or governing body of the museum; being involved in advisory panels; or participating in workshops that influenced the long-term strategy for the museum.

"The feedback from EYU4 – from the centres, evaluators and facilitators – demonstrates a need for an ongoing role and responsibility for the Association for Science and Discovery Centres in terms of providing support for continuing change in the centres, and to act as an external voice and critical friend. This is potentially a crucial role, to encourage the centres to continue to have open and honest conversations about the process of change, to offer a fresh and independent perspective, and to encourage reflection."

Piotr Bienkowski, Director of Our Museum programme, cultural consultant

Explore Your Universe was a 3.5 year programme from kick-off to final reporting, with science centre and community partnership building and delivery taking place for less than a year before the Covid-19 pandemic lockdown.

Even more than usual, at this time all practitioners within the partnerships were committed within their roles to other priorities. When line managers and senior staff were able to prioritise this work or reassign their other responsibilities, practitioners were able to be more responsive, flexible and adapt as much as was necessary.

Time was the most valued resource during this programme. Time for science centre staff to work with partners to co-produce multiple engagements, and time for reflection, with staff and with community partners, as an essential tool to support learning.

Learning from the

Building on the knowledge and relationships with your community partners, have you considered the benefits of a youth board for your organisation? Their voices are often not included in the design and development of programmes or experiences for them! 'How to set up and run an equitable youth board' is an excellent download of top tips that you can find here:
yestem.org/tools/core-equitable-practices/

> "Change is a continuous process, not an event. Most organisational change succeeds after five years, if at all."

R Hewison, J Holden and S Jones, All together: a creative approach to organisational change, page 19

EMBEDDING CHANGE IN ORGANISATIONS

Even if knowledge and connection for community participation is spread among a number of staff involved in outreach or engagement, this work can often be siloed in particular departments within an organisation. It simply may not go further.

For many informal science learning organisations, despite substantial support for EDI efforts within education, learning and public engagement departments, the shifts within wider organisations are less clear to see, and may be blocked by out-dated, systemic processes and policies.

Robust mechanisms for organisational communication and reflection need to be in place to feed valuable professional practice relating to equity, inclusion and engagement and participatory practice across other departments. This improves the holistic learning of an organisation, decreases the disconnect between departments and schemes of work and can influence future policy documents. Policies and strategies embed this into the day-to-day workings of an organisation and sustain change by committing it to institutional memory.

Mechanisms that support embedding change do not just address the question 'how do we make inclusion work?' but 'how do we make anything work in an organisation?'. During this programme, ASDC was interested in the conditions under which change was sustained from the Explore Your Universe project. These mechanisms include such things as:

- Full staff briefing and meetings
- Effective trustee engagement
- Processes for cross departmental working groups (such as EDI groups)
- Long-term and consistent planning approaches
- The storing and sharing of information
- Monitoring, measurement and reporting on impact
- Offering suitable opportunity for staff from other departments to engage and reflect.

Case Study from Explore Your Universe

Alongside a fit with wider schemes of work, another opportunity for embedding this kind of work was provided by alignment with moments where science centres were discussing and developing new organisational strategies. In 2021, Science Oxford were developing their next five-year plan, which staff hoped would be informed by the experience of Explore Your Universe Phase 4.

During the 2020 lockdown, the urgency of revisiting organisational strategy documents increased these opportunities for embedded change.

> "In my current role I am now focused more on creating a healthy, change-ready and reflective organisational culture. The content or theme of the change now feels much less meaningful – I don't want to focus on the new and shiny, but on the 'boring' structural issues that make change stick and embed."

Jo Bryant, Volunteer Manager, We The Curious

The ASDC Inclusion Wheel

> The Inclusion Wheel is an excellent tool for organisational reflection. I used it with several centres, discussing all 12 spokes across different breakout groups. This encourages a more holistic understanding among staff and community partners of what EDI means in practice and how it impacts all parts of the organisation. It is a great way to start a conversation about where an organisation currently is and about achievable, incremental change.

Piotr Bienkowski, Director of Our Museum programme, cultural consultant

The Inclusion Wheel is a tool for organisational reflection. Developed for Explore Your Universe, it has since been translated into a number of different languages and used across Europe in a movement towards more equitable working in science centres and science museums within 'Ecsite' (the European network of science centres). A simple and enjoyable tool to use, practitioners within this programme discussed within their teams where they place themselves, and shared their reflections at the start and end of the project.

Learning from the WIDER SECTOR

The co-produced 'DiverSci' Framework (chosen to emphasise Diversity, Inclusion, Values, Equity & Responsibility in Science Communication) supports progression towards organisation-wide, long-term change. There are five key areas that European science and discovery centres, museums and networks consider important to address in order to truly move towards becoming more diverse, inclusive, equitable and accessible organisations. These key and overlapping areas are Access, Content, Partnerships, Staff and Strategy. Explore a 'first aid kit' for frequently encountered EDI situations, indicators of inspiring practice, tools, case studies and a community of practice at diversci.eu

> It's certainly kick-started something that the Centre wouldn't have been able to do.

Practitioner, Cambridge Science Centre

The changes that stuck from Explore Your Universe

The most consistently and significantly increased areas of the Inclusion Wheel, demonstrating a shift during this time frame in organisational practice, related to the following questions:

- Does your content reflect the diversity of your organisation's catchment?
- Whose responsibility is it to promote diversity, equity and inclusion in your organisation?
- Who decides on the content of your events, activities and exhibits?
- What mechanisms are in place to share the learning from events and activities within your organisation?
- Is equity, inclusion and participatory practice referred to in your top-level statements (e.g. vision and mission or strategic objectives)?

Areas that still demonstrated minor improvement across the project partners, but appeared harder to progress during this timescale, included the following questions:

- Do your staff and governing body reflect your local community diversity in terms of genders, ethnic and social backgrounds and abilities?
- How do you know your organisation is making an impact with this work?
- How is your work partnering with local communities funded?
- Does your science centre leadership champion equity, inclusion and your work with local and / or diverse communities?

> We had changes in our team and our partners during EYU4 and Covid caused disruption too. Yet, we have a flourishing and ongoing relationship with our community partner. We have a great dialogue with the community gatekeepers and we are still active in the community every week. The young people of that area are increasingly taking ownership of both STEM and the dynamic with our team.

Practitioner, Cambridge Science Centre

TOP TIPS

Find the Inclusion Wheel and other downloadable creative tools to support organisational reflection at inclusion.sciencecentres.org.uk

> Every science centre (and practitioners within it) has learnt from this project about working with community partners and strategies for engaging with new audiences.

Jen DeWitt, Senior Research Fellow,
UCL Institute of Education,
External evaluator Explore Your Universe Phase 4

It's about the people

This programme has been all about the people: the young people, their families and their stories, the supporters, contributors and consultants to the project, and of course the motivated and empowering individuals within the science centres and community organisation partnerships.

To protect anonymity we are unable to name community partners and individual staff, but would like to dedicate this resource to the teams working on the Explore Your Universe Phase 4 project within the following participating science and discovery centres and their partnering youth and community organisations:

UK Science Centres

Aberdeen Science Centre
Cambridge Science Centre
Dynamic Earth
Jodrell Bank Discovery Centre
Science Oxford
Techniquest
W5
Xplore! Science Discovery Centre

Youth and Community Partners

ACE Cardiff
Ardoyne Youth Club and Ardoyne After Schools Club
Eastside Learning
Edinburgh Young Carers
Family Learning Group (supported by Aberdeen City Council)
Fersands and Fountain Community Project
North Cambridge Community Partnership (NCCP)
The Land
Tillydrone Community Campus
Sanctuary Housing
Shiloh Fellowship
Stanley Grove Primary Academy
Space 4 Autism
Syrian Dads Group (in partnership with Lifelong Learning, Edinburgh City Council)
The Summer of Smiles
Women Connect First
Women Seeking Sanctuary
Valleys kids
Y Fenter / The Venture
Your Space

ASDC Project Team

Shaaron Leverment, Chief Executive, Project Director
Jaclyn Bell, Project Manager (2018- 2019) and Project Consultant
Abi Ashton, Project Manager (2019-2021)
Penny Fidler, CEO (until April 2021),
Cait Campbell, Project Manager (current)

ASDC at the training academy event with science centre participants (pictured here from Cambridge Science Centre, Dynamic Earth, Jodrell Bank, Science Oxford, W5, Xplore!), plus EYU4 consultants and members of the management board.

Project Management Board

Neville Hollingworth, Public Engagement Manager, STFC, UKRI
Jenni Chambers, Head of Skills and Engagement, STFC, UKRI
Derek Gillespie, Head of Skills and Engagement (until August 2019), STFC, UKRI
Chris Allton, Oriel Science, Swansea University
Clio Heslop, British Science Association
Hannah Lacey, NERC, UKRI
Wyn Griffiths, SMASHfestUK

External Evaluator

Jen DeWitt, Senior Research Fellow, UCL Institute of Education

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Emily Dawson, UCL
Jaclyn Bell, Imperial College London
Jo Bryant, We The Curious
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Piotr Bienkowski, Director of Our Museum programme, cultural consultant

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Helen Highley, Brightpurpose
Helen Rae, Diversity in Marketing Consultant
Jo Lewis, STFC (until 2019)
Liz Rasekoala, African Gong
Louise Swan, Institute of Physics
Maddy Foard, NCCPE
Rachael Inglis, Cambridge Science Centre (until 2019)
Sophie Wang, Free Radicals & Comic and Zine Artist
Vicky Clifton, National Science & Media Museum (until 2022)
Tamasin Greenough Graham, Parenting Science Gang

inclusion.sciencecentres.org.uk

Association for Science and Discovery Centres

Science and Technology Facilities Council

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