# Inclusive Digital Interactives

## Best Practices + Research

**Chapter 5**

# purpleSTARS: Inclusive Curation and Production Creates Inclusive Museums

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# Overview

The Sensory Objects research project (2012-2015) was funded by the UK Arts and Humanities Research Council. The project encouraged the personal viewpoints of an inclusive research team who engaged critically with museum collections and produced multimedia and sensory art interpretations using various technical tools and creative processes. Our research demonstrated that using technology to critically engage with collections, reflect, and activate a sensory encounter in response, helped engage people with intellectual disabilities (ID) in creating a complementary and more inclusive visitor experience, so widening the public appeal of museums and heritage sites. The follow-up enterprise, named purpleSTARS, combines 'purple,' the color associated with disability in the UK, with STARS, which stands for Sensory Technology Art Resource Specialists. The purpleSTARS' mission is to bring together artists and technologists with and without ID to transform museum experiences and make them truly inclusive, using sensory and digital media to creatively disrupt and reinterpret heritage sites and museum collections.

# Introduction

The purpleSTARS combine media production and creative art practice in a blended mix of multimedia and multisensory processes that enable people with diverse gifts and abilities to work together and actively engage with museum and heritage sites to research and develop new ways in which to make them more inclusive and relevant for people with intellectual disabilities. The purpleSTARS approach to inclusive design is transformative because it applies the self-advocacy maxim of 'Nothing About Us Without Us' by actively engaging and valuing people with ID as experts at the heart of the processes that shape our cultural institutions. The technical tools and methods we use scaffold the active engagement of a wide team of people with and without ID. As such, this work disrupts the established understanding of inclusive design as a set of adjustments, proposing in its place, a model of inclusivity gained through

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practice, that interprets the often-cited 'public ownership' of our museums in a challenging way. We promote inclusive public culture by actively engaging disabled people as researchers, curators and creative producers, with a method that enshrines the definition of inclusive research proposed by Walmesley and Johnson: Inclusive research is research in which people with learning disabilities are active participants, not only as subjects but also as initiators, doers, writers and disseminators of research (2003).

Our model of inclusive research and development (R&D) draws from both contemporary art and media practice and participatory action-research, using technologies for media authoring and the creation of interactive sensory objects to enable people with ID to fully participate. The purpleSTARS bring user-centered mixed-ability teams into public culture and heritage spaces to explore and trial installations, reflect and then produce their own objects and interactions in response, through a personal, critical and creative practice. The result is the development of innovative visitor experiences, led and co-created by people with ID to make museums and heritage sites more diverse and inclusive, as disabled people reinterpret what is on offer and affirm their shared ownership of these public amenities. The wider potential impact of a purpleSTARS intervention is upon the culture of the museum or heritage site. The active and integrated presence of people with ID collaborating with its teams, within the fabric of the museum, prompts a reinterpretation of the site's outreach strategies, as well as the design and curation of its installation, asking significant questions about how the institution engages with its public and interprets the mission to widen engagement.

The purpose of this essay is to share the methods and achievements of the purpleSTARS and the Sensory Objects research project from which this enterprise emerged, with a focus on our unique application of sensory and digital technologies to achieve inclusion for museum collections and heritage sites, working in collaboration with people with intellectual disabilities.

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Figure 1: Sensory Objects research project poster.

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# The Sensory Objects/purpleSTARS Method

This essay showcases our work with the British Museum, London, and The Museum of English Rural Life (The MERL), Reading. We employ these assignments as case studies to illustrate our developing methodologies that combine digital media, sensory art, and electronics, to create interactive sensory objects and to demonstrate the way in which this work realizes our goal to influence and affect museums. We are a collaborative design team that respects and listens to each other as 'experts by experience,' whether we are people with or without ID, artists, curators or technology experts.
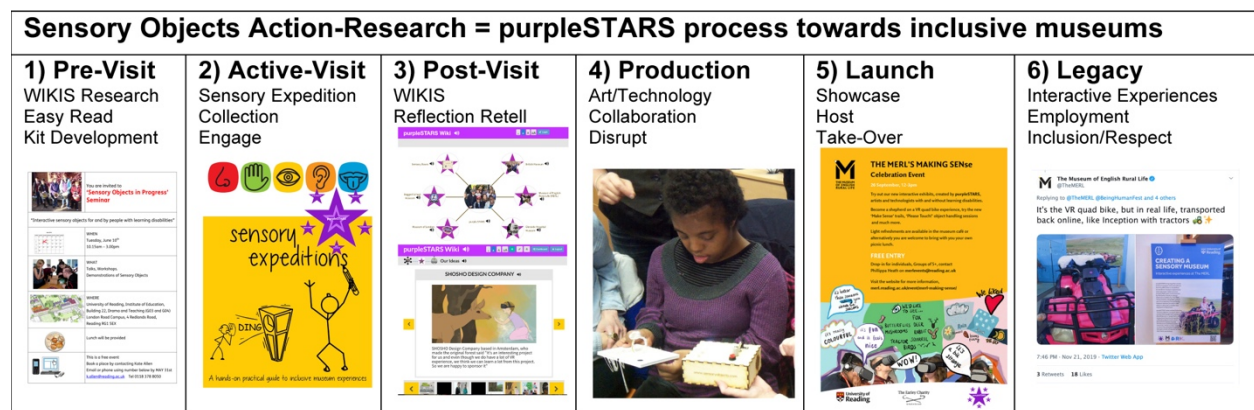


Figure 2: Sensory Objects/PurpleSTARS' 6 Steps towards inclusive museums.

# Sensory Objects/purpleSTARS Action Research 6-Phase Timeline

### 1) Pre-Visit

The *Access to Heritage Guidelines* (Mencap Liverpool, 2009) advise that, "People need to know what a heritage site can offer them," before they make a visit. They recommend that people with ID should prepare by finding out as much as possible beforehand. The purpleSTARS adopt this approach in the preliminary phase of their work plan, using the web to build their knowledge and orientation around an exhibit and its themes before they visit. The pre-visit phase also entails preparation for the researcher's own active media production and collection of sensory materials, which will be central to their visit. In preparation

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for this dimension of the work, co-researchers are encouraged to select and prepare the kit they will use for their expedition. We invest in this process, making adaptations to the tools we use to ensure all individuals feel equipped and included as part of the expeditionary team. Certain equipment has been shown to suit each individual's different manipulative skills, visual capability, or capacity for attention and focus. They choose from a comprehensive range of different cameras, recorders, tripods, clamps, and stands to suit their individual needs. We develop an Easy Read program for the visit, creating a simple table with images providing practical information such as dates and times, events of the day, tasks, etc. We have found these Easy Read 'call sheets' really valuable, providing an accessible way to understand the structure and focus of the day, and providing a focus for prior consideration of environments, risks, or challenges by the whole team.

**2) Active-Visit Sensory Expeditions — engendering an active and critical approach to a museum visit.**

The easy-to-understand *Sensory Expeditions* instruction manual guides purpleSTARS' collection of information as they explore a museum or heritage site using as many senses as possible, noting surface textures and identifying things to hear, touch, smell or taste — alongside things they *would like to* hear, touch, smell or taste — but that are out of reach or missing from the collection. The team uses sketch pads, cameras, and tablets, alongside some creative tools and methods designed and customized to facilitate consideration of sensory experiences that otherwise resist capture with a camera and so are more likely to be overlooked.

To engage with auditory senses, we listen to and record sounds from museums and heritage sites. While some places were rich with audio sources such as creaky floorboards or lofty halls where every sound resonated, elsewhere we noticed hushed and reverential silence and our researchers identified the *absences* of key sounds in relation to the collections. This has prompted us to run sound effect production workshops with the team to create sounds that were missed. We also designed a highly accessible 'sound player' comprising a small rectangular box and an easy-to-use rotary knob that required minimal instruction to use. We preloaded the player with audio files that corresponded to the museum exhibits (e.g. animal sounds and sounds of farm machinery in a

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farming museum). The files were visually labelled, then selected with the rotary dial and played back by pressing a large red button. Co-researchers used these devices as they toured the museum, and matched the sounds with the exhibits.
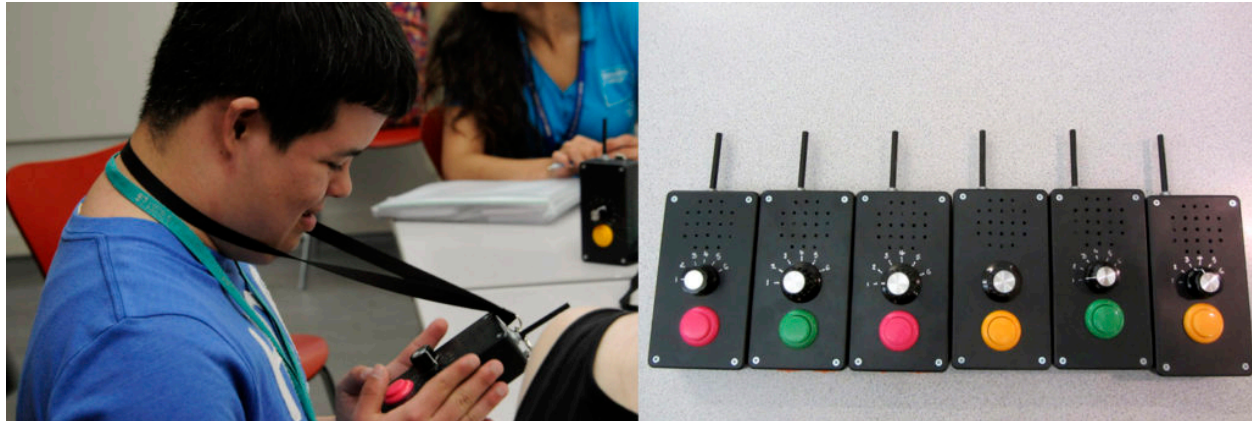


Figure 3: (Left): Sensory Objects co-researcher Guillermo looking at a prototype of a sensory sound player.
(Right): Six sensory sound players.

Once we have collected our sensory information on the expedition, we then reflect on our experiences and capture our thoughts back at our home base. We use a mix of digital and creative processes with easy-to-build multimedia websites called the RIX Wikis, and recordable Talking Postcards for the Retelling phase in the third stage.

**3) Post-Visit Reflection, Retelling**
RIX Wikis and Talking Postcards provide tools and techniques to collate, review and critically reflect on our expeditionary visit. They also allow us to develop individual and shared accounts of the visitor experience as it was for us, and, in thinking about how it could be, creating both a multimedia and a multisensory response to the exhibition or installation.

The Wiki website software developed by RIX Research & Media are a key resource for this purpleSTARS methodology. They are designed to help individuals collate and arrange rich media using the Wiki's mind map navigation design and a slideshow structure to help them select and sequence their media material. Individuals also have the choice to add text and voice-over, or attach links and files to compile a richly-layered interactive multimedia portfolio. During the Sensory Objects project, Wikis have proven to be an effective tool to facilitate research processes in ways that can include the full team. They served as a

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repository for the data gathered by the research team in their various media formats. The site's navigation provides a scaffold for the organization of the experience into thematic order and chronological sequence. By arranging and annotating media with a Wiki after a visit, we draw on people's memories and share a process of critical reflection. Together, we start curating a discourse around a museum's collection, constructing narrative threads. People have control over their own sections of the Wiki where they can tell personal stories that align to the objects they encountered. They can develop their own contributions by attaching files or adding links to document further contextual research pursued via the web or through access to other media sources.
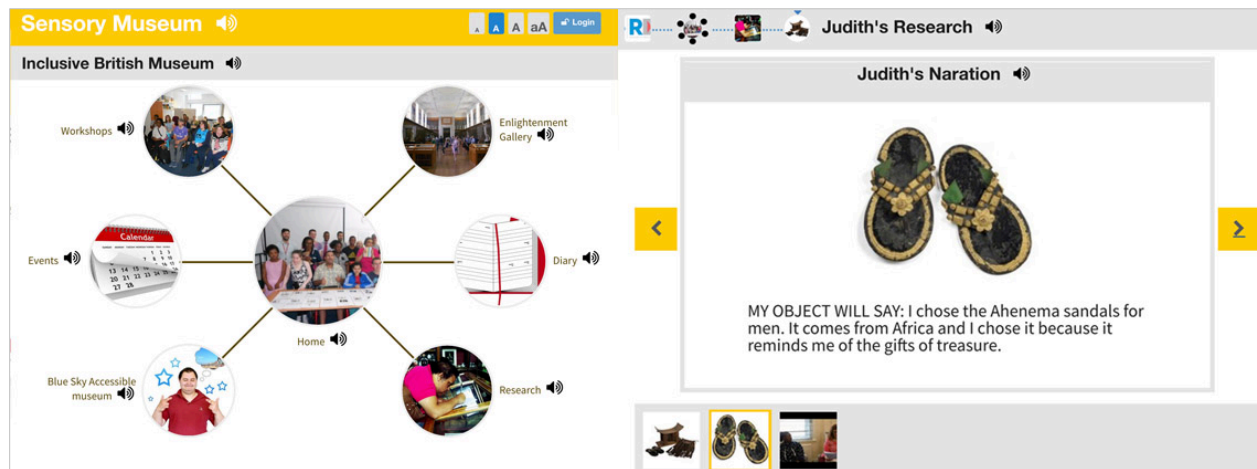


Figure 4: Sensory British Museum WIKI. Two pages from the easy to use webpage.

We thus develop our own unique interpretations of the stories that museum collections hold, using our Wiki websites as digital sketchbooks and tools for data analysis, as well as for developing and communicating our ideas. A single Wiki website provides a portfolio for the purpleSTARS' work as it progresses, with easy functionality to project and share work with fellow team members or with our client partners. The critical engagement with museum collections through our sensory expedition and the re-working of the data collected in adding to the Wikis, are developed with hands-on art workshops using interactive technologies such as the Talking Postcards — postcards containing a voice recording chip with a simple record and play operation. The postcards are employed to capture sensory material: images, sounds, textures and smells. This enables a process of reflection and exploration of the subjective meanings and associations evoked alongside our sensory experiences with a museum collection. This is a process of

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retelling in which we actively engage and include people with ID, sharing and valorising their unique lived experiences as well as their sensory perceptions to include everyone. Our retelling starts combining digital media and other art materials and processes with the introduction of simple electronic interactive components. We take this forward in the next phase as we then translate our retelling into a re-curation of the story, working on the co-production of a more complex and finished alternative environment or object that can enhance a visit or cohabit in the museum with the original displays. This adds narrative and sensory wealth, encourages further points of access to the collection, and prompts and promotes further reinterpretation by museum visitors.

Usefully, the Wikis and the mini-installations enshrined in the Talking Postcards provide a record of our process that helps to frame and sustain engagement of participants with ID, triggering memories and capturing thoughts that might otherwise be lost, as well as providing a rich archive of background information on how our works are developed.
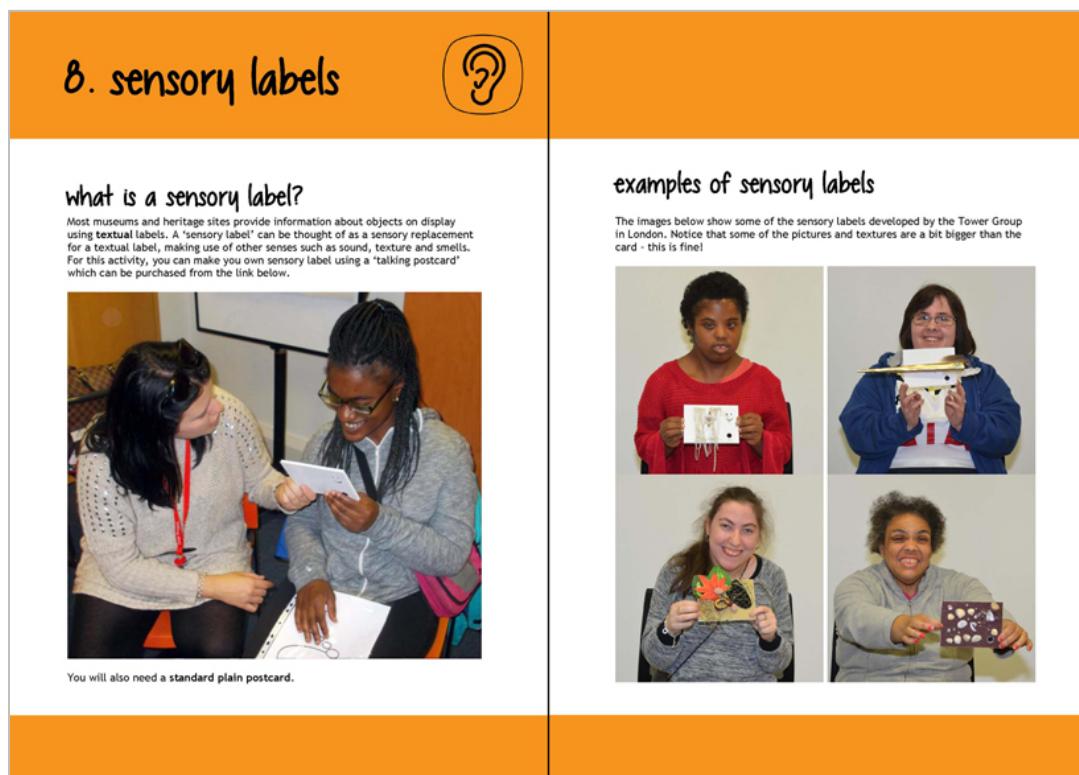


Figure 5: Examples of using Talking Postcards to create Sensory Labels for the Enlightenment Gallery at the British Museum 2014 pages from the Sensory Expeditions Workbook.

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**4) Production: Creative Art and Technology Collaboration**

Creative art workshops are central to the purpleSTARS process — the sensory materials collected from a museum are brought together to help us discuss and experiment, as well as create stories and sensory objects in response to the museum collection. Working together to share and consider sensory materials incorporates our Talking Postcards experiments alongside clay, cloth, microcontrollers, plastics, laser cut imagery etc. Allowing for everyone to share something, whether a sound, a movement, a drawing, or object, the production process enables all types of content to be shared and acted upon. Hands-on experiments allow for accidents and unexpected outcomes to occur — everything is up for consideration as we enjoy a level ground where everyone can 'have a go.'

This phase exploits the permissive openness of creative art practice, applying a 'process-driven' approach that can conflict with the conventional expectations that come with a museum commission and a brief. Museums have expressed concern that they could see no pre-defined outcome from a purpleSTARS workshop, but our engagement in art practice is part of an action research methodology, whereby outcomes are discovered through the process of experimentation and discovery. Our belief is that the freedoms of art practice make the opportunity to contribute more flexible and in the process, original ideas can emerge and prompt unexpected solutions for more inclusive experiences.

Sensory Objects and purpleSTARS' work has repeatedly demonstrated that stand-alone touchscreens do not readily engage visitors, who are more eager to be able to physically engage with museum exhibits. However, this is rarely an option with the majority of a museum's collection, comprising objects that are too fragile and valuable to handle. We recognized the potential value of the replica objects that museums acquire so as to provide relevant tactile experiences for visitors, and these have become a popular vehicle for the Sensory Objects experience that purpleSTARS developed. The team discovered the power of sensory technologies embedded into replica museum objects that are sufficiently robust to feel, touch and share with other members of the public. The cause and effect enabled by electronic sensors and triggers could trigger sensory surprises from objects and evoke the stories the collections hold in ways more intimate and shared.

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Through our design process over the three years of the Sensory Objects research project, short but regular workshops gave our co-researchers the opportunity to discover how to design an artwork that was responsive in some way, for example, choosing a sensor responding to light, sound, touch or the proximity of a user. The idea was to be able to activate and share a moment with a sound, smell, texture or vibration so we could experience a fresh and often unexpected perspective of a museum collection. This triggering of a different point of view provides the opportunity for historic objects to become part of our present time and be enriched by tangential stories and sensory experiences that can make connections for us that are not otherwise available. For example, the *MERL Sensory Cow* allows visitors to press a button under the cow's chin to record and play back their own "moo," enabled by a Raspberry Pi embedded under the cow's life-size body. Making animal sounds and leaving something personal in the museum, we note, has helped to promote an enhanced sense of connectedness, as well as ownership of the museum as an experience, for visitors.



Figure 6: MERL Poster for Research in Action event which led to the MERL Sensory Cow commission. Press the record button under her chin to leave your own Moo. The MERL sensory cow is fitted with a microphone in her ear. A raspberry pi controls her own intranet for recording and playing collected Moos. She also has a smell machine blowing out the smell of milk chocolate and a selection of magnetic tactile examples produced from cows, including a leather hand control patch with a touch sensor embedded to turn sounds on and off.

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For our co-researchers with ID, this interactivity added to their sense of ownership and control of the alternative experiences that they created. They were consistently delighted in the cause and effect of a switch or trigger that they deployed to spark the special experience they designed for the visitor. We see that these interactive controls reinforce the rebalance of power relations that the purpleSTARS promote by further emphasizing their agency and advocacy as producers.

For this to be learned and embedded into our practice, as with our media and sensory methods, we found we had to adjust the way these tools were designed, and introduce them to the purpleSTARS team incrementally so as to fully engage the people with different abilities who made up our R&D team. To further this aim, we first explored the idea of cause and effect, illustrated by a picture of a cat, with the 'cause' being a hand stroking it and the 'effect,' the cat's purring. We introduced the technology in stages, with workshop sessions to first demonstrate what was possible in terms of making objects interactive and responsive, then providing accessible tools to facilitate hands-on exploration and experimentation with interactive elements, and ultimately designing and producing our own interactive objects together.

We developed individuals' practical understanding of cause and effect with *Squishy Circuits* (Johnson and Thomas, 2010) — the co-researchers constructed simple electronic circuits using conductive dough made from flour and cooking oil, connected to batteries, buzzers and LEDs. We also added smell to the dough, which everyone found fun to model and easy to work with. With a little guidance, we were able to make simple circuits and experiment with triggering actions, such as switching LEDs on and off, and gaining experience and confidence in assembling electronic components by introducing simple power sources, output devices, and triggers.

As a next step in encouraging the exploration of technologies and what they can offer, we experimented with littleBits (Bdeir and Rothman 2012), an electronics kit that consists of small electronic components (somewhat similar to Lego), which snap together through magnets. Our co-researchers readily engaged with the simple design and magnetic connections of the littleBits, and with some guidance, were able to construct simple circuits that allowed them to explore

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different methods of triggering sounds, light, and movements. However, these kits demanded a level of manual dexterity that was beyond some of our team. With the expertise of our Sensory Objects post-doctoral researcher Dr. Nic Hollinworth, we designed larger bases onto which to attach the littleBits pieces, making it far easier for those with limited motor control to manipulate the components which were resized as larger objects. This piece of R&D was described in an article entitled 'Little Bits Go Large' and was awarded the International Design for All trophy in 2014 (https://extrasensoryobjects.wordpress.com/littlebits-go-large/).



Figure 7: LittleBits Go Large research project poster.

In our work with the British Museum on the Sensory Objects research project, we developed a set of sensory labels by applying these methods. Our labels used an Arduino controller to trigger sounds in unique ways, adding alternative sensory stories and perspectives to some of the objects in the *Enlightenment*

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*Gallery* at the British Museum. The gallery represents an eighteenth-century cabinet of curiosities collected by the museum's founder, Sir Hans Sloane. The collection is displayed in wooden cases, with most items behind glass. Each of our co-researchers chose an object as part of their sensory expedition, researched it, and collated information about the object and the thoughts it inspired in their Wiki. We initially developed labels for the objects with sounds, smells, images and textures using the Talking Postcards mentioned above. Then, in response to the ambitious designs of the labels developed, we progressed to the use of sturdier materials, creating larger, laser-cut wooden sensory boxes to serve as labels. They became remarkable artworks in their own right, each capturing a co-researcher's individual response to, and reinterpretation of, the chosen museum item. purpleSTARS' first employee, Judith Appiah, created a sensory label. She chose a leather slipper from Ghana. Judith drew the slipper and then decided to make a replica in leather to recreate its texture and smell, and to be able to bend it like the original slipper in the collection would, if she was able to touch it. She also wanted to include sounds of Ghanaian music and the sound that sandals and flip-flops make when you walk in them. Through the earlier workshops, Judith had experience using littleBits — she enjoyed using the bend sensor and said that the demos of the littleBits from earlier workshops helped her understand how she could trigger sounds when designing her sensory label. Judith decided to embed a bend sensor in her slipper so when it was bent it triggered the sounds.



Figure 8: Judith demonstrates her Sensory Label at the British Museum.

The idea to create an immersive virtual reality (VR) experience was triggered while observing college students with ID attempting to walk into a projection of

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an animated forest. On a visit to MERL, the college students requested to show the animation in their sensory room. during the showing we observed students repeatedly trying to walk into the animated forest space. We started experimenting by making a simple VR version of the forest which could be experienced through a VR headset. Most of us really enjoyed the experience and found it very calming. We noted how popular VR was with ID learners who typically had low attention spans for conventional displays. Judith Appiah, the purpleSTARS employee who built the sensory label, suggested a VR version of the forest with changing seasons would make a great outreach exhibit — for example, to be shared in a hospital for those who are unable to come to the museum. We sent our simplified VR version to Shosho, the design company in the Netherlands who had made the original animation. They were very excited about the idea of a VR forest developed by people with ID and offered to work with us to create a version, complete with additional elements suggested in drawings by the purpleSTARS, including a rainbow and a weasel agreed upon during online meetings.



Figure 9: purpleSTARS suggest ideas for a virtual forest.

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MERL commissioned purpleSTARS to create a series of immersive experiences. During our *Sensory Expeditions* visit with local students with ID, everyone wanted to sit on the old tractors and Land Rover, but the machines in MERL were either too vulnerable or too valuable. One exhibit of a shepherd's smock and crook featured accompanying information that a modern shepherd would use a quad bike (all-terrain vehicle) to look after his sheep and this prompted the idea to create our second VR experience. Here, production entailed the purchase of a quad bike and a 360 GoPro Fusion camera to film a Dartmoor farmer as he worked with his dog to round-up a flock of sheep on his own vehicle. The 360-degree video was transferred to an Oculus Go headset so the visitor, while on the quad bike and wearing the VR headset, could view and enjoy the immersive VR experience of a farmer working with his dog and sheep on Dartmoor in the museum.

The purpleSTARS were very keen to create versions of their VR experiences to be as inclusive as possible, demonstrating how attuned they are to a specialist understanding of the rights issues that determine inclusion. The team were keen to create audio descriptive versions of the quad bike (https://extrasensoryobjects.wordpress.com/littlebits-go-large/) and shepherd experience for people with visual impairments. They also designed and produced a detachable handlebar version, coupled to a vibrating cushion, to simulate the experience for wheelchair users.

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Figure 10: purpleSTARS Julie on VR Quad Bike Experience at MERL; Justin tests wheelchair version of VR Quad Bike experience.

### 5 and 6) Launch and Legacy

The purpleSTARS engage with the public and share their work through showcase events and seminars and they have found that doing so further develops their relationships with the museums with which they work. The purpleSTARS take over as hosts, presenters and leaders, demonstrating their effective accomplishment as self-advocates. We showcased the sensory labels from the *Enlightenment Gallery* at the British Museum at a special event with all twelve co-researchers present in the gallery. Visitors were invited to inspect our sensory labels. This led to unexpected conversations with the public, who were intrigued — the change in positioning engaged museum workers, who notably shifted their own perspective from seeing the co-researchers as recipients of their workshops to creators and facilitators. Our co-researchers felt respected and proud to share their beautifully-made labels, with personal perspectives on the objects in the collection, with everyone. Support workers were also surprised to see the confidence with which the group engaged with the public and shared their sensory labels. Museum visitors enjoyed sharing alternative perspectives of

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the collection presented by the co-researchers. Children loved to trigger the sensory label sounds, sniff the 'smell chamber' and feel the surface of the laser-cut wood. The British Museum invited the Sensory Objects team back to the *Enlightenment Gallery* during school holidays to share the sensory labels with children of all abilities, and the team have subsequently contributed to the #purplelightup at the Museum for the International Day of Persons with Disabilities.

The legacy of the Sensory Objects research and purpleSTARS enterprise continues at the MERL — the quad bike VR installation is now permanent and is a very popular feature of the museum. Some of the students with ID from the local college work as volunteers to help visitors fit the VR headset and enjoy the experience.
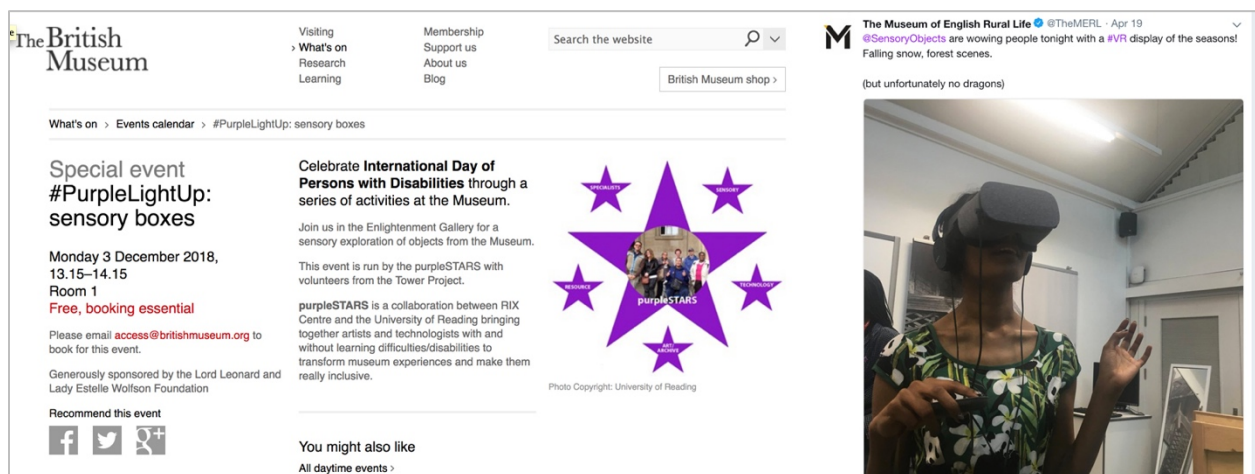


Figure 11: #PurpleLightUp at the British Museum for the International Day of Persons with Disabilities event 2018 and visitor at MERL Lates Digital Take Over Night 2019

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# Reflections and Conclusions

The work of the Sensory Objects project and its subsequent manifestation as the purpleSTARS enterprise has established the beginnings of an innovative method for making our museums and heritage sites genuinely more accessible and inclusive places. The combination of multimedia advocacy and sensory creativity enshrined in the approaches that we have started to map out in this chapter has proven potential to raise awareness for all stakeholders and frequently catalyze and stimulate the necessary processes of change that are required. These are practical methods to help include diverse people in different ways that can complement each other and combine to achieve more welcoming and inclusive amenities.

The key step that we note, to progress towards better inclusion, is to **rethink the roles** that are considered for the disabled people you wish to engage. Kate Arnold-Forster, the Director of The MERL recognized the powerful effect of this shifting of relationships in her speech to the purpleSTARS:

> I think the idea that you are the researchers is fantastic and you tell us what we should do. It's not us thinking about ideas and trying them out on you, the ideas are being born and developed between us — and that has been fantastic.

Describing and reflecting on our experiences has led to a set of recommended approaches that, together, constitute an emerging methodology. We summarize here, as a concluding draft, purpleSTARS' *Manifesto for the Inclusive Museum:*

• Engage people with ID as co-researchers, creatives, guides, and curators alongside your existing in-house teams to apply the principle of 'Nothing About Us Without Us.'

• Acknowledge how everyone can contribute expertise as 'experts by experience' and actively identify, value, and incorporate those contributions into your teams and their workflows.

- To make this work, you should break your existing processes down into small, manageable steps and be creative about how they might be made easier to understand and engage with (e.g. for data analysis, use chairs with single-word and picture labels to organize research data — in written notes or objects — into the emerging themes, located in different parts of the room).

- Use multimedia authoring, organizing, and annotating tools, such as the RIX Wiki, to collate observations and ideas, and to frame your research study.

- Plan and organize all of your activities for clarity and orientation with easy-to-understand Easy Read 'call sheets' to ensure that everyone is up to speed and engaged with the program.

- Be prepared to make alterations to some technologies and processes so as to ensure that you include everyone. Set time and resources aside to achieve this so that no one is left behind as the project develops.

Our experience is that these methods can enable people with ID to challenge legacy practices that exclude them and catalyze change to make our public culture more inclusive. These are not discrete specialist outreach activities or 'reasonable adjustments' to curation design. They represent fundamental change to working practices and introduce new processes to the museums and heritage sites into which they are introduced.

The creative art and media elements of these methods provide important freedoms and establish a space for disruptive things to happen that can help promote change. Process-led approaches carry uncertainty and can alter the ways in which we all work and transform our workplaces. Inclusion means local people seeing your museum as a welcoming space where they belong and as a public amenity to which everyone can make a contribution.

The creative work of people with ID has a special aura. Its appeal is often seemingly new and surreal to audiences who have the opportunity to experience personal perspectives that are rarely articulated or shared in our exclusive culture. Given the right structure, support and license to create, people with ID will provide museum experiences that will make visitors value their own

subjectivity and difference, whatever their background. Such inclusive practices make inclusive museums — which are better museums for us all.

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