Inclusive Museums: Addressing Neurodivergence in Cultural Spaces

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Abstract: The "Inclusive Museums initiative: Addressing Neurodivergence in Cultural Spaces" aims to foster inclusive cultural spaces by integrating neurodiversity into space design education and by raising awareness of cultural institutions. This small-scale pilot initiative was developed in collaboration with a design and applied arts school, a cultural institution, special education counsellors and a biomedical start-up specializing in neurodevelopmental diagnostics, the project introduces a multidisciplinary and participatory model for inclusive museum design. It engages design students and cultural actors through immersive workshops, collaborative design sprints, and public-facing events, including virtual reality (VR) experiences simulating sensory and cognitive challenges. The initiative also supports professional development and dialogue within cultural institutions, encouraging long-term reflection on accessibility, spatial justice, and the cultural mediation of neurodiversity. This paper presents the methodology, challenges, and preliminary outcomes of the initiative, arguing that inclusive design education—when coupled with lived experience and institutional engagement—can serve as a catalyst for structural change in the museum sector.

Keywords: *Inclusivity, Design for All, Institutional Change, Neurodiverse Visitors, Neuroinclusive Museums, Empathy Experiences, Museum Accessibility*

Introduction

Museums are often considered safe, inspiring spaces where people can learn, explore, and engage with culture in meaningful ways. While this holds true for many, it is not the case for all. For some neurodivergent people with dyslexia, dyspraxia, ADHD, autism, or sensory processing differences, museums can be an overwhelming environment. Crowds, noise, lighting, textures, and traditional educational formats may create significant barriers to access, comfort, and learning.

The concept of neurodiversity offers a valuable lens for understanding these challenges. As Masataka (Masataka 2018) explains, neurodiversity refers to the cognititive and emotional traits often considered as impairments, such as those associated to autism, as natural variation of human behaviour. According to Granland, Sadia, and Cooper (2024), individuals with neurological or neurodevelopmental differences—such as attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), specific learning differences (commonly referred to as "DYS", including developmental language variation, speech and fluency disorders, dyscalculia, dyslexia, dysgraphia), obsessive compulsive disorder (OCD), and Tourette Syndrome—are considered neurodivergent (Granland et al. 2024).

Although in French clinical contexts, the term neurodevelopmental disorders is commonly used to classify these conditions, in this article we primarily adopted the term neurodivergent, as recommended by the NHS Dorset Neurodiversity Hub. This term describes someone whose brain functions differently from typical patterns, and may have one or more neurodevelopmental differences (NHS Dorset Neurodiversity Hub, n.d.). We also use neurodiversity to denote the broader concept that everyone's brain is unique, emphasizing natural variation in neurology rather than deficits (NHS Dorset Neurodiversity Hub, n.d.).

The terminology clarified, this paper addresses a clear problem: the inadequacy of one-size-fits-all approaches to museum accessibility when it comes to neurodiversity. As Baumer and Frueh (2021) explain, "Neurodiversity describes the idea that people experience and interact with the world around them in many different ways; there is no one "right" way of thinking, learning, and behaving, and differences are not viewed as deficits" (Baumer and Frueh 2021). Whereas many institutions have effectively addressed mobility and visual impairments through built-environment interventions (e.g., ramps, lifts, tactile guides), neurodiverse accessibility requires attention to sensory, cognitive, and social dimensions that extend beyond physical infrastructure.

At a time when 1 in 6 children lives with a neurodevelopmental variation (The French Ministry of Health 2023), with autism affecting 1 to 2% of the population, learning differences (DYS) impacting 8%, and attention deficit disorder (with or without hyperactivity) affecting 6% of children and 3% of adults, it is urgent to move beyond one-size-fits-all approaches. This is even more true when, for instance, 41% of family visitors to UK museums have a neurodiverse child (Baker Richards report 2025).

Clinical research provides the foundation for understanding the diverse sensory, cognitive, and social experiences of neurodivergent individuals. It highlights patterns of sensory hyper- and hypo-reactivity, attention-regulation differences, and variations in processing that make typical museum gallery and exhibition conditions overwhelming for many neurodivergent people. For example, autistic adults frequently report sensory hyperreactivity, hyporeactivity, and sensory seeking across modalities, often leading to feelings of being overwhelmed in overstimulating environments such as cultural venues (MacLennan et al. 2022).

Design research emphasizes that neurodivergent visitors benefit from clear signage, simplified layouts, and predictable spatial organization to reduce cognitive load and improve wayfinding (Travel Wayfinding 2025).

Accordingly, measurable museum indicators should extend beyond attendance figures to include sensory comfort, cognitive clarity, wayfinding ease, agency, and belonging. Tools such as sensory maps, which visually communicate areas of higher or lower sensory intensity, allow visitors to self-select environments that support their needs enhancing autonomy, safety, and inclusion (Cieslik 2024).

While many sensory-friendly programs emerge (c.f. Literature review), one-size-fits-all solutions are insufficient, and interdisciplinary/immersive approaches are underexplored. This is the aim of "Inclusive Museums: Addressing Neurodivergence in Cultural Spaces", an initiative that rethinks cultural environments through the combined lenses of inclusivity, innovation, and design. The initiative was born thanks to a research project, funded by the European Commission, aiming to establish interdisciplinary collaborations and synergies based on artistic methods and approaches within a local context to drive positive change and address current challenges within different domains, such as health, democracy, environment and digital age, through the organisation of interactions with the general public.

Purpose and Scope

The « Inclusive Museums » initiative was developed to raise awareness about neurodiversity, specifically ADHD, sensory processing differences (hypo- and hypersensitivity), and DYS variations, within an interdisciplinary ecosystem based in the French Riviera. The initiative was a small-scale pilot, bringing together an unusual alliance of partners: cognitive neuroscience researchers, special educators, a performing artist, a cultural institution, and 48 space design students. It combined scientific knowledge, capacity-building, artistic practice, and design education to promote neuro-inclusive cultural experiences.

Grounded in the principles of Universal Design for Learning (UDL), the initiative promoted multiple modes of representation, engagement, and expression to meet the diverse learning needs of all participants, including neurodivergent visitors (CAST 2018). Applied in museums, UDL supports the layering of content (visual, tactile, audio), flexible pacing, and opportunities for co-creation. These strategies reduce barriers not only for neurodivergent audiences but enhance experiences for all visitors.

A key component was a virtual reality (VR) experience designed to simulate the sensory and cognitive realities of neurodivergent individuals, allowing participants to "step into their shoes" and foster empathy and understanding. According to the National Education Association (NEA) and the Minnesota department of education, the immersive nature of VR evokes strong emotional responses that facilitate compassion and social awareness (Klein 2024).

Complementary activities included capacity-building workshops, prototype (scale models) development, and exchanges with neurodivergent participants and their families. The approach emphasized consultation, working with neurodivergent people and their carers rather than designing for them, following the principle of *"nothing about us without us."* Some of the student participants identified as neurodivergent themselves, while others conducted interviews with neurodivergent people to inform the design process. Additionally, "Inclusive Museums" supported families by involving them in testing

innovative diagnostic protocols developed by a start-up specializing in early neurodevelopmental assessments, ensuring solutions are built around real needs.

While shaped by the specific local collaborations and resources available, the methodology and objectives were designed to be transferable to other contexts where similar expertise can be mobilized. Building on these foundations, the present study seeks to examine how interdisciplinary collaboration can shape more accessible and inclusive design practices in cultural institutions. It also explores how immersive artistic approaches can foster empathy and awareness of neurodiverse experiences, while guiding the creation of more inclusive cultural environments. Finally, it investigates how artistic facilitation can enhance public engagement in a non-stigmatizing way and support participatory research in cultural contexts.

Literature review

Museums around the world are beginning to reimagine their spaces through the lens of inclusivity and neurodiversity. These institutions have a unique opportunity to create environments that are friendly for those on the spectrum and promote the importance of inclusive access to education and cultural experiences for all in their community (Hutson and Hutson 2022). Initiatives such as sensory-friendly programs and inclusive design guidelines are emerging as best practices. For example, the Dallas Museum of Art, the Palais des Beaux-Arts de Lille, and the Montreal Museum of Fine Arts, all members of the French American Museum Exchange (FRAME), have co-developed a guide to welcoming visitors with neurodiverse profiles on the autism spectrum (Barthélémy et al. 2021). In her reflection on "Speechless: Different by Design", an exhibition she curated for the Dallas Museum of Art and the High Museum of Art in Atlanta, curator Sarah Schleuning emphasizes the institutional conditions necessary for accessibility-focused initiatives to succeed. She stresses the need for comprehensive staff training on accessibility, best practices and the establishment of strong, consistent communication pathways across departments. Schleuning also points to the importance of monitoring how well information is being understood by staff and ensuring that additional support or in-depth training is available when needed (Schleuning 2023).

In the United Kingdom, several museums have developed innovative neuroinclusive programs. For example, Manchester Museum hosted *"The Cat that Slept for a Thousand Years"*, a multisensory, low-stimulation installation co-designed with neurodiverse audiences (Manchester Museum 2025). The Leeds Museums and Galleries implemented autism-friendly mornings, reducing sensory load and creating predictable routines, which families reported as reducing anxiety and increasing engagement (Leeds Museum 2018). Online initiatives such as Sensational Museum (The Sensational Museum, n.d.) and Neurodiverse Museum (The Neurodiverse Museum, n.d.) also provide resources, guidance, and community-driven content supporting neuroinclusive practices across the UK and internationally.

The Whitney Museum of American Art runs ongoing sensory-friendly programs that include adapted visits and hands-on art activities tailored to neurodivergent children (Whitney Museum of American Art 2025). Sensory-friendly programs typically involve modifying environmental factors—such as reducing lighting, lowering background noise, limiting visitor capacity, and providing designated quiet zones—to minimize the risk of sensory overload. They also often include visual schedules, social narratives, or sensory kits (containing items such as headphones, fidget tools, or weighted lap pads) to support self-regulation. Sensory-friendly programming in museums demonstrates clear effects on visitor experience. At the Carnegie Museum of Natural History (USA), roughly 660 individuals participated in Sensory Friendly Hours in 2019, indicating significant interest and uptake (Hannon 2022). Similarly, the Science Museum Group observed that "half of the families who came were visiting for the first time," suggesting such events can attract new audiences to cultural institutions (Slater 2022). These findings complement the behavioral evidence for Social Stories: meta-analytic review confirms that such narratives are most effective in supporting positive behavioral outcomes (Kokina and Kern 2010).

The Whitney Museum also offers other access programs for people with disabilities such as visitors with hearing or vision differences. It was also interesting to see that they offer a "social narrative" program designed for visitors on the autism spectrum containing photos and texts to describe the course of the visit and what to expect while visiting the museum. In their autism training module for rehabilitation counselling, developed for the State University of Emporia, Dr. Marjorie Bock and Dr. Jessica Stallings state that social narratives help people on the autism spectrum navigate challenging situations (such as initiating conversations and engaging in short social interactions) by using text and images to highlight important elements and rules in social situations (Bock and Stallings 2024).

Finnigan (2024) highlights that neurodivergent individuals experience significant benefits from environments that integrate natural and biophilic elements. Participants in her study emphasized that features such as organic textures, soft and adjustable lighting, natural rhythms, and gentle movements (e.g., rustling leaves or flowing water) create spaces perceived as calming and supportive. These sensory-responsive design elements reduce overstimulation, enhance predictability, and foster a sense of safety and comfort, enabling better engagement and emotional regulation for individuals with autism, ADHD, or other sensory sensitivities. Similarly, installations such as Tree.ONE by ecoLogicStudio at the Chengdu Contemporary Art Museum exemplify how biomimetic design can improve air quality, introduce visually and tactilely engaging natural elements, and provide a restorative environment for neurodivergent visitors (Hutson and Hutson 2024). Finnigan's findings, together with examples like Tree.ONE, provide empirical and practical support for incorporating biophilic design principles in museums and educational spaces to improve accessibility and inclusivity for neurodivergent audiences.

These adjustments are designed to make museum spaces more predictable and manageable for neurodivergent visitors, especially those with autism or ADHD, while still maintaining an engaging cultural experience for all.

Another example is presented in a recent paper published by the National Library of Medicine (Holt et al. 2024) that highlights the work of Islands of Brilliance, a non-profit organization that uses creativity, technology, and mentorship to empower autistic and neurodivergent youth. By adopting a project-based, participant-led, and universally designed educational model, Islands of Brilliance reframes neurodivergence as a source of unique creative potential not a limitation. Programs like these not only promote self-expression and confidence but also challenge occurring societal narratives around disability. At the core of this movement is the belief of making the invisible disability visible and that museums can be inclusive spaces of discovery and creativity for everyone. The Arts Management and Technology Lab at the Carnegie Mellon University states that while there may be overlap with the needs of those with physical disabilities, neurodiverse accessibility extends beyond physical accommodations like ramps and elevators. It involves creating environments that consider the individualized needs of neurodivergent individuals. Because of this, museums and cultural institutions cannot reasonably adopt a one-size-fits-all solution to address the barriers that neurodivergent individuals, as well as educators bringing neurodivergent students into museum spaces, may face. However, museums can still make concerted efforts to address as much as they can (Hernandez 2024).

In a cultural context, the main forms of neurodivergence relevant to museum accessibility include autism, ADHD, DYS, and sensory processing. Autism influences how people experience and interact with the world. Autistic people differ from non-autistic people in how they think, feel, and communicate (National Autistic Society, n.d.). In particular, they often experience differences in communication, social interaction, and sensory processing, which can therefore lead to sensory overload in crowded or noisy spaces. For example, busy environments, changes in light and noise, automatic commentaries or displays, and bright lights can all cause distress. In addition, the large scale of museums, with many rooms and unclear routes, may also be overwhelming (Coates 2019). However, sensory-friendly adaptations such as quiet areas and adjusted lighting improve accessibility (Autism in Museums, n.d.). Similarly, visitors with ADHD may have differences in attention, hyperactivity, and impulsiveness, and they often benefit more from interactive, multisensory exhibits rather than static, text-heavy displays (Additude editors 2025). Moreover, DYS variations (dyslexia, dyspraxia, dysphasia) affect reading, motor coordination, and speech/language, and heavy reliance on text or poor layouts creates barriers. Nevertheless, tactile exhibits, audio guides, and clear signage can mitigate these barriers (Glencross 2019; Deakin 2022). In addition, sensory processing differences, which include hypersensitivity or hyposensitivity, can also be supported through universal design, quiet zones, and flexible layouts (Cieslik 2024; Seeberger 2024).

Finally, putting interdisciplinary collaborations and arts at the heart of such programs is a key component to design more accessible, empathetic, and inspiring experiences for all visitors. In her paper, Brown states that due to the increasing complexity of scientific, health, and societal problems, multiple disciplines are needed to fully comprehend and develop solutions (Brown 2023). She adds that uniqueness in perspectives and skills across team members can benefit decision-making and improve outcomes. In this context, Art has the potential to be an essential medium for science. In fact, its role is not limited to dissemination only since art can play a key role in actually co-producing scientific questions, methods and results (Azagra-Caro and Pavone 2024).

Methodology

The methodology adopted for the "Inclusive museums" initiative was rooted in consultation, interdisciplinary collaboration, and experiential learning. Consultation here refers primarily to consultation-based collaboration with stakeholders, interdisciplinary collaboration refers to integration of expertise across multiple fields, and experiential learning refers to learning through direct experience such as VR and workshops, resonating with principles similar to Universal Design for Learning, though UDL was not formally applied.

The project was structured into a three-phase process aimed at

1) raising awareness of cultural and educational institution and
2) fostering inclusive spatial design practices for neurodivergent audiences, with a focus on museum accessibility.

Central to the methodology was the integration of artistic practices, scientific insight, and educational engagement, supported by a diverse set of institutional partners and community stakeholders.

Preparation and Stakeholder engagement

This phase involved mapping the landscape of neurodivergence and cultural accessibility through a combination of academic research, institutional collaboration, and expert consultation. Best practices were reviewed through literature and institutional case studies (e.g., FRAMEwork program, Royal College of Art's Grand Challenge), while local partnerships were established to anchor the initiative in context-specific challenges and opportunities. This dual approach guided the project to looking into both practical innovation and state-of-the-art research, shaping the overall methodology and ensuring the initiative was grounded in both scientific and cultural relevance.

The initiative was co-developed with a diverse group of partners, each selected for their alignment with the project's inclusive goals and their capacity to contribute expertise across multiple domains—design, neuroscience, education, technology, and art.

Partners involved in the initiative included cognitive science researchers to provide scientific grounding to the initiative. Their role was to guide the understanding of neurodiversity and ensure the initiative remains evidence based. A tech start-up specialising in neurodevelopmental diagnostics contributed with their expertise in data-driven approaches to early detection and personalised therapeutic pathways. Their involvement introduced technological innovation to the initiative, particularly using immersive tools such as virtual reality and AI-powered screening platforms. In addition to co-leading a public awareness conference, the start-up aimed to engage with potential candidate families for participation in their upcoming clinical cohort. The overall initiative thus served as both a public education effort and an opportunity to improve the visibility and accuracy of their diagnostic models through real-world interaction and feedback.

Another type of partners involved in the field of neuroscience and education were specialized educators, who played a key role in shaping pedagogical content and training components. As professionals who work directly with neurodivergent people and their families, they provided essential insights into the lived experiences, sensory needs, and learning challenges faced by the initiative's target audience. Their input ensured that the inclusive design challenge was grounded in practical realities, and they offered continuous feedback and support throughout the students' design process.

The "Inclusive Museums" initiative drew inspiration from the Royal College of Art's Grand Challenge, an annual interdisciplinary event that brings together students across the School of Design to collaboratively address key global challenges (The Grand Challenge 2025). This challenge involves postgraduate students across design, fashion, innovation, textiles, intelligent mobility, and service design, combining social, cultural, economic, and technological perspectives to tackle real-world problems within the world's largest single-institution postgraduate design project. This pedagogical model, grounded in real-world impact, design thinking, and social innovation, provided a valuable framework for engaging students in inclusive design for neurodivergent audiences. Building on this model, a local design and applied arts school was invited to participate as an educational partner. The school is known for its Care Design projects, in which students publicly present prototypes and inclusive spatial solutions with a focus on physical disability. Its involvement was pivotal in adapting the Grand Challenge methodology to a local context focused on neurodivergence. Together with the project partners, the school's pedagogical team co-developed a series of workshops that raised awareness of neurodivergent experiences and guided students in the design of spatial and experiential solutions adapted to the sensory needs of neurodivergent visitors.

Finally, a cultural institution specializing in contemporary art served as a key partner as they provided the case study for the design school and hosted the final public event. Known for its community-oriented programming and support for underrepresented audiences, the institution provided an ideal context for prototyping inclusive design strategies. It also acted as a bridge between educational, artistic, and public engagement components of the

initiative. With their support, a contemporary artist was engaged to facilitate the translation of scientific information into emotionally resonant and accessible artistic narratives. The artist co-led the public event and contributed to the initiative's pedagogical strategy by helping foster empathy and engagement through storytelling and performance.

Implementation

The implementation of the project followed a multi-phase structure. The first phase, held on April 11, 2025, at the design and applied arts school, focused on awareness-raising and training. It targeted first-year Bachelor students in space design, aiming to introduce them to the challenges faced by neurodivergent individuals in public and cultural spaces. This one-day session combined theoretical input and immersive artistic activities.

A virtual reality experience, provided by a company designing educational content, enabled students to gain an insight into the perception of a child with dyslexia during a classroom reading exercise, fostering empathy through emotional and sensory immersion. In response to concerns about sensory overload, a carefully chosen cartoon-style VR 3 minutes video was used. The video gradually distorts the text on the page, making it increasingly difficult to read, while layering the emotional impact of the situation: the teacher's impatience, classmates' mockery, the child's rising anxiety, and their academic struggles. Viewers then follow the journey toward diagnosis, the supportive role of a speech therapist, and the child's eventual improvement once understood and supported. This animated content with simplified visuals was selected for its gentle and controlled sensory stimuli, minimizing the risk of overstimulation.

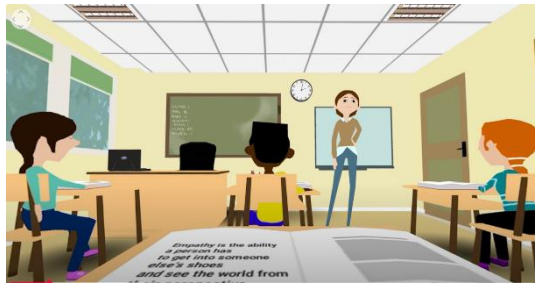

Figure 1 A screenshot from the VR video
Source: Smile & Learn, 2018

The VR sessions were conducted in small groups of participants, ensuring a controlled and supportive environment. The sessions were held in a calm, quiet area, designed to minimize external distractions and sensory stimuli. Participants were seated at tables to promote physical comfort and reduce the likelihood of discomfort associated with standing or movement during the session. Each session lasted approximately 15 minutes, a duration chosen to balance engagement with comfort.

A skilled and experienced facilitator, trained in supporting neurodivergent individuals, accompanied participants throughout the VR experience. Before the session, the facilitator introduced the activity, explaining what the VR simulation was about and what participants could expect, helping them feel informed and avoiding uncomfortable or overwhelming situations. During the experience, the facilitator's role was to ensure that all participants felt comfortable and supported, providing assistance as needed and, afterwards, guided a group discussion. This approach fostered an atmosphere of empathy and understanding, allowing participants to express their feelings and reflections.

This was complemented by a scientific presentation from the researchers in cognitive science and neurosciences and a practical workshop facilitated by the specialized educational consultants providing targeted support to neurodivergent individuals. The educators offered hands-on sensory exercises that simulated conditions such as hypersensitivity and executive dysfunction, providing students with a tangible understanding of neurodivergent experiences.

The second phase, held between late April and early June, involved a five-week inclusive design sprint in which 48 design students were individually challenged to develop space design projects that address the needs of neurodivergent visitors, using an ocean-themed exhibition at the local cultural institution as a case study. The sprint followed an iterative process of analysis, development, and refinement, supported by interim meetings that took place on the 5th of May 2025 where special education counsellors offered feedback on the inclusivity and feasibility of student concepts. This participatory dynamic ensured that neurodivergent perspectives were integrated throughout the design process. At the end of the sprint, six student projects were selected for the public exhibition with the support of the involved cultural institution. The selection criteria emphasized creativity, emotional sensitivity, and the ability to translate neuroinclusive principles into space and scenography solutions.

The third and final phase was the public event held on June 20, 2025, at the cultural institution. Designed as a moment of both celebration and knowledge dissemination, it brought together a diverse group of stakeholders including artists, museum professionals, associations, architects, teachers, parents, and representatives from the French Ministry of Culture. Participating associations, in particular, play a vital role in supporting neurodivergent individuals, fostering social inclusion, and raising awareness to break isolation and contribute to a more inclusive educational and societal environment.

Participants were welcomed with an overview of the program, a self-soothing kit (designed by one of the space design students) for neurodivergent attendees and a dinner cocktail to soften the ambiance and encourage exchanges and interactions.

The event featured the same VR experience used in the first phase with design students, facilitated by an association with extensive experience in running VR sessions. The experience took place in the partnering cultural institution’s library, providing the right setting and conditions (calm and seating area) for the participants.

The event then continued with a 90-minute scientifically grounded conference co-led by researchers in neurosciences and an artist -storyteller. The conference opened and closed with the same question “What do forms of neurodivergence such as dyslexia, dyspraxia, ADHD, or sensory sensitivities convey to you?”. Answers were collected to assess participant’s perceptions and engagement, as well as the impact of the event on public awareness of neurodivergence and inclusive museums. The answers were systematically recorded through structured notetaking by the research team during the conference. These responses were subjected to thematic analysis, a qualitative method that identifies recurring patterns and shared perspectives within the data (Braun and Clarke 2006).

The researchers presented foundational knowledge on brain development, the causes of neurodiversity, the signs, how to get diagnosed, and the technologies and protocols employed by the tech start-up in this field. This scientific knowledge was paired with recommendations and concrete examples of inclusive and successful space design solutions and its impact on mental health.

Artistic facilitation played a key role in translating the neuroscientific concepts into emotionally relatable narratives for the broader public and taking them into a magical cosmic universe. The artist laid out the decoration in artistic and expressive gestures and movements during the scientific conference. After the researchers explained how neurodivergence traits can be capitalized by the neurodivergent individuals as a strength, the artist proceeded to the poetic reading of magical tale “Mia's Magical World and the Imagination Notebook” from the collection “Therapeutic Stories for Children with ADHD, Je Grandis”. This short tale tells the story of a little neurodivergent girl called Mia whose ADHD was channeled into unique creativity, making it her force and strength.

The event continued with the exhibition and presentations of the six selected student projects.

Each student was asked to give a 3–5-minute pitch addressing how their design responded to the sensory needs of neurodivergent visitors within the context of the ocean-themed exhibition. A jury composed of specialized educators, a designer, and a parent of a neurodivergent child evaluated the projects based on relevance, creativity, clarity, and coherence with the exhibition. Four winners were selected following deliberation.

The event concluded with an inclusive reception that facilitated exchanges between students, families, educators, artists, and institutional representatives.

Figure 2 Inclusive Museums' initiative implementation phases
Source: Kouraichi and Petit, 2025

Ethics, Informed Consent and Participant Preparation

To meet ethics principles, a dual consent process has been conducted to ensure comprehensive ethical oversight and respect for participants' rights. First of all, students participating in the design sprint signed consent forms through their educational institution. These forms covered aspects such as participation in the VR experience, photography, and the use of their work in the public exhibition.

Then, all public event attendees were required to complete a registration form that included explicit consent for participation. A descriptive sheet was provided to all participants ahead of the event. This document outlined the context of the VR video, describing its content and the sensory experiences it aimed to simulate. The sheet served as a preparatory tool, allowing participants to make an informed decision about their involvement.

This process ensured that all aspects of the initiative adhered to ethical standards, prioritizing participant safety and well-being, while complying with GDPR rules.

Results and Discussion

The Inclusive Museums initiative unfolded as a multi-phase, small-scale, interdisciplinary approach generating meaningful outcomes across educational, emotional, and institutional dimensions. While the project was qualitative in nature, the data gathered through participant experiences, reflections, and testimonials indicated notable shifts in awareness, empathy, and design thinking, among both students and institutional stakeholders. The growing urgency of addressing accessibility for neurodivergent audiences was immediately recognized throughout the project.

Phase 1: Building Awareness Through Immersion

According to the International Council of Museums UK (ICOM 2022) flexible and sensory-aware spatial design can significantly improve museum accessibility for

neurodivergent visitors. Preparing the next generation of space designers to incorporate inclusivity into their creative processes and involving a design school as a core partner was therefore essential for the initiative.

The first phase hence began with a training session involving 48 first-year space design students, many of whom had limited prior exposure to neurodiversity. As one student observed, the "care design" part of their curriculum had predominantly focused on physical disabilities rather than cognitive or invisible conditions. Their awareness of neurodiversity expanded rapidly through an integrative session combining scientific presentations, sensory experimentation, and an immersive VR simulation of dyslexia.

The immersive experience powerfully conveyed the invisible challenges of dyslexia, highlighting how early recognition and empathy can transform educational outcomes. This intervention effectively shifted the participants from a conceptual distance to emotional proximity, with students describing the VR experience using terms such as "frustrating", "confusing", and "isolating", thereby facilitating a deeper understanding of the everyday realities of neurodivergent individuals. For instance, a student with a dyslexic sibling stated that the experience "helped me understand what he actually feels like". In fact, Simon Luxford-Moore, an educator at ESMS Erskine Stewart's Melville Schools, shares his view about using virtual reality to support Neurodiversity and foster Neuro-empathy in the class.

He realized that we would need to go beyond traditional teaching methods to really make an impact on developing students' understanding of neurodiversity. In his class, he facilitated an immersive experience, which allowed every student to experience what a sensory overload for autistic people, is really like, how it can affect all the senses, and how overwhelming it can be both physically and mentally (Luxford-Moore 2025). This statement illustrates how VR can be a key tool for impact contributing to shifting perspectives.

To move beyond individual accounts, facilitators also held debriefing discussions with students after the VR session, the workshops, and the scientific presentations. Student reflections were collected systematically and analyzed thematically. This analysis highlighted recurring dimensions such as emotional engagement, empathy development, curricular gaps, and recognition of hidden disabilities. For example, several participants expressed that they had previously only studied physical disabilities, while others emphasized that the VR simulation helped them relate more directly to neurodivergent family members.

Several students, including some of the finalists, self-identified as neurodivergent themselves. Their voices added critical depth and valuable experience perspectives to the initiative. Consistent with the observation of Jennifer Leigh in *Belonging and Identity in STEM Higher Education*, inclusion efforts must actively involve those with lived experience, as this "builds trust, rewards effort, and explicitly acknowledges power imbalances" (Leigh et al. 2024). One neurodivergent student reported that the VR simulation triggered difficult memories of academic struggles due to inadequate recognition or support.

Complementing the emotional engagement, the scientific conference, led by cognitive science researchers, was widely perceived as accessible and engaging by students as it also reflected the space-design perspective. To illustrate, one was surprised and noted, “The conference wasn’t boring. It was actually interesting”. Additionally, hands-on sensory workshops, facilitated by two special education counsellors, invited students to physically experience altered perception, hypersensitivity to sound, touch, or light, further grounding their learning in embodied understanding.

In parallel, students also conducted semi-structured interviews with neurodivergent adults (anonymized here). For instance, one participant with ADHD described struggling to navigate cultural spaces that were too linear, silent, or text-heavy, emphasizing the importance of modular pathways, clear landmarks, and “micro-spaces” for rest. Another participant with sensory hypersensitivity highlighted the need for calming ambiances, gentle lighting, and refuge zones to manage overstimulation. These interviews reinforced students’ recognition of design adaptations that support inclusion and provided authentic lived-experience insights to complement the simulations.

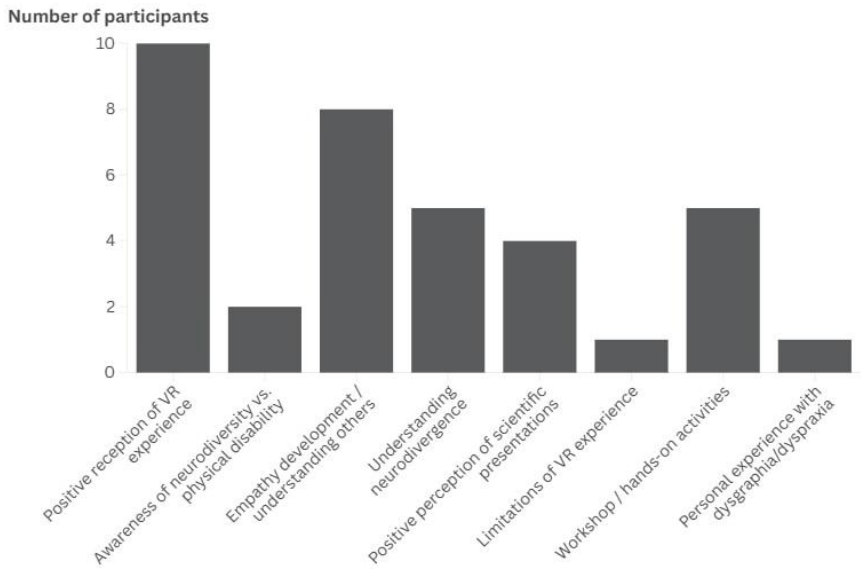

Figure 3 Themes emerging from discussions with the students after the VR workshop
Source: Kouraichi and Petit, 2025

Phase 2: Designing With Insight

In the second phase, students engaged in a five-week design sprint to create inclusive space concepts. Their work was continuously supported through iterative feedback from both their space design professor and the special education counsellors.

The quality of the resulting proposals was notable, with several students producing strong and well-contextualized designs, drawing visual and thematic inspiration from the institution's ocean-themed exhibition. This approach created a subtle but meaningful bridge between inclusion and the existing curatorial framework.

The finalists' projects were distinguished for their research work and assessment of current gaps or challenges encountered in the case study, but also for their sensitivity, narrative coherence, and symbolic power. The jury, composed of specialized educators, a designer, and a parent of a neurodivergent child, praised the clarity and communicative strength of their work, reflecting how deeply students had absorbed the insights gained during the first phase. While the competition was open to all first-year space design students, inclusivity was supported throughout the process: teachers experienced in working with neurodivergent students provided ongoing guidance; the VR facilitator, trained in supporting neurodivergent participants, offered individual reassurance; and special education counsellors familiar with some of the students ensured an environment where participation was accessible and sensitive to diverse needs.

For example, the winning project introduced an immersive and inclusive exhibition design specifically tailored to the needs of neurodivergent visitors, including individuals with dyslexia, hypersensitivity, and ADHD. The proposed concept is centered around creating a soothing, sensory-friendly environment through carefully considered space and design elements. The installation features dune-shaped seating areas with soft, organic forms that encourage freedom of movement and relaxation (Figure 1). Completed by resting pods inspired by sea caves, it provides quiet, enveloping spaces for retreat, helping visitors regulate their sensory experience and emotions. The concept also included a schedule for quiet times for visitors.

Empirical studies support the effectiveness of such design elements. Research on multisensory environments (also known as sensory or Snoezelen® rooms) and spaces with controlled lighting, textures, and soft furnishings show measurable benefits such as improved attention and reduced stereotyped behaviors (Fava and Strauss 2021). These findings reinforce the value of incorporating calming, controllable spaces, such as the project's dune-shaped seating and retreat pods into the exhibition's design for neurodivergent visitors. A multisensory environment study at the University of North Carolina – Greensboro (Morgan and Parker 2024) converted a 25 m^2 room into a sensory-friendly space with adjustable lighting, sound, and tactile elements, as well as soft seating and relaxation areas. Forty-nine students spent approximately 28 minutes in the space, and results showed a mean reduction of 3.62 points on the 40-point Perceived Stress Scale, alongside a high average restorative score of 4.5 out of 6. Participants reported that having control over environmental features—such as lighting, sound, and seating options—was key to reducing stress and supporting self-regulation. The proposals put forward by the student align with the example provided by Svaler (2023) in the article "On making

libraries and museums more accessible for autistic people". Svaler highlights practices implemented by the British Museums, such as providing information on their website about quieter and busier times of day (week and week-end), identifying quieter and more crowded areas within the venues, and describing environmental factors such as lighting and temperature across different rooms. These measures aim to support neurodivergent visitors by enhancing predictability and comfort within cultural spaces.

Indeed, sensory-friendly museum initiatives such as quiet hours, reduced lighting, and structured routines have been reported to create calmer visits and enhance predictability for neurodivergent audiences. For example, Museums Victoria's Annual Report (2023–24) notes that the Autism Friendly Museum webpage attracted over 11,000 visitors, with more than 3,400 downloads of their sensory-friendly social stories and maps, and newly developed resources for exhibitions such as Air Playground, Titanic: The Artefact Exhibition, and Victoria the T. rex (Museums Board of Victoria 2024). These initiatives highlight the growing demand for, and effectiveness of, structured and predictable supports in reducing anxiety and improving accessibility for neurodivergent visitors.

The way finding system includes large, clearly visible illuminated numbers, uncluttered interpretive signage, and a discreet guiding rope along the route, all designed to support intuitive navigation and reduce cognitive load.

Each component of the student's proposal was developed to minimize sensory overstimulation and offer a calm, respectful, and adaptable museum experience, aligning with the diverse needs and rhythms of neurodivergent audiences.

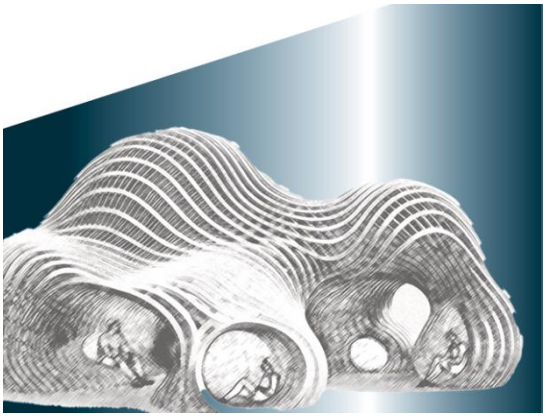

Figure 4 Illustration of the design concept proposed by the winning project

Source: Cohn, 2025

Another student project adopted a biophilic design approach, exploring how existing natural elements can be used to create sensory-regulating environments for neurodivergent visitors. The installation focused on integrating plant-based and ocean-inspired design elements to offer a calming, immersive experience.

Plants sourced from the cultural institution's renowned botanical garden, an integral part of its identity, were incorporated into the exhibition space, not only as decoration, but

as active components of the space challenge. These plants were seamlessly integrated into the furniture, which drew formal inspiration from oceanic forms. The design created a soft, cocoon-like environment that celebrated both the natural heritage of the site and the soothing power of natural materials.

Figure 5 Illustration of a design concept proposed by another finalist project
Source: Zaric, 2025

By blending botanical elements and marine-inspired structures, the project fostered a sense of sensory refuge. Neurodivergent individuals, particularly those with sensory sensitivities such as ADHD, hypersensitivity, or anxiety-related traits, often benefit from spaces that offer organic textures, low-stimulus visual patterns, and natural rhythms. In fact, qualitative evidence demonstrates that natural and sensory-responsive outdoor environments—such as gardens, shaded trails, and spaces with biophilic features—are perceived by the neurodivergent individuals as calming and less overstimulating compared to conventional indoor spaces (Finnigan 2024). This installation did exactly that by inviting rest, curiosity, and grounding through nature.

The value of this nature-based approach is backed by growing scientific and design literature. Research in biophilic design, the practice of incorporating nature into built environments, has shown significant benefits for neurodivergent populations as nature reduces sensory overload. Natural environments typically have low-arousal sensory inputs, such as soft lighting, organic shapes, and gentle movement (e.g., plant leaves swaying), which help regulate over-stimulation in autistic individuals (Browning et al. 2020). The student incorporated biophilic elements in their exhibition designs, including organic forms, natural materials, and soft lighting solutions. These design choices are consistent with research showing that biophilic environments contribute to sensory regulation and comfort among neurodivergent individuals (Browning et al. 2020; Kellert and Calabrese 2005).

This phase illustrates the value of embedding real societal issues into pedagogical practice. As Slingerland and Wang write in Co-design for Change, co-design creates a sense of ownership by "actively involving end-users or citizens and enabling them to shape the process" resulting in deeper commitment and more sustainable outcomes (Slingerland and Wang 2024)

The institution's decision to establish a working group with its two main contemporary art networks emerged directly from this process, an institutional outcome rooted in educational engagement.

Phase 3: Public Engagement and Open Dialogue

The public event extended the reach of the initiative to a broader audience bringing together around 80 attendees, including museum professionals, educators, designers, researchers, families, and members of local associations.
The event was carefully structured to be welcoming, especially for those unfamiliar with neurodiversity or interdisciplinary initiatives. Attendees were welcomed with clear guidance on the program and timeline and the self-soothing kit, something participants later said helped them feel at ease.

The program featured the exhibition of student design projects, the immersive VR station, and the live, artist-facilitated, conference. All these elements created moments of curiosity, reflection, and emotion. The opening question "What do forms of neurodivergence such as dyslexia, dyspraxia, ADHD, or sensory sensitivities evoke for you?" generated responses like imagination, uniqueness, stimulation, and attention. By the end of the event, these perceptions had notably evolved, with most of the visitors feeling more connected, informed, and ready to act.

The participants' answers allowed identification of key themes, including:

1. Awareness and understanding of neurodivergence: Participants asked questions about neurodevelopment, ADHD, and sensory processing, demonstrating engagement with scientific content.
2. Perceptions of terminology and identity: Several participants emphasized the importance of language that refers to the person rather than the differences, reflecting neurodivergent-affirming perspectives.
3. Interest in applied research and innovation: Questions about AI-assisted diagnostic tools highlighted participant curiosity about the accuracy and potential applications of new technologies.
4. Emotional and imaginative reflections: Descriptions such as imagination, uniqueness, hyper-stimulation, and perpetual sensory input indicated empathy and emotional resonance with neurodivergent experiences.

Analysis of participant responses during the public conference revealed measurable shifts in perceptions of neurodivergence. Figure 6. summarizes the perceived impacts of the conference on the participants and illustrates how their perceptions changed over the course of the event. For example, while personal experiences and journeys were rarely mentioned at the opening, participants shared detailed accounts of their own experiences and involvement with neurodivergent associations by the event's conclusion. Similarly, sensitivity to language and identity, initially unaddressed, became a prominent theme, reflecting increased awareness of the need for inclusive terminology. Creativity and

imagination, sensory challenges, neuroscience curiosity, AI applications, research interest, and desire for continued engagement all showed measurable development from initial perceptions to post-event reflections.

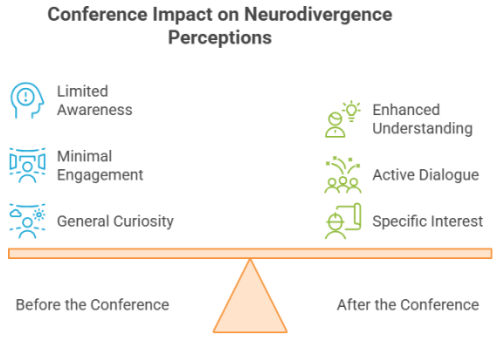

Figure 6 Perceived impacts of the conference on participants
Source: Kouraichi and Petit, 2025

A particular moment stood out during the poetic performance when a young autistic man was so moved that he spontaneously stepped onto the stage to join the artist, communicating through movement and gesture. His presence was warmly welcomed by the room, an unplanned yet powerful moment of inclusion-in-practice.

Conversations flowed throughout the day. The director of the host institution shared that she now felt "more open and informed" and expressed interest in expanding the initiative. A member of a local autism association spoke about the importance of involving neurodivergent people not only as participants but as researchers. Another participant highlighted how our language terms can be stigmatizing and suggested more empowering alternatives.

Following the event, the institution organized a tailored visit for the autism association to experience the exhibition, a small but significant action that demonstrated ongoing commitment.

Reflection on the importance of interdisciplinarity

A key feature of the initiative was its strongly interdisciplinary nature, bringing together researchers in neuroscience, artists, designers, educators, architects, technologists, cultural institutions, and associations. Each discipline brought its own language, methods, and priorities ranging from scientific accuracy and clinical frameworks to cultural mediation, emotional storytelling, spatial aesthetics, or lived experience advocacy.

These differences at times led to misalignments or contrasting interpretations of key terms such as "accessibility" or "inclusion." However, acknowledging and respecting the

distinct “cultures” of each stakeholder group proved essential to fostering genuine dialogue and co-construction. Rather than seeking to unify perspectives under a single framework, the initiative embraced these tensions as opportunities to build shared understanding through translation, empathy, and iterative design. This interdisciplinary approach enriched the outcomes and modelled a practice of inclusive collaboration that mirrored the values the project sought to promote. By creating conditions for dialogue across disciplines and with the audience, the initiative moved beyond conventional interventions to embrace pedagogical, narrative, and affective dimensions of inclusion.

Reflections on Artistic Mediation

Throughout the initiative, the artist’s role was essential, not as decoration but as a translator of complexity. Whether through movement, storytelling, or artistic interventions helped the public to connect to the scientific content in intuitive, accessible ways.

The VR experiences were not tech novelties; they were artistic devices for perspective-shifting.

The design process challenged students to think about space not just as function, but as narrative. The emotional layer added by the artist ensured the work resonated beyond the intellectual.

Interestingly, the researchers in cognitive science expressed how this approach had shifted their own thinking. They plan to adopt similar formats in their upcoming national tour, evidence of how the collaboration influenced not only students and the attendees, but the scientists themselves.

Lasting Outcomes and Shifts

As a result of this initiative, the design school and cultural institution have both made clear commitments. Teachers reported new sensitivity to neurodivergent students, and museum staff committed to rethinking how they welcome neurodivergent visitors. Several of the student design projects have been identified as feasible, low-cost interventions that could be implemented quickly in museums, including flexible signage, quiet corners and multisensory labels. These “quick wins” demonstrate that meaningful change for neurodivergent visitors is achievable without large infrastructure or staffing investment. In addition, involving neurodivergent individuals in the co-design process proved essential for identifying practical solutions and ensuring that interventions genuinely address visitor needs rather than assumptions.

The student feedback has been especially encouraging. Many described the experience as transformative, not just for their knowledge, but for their design practice. One student said, “Now I can’t imagine designing without thinking about how people feel in the space”.

To summarize, the “Inclusive Museums” initiative offers a working model for how cultural institutions can integrate inclusive practice through collaboration, emotional engagement, and interdisciplinary learning. When design, science, and art come together,

not just to inform, but to involve, the result is not only better projects, but more thoughtful, equitable institutions.

Importantly, the host cultural institution is taking a leadership role beyond this project. As a key member of two national contemporary art networks, it is launching a special task force to address neurodiversity inclusion, aiming to influence institutional policies, standards, and political support for systemic change.

Based on the outcomes and lessons learned, we propose the following recommendations for future action:

1. To embed neurodiversity-informed practices across museum teams, organize regular awareness-raising workshops and training, fostering professional development.
2. Implement incremental and low-cost interventions like quiet zones, flexible signage, multisensory labels, and rotating VR experiences.
3. Continuously involve experts from neuroscience, special education, design, curatorial practice, and lived experience in trainings and project development.
4. Maintain long-term engagement with neurodivergent communities and researchers to co-create exhibits and programming.
5. Leverage cultural networks to influence standards, funding priorities, and political support for neurodiversity-inclusive museums.
6. Establish similar initiatives as an annual program to continuously train students and engage fresh audiences.

Conclusion

The Inclusive Museums initiative set out with three core objectives, (i) to raise awareness about neurodivergence, (ii) to foster inclusive spatial design practices, and (iii) to create meaningful, cross-sector dialogue through the convergence of scientific research and artistic expression. Through immersive learning experiences, creative co-design processes, and public events, the project succeeded in engaging students, cultural professionals, researchers, and neurodivergent individuals around a shared commitment to accessibility and inclusion.

A key factor in this success was the initiative's interdisciplinary nature. By uniting experts from neuroscience, special education, design, curatorial practice, and the arts, the program highlighted how collaboration across fields can lead to more meaningful, innovative, and human-centered solutions. Involving people with lived experience of

neurodivergence added essential depth and authenticity to the outcomes ensuring that the initiative responded to real needs rather than assumptions.

Looking ahead, both the host cultural institution and the partnering design and applied arts school have committed to sustaining this momentum. Internally, they will continue raising awareness about neurodivergence and accessibility among their staff, educators, and leadership teams. More broadly, the cultural institution has promised to advocate for inclusive practice within its two contemporary art networks and to continue developing actions that make its programming and spaces more welcoming to neurodivergent audiences. A working group is being formed to explore these directions and translate the lessons of Inclusive Museums into long-term institutional change.

This initiative demonstrates that inclusive design is not a one-off gesture but an evolving practice: one that benefits from interdisciplinary expertise, and sustained institutional engagement. By embracing these principles, museums and cultural institutions can become more equitable, more responsive, and more deeply connected to the diverse publics they serve.

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While the authors acknowledge the usage of AI, they maintain that they are the sole authors of this article and take full responsibility for the content therein, as outlined in COPE recommendations.

Informed Consent

The authors have obtained informed consent from all participants.

Conflict of Interest

The authors declare that there is no conflict of interest.

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