

Capturing Impact in Informal Learning Institutions: A Practical Evaluation Guide

Adapting the Museum Impact Toolkit for Broader Application



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Introduction

The educational contributions of science centres and other informal learning spaces are often overlooked, largely due to the limited evidence of their impact which is difficult to capture given the informal and dynamic nature of their activities.

This new guide builds upon the foundations of an earlier participatory action research project 'Impact measuring toolkit for museums' funded by UKRI Research England, which brought together researchers from the University of Southampton and practitioners from Winchester Science Centre.

That collaboration resulted in a practical, easy-to-use **Impact Measuring Toolkit** designed to enhance how impact is assessed in informal science learning environments.

Led by Dr. Neta Shaby and Dr. Ran Peleg, with support from Dr. Ian Coombs, the original project combined academic research on informal learning with on-the-ground insights from museum practitioners. Together, the team identified key challenges in practice, co-developed tools to address them, and used these tools to gather and reflect on meaningful data. The result was a toolkit aimed to help institutions of informal learning both improve practice and demonstrate value to stakeholders – empowering science centres to better communicate their role in shaping public engagement with science.



This guide builds on that foundation while expanding its scope. Funded by the ESRC Impact Acceleration Account at the University of Southampton and developed in collaboration with two new partners - Edinburgh Science and Exeter Science Centre - the tools from the original project have been adapted and new tools have been developed to reflect the needs of a wider range of informal learning institutions. This guide outlines the process of creating and refining these tools and offers practical guidance for other organisations looking to measure and understand their impact more effectively.

Find out more about the **Impact Measuring Toolkit**



Read our published paper **Interactions Following a Planetarium and Science Shows**



Read more about our **Participatory Research with Museum Practitioners**



Capturing Impact in Informal Learning Institutions: A Practical Evaluation Guide

This Practical Evaluation Guide consists of two parts:

Part One focuses on the **process of tool development**: How can institutions identify their specific needs, define what “impact” means in their context, and create tools that are relevant, flexible, and easy to use? Drawing on lessons learned from both the original project and the new collaborations with Edinburgh Science and Exeter Science Centre, this section offers a step-by-step framework for designing meaningful and manageable evaluation strategies.

Part Two presents a curated selection of **exemplar tools** including those originally developed with the Winchester Science Centre and new tools created during this project. Each tool is accompanied by guidance on how and when to use it, what kind of data it collects, and how it can inform institutional learning and communication with stakeholders.

Together, these two parts aim to support informal learning institutions in capturing the richness of their impact. By combining theoretical insight with real-world application, this guide aims to empower informal institutions to build meaningful, context-specific approaches to impact evaluation.

Our partners

Edinburgh Science Festival by Edinburgh Science

Founded as an educational charity in 1989, Edinburgh Science promotes and celebrates science and technology through schools outreach work across Scotland and by delivering the Edinburgh Science Festival. The annual Festival welcomes around 170,000 visitors over a two-week period. This multi-

location, multi-event festival is one of the largest science festivals in Europe. This study draws on learning from the DiscoveryLab, a hands-on family pop-up science centre, full of workshops and activities for 5–11-year-olds held across the five floors of the Edinburgh City Art Centre.

Exeter Science Centre

Exeter Science Centre was founded in 2020 and works to engage the public in the South West of England with the science of global issues, with a particular focus on local research, industry, and positive action. The charity has so far operated without a physical space of its own, and instead runs engagement projects and pop-up events in other spaces, from libraries and community hubs to shopping centres and schools, reaching primary and secondary schools, families and adult audiences. This study drew on the experience of people attending a 1-day pop-up event entitled ‘Our Positive Future’, which was an interactive imagining of a positive future for the City of Exeter.

Wonderseekers and the Winchester Science Centre

Wonderseekers, the Charity behind Winchester Science Centre, has been sparking children’s curiosity in science, technology, engineering, and mathematics since it was founded in 1986. By sparking and harnessing children’s curiosity in science, and by removing barriers to engagement, the science centre believes it can give children the confidence, ambition, and freedom to improve their own lives, the lives of others and ultimately life on Earth. Each year 130,000 visitors and 45,000 primary school children engage with the science centre.

Part One: The Process of Tool Development

Introduction

This section offers a framework for developing an evaluation strategy for any informal institution. Through a workshop, or series of workshops, it is possible to develop an action plan of evaluation activities intending to gather impact assessing data bespoke for the organisation or event. Illustrations and examples in this section come from the workshop involving personnel from Edinburgh Science and Exeter Science Centre.

Before commencing the workshop(s), it is essential to choose the participants and meeting location. When planning the workshop(s), make sure to bring diverse voices and perspectives into the room. Also consider staff from various levels within the

organisation. For example, managers who might have little front-of-house contact with visitors can be supplemented by front-line science communicators. Consider who should lead the workshop. An internal facilitator will have a more intimate knowledge of the institution. An external facilitator can offer a fresh perspective and guide the process with less direct involvement in day-to-day operations.

It is important that the workshop(s) is held in a private space which provides room for participants to move around and work in a range of formations: as one group, breakout groups and as individuals. It is helpful if the room used has space for putting up Post-its and flip chart sheets on walls or windows.



Step 1 – What do we want to know?

The first step seeks to establish what you want to find out about your exhibition, museum or event, its visitors or any other related topic. This is best conducted as an open-ended ideas generating session.

Materials: Post-its and a way to gather them.

Time Required: 40-50 minutes – 20 minutes for introduction and individual creation of questions and thoughts, 20-30 minutes for feedback.

Regardless of how many people are in the room, start with individual reflection. Encourage everyone to think about the question (What do we want to know?) and invite them to make a note of ideas on their own. If conversations begin too soon, you may miss out on some of the slower or deeper thinkers from getting their ideas down. It is important to emphasise that at this stage there are no wrong or

inappropriate suggestions. No time should be spent considering practicalities of say how to collect the data, potential cost or practical limitations. There will be time for those factors to be addressed later. It is far better at this stage to encourage thinking that is as unhindered by any potential constraints.

Next, hear back from everyone sharing what they have written down. Make sure that everyone is heard. Allow people to share their questions and why they think it is important to know something but again do not spend time thinking about the practicalities of any suggestion.

At this stage no one should have their contribution criticised or disregarded. Have someone ready to record what is brought back to the group (using flipchart, whiteboard or Post-it notes). Allow adequate time for open conversation and discussion.

How has your perception of science changed from today?

What is the one thing you will remember from today?

Would you like to come back again?

Were there any barriers to getting involved today? What could be done to get round them?

Did you see 'science' in what you were doing today?

Are they more interested in the topic now?

Do they or how do they feel about why science is important?

Has it added to what they know or understand about the world?

How does this relate to them?

- What will be different?
- Can they relate it to their lives?

Do you feel more hopeful about global issues (climate change, biodiversity...)

Do you feel like you can/want to make a difference about these issues

Are you informed about science?

**What changes has it made them have?
Knowledge?
Emotion?
Behaviour?**

Are you more interested in science as a career?

Do you feel more connected with Scientists?

Do you feel more connected with Scientists?

Has it made a lasting difference to their lives?

People who don't normally speak to us?

Do you want to do more with us in (the) future?

Would you want to do something similar again?

**Demographics:
Have you experienced a science centre/ event before?**

Step 2 – The 5Ws

In this step you will reduce the number of questions and focus-in on the priority areas.

Materials:

5Ws (and H) table printed on A3 paper and pens. [Download the template here.](#)

Time Required:

30 minutes – 120 minutes depending upon the number of issues being considered.

In step 1, a list of ideas was created. Here the list gets whittled down to a manageable number and then consideration is given to how the priority questions or issues might be addressed.

As a group, decide which are the priority questions or ideas to address. Some questions may be combined, others rejected.

Working in small groups, assign one or two questions to each, to develop and add some more detailed information. This is where an attention to detail and an appreciation of complexity is important, thus having more than one person work on this stage is advantageous.

Each group should have a 5W/1H table.



5Ws (and H)	Your thoughts		
Why? Why is it important to find out this information? How might knowing this change what you do?			
Who? Who do you need to gather information from?			
What? What data or information do you need? List all the information which would be useful to know.			
Where? Where will the data be collected? Give the location			
When? What date/days will be best to collect data?			
How? What methods might be used to gather the data? Try and suggest many options at this stage.			

The workshop leader should carefully explain how each column is to be used (see next page). Then ask the groups to complete the table – with the exception of the How column which will be filled in later.

Why?

Why is it important to find out this information? How might doing an investigation about this topic be useful to the organisation? Who needs the information: science communicators, company directors, funders, etc. Include as much detail as possible.

Who?

Who do you need to gather information from? Parents, children, adults, families, teachers, etc. It might be multiple groups.

What?

What data or information do you need? List all the information it would be useful to know.

Where?

Where will the data be collected? It could be throughout your main site, within a new exhibition or exhibit, in schools, on the high street, etc. If it is in various locations, are there some locations which are better for data collection than others?

When?

When do you expect to gather the data? If you are dealing with a one-off event, the date and time of that event is vital. If it is an ongoing activity, a deadline can be recorded.

Repeat the processes for all the questions from the previous step.

This step can be challenging. It is sometimes difficult to articulate what needs to be understood. Determination and additional thinking time can sometimes be beneficial. Also, sharing incomplete thinking with others in the room can help.



5Ws (and H)	Example 1	Example 2
Why? Why is it important to find out this information? How might knowing this change what you do?	<i>We need to understand whether our science shows are understood/appreciated by the family audiences and whether they encourage an interest in space sciences.</i>	<i>To capture the impact of our schools outreach programme</i>
Who? Who do you need to gather information from?	<i>Adults & children attending the planetarium show</i>	<i>Pupils (4-11 years old) Teachers</i>
What? What data or information do you need? List all the information which would be useful to know.	<i>Gender, age, who are they visiting which? Whose idea it was to come to the show? What space topics interested them? Do the questions children/ adults ask after the show arise from the show's content, or is it beyond the remit of the show? How successful are SciComs in dealing with questions?</i>	<i>To what extent are students engaging in the activities during the visit? To what extent would students consider a career in STEM following the visit? Does our outreach programme help schools with their goal to engage more students in science?</i>
Where? Where will the data be collected? Give the location.	<i>Science Centre (planetarium foyer or the canteen area)</i>	<i>In schools during the outreach programme visits</i>
When? What date/days will be best to collect data?	<i>Any weekend (mid-week is school groups only)</i>	<i>- Before visit - Immediately after - A long period of time after</i>
How? What methods might be used to gather the data? Try and suggest many options at this stage.		

5Ws (and an H)

Who?	What?	Where?	When?	Why?	How?
Who do you want information from? Or what do you want to understand?	What data/information do you need? List all the information which would be useful to know.	Where (event/place) will this be collected?	What date/days – broad window of opportunity or a specific time and date?	How might it be useful to you? How might it change what you do?	What methods might be used to gather this information? Try and suggest many options at this stage.
ADULT AUDIENCE THAT'S NOT ENGAGING CURRENTLY (NOT FAMILY)	WHY ARE YOU NOT ENGAGING WITH US? WHAT ARE THE BARRIERS? WHAT WOULD WE NEED TO DO FOR YOU TO ENGAGE WITH US?	THE STREETS ↳ SHOPPING CENTRES ACROSS THE CITY BUT ALSO MUSEUMS OTHER CULTURAL PLACES WHERE PEOPLE ARE ENGAGING	NEWG EXHIBIT/OUR FESTIVAL BUT OTHER TIMES OF THE YEAR/OTHER FESTIVALS	TO CREATE A MORE INCLUSIVE PROGRAMME THAT MORE PEOPLE WANT TO ENGAGE WITH CHECKING OUR MARKETING STRATEGY	
Family. children Adults People who buy tickets and those who just discover us at the museum.	Do they see science as important in their lives + futures? Have they learnt something * Science capital as → what they bring to the table Have they experienced a change in themselves?	• CAC family venue. • NMS • Family show programme. • Content that is not ours.	• Easter - Festival (Sometime after visit) as well?	• To support funding applications. • To know what we are doing works. • Feedback on new formats.	
	What event/workshop did they do. Did they prefer kids only or family/intergenerational drop in activities				

Step 3 – How?

In this step we will identify some potential data collection methods for each question.

Materials:

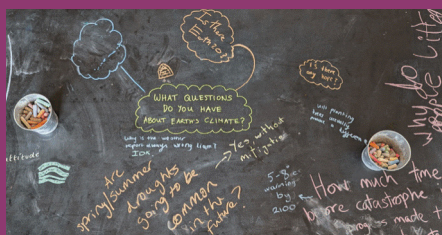
5Ws + 1H table previously completed

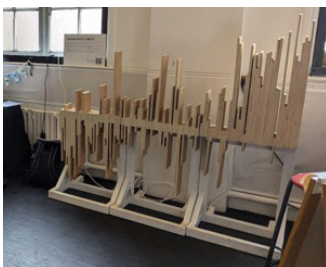
Time Required:

30-60 minutes

There are many methods which can be utilised to gather data to answer the questions posed. You can find some examples in the **Impact Measuring Toolkit** and in **Part Two**.

For each method, there is a brief description alongside how it may be effective but also an indication of its limitations. It is worth noting that all data gathering methods have strengths and drawbacks. At this stage it is a matter of determining whether the potential benefits outweigh the limitations.





A Disruptive Diversion

Having looked at conventional methods of gathering data, there are some unique alternative methods which you might consider. This method could gather valid data, though what is gathered may be limited. Below is one example.

Ran's Rubbish Game

Go through the rubbish bins from someone's office or an exhibition space. What does the rubbish tell you about the people who have been there? This is Garbology, extracting meaning from that which is thrown away. A strangely fun activity but filled with all sorts of opportunities for wild conjecture

Protective gloves are essential!

Might there be an original method to employ in your setting?

Step 4 – Matching Method(s) to Question

Having settled on what you are seeking to understand more about, next you should select an appropriate method to gather data to help answer the question. The second section gives a range of possibilities.

When you are selecting a method you might additionally consider:

- What would be a good size of the sample – how many responses do you need? A survey could provide anything between 30 up to 1000+ responses. Interviewing 30 families/individuals might be enough. It is helpful to set a target.
- It is often good, in ideal circumstances, to trial your data collection tool before

using it. For example, if you have a survey, use it with 10 people from your target audience first just to check that they understand your questions, that the layout works, that there is sufficient space for filling in answers.

- What is the budget for the activity? Will you engage your designer or a professional printer, or will you create the tool and use the office photocopier? Is signage needed? Does the activity require someone to supervise or collect the data? Who will do this?
- Consider data analysis – how will this be done and who will be doing it?

Ethical Considerations

Before gathering any data, you must have consideration of research ethics protocols. Your organisation may have an ethics policy which you need to abide by. At its core, ethics in research is about making sure the pursuit of knowledge never comes at the expense of people's rights, dignity, or well-being.



Part Two: Example Tools

In this part we share some of the data collection tools which were used by Winchester Science Centre, Edinburgh Science and the Exeter Science Centre throughout our projects. Rather than describe them in theoretical terms, we are outlining their application as they were used. As such, the examples are concrete in nature.

The tools are clustered by type of evaluation method:

Short self-reported feedback

– where data is provided by visitors with no intervention by staff

Naturalistic interactions

– gathering audio or video data from visitors during the visit

In-depth views

– intensive methods for gathering rich (detailed and well explained) data from visitors facilitated by staff



Short self-reported feedback

Feedback Form

Example: Mind-Hand-Heart (Winchester Science Centre)

Why

Use this tool to explore visitors' cognitive, physical, and affective outcomes by finding out what they learnt, did and felt.

Who

All visitors. If possible, separate responses of different visitor groups (adult visitors, child visitors, school groups, etc.).

What

A5 postcards left in key locations around the science centre for adults and children to fill in and return through a feedback post box.

Where

Convenient places where visitors can pause and write.

When

Anytime during the visit.

For more information about this tool, check out [Impact Measuring Toolkit](#), p. 8.



Short self-reported feedback

Thought bubble

Example: What does Science mean to you? (Winchester Science Centre)

Why

To discover what your visitors think regarding a specific concept, term or idea that interests you. In this example it was used to see how visitors viewed the institution's mission statement.

Who

All visitors. If possible, to help with the data analysis it is recommended to separate responses of different visitor groups (adult visitors, child visitors, school groups, etc.)

What

A dedicated exhibition space with a screen or board displaying the question to be addressed by visitors. For example, 'What does science mean to you?'. Adjacent to the screen is paper for visitors' responses and a clip wall to hang the completed responses.

Where

Within the exhibition space.

When

Anytime during the visit.

For more information about this tool, check out [Impact Measuring Toolkit](#), p.10.

What does science mean to you?

Let us know your thoughts



Short self-reported feedback

Example: Feedback phone (Exeter Science Centre)

Why

Use this to gather audio recordings of visitor responses to a specific exhibit, concept, term or idea.

Who

All visitors.

What

The phone, via a pre-recorded message, tells the visitor the question and explains how to record their response. The question must be clear to understand and also available in text form alongside the telephone. When visitors have finished recording their message they replace the receiver and the message is saved.

Where

Dedicated space.

When

Anytime during the visit.

Adaptations

- The question/statement can be easily changed to anything that might be of interest.

Resources

- A feedback phone
(See Amazon and other suppliers)
- Signage for instructions



Affordances:

- Data collection is easy and doesn't require the presence of staff
- Responses are anonymous; therefore, ethical approval can be easily granted
- It is easy to adapt the purpose by changing the question prompt

Challenges:

- Getting instructions and the key question short and sharp is the key to success
- The responses will range in quality and length
- Some younger visitors have never used an "old fashioned" telephone! Our experience showed that the feedback phone was better at capturing data from adults than children
- We found it a useful for gathering powerful quotes

Example of data – testimonials:



This is a wonderful event. I brought my daughter who is 7 and there are tons of real interactive fun activities that she enjoys doing and are accessible to both her and I. Thank you.



Oh hello. Thank you very much for today. My son and my daughter we've spent about two hours here and still not wanting to leave. There's lots of things to do. Including things about what climate change does to our weather. And ... how we can best reduce, reuse and recycle.



...I do feel really inspired. And I have already made a friend, and we are following up and doing something together for the event. We are buying some fruit tree as that was one of the ideas that we picked on our table. So hopefully it is going to work in practise as well. So fantastic event, well done.



Naturalistic interactions

Example: Audio Recordings (Winchester Science Centre)

Why

Used to obtain in-depth views and direct questions from visitors. Conversations with staff might cover: what further information they seek, what topics interest them, what elements in the activity excited them, etc.?

Who

All visitors

What

A member of staff wears a small audio device which records conversations with visitors

Where

Probably close to the dedicated activity

When

In this example, following a Planetarium or Science Show



Read more

Check out our
[published paper](#)



Naturalistic interactions

Example: Video recordings (Winchester Science Centre)

Why

Understanding how children (and adults) engage with exhibits, staff, and each other during a visit to the science centre. This offers a rich dataset from the visitor's point-of-view. In this example we analysed science related conversation during the visit.

Who

Families (Children as young as 6 have participated in this research)

What

A member of a family (usually the child) is asked to wear a video camera during the visit. All family members need to give consent (in the case of minors, parents need to give their consent, and the child gives their assent). The visitor can remove the camera at any time. The child's interactions with exhibits are recorded in real-time.

Where

All around the museum/exhibition.

When

During the visit.

Example of data analysis

The figure represents findings from data collected during family visits. Each child represents a family. The name on the T-shirt is the family's pseudonym, and the number represents the number of science conversations the family had during their visit to the science centre. The topics of the conversations and their respective frequency are listed in middle.

For more information about this tool, check out [Impact Measuring Toolkit](#), p. 16.



In-depth views

Example: Interviews with families (Edinburgh Science Festival)

Why

To explore questions of interest with families. The questions posed will reflect the area(s) of interest.

Who

Families visiting the festival.

What

An area with sufficient seating for a family and some clear signage. Families are invited to sit down and speak with a researcher. The interview is semi-structured. The family consents to having the conversation recorded and used for research purposes. Having something for the children to do during the interview is useful to help families remain talking longer.

Where

A fixed location within the space.

When

During the visit.

Adaptations:

- The interview questions can be changed depending on what you want to gain insights on.
- The location does not have to be fixed, it is also possible to gather interviews by roaming round an exhibition area with an audio recorder and approaching visitors for comments wherever they happen to be. The interactions are likely to be shorter.

Resources:

- Digital audio recorder
- Colouring materials for children (avoid noisy activities such as Lego, since it adds to the superfluous noise to the audio recordings!)

Affordances:

- A rich cross-generational dataset is gathered that offers rich insights
- Through expert questioning it is possible to achieve detailed understanding of the visitors thinking about your chosen topic

Challenges:

- An experienced interviewer has to be present throughout the data collection period
- Getting the signage and location for the interviews right, so that visitors want to participate and feel they can do so with some measure of privacy
- To achieve a suitable sample may take several days work
- Although not collecting personal information, obtaining ethical approval for audio recording may be challenging
- Audio transcriptions and data analysis is time-consuming and requires expertise. Seek guidance from your local university

Example of data analysis

Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. Thematic analysis is a popular way to present data, that can be easily reported. In the example below, parts of the codebook are presented. Unexperienced researchers can easily be trained to perform thematic analysis!

Category	Sub-Category	Examples
Positive Experience	Affective	"It's science based, but actually fun."
	Physical Space	"This is really good, I think the fact that it's got lots of different floors, it's about trying out what's on each floor."
	Design elements	"This was quite unique, quite special."
	Engagement with Science Communicators	"We were talking to the people who did the [presenting]...they made it really interesting and entertaining."
Learning	Outcomes	"I learned that [lynx] don't eat humans, but they might steal from farmers"
	Sense of achievement	"I managed to launch three propellers into the air. And usually people are only doing one or two."
	Productive struggle	"Part of the challenge is that it gets your mind working in a different way than it's used to"
	Surprise	"It was pretty surprising how far the fan went."
Social interactions	Participating as a family	"It wasn't a one person thing either, I think we worked as a team. The three of us."
	Collaborative engagement	"I was talking to [a friend] while I was building a dinosaur."
Perceptions of science	Positive attitude towards science	"She's a scientist in the making, so anything to do with science, they love."
	Want to be a scientist	"I want to be a scientist when I grow up."



Find out more:

www.southampton.ac.uk/education/news/2023/06/16-impact-measuring-toolkit-for-museums.page

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