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# Participatory Research with Museum Practitioners: A reflection on the process

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**Abstract**
This research explores the process of a Participatory Research (PR) project that brought together university researchers with museum practitioners to create reflective tools that can be used to better understand real practical challenges. This project followed Bourke's (2009) definition of PR, viewing the process as a collaborative endeavour between researchers and practitioners in all steps of the way including project planning, research design, data collection and analysis, and distribution and application of research findings. In this project, we ran three main workshops with small group meetings in between, which were audio and video recorded and subsequently transcribed. These were then analysed to capture the PR process using James and Shaw's (2023) Heuristic Framework as our analytical framework while using deductive and inductive techniques. Our analysis focused on understanding the dynamics between researchers and practitioners in this PR project in order to better understand how to conduct PR projects in this context. Our analysis offers a refined model that can be adapted and used with museum practitioners while identifying areas that need further attention in the process of PR. We included an important phase of reflection, and we offer recommendations for those who would like to take a PR approach in their research.

**Keywords** Participatory Research · Informal Science Education · Museum practitioners · Science Museums

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## Introduction

Traditionally, research is conducted by expert researchers, often from academia, answering burning questions in the field, as they see it. Over the years, a movement towards more inclusive research emerged in several research areas, calling for more equal and equitable approaches, considering the voices of those being researched, recognizing and valuing the expertise/knowledge they have and using these as the basis for research and planning. This type of research which encompasses a range of approaches and methods is referred to in the literature, amongst others, as participatory research, emancipatory research, partnership research, user-led research, action research, community-based participatory research and inclusive research (Nind, 2014). In essence, all these approaches can be seen as research that changes the dynamics between research, researchers and the people who are usually the focus of research. It is conceived as research *with*, *by* or sometimes *for* rather than research *on* a certain group (Griffiths, 1998). In recent years, participatory research has become more apparent in the field of educational research in general and in science education in particular (Calabrese Barton et al., 2002). Additionally, there is a growing body of studies using participatory research approaches within informal learning environments.

In our research, we adopted a Participatory Research (PR) approach, where researchers from a University collaborated with staff in a Science Centre to create research questions related to their practice. Together we developed and selected appropriate tools that can be used to answer these questions and used them to collect data. Finally, this data was analysed and reflected upon.

As museum visits tend to be one-off events and their impact is often hard to record, museum practitioners are always seeking effective ways to maximize learning experiences and outcomes of the visit. Using a PR design enabled us to collaborate with practitioners to focus on their real practical challenges, giving them the opportunity to create reflective tools that they can use to better understand these challenges. The reflective tools that were developed were put together to form an 'Impact Toolkit' for use by the museum staff in the future and to share with staff in other museums. Ultimately, the aim was to empower practitioners by giving them research tools that enable them to reflect on their practice.

## Participatory Research

Participatory research (PR) originated in the mid-20th century, with studies concerning the democratization of knowledge-making and inequalities of power (Chevalier & Buckles, 2019). PR presupposes a partnership or interrelationship between appropriately trained and qualified researchers who work alongside lay people who are consulted and contribute to the academic endeavour (McManimon et al., 2020). Bourke (2009) offers a definition of PR as "a research process which involves those being researched in the decision making and conduct of the research including project planning, research design, data collection, and analysis and or the distribution and application of research findings" (p.458). This definition indicates that it is the people being researched who are participating and that the participation is comprehensive across the multiple stages of the research rather than merely providing data for it.

PR changes how knowledge is produced including a de-privileging of 'research only expertise' and what the knowledge created is used for. It is about 'lay' researchers setting

the agenda for research and working closely together to benefit from each other's perspectives (Nind, 2014). PR has the potential to bridge the gap between research and practice by fostering meaningful engagement between researchers and practitioners. There are some core ideas that are central to researchers adopting participatory approaches. These are ideas about power, participation, authenticity, empowerment, accessibility and ethics (Ospina et al., 2021). However, when it comes to the details and practicalities, the core ideas are interpreted differently, influenced in part by disciplinary backgrounds, fields of knowledge, the nature of the participants, the nature of the researchers and the sociocultural context.

In our PR all participants were involved in all stages of the process, thus ensuring equitable participation and power relation between researchers and practitioners. Authenticity was addressed by treating all participants equally to co-create and execute a research plan developed to investigate issues raised by the practitioners regarding their own practice. Practitioners were empowered with knowledge and/or new information which they can take away and use to improve their practice (Ospina et al., 2021).

## Participatory Research in informal Science Education

Participatory research has been accepted as an important approach in science education, taking centre stage in various projects with teachers (Calabrese Barton et al., 2002). However, although growing in popularity in formal settings, PR is not yet common in informal science education research. One of the earlier forms of participating non-researchers in research was Citizen Science projects. Citizen science is a movement that aims to involve the public in science, normally by creating a partnership in which professional scientists and the public gather or analyse large quantities of data (Bonney et al., 2016) with, the term 'citizen scientist' (CS) used to describe those enlisted to help gather data. For example, Heaton et al. (2016) recruited and trained CSs to gather data about grasshoppers while McNew-Birren and Gaul-Stout (2022) taught the public to identify birds, bats, frogs, and snakes. Thus, with the support of CSs greater quantities of data can be gathered than if the researchers worked alone. In addition to any scientific findings, these projects result in a more knowledgeable and engaged community with raised understanding of their local ecosystems (Bonney et al., 2016; Heaton et al., 2016).

Still, there is criticism of those approaches in science education research, questioning who these projects benefit. Recently, Citizen Science projects have taken a more participatory approach, looking at specific scientific problems raised by community members and involved researchers and members of the community in data collection, analysis and generating implications to the community, driven by the scientific investigation.

The ideas of CS can be more participatory while taking 'Science for Citizenship' approach, considering perspectives of both citizens and of scientists while answering the research questions (Bruckermann et al., 2022). For example, Chen and Cowie (2013) designed a unit of learning about New Zealand's butterflies that aimed create opportunities for students to act locally and globally through participating in science activities and to 'see themselves' in science through 'being there' experience.

Arguably, effective PR should result in CSs who are educated about the focus of their study (Bruckermann et al., 2022). To achieve this end, both the scientists' and citizens' perspectives must be considered when developing any such Citizen science PR project.

Recently, there has been a growing body of research in museums and outreach activities that follows the principles of PR with communities traditionally marginalised from

STEM (Science, technology, engineering, and mathematics). Dixon et al. (2023), for example, applied participatory design as their primary method when seeking to co-construct a new museum exhibit about radio frequency technologies with historically marginalised groups (including Latinx and Black communities). To improve equity, they opened up the design processes about determining which aspects of the technology – scientific, social or personal – should be included in the exhibit. Other examples of working with marginalised groups include listening to the voices of preschool children (Dockett et al., 2011), engaging with girls from low socio-economic status attending an after-school science club (Birmingham et al., 2017) and seeking feedback on a museum, particularly from visitors of African, Hispanic, Latinx and Native American descent (McManimon et al., 2020).

Calabrese Barton et al. (2021) adopted a critical ethnography approach in a recent research-practice partnership project, YESTEM, that aimed to support equitable youth pathways into STEM in both the UK and US. This methodology is justice-orientated and sensitive to the power dynamics of those contributing to the research. All the above include research projects with students or the community. Our research focused on practitioners in a science centre, although not a marginalised group *per se*, traditionally a group that had not been influential in research in informal learning environments. Most research in informal settings is determined by researchers, even research done on practitioners usually takes the researcher's point of view (for example, Busch et al., 2023; Plummer et al., 2021). This research sees the practitioners as co-researchers, co-creators, and equal collaborators in the project. As Participatory Research becomes more prominent in science education in general and in informal science settings in particular, reflecting on the process itself, while providing practical implications is highly valuable. This research can shed light on the process, contributing to the body of knowledge using this approach.

## Context

Participants in this research were three researchers from the University of Southampton and nine practitioners from the Winchester Science Centre (run by the Wonderseekers charity). Both institutions are based in the south of England. The Winchester Science Centre aims to spark children's curiosity in science, technology, engineering, and mathematics. Each year over 130,000 visitors and 45,000 primary school children engage with the science centre either through direct visits or Wonderseekers outreach into underserved communities.

University researchers included two with a background in informal learning environments and a research assistant. The science centre practitioners included staff members from various teams: three were 'Inspirers' who are "on the floor" explainers interacting with visitors, three were senior management who supervise various teams related to visitor experiences and events, and three were from the marketing, fundraising and customer service teams. Two of the team have a STEM background, the others have psychology (2), education (1), and arts (4) degrees. Following PR principles, all names of participants are not pseudonymized, per the specific request of the participants. The overall purpose of the project was to develop an Impact Measuring Toolkit for Museums. However, in this specific paper the aim is to understand the dynamics between researchers and practitioners in a PR project in order to better understand how to conduct PR projects in this type of context.

To do this we used and refined an existing analytical framework to analyse the process and draw conclusions from it.

## Design – Creating the Toolkit

In this project we ran three main whole-team workshops (see Fig. 1) with smaller group meetings in between them. Times of workshops and meetings varied (from one to three hours, as indicated in Fig. 1).

In workshop 1 the co-researchers developed the research questions with initial thinking captured on a wall of 'Post-it' notes. The Science Centre staff divided themselves into two interest groups to work on separate lines of enquiry. To consolidate their initial thinking and finalise the research questions, two smaller group meetings were held after workshop 1.

This was followed by developing various tools to explore the research questions in workshop 2. Data was collected after workshop 2 and subsequently analysed by the co-researchers in small group meetings. The co-researchers finalised the analysis with the aid of the research assistant in preparation for workshop 3. In workshop 3 findings were presented and reflected upon.

Throughout the research project, the university team held planning meetings before workshops and reflection meetings after each workshop. After workshop 3 a reflection and summary meeting was held with the lead practitioner.

## Data collection and analysis

The workshops and meetings were audio and video recorded and then transcribed. Data collected in the workshops and meetings to capture the process were analysed using James and Shaw's (2023) Heuristic Framework as our analytical framework.

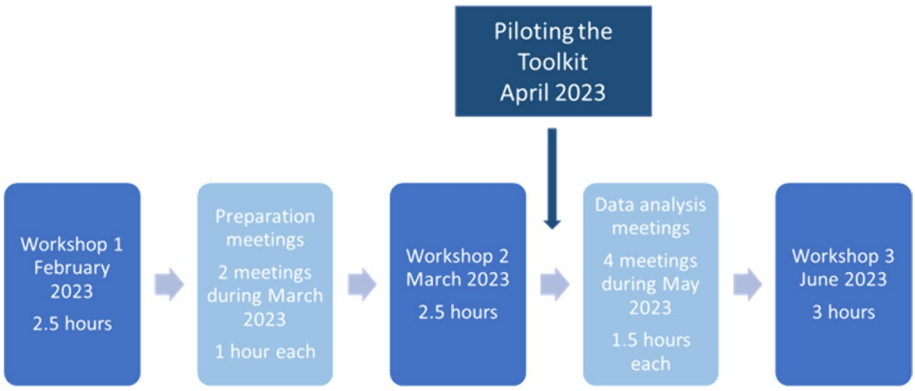


**Fig. 1** Project timeline

## The Heuristic Framework

James and Shaw's (2023) original framework "drew an analogy to the role of the choreographer, drawing on dance literature to offer a vision of the adult facilitator who may decide to 'step in' or 'out', or recognize when 'stepping on toes'" (p.338). This framework was designed to assist teachers' decision-making in facilitating PR projects with children by describing three types of interactions (direction, facilitation or non-intervention). We found it useful in analysing the dynamics between the participants in our research.

The framework consists of three modes, as specified below. The original framework was designed for PR with children. Since our research involved researchers from the university and practitioners from a science centre, we adapted the framework and replaced "child" with "practitioners" and "adult" with "researcher", resulting in the following modes (adapted from p.339):

1. Enabled and shaping (stepping on toes) – researchers guide practitioners to achieve end result and/or researchers provides technical support;
2. Organic yet enabling (stepping in and stepping out) – practitioners design/direct project and/or practitioners ask researchers for guidance/expertise when needed;
3. Organic and unbridled (stepping out) – practitioners initiate/change direction of project and/or practitioners adapt tools to interests.

We used deductive analysis to code for specific elements from the Heuristic Framework, combined with inductive analysis to allow other elements to emerge from the data and used it to refine the original framework. This deductive and inductive thematic analysis approach followed Braun and Clarke's (2006) six phases of analysis. First, we re-familiarised ourselves with the data (re-familiarised since we were present and participated in all the workshops and meetings). We then coded the data twice: deductively first using the Heuristic framework whilst creating additional memos for a second inductive coding. We then organised the data according to themes and generated new emerging themes, which were added as sub-categories in the initial framework.

As reflection was not part of the original framework, we analysed the reflection separately (see in the Findings). Similarly, we performed thematic analysis following Braun and Clarke's (2006) six phases of analysis described above, however, this analysis was inductive, as categories emerged from the data and was not analysed using predetermined themes. All data analysis was done by two researchers.

This research was participatory in nature and indeed the process that focused on practitioners' work was fully participatory. However, the analysis presented in this paper focused on the process of the PR and not on the co-researcher's practice. It was carried out by the university researchers (see Ethical considerations).

Throughout the project, attention was paid to the trustworthiness of the process. Researchers prolonged engagement in the field (both in the Science Centre itself and with the practitioners) ensure credibility. Credibility was also maintained by conducting member checks in which the researchers solicited comments from participants (the practitioners) to guarantee accuracy of responses and interpretations, while approving the final report produced. To maintain transferability, we provide thick descriptions of the data (Lincoln & Guba, 1985).

## Findings

The findings consist of two sections. In the first section, we adapt James and Shaw's (2023) Heuristic Framework based on our analysis of data from our workshops and meetings. Our focus is to understand the modes of involvement of participants rather than to criticise the structure of the process. We therefore present our findings through the modes of an adapted framework rather than in a chronological order. In the second section, we discuss participants' reflections of the process.

## Analysis of PR Process According to the Heuristic framework

James and Shaw's (2023) Heuristic framework was developed based on their experiences of running PR with children. We used this framework to analyse the occurrences in our process of PR. As we were analysing the data we adapted and refined the framework to our context and our data.

As mentioned previously, because our context involved adult participants rather than children we replaced "child" with "practitioners" and "adult" with "researcher". We kept the three modes from the original framework but adapted each to the current context by adapting and changing sub-categories. We organise our findings according to these three modes.

### Enabled and Shaping

This category describes instances where the researchers attempt to steer practitioners' ideas back into alignment with the focus of the project. This mode is further divided into two sub-categories as detailed below. We added a third sub-category that relates to the dual role of one of the managers who led the project for the museum.

**Researchers Guide Practitioners to Achieve End Result** This sub-category focused on instances where researchers guided the practitioners to achieve the end results. This sub-category was prominent in workshop 1 and the following meetings when the research team worked on creating the research questions. The practitioners struggled with the notion of research questions that can be answered by collecting data and needed constant reminders and guidance from the researchers. There were three types of guidance given by the researchers:

(1) *Introduce or remind practitioners of a specific task*

These were very specific instructions keeping the group on the specific task at hand. For example:

> "Do you want to try to maybe cluster the post-it's together?" or "So today we're going to start doing kind of the initial coding. But before we do that we need to do something called data reduction." (both by Neta, Researcher).

(2) *Take a step back and summarise*

These were instances where the researcher would step back from the discussion to summarise and bring it to a close by drawing relevant conclusions which would help the practitioner's refine their analysis or thinking. For example, after doing some initial data analysis with the practitioners the researcher summarised the process for them:

> "So, we looked at one recording that was […] five minutes. Okay, so you see how long it takes to do that. And this is very, very initial coding so we don't have actual insights from what we've done here yet. […] Now, let's go back to the research question. […] From the very short kind of exercise that we did now, does it help you to answer this question?" (Neta, Researcher)

(3) *Asking guiding questions to scaffold the group discussions*

In these instances, the researchers asked guiding questions to promote the discussion or to change the direction of the conversation to help the practitioners achieve the end task. For example, the practitioners reflected that they might use their data in training, to which the researcher commented:

> "Just one small thing. You mentioned something interesting. You've mentioned… a link between what you've done and training. Can it be either used for training or by trainers to analyse?" (Ran, Researcher)

**Researchers Provide Technical Support** Throughout the process, the researchers provided the practitioners with technical expertise in setting the project goals and working through the research process. This included prolonged sections in the workshops or meetings where the researchers would give a presentation about a topic (such as setting the context of the project, what is data analysis, how to present research data, etc.). Whilst this was present in all workshops and meetings, it was most prevalent when giving the practitioners tools regarding analysing their data, as data analysis was an area they found challenging and needed extra support on.

**Dual Role of Jo, the Director of Experiences** Throughout the project, Jo was the coordinator and the contact point between the practitioners at the Science Centre and the research team. As such she felt responsibility for the project which was apparent in her interactions throughout the process. Whilst most of the time she took the role of a practitioner, on numerous occasions she stepped forward and took on a role similar to that of the researchers by guiding the others to achieve the end result. This took the same three forms of guidance given by the researchers. For example:

In a meeting preparing for the presentation of data in the final workshop Jo reminds everyone of their specific tasks to achieve the end result:

> "So actions are, now categorize everything. Paul your team very kindly are going to put this in, over the next couple of weekends [...] Then we'll meet up again and we'll put it into categories." (Introduce or remind practitioners of a specific task)

Then later,

> "I feel like we have now got it down to two projects. And we have we have two projects going on here. So yeah. So, team one, we've got the sound recordings. And that's going to be in Planetarium, Biospace, where else? Theatre. And you can do that, what, over three days...." (Take a step back and summarise)

When discussing the plan for data collection, Jo asked guiding questions to ensure everyone was on board:

> "I quite like, how does everyone feel? Sarah do you feel like that's getting.... Is that answering the questions that your department wants to know the question the answers to." (Asking guiding questions to scaffold the group discussions)

This duality of roles is an addition that needs consideration for the framework and one that only became apparent once the hierarchy between Jo and the other practitioners was recognised, a feature not present in the original framework including children.

### Organic yet enabling

The organic yet enabling mode is one in which the practitioner works on their own organic project with the researcher facilitating the process to "harness ideas and provide suggestions in a light-touch manner" (James & Shaw, 2023, p. 332). This mode is reflected by two types of sub-categories:

**Practitioners and Researchers Design/Direct Project** For most of our recorded discussions, this was the overarching sub-category. Practitioners took responsibility for their project and designed it within the guidelines set by the researchers. The discussions in this mode were focused on different avenues of advancing the project within the given framework.

One change from the original model that emerged from our data was that on many occasions the researchers joined the discussions as integral members of the team. In those instances, it was clear that the researchers did not assume the role of 'enabled and shaping' (i.e., providing technical support or of guiding practitioners to achieve the end result), but rather were part of the practitioner team in a fully participatory manner. We therefore suggest this sub-category should be renamed and add 'researchers' to the sub-category: practitioners and researchers design/direct project.

An example of this is between Jo (senior management, Director of Experiences), Paul (senior management, Head of Experiences) and Ran (researcher) where the researcher is part of the organic conversation about how to collect data from visitors in the planetarium audience:

Jo: It is taking that opportunity isn't it. Like grasping that moment where... they're just sitting waiting for the Planetarium for 10 minutes which would be a great time.

Ran: Yeah. That's what I'm thinking. If it's something, a game... If the whole activity is a game or is gamified.

Paul: Wanting to do it, is the hard bit. That moment might be 2 minutes before they head out the door.

This illustrates that the researchers were not "outside" the process and participated in the discussion contributing ideas to the development of the tools.

**Practitioners Ask Researchers for Guidance/Expertise Where Needed** These were instances where practitioners asked for specific help from the researchers. This could either be to consult on a technical matter:

Jenny (Widening Participation Inspirer): How long do you think we need to dedicate to going through those transcripts?

or to receive confirmation that they are doing the right thing:

Jo (Director of Experiences): "What do you think Neta and Ran? Do you have a steer you can give us at this point?

This was mainly found in the data analysis meetings leading towards workshop 3, as mentioned previously. The practitioners had very little data analysis experience and therefore required guidance, both in the analysis itself and with expectations about the time it will take to perform the actual analysis. This was not evident in the other meetings. For example, in the meetings leading to workshop 2 which focused on data collection, the practitioners showed sufficient knowledge and experience from their everyday roles to be confident in aspects of data collection including logistical and ethical constraints.

## Organic But Unbridled

This mode "allows for spontaneity, or new paths to grow as different minds meet or connect" (James & Shaw, 2023, p.335). These are opportunities that allow participants (practitioners) to "express themselves in previously unforeseen ways, or to influence the project's direction" (ibid, p.335). Based on our data and context we adapted the two original sub-categories.

**Practitioner Adapts Discussion to Interests** In the original framework, this category was "child adapts tools to interests". In our project, we did not have tools, we had discussions, therefore, we adapted the category to reflect the discussion element. We noticed that the main way in which the practitioners allowed for "new paths to grow" was by adapting or steering the discussion to their interest. We also noticed that in all cases this interest stemmed from the practitioners' current role in the science centre. What interests them is what they do in their job and how the project relates to their role. This was mainly observed in brainstorming discussions and in the reflection at the end of the process.

When trying to decide on a strategy for data collection in a small meeting Jackson, who runs the science show, made the case that it is really important for him in his role to understand what information viewers of the show pick up:

> But the big one for me, and this is the big one for me. It's like, has it gone in one ear and out the other?... Look, because we cover a lot in quite a short amount of time is very much the case. So, in a way [do the] kids come away with something. Jackson (Inspirer)

A further example is taken from the end of the process. In workshop 3 whilst discussing the practitioners' findings:

> And from marketing's point of view, it allows us to [...] get into listings and [...] it's a practical thing of, yeah, advertising what we do. Jenna (Head of Events)

**Practitioner Initiates/Changed Direction of Discussion** In the original framework, this sub-category was "child initiates/changes direction of project". As noted above a significant part of data consists of discussions. We did not see instances where there was a big change in direction from that intended by the researchers for the whole project, but we did see instances in which practitioners changed the direction of the discussion from that intended by the researchers.

After a discussion on data collection between a researcher and the practitioners, Sonny interjects and changes the direction of the discussion:

> "I'm really not intending to be devil's advocate here. [...] If we're going to do it, let's do it properly. [...] I just feel we need a bit more of an actual designated space for it." (Sonny, Inspirer)

This sub-category also manifested itself in rejecting ideas from the researchers. For example, when the researchers suggested the use of an app to collect data Jo (Director of Experiences) commented that this was "Going a bit too far ahead" to change the direction of the discussion from an app to signify this was not plausible. This inhibiting of changes of directions from ideas brought forward by researchers was behaviour seen from practitioners in senior management who felt comfortable rejecting the researchers' suggestions.

In the James and Shaw's framework for PR, there was no space for reflection from practitioners *and* researchers. However, reflection was an integral part of our process. We therefore left space for participants and researchers to reflect at the end of workshop 3. The findings from this reflection are detailed in the next session.

## Reflection

Reflections on the experience mainly took place in the workshop 3, however, reflection was observed in other meetings as well. Since reflection was not part of the analytical framework, we conducted a separate analysis to address reflective comments during the project. While analysing the participants reflections, three main themes emerged: Reflection on their practice, Reflection on conducting research and evaluation and Affective reflection. Of note, while reflecting on the process, participants only referred to the research project itself and not on the Participatory approach.

### Reflection on their Practice

Reflecting on the process, the practitioners noted that the participatory nature of the project allowed them to make strong connections between the research and their daily practice. For example, Jo (Director of Experiences) noted this reflection as a derivative of the participatory nature of the project:

> "… [the practitioners] they've been more participatory. We were a lot more reflective on what we want because, you know, if you'd have come and said here's what

you can do: this, this, this, this, I think we wouldn't have really thought about us as a team and what we mean to our audience. It's giving us a chance to be a lot more reflective".

Additionally, while reflecting on the findings of their research, they noted that these can be used for future training:

"And some really, really good stuff for team development. […] Like, I mean, I actually, when I was making the PowerPoint out of the tough questions, (I thought) hey team there are these questions that people can't answer, I'm going to give them to you now (Jackson, Inspirer)".

Insights about their own practice stemmed mainly from the data collection and analysis phases they conducted during the project.

### Reflection on Conducting Research and Evaluation

This theme was evident not only in the reflection done in workshop 3, but also throughout the project. This theme can be further divided into reflections on the value of conducting research and evaluation and on the process of conducting research and evaluation.

The practitioners saw the value of collecting and analysing data as providing proof of impact for stakeholders:

"…I think we now have a huge spreadsheet of children's testimonies, you know, the thoughts about what science means to them. I think to share this is perfect for trustees. That's going to be so valuable, particularly for fundraising" (Jo, Director of Experiences)

And as providing further evidence for their practice:

"I think the other important thing is that we've got all of this data. We also need to individually think about what we can extract from it personally to support our roles. And that for me is a big takeaway. (Laura, Trust Fundraising).

The practitioners also mentioned that getting valuable data from this project can help them make the case that this should be considered as valuable and be part of their role:

"I think if we're getting such good resources and information out of there, I think it can probably justify half an hour of the week spent over 12 different Inspirers. I think it would be feasible in the long run" (Sonny, Inspirer).

And,

"…this is the beginning of the journey I felt, and it was a change in culture and plant an idea". (Jo, Director of Experiences)

One of the main areas for reflection in this theme, was the skills gained during the project, specifically when it comes to analysing data:

"I mean, so for me, coding the transcripts, I was very unsure of what that actually involved. And the only reason I knew what was going on was because I was doing it with Sonny. […] But the kind of the analysis of it was a very new world for me and to me that I just wasn't entirely sure. I understand more now" Jenny (Widening Participation Inspirer).

They all commented that moving forward they might have done things differently in terms of collecting data and started thinking about how to incorporate research in new projects:

> "I think we've learned what not to do now. So, we go back in the next time we go. All right. Well, okay, we need to be more specific. We can't assume that the general public get what we're trying to ask them, we have to be really ready and precise in what we're trying to ask. Yeah. Go back and change" (Jackson, Inspirer).

While critiquing the way they conducted the project and recognising the skills they gained Jackson reflected on the process from his own perspective, saying:

> "I kind of share a very similar sentiment. I think before when we've looked at evaluating […] It's very much been let's shove a feedback form out for people to do. And actually, this has given us...we can record audio, we can get them to do just an emotional response. […] And so, I think it's very much from us, from a fact that we haven't really done anything like this before, and it's really eye-opening to see what we can try out next".

Surprisingly, the practitioners did not mention challenges too often. There was a consensus that time is the biggest constraint:

> "I think we've definitely got the beginnings of some interesting tools to be able to do that, but that's kind of how I feel. I think time was our biggest enemy. I think we just really struggled too. We did it though. But we really did struggle to find the time to sit down, mainly as a group, have them sit on the floor and do that" (Paul, Head of Experiences).

However, overall reflecting on the experience of the project itself, the practitioners acknowledged the value of participating in the project.

### Affective Reflection

While discussing the data that was collected and analysed, the practitioners expressed positive emotional responses, including:

> "I'm so excited about that nice little statistic" (Sonny, Inspirer), and
> "I'm really excited to share this with everyone" (Jo, Director of Experiences).

The findings also reassured the practitioner researchers, mainly the Inspirers, that they were "doing a good job" which elicited their motivation:

> "I think maybe looking at it as a way to, not judge ourselves, but gauge ourselves, our interactions and how successful interactions are ... I know it's like we're getting stats at that 88% [of questions answered]. It's like such a good stat for us to have under our belt" (Sonny, Inspirer),

The reflection was invaluable in obtaining a glimpse into the practitioners' views on the PR. From the reflection, we could see that the practitioners were fully involved and committed to every stage of the process. They appreciated the value of the process to both their personal development as well as for enhancing their role. This will be discussed further below.

## Discussion

In this research, we describe the process of Participatory Research, between university researchers and science centre practitioners. We used James and Shaw's (2023) Heuristic framework to analyse the data collected during the process. As suggested by the original authors "The framework might be refined further, and perhaps rendered more widely applicable to those engaging in research under the umbrella of PR, through consideration of whether its three modes relate to different contexts" (p.338), our research revealed additional sub-categories that emerged in our PR project with museum practitioners. As described in the findings section, we offer a refinement of the model (Table 1).

As intended in the original framework, the adapted framework is not hierarchal; one can shift between modes, offering more or less "participatory" research. Referring back to Bourke's (2009) definition, the initiation of the project and the initial decision-making framing of this project, was led by the researchers and not by the practitioners. Looking at the continuum of PR, the first conceptualisation of the project was research-led (Nind, 2014). Similarly, the introductory section in the first workshop did not afford the practitioners the lead on the project. They also did not have a say about the final outcome (developing the Impact Toolkit). This is similar to the project used to create the original Heuristic framework by James and Shaw (2023), where the initial projects (the plastic project and inclusion project) were predetermined by the researchers. However, besides the initial conceptualisation and the outline of the process, the particulars of the process of developing the Impact Toolkit were entirely up to the practitioners, moving from 'research-led' to 'participants-led' (Nind, 2014), while providing them with knowledge they can later use in their practice (Ospina et al., 2021). One exception was providing technical expertise regarding the data analysis process. Here, the researchers provided content on thematic analysis, predetermined, without providing the opportunity to analyse the data in a different manner. The researchers use a more "Western way of knowing" approach (Gutiérrez & Penuel, 2014; Smith, 2013), directing the way the data was handled. Within our context, working with museum practitioners, with university degrees and experience providing proof for stakeholders, it was unlikely that they would offer a different way to analyse the data. However, in hindsight, the opportunity to discuss the analysis method was not provided. There is evidence from empirical research showing that offering participants the opportunity to analyse data as they see fit can be productive and informative, as well as empowering by shifting power dynamics between the participants and researchers in PR projects. For example, a Youth Participatory Action Research project with a Chicago community discovered that the young people were able to identify examples of inequality not immediately obvious to the adult researchers (Foster-Fishman et al., 2010). Also, primary school children can gather and analyse data allowing them to authentically articulate what is important to them without reliance on researcher expertise (Meehan, 2016). Despite its importance, as the examples above show, using non-traditional epistemologies might pose a challenge in peer-review processes while disseminating PR projects (Calabrese Barton et al., 2002). In future research projects, a way to overcome this traditional way of knowing, might be the use of Group Level Assessment, a participatory research methodology emphasizing "personal relevance, shared decision-making, systematic inquiry, and collaboration" (Vaughn et al., 2020, p. 539) while generating and analysing data to create an action plan.

Another unique attribute of our project was the specific role Jo, the Director of Experiences took. This was mainly due to the context, in which she was most of the other

**Table 1** Adjusted framework for understanding PR with museum practitioners adapted from James and Shaw's (2023) Heuristic framework based on the findings of this study

| Enabled and shaping | Organic yet enabling | Organic but unbridled |
|---|---|---|
| • Researchers guide practitioners to achieve end result<br>➢ Introduce or remind practitioners of a specific task<br>➢ Take a step back and summarise<br>➢ Ask guiding questions to scaffold the group discussions<br>• Researchers provide technical support<br>• Dual role of specific participants | • Practitioners and researchers design/directs project<br>• Practitioners ask researchers for guidance/expertise where needed | • Practitioners initiates/changes direction of discussion<br>• Practitioner adapts discussion to interest |

practitioner's manager as well as the liaison for the project. It is not unusual for participatory research to have participants from either the researcher or researched groups whose roles in some way overlap, change with time, or present some form of ethical issue (Banks et al., 2013).

Additionally, again due to the nature of the project, practitioners felt comfortable enough to reject the researcher's suggestions. Others have recognised that participatory research will involve a blurring of roles between the researcher and the co-constructors. As Banks et al. (2013) observe, "co-researchers may experience moments of inclusion and exclusion in the research process" (p. 267).

Although the original Heuristic framework did not include reflections embedded within it, the authors do mention this as a way to use the framework: "in the post-activity phase, which might be prior to planning the next phase, to aid reflections on which mode was dominant and whether this was desired" (p. 338), therefore, we did embed reflection as part of the project. The reflection process enabled us to offer some recommendations for designing and implementing Participatory Research with museum practitioners.

### Guidance and expertise during the process

From the analysis of the process (using the Heuristic framework) and the reflection, consideration of the areas in which 'expert' guidance and expertise will be needed before starting the process is important. In our case, practitioners struggled with two main areas: generating the research questions and analysing the data.

Creating research questions is especially difficult for both novice and expert researchers. Offering more guidance in this area might be needed. Alternatively, taking an unconventional approach to research by not creating research questions could be a solution through including the practitioners in discussions on how to steer the project to achieve the end goal (Impact Toolkit) might be more productive than inciting on the creation of research questions. Nonetheless, discussing different ways to analyse the data might not be feasible in this case, where conventional evidence of impact might be needed. Here, additional support will be needed and factored in the process of the project. Developing this skill was highly valued by all practitioners based on their reflection. However, the time pressure was a challenge, given that it was not embedded in the project timeline.

### Offer time to plan future iterations

As the refection section demonstrates, all the practitioners acknowledged the value of conducting research as part of their practice. They also mentioned that this would be a steppingstone for the future, where they will incorporate research and evaluation in all their new activities. However, the design of this project only allowed one iteration of evaluation, which might have been a missed opportunity to gain a more complete view on evaluation in this case. Throughout the process, both practitioners and researchers came up with various ways to improve the Impact Toolkit or the research process. However, those were not documented or consolidated due to the constraints of achieving the end goal (and those were considered distractions). We recommend including a time or a way to document these ideas so that they can be used in the future and not lost in the process.

### The affective domain

Evidence from the process documentation and the reflections, point to the fact that the project had a positive impact on all participating in it. This included emotional reactions to the data, acknowledging the valuable skills gained and high levels of motivation to work to complete the tasks. These should be fully acknowledged and leveraged to promote future projects.

## Ethical Considerations

This study was approved by the University's ethics committee (reference 79451.A1). The participants were requested to read a Participants Information Sheet (PIS) which provided details of the study design and of any ethical consideration. They were then asked to provide a written consent. It was clearly stated that participatory research would be driven by the priorities of the practitioners and would be video and audio recorded. The recordings would be analysed in support of a further study seeking to explore the participatory research process (the focus of this paper). This specific analysis detailed in this paper was done by the university researchers, with the final draft of the manuscript sent to all participants to comment on. Participants were asked directly if they can be named in the manuscript or whether they would prefer to be referred to by pseudonyms.

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## Declarations

**Ethics Approval** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

**Competing Interests** The authors report there are no competing interests to declare.



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