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ISTITUTO NAZIONALE PER L'ANALISI DELLE POLITICHE PUBBLICHE

HANDBOOK ON ARTISTIC AND CULTURAL ACCESSIBILITY IN ITALIAN AND EUROPEAN ART VENUES TO IMPROVE INCLUSION AND ACCESSIBILITY FOR PEOPLE WITH VISUAL IMPAIRMENTS

Theoretical, Methodological and Operational Guidelines

MOVIMENTO DEHONIANO EUROPEO MD

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CHAPTER 1

Visual impairment and cultural context: theoretical frameworks, empathic communication and international models.

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1.1 Types of visual impairment and perceptual impacts

Visual impairment within cultural venues requires moving beyond a monolithic view of the deficit. Blindness and low vision do not manifest as binary conditions (seeing or not seeing), but unfold across an extremely broad and diverse spectrum of perceptual constellations. The main clinical and functional distinction is between:

- **Total blindness**: Complete absence of any visual perception (visual acuity of zero) or mere perception of light and the movement of shadows without the ability to distinguish shapes. In this context, the acquisition of environmental and cultural information depends entirely on substitute sensory channels (tactile sensation, hearing, smell, proprioception).
- **Partial blindness**: Extremely low residual visual acuity (ranging from zero to 1/20 in both eyes or in the better eye with correction), which allows for the partial localisation of large obstacles or rough orientation in the presence of strong light contrasts.
- **Low vision** (severe, moderate and mild): A condition in which visual acuity is significantly reduced (from 1/10 to 3/10) or the field of vision is severely compromised.

Low vision **falls into two broad functional categories** that radically alter the ways in which a museum space is explored:

1. **Impairment of the central visual field** (macular disorders, scotomas): The visitor retains peripheral vision but loses the ability to focus on detail. They are able to move around space independently (they perceive their surroundings), but are unable to read a traditional caption, recognise the fine details of a painting or focus on an exhibit in a display case.
2. **Impaired peripheral visual field** (glaucoma, tubular or 'tunnel' vision): The visitor retains a small area of sharp central vision (sometimes just a few degrees) but completely loses perception of the periphery. This results in the exact opposite of the previous case: the visitor can read a caption in standard-sized text if it is perfectly framed, but experiences severe spatial disorientation, failing to perceive lateral obstacles, changes in gradient or the general layout of the museum galleries.

Understanding these structural differences is the first step towards inclusive design: a feature that is effective for someone with central visual impairment (e.g. large print or high colour contrast) may prove entirely inadequate or even disorientating for a person who is totally blind or has peripheral visual impairment.

1.2 Analysis of barriers in cultural venues: physical, sensory, communicative and behavioural

The accessibility of a cultural institution is measured by its ability to avoid creating interruptions in the visitor's 'chain of autonomy. Traditionally, the focus has been on removing macroscopic obstacles, but a rigorous analysis conducted in accordance with European standards requires the classification of barriers into four interconnected macro-categories:

- **Architectural and physical barriers**: Structural obstacles that impede mobility or spatial safety. These include staircases without alternative ramps or lifts, unmarked isolated steps, uneven flooring, protrusions that cannot be detected by a white cane (e.g. display cases suspended at mid-height or protruding sculptures) and the absence of tactile paving.
- **Sensory barriers**: Limitations related to the perception of environmental stimuli. These include poorly calibrated lighting (glare on display case glass that blinds the visually impaired, excessive dimness in drawing rooms), a lack of colour contrast between walls, floors and display stands, and a total lack of tactile or auditory alternatives to the visual appreciation of works of art.
- **Information and communication barriers**: These relate to the inaccessibility of cultural content and wayfinding systems. These include captions printed in fonts that are too small or use complex typefaces, museum websites or apps not optimised for screen readers (lack of alternative text for images, absence of semantic tags), ambiguous directional signage, and traditional audio guides lacking accessible interfaces or spatial descriptions to aid orientation.

- Behavioural and reception barriers: These relate to the relational approach and the emotional and professional preparedness of museum staff. Often, a lack of specific training results in dysfunctional ' ' attitudes at the entrance or during the visit: on the one hand, paternalistic over-protectiveness (which infantilises the visitor, undermines their autonomy and makes decisions on their behalf); on the other, procedural awkwardness that leads to detachment, indifference or inappropriate responses. Not knowing how to welcome a person with visual impairment, how to address them or how to offer physical assistance correctly transforms the relational space into an invisible yet highly exclusionary barrier, undermining the visitor's sense of security, dignity and psychological comfort.

1.3 The bio-psycho-social model and the ICF in the cultural context

The fundamental paradigm shift at both global and national levels has been brought about by the International Classification of Functioning, Disability and Health (ICF) issued by the World Health Organisation.

The biopsychosocial model definitively moves beyond the old clinical-medical conception of disability, understood as a 'personal tragedy' or merely a biological impairment intrinsic to the individual. **The ICF** (International Coaching Federation, the global association of professional coaches) establishes that **disability** is not a classification of people or their medical conditions, but **a classification of health characteristics in close relation to their living environments.**

According to this logic, disability arises exclusively from the dynamic, complex and bidirectional interaction between an individual's health conditions (bodily functions and structures) and contextual, environmental and personal factors.

Environmental factors, within the cultural context, operate according to a dual framework:

1. **Barriers**: Elements in a person's environment which, through their presence or absence, limit functioning and create disability. EXAMPLE: If a museum displays a Baroque painting behind reflective glass without any audio description or tactile model, the restriction on the blind visitor's participation is caused by the failure of the structural context, not by their blindness.
2. **Facilitators**: Elements in a person's environment which, through their presence or absence, enhance functioning, expand imaginative capacity and reduce the impact of disability. A guide trained in professional empathy, an optimised tactile relief '', a well-designed tactile floor map and a semantically accessible app are facilitators that eliminate social restrictions, enabling the visitor's full participation.

In the museum context, the ICF approach transforms the duty of accessibility from a mere 'act of charity, assistance or regulatory compliance' into a structural intervention within the design context. **The operational focus** shifts radically from 'treating or compensating for deficits (which is impossible to implement in a museum) to **the design of enabling environments** capable of universalising the aesthetic and cognitive experience.

1.4 Empathetic communication as a professional skill

Within cultural venues, welcoming visitors with visual impairments requires specific interpersonal skills. Interaction is often undermined by polarised attitudes: on the one hand, paternalistic over-protectiveness; on the other, embarrassment that leads to avoiding interaction, thereby creating isolation.

To overcome these pitfalls, it is necessary to introduce **empathetic communication** as a technical skill for museum professionals, separating it from purely personal attitudes; this can take the form of either Emotional Empathy or Professional Empathy, with clearly distinct differences:

- **Emotional Empathy**: An affective, immediate and spontaneous response to another person's condition ('I feel sorry for you', 'I feel pity for your situation'). Whilst this approach stems from good intentions, it tends to focus on pain or biological limitations. It creates an asymmetrical relationship of dependence or 'pity', which

ultimately infantilises the visitor and hinders the genuine development of their autonomy within the cultural space.

- **Professional Empathy**: A technical, intentional relational skill, learnt and codified through staff training. It consists of the practitioner's ability to recognise, understand and respond in a measured and respectful manner to the other person's lived experience and concrete needs, whilst maintaining their own role and consciously adapting the communicative register, the medium and the pace of the interaction. Professional empathy does not deny emotion, but channels it towards the effectiveness of the support provided, treating the visitor as an equal and fully self-determined cultural participant.

In this regard, we have drawn up a **Practical Guide to Communication** to minimise any approaches that are inconsistent with the type of visitor the guide aims to explain to practitioners: **how to conduct oneself, what to say and what to avoid doing or saying.**

To translate professional empathy into everyday actions, the cultural practitioner must adopt a symmetrical and mindful relational stance, eliminating anxiety about interaction and improvisation. The behavioural and communication guidelines are set out below.

- **How to conduct yourself physically and verbally**: Always address the person with visual impairment directly, even if they are accompanied by a guide or a family member. Keep your body facing them to enable them to locate your voice in space and establish proper interpersonal contact.
- **Handling the initial interaction**: Clearly announce your presence when you approach ('Good morning, I'm Marco, the museum attendant') and explicitly let them know when you are moving away, to prevent the person from continuing to speak into thin air or experiencing a sudden sense of abandonment.
- **Consent and assistance**: Always ask whether and how assistance is required before acting ('Would you like me to accompany you to the ticket office?'). Never take hold of the person, their arm or their white cane without their explicit consent. If physical assistance is accepted, use the Sighted Guide Technique: offer your elbow so that the visitor can hold on to it lightly, positioning yourself half a step ahead to anticipate changes in the ground in a natural way.

Folllowing a summary of the main actions to support those involved.

PRACTICAL GUIDE TO COMMUNICATION

WHAT TO SAY / RECOMMENDED PHRASES	WHAT NOT TO SAY / PHRASES TO AVOID
'Would you like to have a look at this sample?' / 'Please feel free to feel this texture with your hands'. *(The natural use of verbs related to sight is correct and reflects a normal, equal and non-stigmatising relationship).*	"Oh my goodness, sorry, I said 'look' – how silly of me… I'm so sorry." *(Constantly apologising for using everyday words creates a great deal of awkwardness and unnecessarily emphasises the distance between you).*
"I'll hand you the guide on your right, at hand level." *(Provide objective, geometric, precise spatial directions based on the visitor's position).*	'The map's over there – can you see it near that thing down there?' *(The use of generic deictics or expressions such as 'here', 'there' or 'this' is completely devoid of any informative value for those who cannot see.)*
'Would you like me to show you the way?' or 'How can I help you find your way around?' *(An approach centred on self-determination and respect for personal dignity).*	'Poor thing, come here and I'll take you, I'll look after you… let me do it.' *(Infantilising, pitying or overprotective language that undermines autonomy).*
'Let me describe the hall to you: it's a circular, very spacious room with a high ceiling and a lot of echo.'	*Remaining in complete silence whilst walking through or moving between areas, leaving the person without any auditory or spatial cues.*

WHAT TO SAY / RECOMMENDED PHRASES	WHAT NOT TO SAY / PHRASES TO AVOID
(Providing contextual and environmental details significantly reduces spatial anxiety).	

Alongside the guidelines for effective communication, it is advisable to use **practical** communication **support tools**, both before and during the visit, which aim to alleviate the fears of visitors experiencing a previously unfamiliar place for the first time.

1. **The Cognitive Preview (Pre-visit briefing)**: A verbal 'mental map' provided before the tour begins, enabling the visitor to visualise and immerse themselves in a structured preview of what they will be visiting, the total duration, the presence of stairs or changes in gradient, and the location of rest stops, thereby drastically reducing anxiety about the unknown and helping them to feel in control of the experience.

2. **Sound and Environmental Mapping**: This involves describing spaces not only through standard physical dimensions (metres, heights), but also – and above all – through their acoustic and microclimatic qualities, as well as background noise ('In this room there is a faint hum caused by a video projector, whilst the next room is much quieter and more hushed thanks to the drapes on the walls').

1. **Haptic-Geometric Metaphors**: Guided verbalisation tools that consistently use comparisons linked to solid everyday objects or basic geometric shapes to explain works of art or architectural details ('The base of this column has the shape and size of a large, square block of ice, perfectly smooth on all sides').

1.5 European models of inclusion and international best practices

An analysis of the reception and inclusion methodologies adopted at European level enables the mapping of structured solutions that go beyond ad hoc interventions. The following section analyses key national models and innovative methodological approaches useful for the development of transnational skills within European educational projects:

- **The British Model (United Kingdom):** Co-design and Standardised Audio Description

The UK's approach is based on the key principle of 'Nothing About Us Without Us'. Long-established organisations such as the Royal National Institute of Blind People (RNIB) and the specialist organisation VocalEyes have codified extremely rigorous methodological standards for audio description in museums and the delivery of guided tours.
The British model is characterised by the requirement to involve advisers with visual impairments from the very earliest stages of an exhibition's curatorial planning. Furthermore, staff training focuses on the national standardisation of the 'Sighted- 's Guide Technique', ensuring that every cultural worker adheres to the same safety and privacy protocols when providing physical assistance.

- **The Dutch Model (Netherlands)**: Permanent Integrated Multisensory Experience

  In the Netherlands, accessibility is not conceived as a parallel or isolated pathway for 'special categories', but as an enhanced sensory experience for the entire audience, fully embracing the principles of Universal Design.
  A world-renowned example is the "Feeling Van Gogh" programme at the Van Gogh Museum in Amsterdam. The museum permanently integrates 3D replicas of the paintings with extremely high tactile resolution into the main exhibition route, combined with synchronised olfactory stimulation (e.g. the scent of sunflowers or the smell of wet earth) and dedicated audio tracks.
  The Dutch approach aims to deconstruct the idea of the museum as a purely 'visual' space, transforming multisensory experience into an aesthetic and narrative value accessible to every visitor, thereby eliminating the stigma of differentiation.

- **The Snoezelen Method applied to the museum context:**

  Originally developed in the Netherlands in the 1970s as a therapeutic and rehabilitative approach for severe cognitive disabilities, the Snoezelen method (derived from the combination of 'snuffle' , to explore, and 'doezelen' to relax) is finding innovative application in cutting-edge European museums for the management of sensory overload and deep inclusion.
  Applying Snoezelen in a museum setting involves designing 'controlled multisensory rooms or corners within the exhibition route. In these spaces, the lighting is soft and carefully calibrated, the sounds are low-frequency and relaxing, and tactile materials with varied thermal, volumetric and textural properties are made available.
  For visitors with visual impairments — who are often subject to significant stress caused by spatial disorientation and ambient noise pollution — the Snoezelen space represents an oasis of cognitive decompression and haptic re-processing, where they can assimilate the artistic concepts learnt during the tour in an atmosphere of total psychological comfort, acoustic isolation and the absence of time constraints.

- **The Central European Model (Czech Republic and Slovakia)**: Methodological Toolkits
  In the countries of Central Europe, with a particular focus on networks of co-operation and institutions in the Czech Republic (e.g. the renowned Teiresiás Centre at Masaryk University in Brno) and Slovakia, the approach to accessibility centres

on the creation of 'standardised toolkits' and ready-to-use, modular action guides for small and medium-sized museums.
These toolkits eschew mere theoretical speculation and provide practitioners with immediate operational tools: technical data sheets for self-assessment of barriers, open-source files for 3D printing of local architectural details, and action guides for the rapid transcription and production of tactile graphics in Braille and microcapsule formats (using fuser ovens).
The Central European approach is strongly focused on scientific replicability and the professional training of staff through structured, rigorously measurable and easily scalable intervention protocols.

During the information session, we will show you photographs and videos illustrating standard accessibility practices at the Olomouc Museum of Contemporary Art (MUO), our institutional partner for this type of project.

CHAPTER 2

Art as a sensory and narrative experience

2.1 Sensory education and the 'grammar of touch'

Accessibility to cultural heritage is not limited to the removal of physical barriers**. Artistic understanding can develop through multiple perceptual channels: touch, hearing, language, movement and sensory memory, all of which contribute to constructing a mental image of the artwork.** Sensory education does not replace sight with touch, but offers a different way of engaging with cultural heritage, one that is accessible to all visitors.

Educating the sense of touch actually means educating perception: touch never operates in isolation, but alongside hearing, spatial memory and language. The aim is not simply to allow visitors to touch an

object, but to guide them towards a conscious interpretation of form, volume, proportions and materials.

The aesthetic experience is a mental process of constructing meaning that engages the body and the senses. To activate this process in people with visual impairments, it is necessary to develop sensory education based on the 'grammar of touch'. Haptic exploration requires a codified, sequential method:

1. Global exploration: an initial contact with open hands to perceive the boundaries, the overall volume and the temperature of the object.
2. Analytical exploration: the use of the fingertips to trace lines, variations in texture, contours and geometric details, following a pattern from top to bottom and left to right.
3. Final synthesis: the conceptual reconstruction of the elements, aided by simultaneous verbal description.

We can therefore say that effective tactile exploration follows **a method that proceeds from the general to the specific:** first the overall dimensions and orientation, then the details and textures. Verbalisation, guided by the facilitator's open-ended questions, supports without replacing the sensory experience.

Unlike sight, which captures the whole picture almost immediately, **touch provides information progressively**: **the pace of exploration must be respected**, not rushed. Verbal description accompanies the process gradually, without anticipating the exploration or taking its place.

The quality of the experience depends on the facilitator's expertise rather than on the tools available. Two opposing extremes should be avoided:

- Assistance that renders the visitor passive
- Detachment that causes disorientation

A person with a visual impairment is a competent participant, not a recipient of special services.

A visit can be structured by following a process summarised in five steps:

Feeling (activating the sensory channels)

Exploring (conscious tactile strategies)

Narrate (transforming perception into language)

To signify (to attribute meaning)

To include (to recognise the diversity of ways of perceiving)

2.2 Narrative methodologies and accessible storytelling

Riconoscere Recognising the perspective of the person we are dealing with is essential; listening to their requests and not automatically assuming their needs – for example, by asking, rather than taking it for granted, what sort of support they require – is good practice in welcoming visitors.

Accessible **storytelling** must be tailored to the nature of the visual impairment, seeking to anchor various details by mapping the space in relation to the visitor's body, which has full awareness within a defined space.

- People who have been blind or visually impaired from birth (congenital): as they lack prior visual memory, they tend to have an imagination linked to kinesthetic, tactile and auditory cues. Their preferred approach favours logical-structural, geometric and spatial storytelling. For them, it is of fundamental importance to stimulate emotions and mental representations in order to reproduce the explanation received within their own imagination
- People who have lost their sight later in life: they retain a rich archive of images, colours and visual relationships. This group seeks a narrative rich in chromatic details, visual analogies and specific, detailed descriptions.

We must always bear in mind that, in this context, a person with a visual impairment ceases to be the passive recipient of an educational explanation and becomes an active participant in co-narration. The guide, drawing on their descriptive and narrative skills, will be tasked with facilitating the interaction by asking open-ended questions and, above all, respecting the visitor's natural pace of tactile exploration.

The brain processes and remembers information presented within a narrative structure more easily than purely descriptive data. For people with visual impairments, **storytelling becomes the bridge that integrates perceptual, historical and symbolic information into a single experience.**

To describe means to list observable characteristics. To narrate means to contextualise, to tell a story, to guide the visitor through an interpretative experience. A neutral description (the sculpture is made of white marble...) leaves less scope for the gradual construction of a mental image than a well-constructed, accessible narrative.

We can say that **storytelling** does not **consist** of simplifying language, but has as its ultimate aim the **design of communication capable of enhancing different modes of perception**: clear but not trivialised language, verbal imagery

(metaphors, comparisons), a dialogic dimension with the audience, and recognition of the value of emotions.

An effective sequence involves guiding the visitor (where we are, what we are about to explore) and a progressive description moving from the general to the specific. Interpretative aspects should only be introduced once a clear picture has been established, followed by a conclusion that encourages reflection.

The characteristics of accessible storytelling are:

• Clarity: understandable without being simplistic;

• Progressiveness: from the general to the specific;

• Multisensory experience: it draws on textures, materials and sounds, not just the visual;

• Active participation: open-ended questions, dialogue rather than one-way communication;

• Flexibility: adapting to individual cultural backgrounds and paces.

Common mistakes:

• describing things too quickly, without allowing time for tactile exploration

• the 'encyclopaedic effect': piling on facts that overwhelm the visitor with too much information all at once creates a jumble of images without helping the visitor to grasp the essential elements of the artwork in their mind's eye

• substituting the visitor's experience with that of the guide (this is a beautiful work of art

• adopting a patronising attitude or addressing only the guide;

• a failure to listen to the group's reactions.

Towards a truly inclusive narrative

Accessible storytelling is not a technique reserved for people with visual impairments: **when cultural heritage is presented through multisensory and engaging communication, the experience is enhanced for all visitors.**

2.3 Emotional and cognitive audio description techniques

Museum **audio description** has historically been understood as a purely technical and objective transcription of visual information. The latest research and international best practice, however, demonstrate that audio description is a genuine interpretative and cultural act. It must be able to move fluidly between **two registers**:

Cognitive Audio Description ---> Provides structural, spatial and iconographic information

Cognitive audio description ensures orientation within the artwork (e.g. *'In the centre of the canvas there is a figure…'*), providing the spatial coordinates essential for the listener to maintain their bearings.

The cognitive description presents shapes, dimensions, colours and spatial relationships in a coherent manner, whilst the emotional description focuses on atmosphere and expressive tension, using a more evocative vocabulary. No description is entirely neutral; every choice is already a form of mediation, but it is preferable to describe observable clues rather than impose an emotion (the eyebrows are raised; rather than 'the character is desperate').

The text should distinguish between what is physically present, what is historically recognised, what is interpretation and what is personal reaction, presenting the facts first and the hypotheses second, and always stating the source of any interpretation.

Emotional Audio Description -> Stimulates the imagination, empathy and poetic expression

Emotional audio description, by applying the principles of empathetic communication, aims instead to create a profound aesthetic experience, capable of conveying the emotional impact of the work through targeted linguistic and paralinguistic choices.

Audio description, therefore, is neither the same as a caption nor a traditional audio guide; rather, it must make accessible the formal, spatial, chromatic and compositional elements that a sighted visitor derives from direct observation. To describe means to make choices: what takes priority, in what order, and using what vocabulary.

An excess of detail hinders understanding. The hierarchy distinguishes three levels:

- orientational information (what is in front of the visitor)
- structural information (the overall image)
- significant details (relevant from a narrative or symbolic point of view)

Colours should also be described; blindness does not imply a lack of colour perception, though one should avoid presenting colour-emotion associations as universal.

Tools for applying empathetic audio description include:

- **Choice of vocabulary:** avoid generic terms or sterile aesthetic judgements (*'it is a beautiful painting'* or *'the atmosphere is harmonious'*) in favour of words and multisensory evocations rich in material texture (e.g. *'the colour is dense, layered, evoking the warmth of scorched earth'*).
- **Tone and rhythm:** the narrator's voice (or the audio guide's sound design) must become a dramatic tool. A fast-paced rhythm can convey the excitement of a battle scene, whilst prolonged pauses and a relaxed tone encourage contemplation of a silent landscape.
- **Stimulating the imagination:** linking the visual element to thermal, kinetic or acoustic sensations (e.g. *'the line breaks suddenly, like a sharp crack in the silence'*), allowing the visitor to 'feel' the artwork with their whole body.

Words are essential because they aid and guide exploration, **whilst touch** verifies it: it is better to alternate between essential instructions and periods of silent exploration than to provide a continuous description. Direct physical contact with a person's hands takes place only with their consent.

2.4 Managing anxiety and ensuring an inclusive welcome

L'ambiente The unfamiliar environment and the cognitive effort required for tactile decoding can generate latent states of performance anxiety.

The facilitator must be trained to recognise non-verbal cues (tensing up, stereotyped movements, tactile freeze) and implement de-escalation techniques: slowing down the pace, suggesting breaks and redefining objectives with a view to creating a safe space.

Not all people with visual impairments have the same needs: residual vision, age and past experiences vary greatly. Simple, non-intrusive questions (Would you prefer me to describe the artwork first, or to start exploring it?) personalise the interaction without turning it into an interrogation.

Assistance should be offered and agreed upon without invading personal space.

There is no need to avoid verbs such as 'see' or 'look', which are commonly used even by blind people.

Instead, pitying expressions (such as 'despite your condition') should be avoided, and the person should always be addressed directly, even if they are accompanied.

Managing anxiety and fostering an inclusive welcome

Being immersed in an unfamiliar environment, exploring large or crowded spaces, and the cognitive effort required for tactile and auditory decoding can trigger latent states of fatigue or performance anxiety in a blind visitor. Cultural practitioners must be trained to recognise these non-verbal signals promptly:

- Stiffening of posture or stereotyped movements.
- Hasty, disorganised tactile exploration or, conversely, a sudden freezing of the hands on the surface.
- Verbal signals of resignation (*"you do it"*, *"never mind"*, *"I can't make sense of it"*).

De-escalation techniques and empathetic, professional reassurance

Professional empathy requires that we do not downplay the visitor's anxiety (*"don't worry, it's easy"*) and that we avoid medical overprotection.

Proper management involves immediately adjusting the setting: slowing down the pace of the visit, suggesting a seated break, temporarily diverting attention away from the artwork to focus on physical well-being within the space, and redefining the objectives of the experience (*"We don't have to complete the whole tour; we can just linger over this detail for as long as you like"*).

The museum is thus reimagined as **a safe space**, free from judgement based on performance.

2.5 Creating visitor itineraries by involving key stakeholders

The involvement of blind and partially sighted people in the design and testing of texts, right from the earliest stages – not just once the work is complete – is essential for verifying their comprehensibility and usefulness: 'Nothing about us without us'.

Audio description bridges the gap between narration and meaning: it does not tell the visitor what to imagine or feel, but provides them with information, timing and tools so that they can participate independently in the cultural experience.

A participatory process involves the people concerned right from the needs analysis stage, not just in the final evaluation of a finished product: listening, shared definition, prototyping, testing, revision.

A report should always be listened to, never dismissed ('no one has ever complained before' is a response to be avoided). Four steps: listen, acknowledge the problem, propose a realistic solution, document the incident.

Role-play as a training tool:

Role-play is an experiential learning tool designed to develop interpersonal and communication skills through the simulation of situations that may arise in the practice of inclusive cultural mediation.

The activity is not intended to simulate blindness or to have participants 'play the part' of someone with a disability, but rather to enable them to observe and experience first-hand the behaviour, communication styles and professional decisions of the practitioner.

Participants are divided into small groups and take turns in three roles: visitor, mediator and observer. The mediator manages the proposed situation, the visitor plays the role of the service user, and the observer pays attention to the communication and interpersonal approaches adopted, identifying what works well and what might need to be adjusted. Rotating roles allows each participant to engage with different perspectives and develop a greater awareness of their own professional behaviour.

Participants take turns in the roles of visitor, facilitator and observer across four pre-planned scenarios, focusing on the professional skills of the service provider rather than on a simulation of blindness.

The activity is based on four scenarios relating to recurring problematic situations in interactions with blind and partially sighted people:

Scenario	Issues to be addressed
Unsolicited help	The staff member takes hold of the visitor's arm without asking: this should be replaced by introducing themselves, asking if the visitor requires assistance, and agreeing on how to proceed.

Communication with the accompanying person	The mediator only responds to the accompanying person: direct contact with the visitor must be maintained.
The service is not working	A QR code is inaccessible: listen, look for an immediate alternative, and document the issue without blaming the user
Paternalistic language	It is admirable that, despite the disability... this needs to be rephrased, focusing the feedback on the cultural experience

Reflective journal and checklist

After the role-play, a brief individual journal (what assumptions did I make? Did I ask for consent? Did I address the visitor directly?) brings to light often unconscious habits.

A checklist guides the facilitator before, during and after the visit: from checking accessible resources to the final collection of observations and suggestions.

2.6 Art, storytelling and rehabilitation in everyday life

If we were to move away from a welfare-based approach centred on 'compensation for harm', the concept of '**rehabilitation in everyday life**' emerges. In this case, the museum becomes a space of ordinary life in which the individual experiences relational autonomy and choice, thereby influencing their psychological and physical wellbeing and their sense of self.

This is not merely a lexical variation, but the logical consequence of the paradigm shift introduced by the biopsychosocial model, which, since the 1970s, has interpreted disability no longer as an intrinsic limitation of the person, but as the result of interaction with the environment. The ICF establishes, in fact, that disability is not a classification of people or their conditions, but a classification of health characteristics in close relation to living environments. If restrictions on participation depend on the context, then the museum cannot be the place where one 'compensates' for a deficit – a task that is, moreover, impossible to carry out within the galleries of an exhibition – but rather the context that removes barriers and multiplies facilitators. This is where the operational focus shifts: from addressing deficits to designing enabling environments.

In this regard, 'rehabilitation in everyday life' takes shape as a concrete exercise in self-determination. Accessibility is neither a favour nor an additional component of the cultural offering: it is an element of the institution's professional quality and a prerequisite for participation on an equal footing. And dignity, in everyday life, is measured first and foremost by the possibility of choice: an accessible environment does not decide on the

visitor's behalf, but provides them with the information and tools necessary to decide, because the possibility of choice is an integral part of accessibility. The effect on well-being and self-perception is therefore not a side effect, but the very indicator of the intervention's effectiveness, measurable across three dimensions: the subjective dimension, namely the sense of perceived efficacy and autonomy ('feeling like real visitors'); the relational dimension, namely the level of interaction with other visitors without social isolation; and the environmental dimension, namely the reduction in cognitive load and orientation-related stress.

Within this framework, **storytelling** is not merely a communicative embellishment, but the mechanism that makes the experience accessible. The brain processes and remembers information presented within a narrative structure more easily than purely descriptive data: to describe is to list observable characteristics; to narrate is to contextualise and guide the visitor through an interpretative experience. Storytelling, however, does not consist of simplifying language, but rather of designing communication capable of enhancing different modes of perception. This is precisely the principle that governs audio description, which 'does not tell the visitor what to imagine or feel, but provides them with information, time and tools so that they can participate independently in the cultural experience'. Accessible storytelling, in other words, does not dictate the experience: it makes it possible, whilst respecting the natural pace of the visitor's tactile exploration.

The body and time are, after all, the two vectors through which everyday life fosters rehabilitation. Touch is not an 'imperfect substitute for sight', but a noble, autonomous sense endowed with its own specific aesthetic and epistemological dignity; when the hand traces the outline of a form, time slows down and an intimate relationship with the artwork is forged, in a form of perception that is slower but also deeper. The aesthetic experience is, at its core, a mental process of constructing meaning that engages the body and the senses: it is precisely the process through which a person redefines their own sense of self.

For this to happen, the museum must reconfigure itself as a **safe space, free from performance-based judgement**, where it is legitimate to slow down the pace of the visit, to pause, to divert one's attention from the artwork in order to focus on the body's well-being within the space, and to redefine the objectives of the experience. Furthermore, 'everydayness' implies repeatability: rehabilitation does not occur through a one-off event, but through a fully accessible journey, from booking to departure, supported by reliable information that reduces uncertainty and allows visitors to devote more energy to the cultural experience.

This leads to a methodological corollary: if the aim is the person's autonomy rather than their care, the project cannot be decided on their behalf. The involvement of blind and partially sighted people from the very earliest stages – 'Nothing about us without us' – and

the very aim of augmentative and alternative communication, which seeks to increase the level of active participation by enabling people to take charge of their own lives, converge at the same point. In this sense too, accessibility does not consist of creating 'alternative' experiences for people with disabilities, but of enriching the way in which everyone can experience art.

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Essential Web Resources

- Anteros Tactile Museum – Cavazza Institute (www.cavazza.it/arte).
- VocalEyes (vocaleyes.co.uk).
- ADLAB PRO (www.adlabpro.eu).
- Blindsight Project – Talking Italy (www.blindsight.eu).

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CHAPTER 3

Assistive and digital technologies for accessibility and inclusion

3.1 Assistive technologies in cultural venues

When we talk about **assistive technologies** in cultural venues, we are, first and foremost, talking about independence. Not about 'help', not about 'special solutions', but about the real possibility for every person to find their way around, make choices, understand and enjoy a cultural experience independently.

As **the World Health Organisation** emphasises, assistive technologies **are** not a luxury, but **tools that enable people to 'achieve the highest possible level of functioning and social participation'** (WHO, 2011).

In **museums** and cultural sites, this principle translates into a shift in perspective: accessibility is not an afterthought, but **an integral part of the cultural project**.

Screen readers are the primary means of accessing digital museum content. Platforms must adhere to the Web and Mobile Accessibility Guidelines (WCAG), which are set out in the four fundamental POUR requirements (Perceivability, Usability, Understandability, Robustness).

The design of a cultural institution's digital platforms must follow four key principles (POUR):

1. **Perceivability (*Perceivable*):** Information and interface components must be presented in ways that can be perceived by the senses (e.g. alternative text (*Alt-Text)* for all images of artworks, high colour contrast).
2. **Operability:** Interface components and navigation must be operable (e.g. full navigability of the site via keyboard or voice commands, without requiring the use of a mouse).
3. ***Understandability*:** Information and interface operations must be clear (e.g. straightforward language, indication of the text's language to ensure accurate text-to-speech).
4. **Robustness (*Robust*):** The content must be robust enough to be reliably interpreted by a wide variety of user agents, including assistive technologies that are constantly evolving.

An assistive technology cannot be assessed solely on the basis of its technical specifications or functionality. It is necessary to adopt a biopsychosocial framework (inspired by models such as the MPT – *Matching Person & Technology*) that measures **the actual impact on quality of life and on the perceived autonomy** of the person with a visual impairment.

The success of a technological installation must be measured using an impact framework based on **three dimensions**:

- **Subjective Dimension**: Sense of efficacy and perceived autonomy (feeling like genuine visitors).
- **Relational Dimension**: Level of interaction with other visitors without social isolation.
- **Environmental Dimension**: Reduction in cognitive load and orientation-related stress.

If a technology (e.g. an indoor navigation app) is technically flawless but causes performance anxiety or socially isolates the visitor from their group, that technology has failed to achieve its inclusive objective.

3.1.1 Screen readers: access to digital content

For a blind or visually impaired person, the first 'space' in the museum is, as mentioned earlier, their interaction with the digital world: the website, the online catalogue, and the captions accessible via smartphone.

- Screen readers – such as VoiceOver on iOS or TalkBack on Android – transform the visual interface into a structure that can be navigated via voice or a Braille display.
- Supporting VoiceOver in your app – Apple Developer Documentation
- Get started on Android with TalkBack – Android Accessibility Help

However, a screen reader does not 'fix' poorly designed content. As the W3C's **Web Content Accessibility Guidelines** (WCAG) point out, it **is the structure of the content that determines accessibility**, not the technology used to read it (W3C, 2023).

Text without headings, buttons without labels or images without descriptions become veritable digital dead ends. Conversely, when information is organised logically – with clear headings, coherent sections and textual descriptions of images – navigation becomes smooth and comprehensible.

Case study

In a **small municipal museum**, the online catalogue was technically 'accessible', but difficult to use: each artwork entry was a single block of text.

Following a minor overhaul involving the division of content into sections, the use of hierarchical headings and the provision of alternative image descriptions, users of screen readers were able to browse the works independently, jumping straight to the information they required.

This example confirms the findings of Lazar et al. (2017): digital **accessibility** does not always **require** major investment, but rather **design** awareness.

3.1.2 Indoor wayfinding: finding your way without seeing

In cultural venues, finding one's way around is often more difficult than accessing the content. Similar-looking corridors, large spaces, multiple levels and ambient noise: all these elements make it difficult to construct a mental map.

Indoor wayfinding systems – such as Bluetooth beacons, NFC tags and talking QR codes – make it possible to transform the physical space into a 'readable' space. The literature highlights how these systems are particularly effective when they provide brief and coherent contextual information, rather than overly detailed descriptions (Meliones et al., 2018).

It is not a question of 'telling everything', but of answering the fundamental questions:

- Where am I?
- What is around me?
- How do I get there?

Case study

In an **ethnographic museum**, an accessible route was created using only **NFC tags** positioned at key points (entrance, junctions, start of each gallery).

By holding their smartphone close to the tags, visitors received standardised messages such as:

"You are in Gallery 2. There is a display case in front of you. To your left is the passageway to Gallery 3." This simple yet rigorous approach enabled blind visitors to move around independently, confirming the findings of studies on indoor orientation: the predictability of information is more important than the quantity (Prandi et al., 2021).

Blind MuseumTourer: A System for Self-Guided Tours in Museums and Blind Indoor Navigation PR2.A1.A2.A3.docx. Ingenium's Wayfinding App for the Visually Impaired | Applied Research

3.1.3 Accessible audio guides: listening, choosing, controlling

Audio guides are often considered 'naturally accessible' because they are audio-based. In reality, many traditional audio guides are difficult for blind people to use: confusing menus, unclear commands, and a lack of feedback.

An accessible audio guide must offer the user control, not just content; as Reid (2019) emphasises, the audio experience **becomes inclusive when the user can choose the route, duration and level of detail**.

Well-structured menus, optional voice commands and location-synchronised content are tools that transform the audio guide from a simple 'narrative' into a tool for cultural orientation.

Case study

The Raja Dinkar Kelkar Museum has introduced an accessible digital audio guide accessible via a QR code, which can be used directly on the visitor's smartphone. The system, restricted within the museum via geofencing, allows for independent and

personalised exploration, whilst also reducing the need to manage physical devices (Times of India, 2024).

This example demonstrates how accessibility can go hand in hand with sustainable and scalable choices, which are particularly relevant for small-scale Erasmus+ projects.

3.1.4 Tactility, vibration and maps: constructing mental images

Il tatto non **Touch** does not replace sight, but **offers another way of understanding**.

Digital tactile maps, vibro-tactile feedback and Braille displays enable blind people to construct a coherent spatial representation, particularly in complex environments.

Research on interactive tactile maps shows that the integration of manual exploration and audio feedback significantly improves orientation and understanding of spaces (Giudice et al., 2012).

Case study

The **Bento Museum** project, developed within the field of museum research, offers layered maps that allow visitors to explore a museum by level (entrance, galleries, points of interest).

The aim is not to provide every detail, but to help visitors understand the general layout of the space, a fundamental principle for independence (Woti Pati et al., 2022). (PDF) Interactive tactile maps, visual impairment, and accessibility of building interiors BentoMuseum: 3D and Layered Interactive Museum Map for Blind Visitors

3.2 The semantic and conceptual meaning of 'Assistive Technologies'

The very term 'assistive technologies' clearly defines the role and scope of these tools within cultural venues: they are designed to assist, support and facilitate both users with visual impairments and cultural practitioners, and **never to replace human interaction, pedagogical sensitivity or professional cultural mediation**.

Assistive technologies – which range from magnification software to screen readers, and from geolocated audio guides to bone-conduction devices – do not constitute a stand-alone solution or an 'automatic process' capable of guaranteeing accessibility on its own. They act as **amplifiers of possibilities and cognitive aids**.

Without skilful human direction capable of contextualising them, guiding their use and adjusting their pace, **technologies risk becoming cold**, **mechanical intermediaries** , or worse still, factors that lead to isolation and information overload for the visitor.

3.3 The principle of personalisation and the rejection of standardised solutions

The most common **methodological error** in museum technology design is the assumption that **a single device**, medium or feature can uniformly meet the **needs of all** visually impaired and blind visitors.

Visual impairment is characterised by enormous individual variability, in which clinical factors, life histories, prior skills, personality traits and emotional needs all converge.

Consequently, **all materials, interfaces and assistive devices made available must be rigorously personalised**.

What proves to be **highly effective** and appreciated by one user may prove to be completely ineffective or annoying for another:

- **Visual and lighting variability in low vision**: A person with low vision due to macular degeneration requires high colour contrast and direct lighting on the display, whilst a person with low vision caused by glaucoma or achromatopsia is severely affected by reflections and glare, requiring matt screens, warm-light filters or dark-mode interfaces.
- **Variation in digital and haptic skills**: A digital native will use complex apps on their smartphone and touch controls with ease, whilst an older user who has become visually impaired in later life may prefer simplified physical interfaces with raised buttons or direct voice narration from a facilitator.

It follows that the primary task of the cultural institution and its staff is not to impose a particular technology, but to offer a flexible range of accessible options that can be tailored in real time to individual preferences, within the limits of the museum's organisational capabilities.

3.3.1 Ticket office and bookings: the point of no return

In the module on audience inclusion, we highlighted a key concept: autonomy is not just about moving around or hearing, but about being able to make decisions.

The ability to book a ticket or an event online is one of the most challenging aspects of the museum experience for visitors with visual impairments.

An inaccessible exhibition room or even a single module forces the person to ask for help, make a phone call or give up. Research into the accessibility of digital services shows that forms and online modules are among the main causes of exclusion for users of screen readers (Lazar et al., 2017).

Case study

A museum that had implemented an accessible indoor wayfinding system discovered that blind people were unable to book a visit.

By making changes to the booking forms (labels, spoken error messages, linear navigation), the accessible journey became complete: **from booking to exit.**

3.4 The irreplaceable value of touch for blind people and clinical-functional differentiation

Whilst it is important to respect those who have aversions or reservations, it must also be strongly emphasised that, for the vast majority of people who are totally blind, **the tactile**

sense represents the primary, irreplaceable and most profound **means of understanding the world and works of art**.

Touch is not simply an 'imperfect substitute for sight', but **a noble**, **autonomous sense endowed with its own specific aesthetic and epistemological dignity.**

Through **haptic exploration** (the synthesis of skin perception, joint proprioception and movement), the blind visitor gathers information about the material, weight, temperature, volumes, texture and formal tension of a relief or a sculpture – elements that are crucial for bringing the artwork to life in people's imaginations.

However, the effectiveness and very value of the tactile experience **depend entirely on the type and onset of blindness**:

- **Congenital (from birth) or Early-Onset Blindness**: In the absence of prior visual memory, touch is the cognitive channel that structures reality. People who have been blind from birth possess a highly sophisticated and analytical haptic processing ability.
  For this audience, tactile models (reliefs, sculptures, thermoformed graphics) do not constitute an 'illustrative aid', but are the very object of the aesthetic experience. They do, however, require guided and methodical exploration (from the whole to the detail and vice versa), accompanied by a verbal description that provides the keys to understanding the spatial and volumetric aspects.

- **Acquired blindness (lost during one's lifetime)**: People who have lost their sight in adulthood retain a rich visual representation and a 'memory of images and shapes'.
  In this case, the tactile experience acts as a trigger and a perceptual bridge: contact with the material or with the three-dimensional surface serves to activate and evoke pre-existing mental images, enabling the visitor to visually reconstruct the form in space with extraordinary clarity.

- **Partial Blindness and Severe Low Vision**: In people with very low residual vision, touch and sight are not mutually exclusive but mutually reinforcing. Tactile perception integrates, corrects and completes the fragmentary or blurred information gathered through the eye, reducing visual fatigue and increasing confidence in perception.

3.5 The perceptual-affective dimension: low vision, tactile defences and rejection of touch

Whilst touch plays a central role for the majority of blind people, cultural practitioners must also be aware that there is a proportion of users (those with low vision or people with visual impairments combined with other vulnerabilities) who have **an aversion to** or a marked reluctance **towards tactile contact**.

This phenomenon may stem from:

- **Hypersensitivity or tactile defensiveness**: Neurological or sensory conditions whereby direct contact with certain textures (rough surfaces, 3D-printed resins,

viscous fabrics, cold metals) causes discomfort, sensory overload or outright irritation.

- **Emotional and psychological factors:** Performance anxiety linked to 'having to understand by touching', fear of making a mistake or a feeling that one's personal space is being invaded.

- **Individual perceptual habits:** Visually impaired people who prefer to make full use of their residual vision with magnifiers or optical aids rather than relying on tactile exploration.

Cultural practitioners and technology must always respect the visitor's perceptual boundaries. Contact with a tactile replica or a 3D model must never be taken for granted, let alone imposed. **The correct approach involves presenting the experience in an inviting and neutral manner**, leaving it up to the user to decide whether to touch, how much to touch and with what intensity.

3.6 How to choose and integrate assistive technologies

Una delle One of the most common causes of failure in accessibility projects is **the adoption of technologies without a clear strategy,** as we have already discussed in the previous sections.

As highlighted by the European Commission, effective accessibility stems from the integration of technology, organisation and skills (European Commission, 2019).

Before choosing a solution, it is essential to ask:

- what real problem am I solving?
- Who will manage the technology over time?
- How will the content be updated?

Case study

A museum had invested in beacons and dedicated tablets, but after a few months the system had become unusable due to a lack of maintenance and staff training.

The solution was not to 'add more technology', but to simplify: using visitors' own smartphones, reducing the number of beacons, and introducing a weekly checklist.

This demonstrates that, as Norman (2013) states, good design is design that works even when things go wrong.

European Accessibility Act (EAA) – European Commission. Web Content Accessibility Guidelines (WCAG) 2.2

3.7 Principles of web and mobile accessibility for museum content

In previous modules of this handbook, we have discussed assistive technologies in cultural venues: screen readers, wayfinding systems, audio guides and tactile maps. These are all tangible tools, often visible, and sometimes even 'spectacular'.

This module starts from a different, yet complementary, premise: all these technologies only really work if the underlying digital content is accessible.

- **An accessible audio guide** is of little use if the museum's website is not navigable.
- **A wayfinding system** loses its value if the 'How to get here' page is unreadable with a screen reader.

A digital tactile map becomes useless if the app hosting it lacks a comprehensible structure. This is why **web** and mobile **accessibility** is not a module in its own right: **it is the invisible foundation that underpins all the others.**

3.7.1 The digital museum as the first point of contact

In many cases, particularly for blind or visually impaired people, the first point of contact with the museum does not take place in the physical space, but online, as described earlier.

The website, the events page, the ticket office, the app: this is where the visitor realises whether that place is designed with them in mind. In the section on assistive technologies, we saw how smartphones and screen readers are everyday tools for independence.

Let's take a step back here: those tools can only work if the content is designed to be 'read' by assistive technologies. The Web Content Accessibility Guidelines (WCAG 2.2) make it clear that accessibility is not linked to the device, but to the structure of the content (World Wide Web Consortium, 2023). It is the same logic we find in accessible museum tours: without guidance, even the most beautiful space becomes hostile.

3.7.2 Semantic structure: the invisible map of the content

In the module on wayfinding, we discussed mental maps: landmarks, junctions, clear signposts. The semantic structure of a web page serves exactly the same function, but in digital form.

Headings, sections, lists and correctly labelled buttons are the digital equivalent of:

- Entrances
- Corridors
- Rooms

- Exits

  For a **screen reader, a page without structure is like a museum without recognisable walls.**

  When, on the other hand, the content is organised logically, the user can:
- jump from one section to another
- go back
- choose what to explore in more detail

Case study

A museum that had invested in accessible audio guides realised that many blind visitors could not even find the information about the audio guides on the website.

The page existed, but it was buried in a confusing layout.

By reorganising the page structure (clear headings, an easily

to spot), the audio guide became genuinely usable, not just technically available.

3.7.3 Minimum requirements: when detail becomes inclusion

When discussing tactile devices and accessible maps, we have emphasised how crucial **clarity and readability** are. The same **applies in the digital realm**.

Colour contrast, text size, keyboard navigation and alternative image descriptions are not 'advanced options': they are the minimum requirements for a person to be able to use the content independently.

Well-written **ALT text** serves a similar function to that of audio description in videos:

it conveys the meaning, not just the existence of an image (Henry et al., 2014).

Case study (linking to the multimedia module)

In an online exhibition, the images of the artworks were already being used in the audio guides as well.

By writing ALT text consistent with the audio descriptions, the museum created a shared language between the website and the multimedia content.

Result: less fragmentation, greater narrative continuity across the different channels.

3.7.4 Accessible multimedia: continuity, not an add-on

In the module on audio guides and audio content, we saw how audio can be a powerful tool for cultural mediation.

This module reinforces the same principle: accessible multimedia is not 'special' content, but a clearer and more accurate version of the content itself.

Videos with audio description, well-structured podcasts and accessible players are consistent with the same guiding philosophy:

- tactile maps
- vibro-tactile feedback
- wayfinding systems

As Fryer (2016) points out, audio description is an interpretative and cultural act, not merely a technical one.

3.7.5 Digital accessibility and inclusion: the thread that ties the whole handbook together

Questo his module ties in with all the others through a simple idea:

digital accessibility is the connective tissue of the inclusive museum experience.

Without web and mobile accessibility:

- assistive technologies remain isolated
- accessible routes go undiscovered
- independence is only partial

The **European Commission** reiterates that digital accessibility is a prerequisite for full cultural participation (European Commission, 2019). In the context of Erasmus+ KA210-VET, this means training professionals who are able to view accessibility as a system, rather than as a one-off measure.

3.8 Introduction to additive technologies

3.8.1 Introduction to 3D printing

La 3D printing is an additive manufacturing technology that enables the creation of three-dimensional objects from digital models, building them up progressively layer by layer.

This approach differs radically from traditional subtractive manufacturing methods, in which material is removed from an initial block by milling, turning or cutting. Additive manufacturing, on the other hand, allows only the necessary material to be used, reducing waste, processing time and costs.

Initially developed as a rapid prototyping tool in the industrial sector, 3D printing has become increasingly widespread in recent years in domestic, educational and professional settings, thanks to falling printer costs and improved performance.

Today, this technology is used across numerous sectors, including engineering, design, medicine, architecture, education and the conservation of cultural heritage.

Among the various 3D printing technologies available, the most widespread is FDM (Fused Deposition Modelling), which involves extruding a molten thermoplastic filament through

a heated nozzle. The material is deposited in a controlled manner, following the path determined by the slicing software, forming successive layers which, as they solidify, give rise to the final object. The most common materials are PLA, which is easy to print and environmentally friendly; ABS, which is more durable but more complex to work with; and PETG, which offers a good balance between mechanical strength and ease of use.

3.8.2 The three fundamental stages of 3D printing

The 3D printing process consists of three main stages: acquisition of the three-dimensional model, preparation of the print file and physical production of the object.

The first stage involves obtaining a digital 3D model. This can be created using CAD modelling software, which allows for the design of precise, parametric shapes, or using artistic modelling tools, which are better suited to organic and sculptural forms. Alternatively, models can be acquired via 3D scanning, a technique that allows real objects to be digitised with high precision. Another option is to download ready-made models from online platforms, which offer thousands of free designs.

The second stage involves the use of slicing software, which divides the model into hundreds or thousands of horizontal layers and generates the G-code file, containing all the instructions required by the printer. During this stage, key parameters such as layer height, extruder temperature, print speed, infill and supports are set. The correct configuration of these parameters is essential for achieving high-quality results.

The third stage is the actual printing. The printer deposits the molten material layer by layer, following the path specified by the G-code, until the object is complete. Once finished, the part is removed from the build plate and, if necessary, undergoes post-processing.

3.8.3 How to achieve good 3D prints: practical tips

Achieving high-quality prints requires attention to numerous technical and operational aspects. **Correct calibration of the printer** is the first fundamental step. Accurate levelling of the build plate and adjustment of the nozzle height ensure proper adhesion of the first layer, reducing the risk of delamination and warping.

The choice of print parameters has a significant impact on the final result. **The temperature** must be appropriate for the material used: temperatures that are too low cause poor adhesion between layers, whilst excessively high temperatures can lead to oozing and loss of detail.

Print speed also affects surface quality: lower speeds ensure greater precision, whilst higher speeds reduce printing time but may compromise the aesthetic result.

The infill – that is, the internal filling of the object – plays a key role. This parameter allows for a balance between mechanical strength, weight and material consumption. For decorative objects or prototypes, a low infill percentage is sufficient, whilst structural components require higher percentages. The choice of infill geometry – such as grid, triangular or gyroid – further influences the final strength.

Support management is essential for printing complex models with overhangs and suspended parts. Correct use of supports ensures clean, well-defined surfaces, making the removal process easier.

Post-production is the final stage of the process. It comprises cleaning, sanding, filling, assembly and painting. These techniques significantly improve the aesthetics and tactile quality of the printed object, making it more appealing and functional.

3.8.4 Uses and applications of 3D printing

3D printing is used in numerous sectors thanks to its flexibility and versatility. In education, it enables the creation of teaching models, scientific instruments and aids for inclusive learning.

In everyday life, it enables the production of personalised accessories, spare parts

that are difficult to find on the market, and bespoke solutions.

In the industrial sector, it is used for rapid prototyping, allowing designs to be tested and modified quickly, thereby reducing development times and costs. In the fields of art and craftsmanship, it offers new creative possibilities, enabling the creation of complex and personalised objects.

One of the main advantages of 3D printing is the democratisation of production: anyone, with relatively inexpensive tools, can design and create functional objects, fostering widespread innovation and creativity.

3.8.5 The use of 3D printing in the healthcare sector

In **the medical and healthcare** sector**, 3D printing has revolutionised numerous aspects** of diagnosis, surgical planning and the production of customised devices. Thanks to the ability to **convert diagnostic images**, such as CT scans and MRI scans, **into three-dimensional models**, surgeons can study the patient's anatomy in detail, plan complex procedures and simulate operations prior to the actual surgery.

The production of customised **prostheses** is one of the most promising areas. Orthopaedic, dental and craniofacial prostheses can be made to measure, improving comfort, functionality and aesthetics. The production of customised braces, orthoses and rehabilitation devices also helps to improve the effectiveness of treatments and patients' quality of life.

In the field of education, 3D-printed anatomical models enable medical students and healthcare professionals to study complex structures in a hands-on manner, enhancing understanding and reducing the need to use real biological specimens.

3.8.6 Online platforms for downloading 3D models

There are numerous platforms offering free, print-ready 3D models. Among the most popular are:

- https://www.thingiverse.com
- https://www.printables.com
- https://www.makerworld.com

These sites provide access to a vast library of designs, making it easier for even complete beginners to learn and experiment.

3.8.7 Tactile representations and cultural accessibility

Tactile representations play a vital role in enabling blind people to engage with culture. Through **three-dimensional models**, **reliefs and tactile maps, it is possible to explore works of art**, sculptures and architectural structures, fostering a deeper understanding of our artistic heritage.

The design of these tools requires particular attention to the simplification of forms, the clarity of structures and the ergonomics of tactile exploration.

The aim is not to reproduce every detail faithfully, but **to make the main volumes and spatial relationships comprehensible.**

3.8.2 Additive technologies: 3D printing, tactile reliefs and CAD modelling

3.8.2.1 Introduction to 3D modelling of artworks and architectural details for tactile purposes

La modellazione 3D rappresenta **3D modelling** is the fundamental starting point for the creation of tactile aids designed to enable blind people to experience works of art, sculptures and architectural features.

It involves **creating a three-dimensional digital model** that reproduces, in a selective and functional manner, the main characteristics of the original object. In the context of tactile accessibility, the primary aim of modelling is not absolute aesthetic fidelity, but rather **the clear conveyance of spatial, volumetric and structural information.**

The model must allow for effective exploration, avoiding information overload and facilitating an immediate understanding of the fundamental forms. For this reason, **digital design requires a multidisciplinary approach that integrates technical expertise, perceptual knowledge and museographic sensitivity.**

Models can be created using parametric **CAD software**, which is particularly suited to the reproduction of architectural elements, or through **polygonal modelling software**, which is more appropriate for sculptural and organic forms.

Alternatively, digitisation via **3D scanning** enables the rapid capture of complex geometries, which can subsequently be reworked and simplified to suit tactile interpretation.

The modelling phase is therefore a crucial step, during which scale, levels of detail, the separation of volumes and **the hierarchy of information** are defined**, significantly determining the effectiveness of the final resource**.

3.8.2.2 Criteria for simplifying and enlarging forms for tactile perception

Tactile perception has specific characteristics that require different design criteria compared to visual representation. Manual exploration is sequential, limited and subject to a reduced ability to distinguish fine details. In this regard, the design of tactile models must be based on a rigorous selection of information according to well-defined principles:

The first principle is the reduction of visual noise, achieved by eliminating secondary decorative elements, excessively intricate surfaces and details smaller than the threshold of tactile perception. This simplification helps to avoid sensory overload and focuses attention on the key structural elements.

The second principle is the emphasis on structural lines and principal volumes. Architectural profiles, edges, cornices, arches and openings must be highlighted, often by slightly increasing the thickness or depth of the relief. This technique makes it easier to identify geometries and spatial relationships.

A further fundamental design element is selective enlargement. Significant but small-scale details, such as capitals, decorative elements or sculptural features, can be isolated and reproduced on a larger scale, allowing for in-depth exploration . **The use of multiple models**, with an overview alongside enlarged details, is a particularly effective solution.

Striking a balance between simplification and informational completeness lies at the heart of the design process, and **requires repeated testing, ergonomic assessments and, where possible, the direct involvement of end users.**

3.8.2.3 Types of tactile reliefs on flat surfaces

Tactile reliefs on flat surfaces are an essential tool for conveying spatial and morphological information in a concise and effective manner. They enable **complex concepts** to **be communicated through two-dimensional surfaces**, providing a complementary aid to three-dimensional models.

Tactile maps are widely **used to aid orientation within complex environments** such as museums, historic buildings, monumental complexes and urban spaces. They enable users to identify routes, points of interest, entrances, exits and facilities, thereby enhancing the user's independence.

Tactile floor plans help users understand **the internal layout of spaces**, the arrangement of rooms and the relationships between different areas. **They are particularly useful** in museum and architectural contexts, **where understanding the spatial organisation** is a key element of the visitor experience.

Artistic bas-relief reproductions, on the other hand, enable the tactile representation of paintings, frescoes and two-dimensional decorations. In this case, the translation of colour information into variations in height and texture makes it possible to convey shapes, perspectives and compositions, whilst maintaining a high level of simplification. 3D printing enables these aids to be produced with precision, repeatability and at a low cost, offering a high degree of design and production flexibility.

3.8.2.4 Stages of the 3D printing process applied to cultural heritage: from scanning to finishing

The application of additive technologies to cultural heritage follows a structured workflow, divided into several successive stages. Therefore, when creating an exhibition, it is of fundamental importance to define the experience to be shared with the visitor and to identify the most important elements in shaping the final experience.

In order to proceed to the data acquisition stage, it is best to identify the actual objects to be reproduced across the various proposed itineraries.

The first stage involves **the acquisition of geometric data**, which can be carried out using 3D scanning, photogrammetry or direct CAD modelling. The choice of technique depends on the complexity of the object, the level of detail required and the operational conditions of the context.

This is followed by the digital re-engineering phase, during which the model is simplified, **optimised and adapted for tactile interpretation**. In this phase, artefacts are removed, geometric errors are corrected, proportions are redefined and any auxiliary elements, such as integrated supports or ergonomic bases, are introduced.

The model is then processed using slicing software, which generates the machine code for printing. At this stage, key parameters such as resolution, infill, print orientation and support structures are set. Correct configuration of these parameters ensures an optimal balance between quality, production time and the strength of the finished product.

The printing stage is followed by a meticulous post-production process, which includes the removal of support structures, surface sanding, any chemical or mechanical treatments and, where necessary, the application of a protective coating. These operations improve the models' tactile quality, durability and ease of sanitisation aspects that are essential for intensive use in a museum setting.

3.8.2.5 Integration of 3D models into the visitor experience

The integration of tactile models into museum and cultural itineraries is a key step in ensuring a truly inclusive experience. **The models can be placed at dedicated tactile stations, designed to facilitate independent and safe exploration, with stable surfaces**, ergonomic heights and adequate lighting for users.

Experiential tables allow multiple models to be presented in sequence, facilitating comparison between different **works**, architectural styles or construction phases. This approach enables a more nuanced and contextualised understanding of cultural heritage.

Portable kits are a particularly effective solution for educational activities, workshops, guided tours and outreach programmes. They enable the tactile experience to be taken beyond traditional museum spaces, reaching schools, rehabilitation centres and community organisations.

The integration of models must be accompanied by appropriate cultural mediation, which may include audio guides, verbal descriptions, Braille texts and digital resources, in order to create a comprehensive multisensory experience.

3.8.2.6 The strategic role of FDM 3D printing in cultural accessibility projects

Within additive manufacturing technologies, **FDM 3D printing** represents a particularly effective solution for cultural accessibility projects, thanks to its operational simplicity, **low costs and great production flexibility**.

Unlike more complex industrial techniques, FDM enables models to be produced in-house directly at museums, schools, educational workshops and cultural centres, facilitating an iterative process based on experimentation and continuous improvement.

This approach makes it possible to test different design solutions, gather user feedback and progressively refine the models.

The ability to use lightweight, durable and easily workable materials, such as PLA and PETG, makes it possible to create durable, safe and pleasant-to-touch aids. Furthermore, the ease of replication allows for the distribution of multiple copies of the same model, reducing waiting times and enhancing collective access.

In this context, **FDM 3D printing** is not merely a technical tool, but becomes a genuine **cultural enabler, capable of making a** tangible **contribution to breaking down sensory barriers** and fostering a culture of inclusion.

3.9 Monitoring the experience, adapting the intervention and multisensory toolkits

The effectiveness of a technological or educational **aid** must be continuously observed and assessed in the field. If, during a visit, the cultural practitioner realises that a particular aid (for example, a geolocation app, a microcapsule relief model or a tactile map) is not being appreciated, is causing frustration or leading to fatigue, **it is essential to have the readiness and methodological flexibility to adapt the intervention immediately**.

The strategic role of Multisensory Toolkits

It is precisely to ensure this capacity for continuous adaptation and personalisation, within the limits of what is possible, that the **Multisensory Toolkits** have been developed. The Toolkit is a flexible and modular 'toolbox' that the cultural mediator carries with them throughout the process.

It is not limited to a single tool, but encompasses **a wide variety of modular aids:**

- **Material and texture samples**: Pieces of wood, stone, metal, fabric and ceramic fragments to provide varied tactile stimuli in cases where there is an aversion to specific synthetic materials. The weight and texture aid and support the cognitive experience.

- **Visual and optical aids**: Sheets with colour contrasts, illuminated magnifying glasses and anti-glare filters to be applied as required.
- **Alternative auditory and narrative stimuli**: Short audio clips, soundscapes and tools for evocative or geometric-spatial description, depending on the visitor's profile (congenital vs. acquired).
- **Olfactory and thermo-haptic elements**: Essential oils, aromas and elements with variable temperatures to stimulate sensory memory without requiring complex formal exploration.

The Toolkit enables the operator to 'switch' on the fly from one communicative-technological mode to another: if the response to a 3D print is lukewarm or taxing, the operator sets the model aside and initiates an olfactory exploration accompanied by an immersive audio narrative. **Technology** thus returns to being what it should be: **a tool at the service of the individual's autonomy**, **psychophysical wellbeing and cultural experience.**

3.10 Artificial Intelligence tools and platforms in cultural mediation

AI offers interesting prospects but requires a critical analysis of its operational balance sheets:

Advantages (PROS)	**Limitations and Risks (CONS)**
Scalability: Instant generation of alternative text (Alt-text) and descriptions for large volumes of works in the catalogue.	**Inaccuracies:** Risk of inventing historical data or misinterpreting complex iconographic details.
Customisation: Immediate adjustment of the level of detail and narrative style according to the user's profile.	**Lack of aesthetic sensitivity:** The algorithm's inherent inability to capture the artist's pathos, emotion or poetic choices.

AI should be understood as a facilitator and **never** as **a substitute for the cultural expert**. Human supervision and content validation remain an essential ethical and scientific requirement.

AI platforms (such as Large Language Models or computer vision systems for image recognition) must be viewed strictly as **facilitators and process accelerators**, and never as substitutes for the cultural expert.

AI can support the mediator in drafting an initial version of a cognitive audio description or in structuring a text logically, but it is solely up to the cultural expert to validate the content, eliminate historical inaccuracies and, above all, instil that **professional empathy** and aesthetic sensitivity described in Chapter 2.

The most serious technological error is blind automation: entrusting the guided tour for a person with a visual impairment to an unsupervised synthetic voice assistant impoverishes the experience, depriving it of the relational and human element – above all, the narrative approach with the appropriate pacing to ensure the work is properly understood.

3.10.1 Artificial Intelligence has arrived in museums without making a sound.

Not as a sudden revolution, but as **a gradual presence**: first in digital catalogues, then in audio guides, and today in chatbots, automated descriptions and personalised recommendations.

Yet, **when we talk about AI and accessibility, it is easy to fall into a misconception: thinking that innovation automatically equates to inclusion. This is not the case.**

For blind and partially sighted people, **AI** can be an extraordinary ally in promoting independence, but **it can** also **become a new form of exclusion** if it is not designed, monitored and used responsibly.

This module is not intended to 'celebrate' AI, but to **learn how to use it effectively**, **within a cultural framework consistent with the values of accessibility and VET education.**

3.10.2 AI as the silent infrastructure of the visit

Nel In the contemporary museum, **AI** is rarely visible as a physical object.

It is, rather, a **silent infrastructure that works behind the scenes**: it analyses images, generates text, answers questions and adapts content.

There are four main areas in which AI is currently most widely used to enhance the visitor experience:

1. Text-to-speech, which converts text into natural-sounding speech, is now central to audio guides, apps and the reading of digital content.
2. Image recognition enables the analysis of artworks, environments and objects, producing automatic descriptions.
3. Chatbots and virtual assistants answer visitors' questions, provide guidance and make suggestions.
4. Finally, recommendation systems personalise itineraries and content.

A real-world example is the work carried out by the Smithsonian Institution, which has trialled digital assistants and automated description systems to make its online archives more accessible, whilst maintaining strong curatorial control over the content generated (Smithsonian Digital Strategy, 2020).

The lesson is clear: AI works when it enhances human work, not when it replaces it.

3.10.3 Describing works of art with AI: opportunities and responsibilities

Uno One of the most promising uses of AI in museums concerns the generation of descriptions of artworks, particularly as a support for:

- Audio descriptions
- alternative text for images
- multi-level audio guides.

Projects such as Microsoft Seeing AI, although developed in broader contexts, have demonstrated how visual recognition can provide immediate descriptions of images and environments to blind people.

However, when this approach is applied in a museum, limitations immediately become apparent: a work of art is not a neutral object.

Museums such as the Tate have experimented with the use of automated tools to generate initial descriptive drafts, which are then rewritten and adapted by educators and accessibility advisers.

AI speeds up the process, but the responsibility for interpretation remains with humans. There is much work to be done in this regard; even new apps such as AMUSEAP, which have been introduced in many national museums, are not consistent with the storytelling language intended for different user groups. Let's just say there is still a lot of work to be done.

This approach is consistent with the points highlighted by Giudice et al. (2012): an accessible description is never merely technical, but cultural and narrative.

3.10.4 The limits of AI: when technology risks betraying the museum

In a cultural context, the limitations of AI are not a technical detail: they are an ethical issue.

AI systems can produce inaccurate descriptions, oversimplifications or, worse still, content that fails to take historical and social context into account.

This has become clear in several European pilot projects, where automated descriptions tended to use vague categories or aesthetic judgements ('beautiful', 'harmonious') that were of little use, if not misleading, to a blind person.

Bodies such as the European Commission emphasise the 'human-in-the-loop' principle: AI must always be supervised, verified and corrected by competent individuals (European Commission, 2019).

In a museum, this principle is even more crucial: every piece of content conveys a particular perspective. To delegate this entirely to an algorithm is to relinquish one's cultural responsibility.

3.10.5 AI, digital archives and apps: when integration makes the difference

AI works best when it is not an isolated addition, but part of an accessible ecosystem. In large digital archives, such as those of Europeana, AI is used to improve the indexing and searching of content, whilst also facilitating access via screen readers and voice commands.

In museum apps, AI can tailor content to users' preferences, suggesting shorter routes, more detailed descriptions or audio-only viewing modes.

For a blind or visually impaired person, this personalisation is not merely a convenience: it is essential for independence.

Pilot projects carried out in Northern European museums have shown that the ability to choose one's own pace and level of detail significantly increases visitor satisfaction amongst those with visual impairments.

Once again, we return to a theme already addressed in other modules of this handbook: the freedom to choose is an integral part of accessibility.

3.10.6 Ethics and culture: AI as a value-based choice

The use of AI in museums is not neutral.

For this reason, UNESCO, in its Recommendation on the Ethics of Artificial Intelligence, calls on cultural institutions to consider the social, symbolic and human impact of the technologies they adopt (UNESCO, 2021).

In the context of inclusive museums, certain guidelines emerge clearly:

- AI must be transparent: visitors must know when they are interacting with an automated system
- it must be controlled: all generated content must be verified
- it must be designed with the relevant and involved people, not just for people.

Museums that have openly declared their use of AI, explaining its limitations and purposes, have seen an increase in public trust, particularly amongst communities of people with disabilities; however, this is not enough to fully satisfy the public.

Assistive technologies and Artificial Intelligence, in cultural venues, are not tools designed for 'special categories', nor **are** they mere innovations to be showcased. **They are universal access points,** bridges that bring people closer to the content, making the experience clearer, more welcoming and more inclusive.

When carefully designed, these solutions enhance the visit for everyone: people with disabilities, families, older people, students and tourists. They do not simplify the museum: they make it more coherent, more accessible and more open. They do not add a technical layer, but bring together technology, content and people, transforming digital tools into truly meaningful experiences.

In an Erasmus+ KA210-VET project, working on these issues means training professionals capable of combining culture, innovation and social responsibility. It means developing

critical skills: understanding what AI can and cannot do, recognising when human judgement is essential, and always choosing inclusion over blind automation.

Accessibility, therefore, ceases to be a regulatory obligation and becomes a shared cultural value. Artificial Intelligence, guided by ethics and a focus on people, does not make the museum more 'technological': it makes it more human.

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CHAPTER 4

Prosociality, ethics, empathy and inclusive co-design. Assessment of sociocultural impact

4.1 The paradigm shift in disability

Until the 1970s, disability in general – and visual impairment in particular – was approached from **a medical model** and therefore viewed as an impairment, a disability or a handicap.

"Individual disability is treated as a condition of individual disadvantage and therefore a condition of social disadvantage".

Within this model, good health is defined as freedom from pain, illness or impairment. It focuses on the physical processes that influence health, such as the biochemistry, physiology and pathology of a condition. It does not take into account social or psychological factors that might play a role in illness. In this model, every illness has an underlying cause and, once that cause is removed, the patient will be healthy again.

From the 1970s onwards, **the Bio-Psycho-Social Model** began to be described and discussed as 'individual deficit < > possible condition of disability (caused by society)'

Disability is no longer seen as a limitation inherent to the individual, but as the result of interaction with the environment. The medical model completely ignored the psychological, social and environmental factors which, on the contrary, play a decisive role not only in promoting or hindering the onset of illness, but also in modulating the patient's response to the care provided. Furthermore, it completely overlooked the importance of the doctor–patient relationship in the processes of assessment, diagnosis and treatment, as a factor which, in fact, strongly influences the outcomes of interventions.

The biopsychosocial model, on the other hand, conceptualises health and illness as the result of the reciprocal interaction between the individual – with their biological systems (organs, tissues and cells) and psychological systems (cognition, emotions, motivations) – and the world, with its social systems (society, community, family), within a framework of continuous and reciprocal influence.

4.2.1 UN Convention – Art. 9 and the Council of Europe Framework Convention on the Value of Cultural Heritage for Society – Art. 12

The UN Convention forms part of the broader context of the protection and promotion of human rights, as defined at international level since the 1948 Universal Declaration of Human Rights and consolidated over the decades, confirming the fundamental principles regarding the recognition of the rights to equal opportunities and non-discrimination in favour of persons with disabilities.

In its **guiding principles,** the Convention does not **recognise 'new' rights for persons with disabilities;** rather, it aims to ensure that they can enjoy, in accordance with the legal

systems of their respective States, all the rights recognised for other members of society, in application of the general principles of equal opportunities.

The aim of the Convention, which consists of a preamble and 50 articles, is to promote, protect and ensure the full and equal enjoyment of all rights and freedoms by persons with disabilities. To this end, disability is defined as the existence of barriers of various kinds which may hinder those with long-term physical, mental or sensory impairments from exercising their right to participate fully and effectively in society.

Article 9:

- Accessibility as a fundamental right: the physical, social and cultural environment, information and services.
- Obligations for cultural venues:
- Removal of architectural barriers
- Minimum accessibility standards
- Braille signage, LIS interpreters, trained guides

The Council of Europe Framework Convention on the Value of Cultural Heritage for Society, better known as **the Faro Convention**, **highlights the important aspects of cultural heritage in relation to human rights and democracy.** It promotes a broader understanding of cultural heritage and its relationship with communities and society.

The Convention encourages us to recognise that objects and sites are not, in themselves, what is important about cultural heritage. They are important for the meanings and uses that people attribute to them and for the values they represent. The Faro Convention is a 'framework convention' that defines the issues at stake, the general objectives and the possible areas of action for Member States to make progress.

Each Member State may decide on the most appropriate means of implementing the Convention in accordance with its legal or institutional frameworks, its practices and its specific experience. Unlike other conventions, the 'framework convention' does not create specific obligations to act. It suggests rather than imposes.

Article 12:

- to promote access to cultural heritage, particularly for young people and disadvantaged individuals.

4.2.2 Italian legislation

2018 was a particularly significant year for the development and promotion of PEBA in Italy, thanks to specific legislative and ministerial measures:

- Guidelines for cultural heritage (2018): On 6 July 2018, the Working Group of the Ministry of Cultural Heritage and Activities published a circular setting out the Guidelines for the drafting of PEBA in museums, museum complexes, archaeological sites and parks.
- Launch of municipal plans (2018): Many Italian municipalities began the process of drafting and adopting their own territorial plans for urban accessibility and historic centre accessibility in 2018.

- Relevant legislation: The PEBA has its roots in Law 41/1986 and Law 104/1992, but it was between 2010 and 2018 that its implementation gained significant momentum in accordance with the UN Convention on the Rights of Persons with Disabilities (Law 18/2009).

4.3 Prosocial behaviour and cooperative behaviour in a cultural context

Accessibility is expressed through acts of prosociality and cooperative behaviour. When a cultural institution fosters active cooperation, it promotes community welfare that transforms culture into a pillar of public health and social cohesion.

4.4 The participatory paradigm: 'designing for' vs 'designing with'

Pronto Percorso's professional model and approach are based on rejecting top-down planning ('designing for') in favour of the participatory paradigm (**'designing** with').

The operational tools used to achieve this objective are:

- **Inclusive Focus Groups:** Involving users, organisations, experts by experience, families and practitioners right from the earliest stages of the idea.ù+
- **Shadowing:** Discreet ethnographic observation of the user during their spontaneous activities to identify barriers and real-world response times.
- **Participatory Prototyping:** Iterative testing and validation of low-fidelity aids and 3D-printed models together with end users.

4.5 Interpersonal and collaborative skills of the cultural practitioner

The practitioner must complement their technical and disciplinary skills with specific cross-cutting aptitudes such as tolerance of ambiguity, procedural flexibility and the ability to manage uncertainty in the field.

The **Inclusive Practitioner Development Scale** is set out below:

1. **Aware Level:** The practitioner is familiar with the theoretical concepts and barriers, but still acts on the basis of emotional empathy, with the risk of causing embarrassment or being overprotective.

2. **Operational Level:** The practitioner has mastered support techniques in the field, the correct use of multimedia aids, the toolkit and audio descriptions.

3. **Competent Level:** Integrates practical and interpersonal skills, applies professional empathy, leads co-design workshops and acts as a cultural mediator and social facilitator.

4.6 Assessment of socio-cultural impact

The long-term impact of an inclusive project is measured through specific qualitative indicators: empowerment and the development of personal identity, the strengthening of local social capital, and stable cultural and organisational change within the museum organisation.

4.7 Universal Design and Areas of Intervention in Museums

Within the context of Universal Design, we can summarise what we really need to bear in mind when planning the layout of spaces, and what and how to improve visitor experience:

- External accessibility and reachability
- Access and reception
- Wayfinding and signage
- Assistive devices
- Accessible museum experiences
- The role of digital technologies (post-pandemic): digitisation, virtual access, inclusion.

Inclusive signage

- Avoiding 'visual clutter'.

Three levels:

- Informative (maps, main functions)
- Directional (arrows, consistent routes)
- Identification (entrances, specific areas)
- Consistency with brochures, website and service charter

Maps and wayfinding

- Clear, legible two-dimensional maps, located at strategic points.
- Paper and online versions.
- Tactile-visual maps: relief maps, Braille, textures.
- Three-dimensional models: scale models of parks, squares and archaeological sites.

Overcoming distances and changes in level

- Rest areas every 50–100 m, uniform and non-slip surfacing.

- Changes in level: ramps, lifts, platform lifts, stairlifts.
- Integrated solutions are often required.

Accessible toilets

- Two spacious bathrooms accessible to everyone (not just 'disabled toilets').
- Colour contrasts, tactile maps, handrails and adequate lighting.

Multisensory furnishings and safety features

- Furnishings designed for everyone: benches, drinking fountains, litter bins, counters.
- Multisensory alarms: visual, audible and vibrating.
- Emergency signage: visual, audible, tactile

In Italy, there are examples of **BEST PRACTICES**, but they are a drop in the ocean; there is still a great deal of work to be done. During the session, practical case studies will be presented to improve the following areas.

Catania Multimedia Tactile Centre – "Do not touch"

- Tactile pathways, 3D models, multisensory experiences.

MiracoLIS – Piazza del Duomo, Pisa

- Video guides in Italian Sign Language (LIS) and International Sign Language (ISL).
- Staff training in sign language.

Accessibility for deaf people

- Guided tours with an LIS* interpreter on a raised platform.
- Downloadable video guides.
- Comic-style guides for deaf children.

  AAC** – Augmentative and Alternative Communication
- Explanatory sheets in simplified language for people with intellectual disabilities, older people and migrants.

*LIS is the Italian Sign Language, used for communication 'between' and 'for' deaf people. On 19 May 2021, the Italian Parliament approved Article 34-ter of the Sostegni Decree, which states:
"the Republic recognises, promotes and protects the Italian Sign Language (LIS) and the Italian Tactile Sign Language (LIST)". International Sign (ISL or simply International Sign) is a system of communication created to facilitate exchanges between deaf people of different nationalities and languages during global events. It was developed from the 1950s onwards by the World Federation of the Deaf (WFD).

**AAC refers to a field of research and clinical and educational practice. It aims to compensate for temporary or permanent communication disabilities. Every person, regardless of the degree of their disability, has a fundamental right to influence, through communication, the conditions of their life, and AAC has as its primary objective the enhancement of the level of active participation of people with special needs, enabling them to take control of their own lives.

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CHAPTER 5

Case studies and experiential methodologies. Introduction to the Workshop

MD MOVIMENTO DEHONIANO EUROPEO

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5.1 Introduction

This chapter is essential because it shifts training from a purely informative level to a practical and relational one: practitioners learn to recognise different needs, to communicate appropriately and to design a truly autonomous and multisensory support programme.

In the various activities developed throughout the course, whilst we have occasionally repeated certain concepts, we have sought to provide further information based on different experiential approaches viewed from various perspectives, and to leave participants with something concrete and replicable that truly serves as a stimulus for furthering their training and operational skills.

The workshop aims **to guide participants in co-designing a short itinerary** that enables independent exploration through touch, narrative audio descriptions and assistive technology, fostering mutual empathy between staff and blind visitors, whilst identifying realistic solutions for European and Italian museums and cultural centres.

Producing a tangible prototype (e.g. a tour route, elements to be described, a tactile map, a narrative script and, where applicable, a tech demo) are practical steps that move the problem from mere awareness to testing and hands-on experience during the practical session.

5.2 Case studies and experiential methodologies

Case studies enable the analysis of concrete experiences of cultural accessibility, identifying effective solutions as well as critical issues, organisational limitations and the conditions necessary to adapt them to one's own context.

Through examples of tactile routes, audio descriptions, three-dimensional models, accessible signage and multisensory mediation, practitioners come to understand that accessibility is not limited to a single aid, but rather relates to the overall quality of the experience, which is shaped by a combination of experiences during a visit.

Experiential methodologies also promote active learning: guided simulations, non-visual explorations, description exercises and interaction with people with visual impairments help participants to question communication and design practices that rely predominantly on sight.

The aim is not to 'simulate blindness', but to develop listening skills, an awareness of the environment's limitations, and to improve one's practical skills in order to build respectful and inclusive relationships.[accessibletourism]

5.3 Introduction to the Experiential Workshop

The Experiential Workshop translates theoretical content into observable skills that can be applied in day-to-day work. It enables participants to directly experience methods of guiding, orienting and verbally describing artworks and spaces, as well as the use of touch and managing interaction, whilst verifying their effectiveness through peer discussion and feedback from blind or partially sighted people.

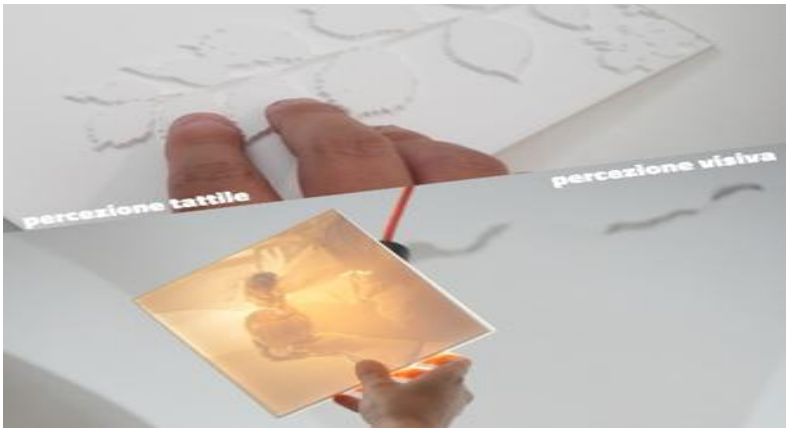
This approach is particularly important in cultural contexts, where access to heritage can be enriched by combining listening, tactile exploration and storytelling; indeed, the guidelines for museums emphasise the value of experiences that engage all the senses other than sight, and of staff trained to interact with visitors with visual impairments. Consente ai partecipanti di sperimentare direttamente modalità di accompagnamento, orientamento, descrizione verbale di opere e spazi, uso del tatto e gestione dell'interazione, verificandone l'efficacia attraverso il confronto tra pari e il feedback di persone cieche o ipovedenti.

Questo approccio è particolarmente importante nei contesti culturali, dove l'accesso al patrimonio può essere reso più ricco combinando ascolto, esplorazione tattile e narrazione; le indicazioni per i musei sottolineano infatti il valore di esperienze che coinvolgano tutti i sensi diversi dalla vista e di personale preparato nell'interazione con i visitatori con disabilità visiva.

Co-design experience – High Touch project (theme: Chapters 2–3)

Co-design experiences – Touch and form: tactile workshops with 3D models. Sensory storytelling

From image to touch: this is how tactile photography comes to life!



Ci Some projects stem from technology, whilst others arise from a deep human need. **High Touch Light** falls into both categories. **It is an artistic and inclusive project launched in Naples*** that seeks to overturn one of the most deeply held beliefs in the world of art and photography: the idea that images can only be experienced through sight.

Here, however, **photography becomes something to be explored with the hands**, to be felt, to be physically experienced.

*(The initiative, funded by the Banco di Napoli Foundation and carried out by ReMade Community Lab, stems from a question as simple as it is revolutionary: how can a blind person experience photography? Not simply by listening to a description of it, but by truly engaging with the image. From this reflection springs a project that combines photography, artificial intelligence, parametric modelling and 3D printing to transform photographs taken by blind and visually impaired people into actual luminous sculptures.)

The heart of the project is deeply human, because even before technology comes the people involved.

The photography and perception **workshops** led by photographer Marzia Bertelli gave participants the chance to explore the relationship between body, space and memory through photography. It was not simply a matter of 'teaching people how to take photographs', but of **creating a new sensory experience, where the act of taking a photograph became a way of expressing one's own perception of the world.**

In this process, photography ceases to be merely a flat image and is transformed into a tangible object. The photographs are digitally processed and converted into three-dimensional models and subsequently, using FDM 3D printing technology, these images become physical objects – surfaces to be touched, reliefs to be explored with the fingers.

The most fascinating thing is that these works/images operate on two levels simultaneously:

the tactile experience, because those who cannot see can finally 'read' the photograph through their hands, perceiving shapes, volumes and depth.

the visual experience, because the works are backlit, and the light passes through the material, highlighting its details and textures. It is almost as if the image were breathing. The light does not merely illuminate the work, but becomes an integral part of it.

This aspect also profoundly changes the role of the sighted viewer.

Normally, in museums there is an unspoken rule: 'do not touch'. In High Touch Light, however, contact becomes essential. Touching is no longer forbidden, but necessary. Hands become instruments of knowledge, just like the eyes. And this is where the project takes on a very strong cultural significance: it is not merely about accessibility, but proposes a different way of experiencing art – one that is slower, more physical and more empathetic.

The exhibition at Palazzo Ricca was not conceived as a simple display, but as a multisensory space where the public is invited to interact directly with the works. Visitors do not merely observe, but explore. It is an experience that breaks down the traditional distance between visitor and artwork.

One of the project's most innovative elements is **the use of technology** not as an end in itself, but **as a bridge**. Artificial intelligence and parametric modelling are not intended to replace human creativity, but to amplify it. Technology becomes a tool for sensory translation: it converts images into surfaces, light into relief, and emotions into tangible forms.

This approach forms part of a broader reflection on the future of accessible art and cultural heritage. In recent years, an increasing number of museums and institutions have been experimenting with tactile trails, 3D models and multisensory installations to make culture truly inclusive. Similar projects demonstrate that accessibility does not mean creating 'alternative' experiences for people with disabilities, but rather enriching the way in which everyone can experience art.

High Touch Light also carries a very powerful symbolic message: **photography**, traditionally linked to the gaze, is freed from its visual limitations. It **becomes something that can be felt, traversed and imagined**. This leads us to reflect on what 'seeing' really means. Perhaps seeing is not merely receiving images through the eyes, but building an emotional and sensory relationship with our surroundings.

The tactile experience, in fact, creates a different kind of engagement compared to mere observation. When a hand traces the outline of a 3D-printed form, time slows down. An intimate relationship with the artwork is formed. It is a slower yet deeper form of perception, which compels us to linger over the details and surfaces.

The project also demonstrates the extraordinary potential of 3D printing when applied to art and social inclusion. Technologies that, until a few years ago, were used primarily in industrial settings are now becoming cultural and social tools. Thanks to 3D printing, it is possible to transform digital data into accessible physical objects, opening up new possibilities for museums, schools and educational workshops.Furthermore, High Touch Light proposes a new concept of a cultural archive. Works can be digitised, converted into three-dimensional models and replicated in other contexts, making it possible to create collections that are accessible and can be shared even from a distance. This means that an experience originating in Naples could be reproduced in other museums, schools or cultural centres around the world.There is also an emotional aspect that makes the project particularly powerful. Knowing that the images were created by blind or visually impaired people completely changes the way one approaches the works. One no longer looks at the photograph in search of 'technical perfection', but enters into the lived experience of the person who created it. The works become personal narratives, fragments of memory, perceptions translated into matter.In an age dominated by fleeting images consumed in a matter of seconds on screens, High Touch Light invites us to slow down. To pause. To use our bodies to understand. It is a project that speaks of inclusion, but also of sensitivity, connection and listening.

Perhaps the most important message to take away from this experience is precisely this: art does not belong to just one of the senses. It can be seen, heard, touched and imagined. And when technology is used to bring people together rather than to separate them, it truly becomes a tool capable of creating new forms of humanity.

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- International Council of Museums - The global museum network - International Council of Museums
- Scopri il patrimonio culturale digitale europeo | Europeana
- https://3d.si.edu/
- Home - Fondazione Banco di Napoli
- ReMade Community Lab - Laboratorio di diffusione e sperimentazione a Napoli

Experience: CATACOMBS OF SAN GENNARO (Naples) (theme: Chapters 3–4)

The La Paranza O.N.L.U.S. Social Cooperative has been operating in the Rione Sanità district for over twenty years with the aim of promoting the social regeneration of the area through the enhancement of its historical, artistic and cultural heritage.

Since its inception, the co-operative has placed people at the heart of its mission, both by involving local staff and by developing a model of cultural engagement based on the principles of accessibility and inclusion. The experience gained in managing the Catacombs of San Gennaro has led to the implementation of numerous projects aimed at ensuring ever-wider and more informed participation by visitors with disabilities.

Key initiatives include:

- Participation, since 2009, in the 'Campania tra le Mani' project, in collaboration with the Suor Orsola Benincasa University;
- Collaborations with specialist organisations, including the Lega del Filo d'Oro;
- Creation, as part of the "Art Up" project (2023), of tactile aids to improve accessibility to the exhibition routes.

The experience gained over recent years forms the starting point for this training programme.

The module aims to provide participants with the theoretical knowledge and practical skills needed to design and deliver visitor experiences that are accessible to people with visual impairments, promoting inclusive hospitality practices and narrative strategies capable of making cultural heritage understandable and accessible to a diverse audience.

Particular attention is paid to developing communication skills that enable guided tours to be transformed into participatory, multi-sensory and truly inclusive experiences.

Learning objectives

By the end of the course, participants will be able to:

- Understand the fundamental principles of welcoming people with visual impairments;
- Adopt appropriate methods of interaction and support during a guided tour;
- Design an accessible narrative using clear, descriptive and inclusive language;
- Use narrative tools and techniques that engage the various sensory channels;
- Adapt cultural content to the needs of different audiences, encouraging full participation in the visitor experience.

Module content

The module will explore the following topics:

1. Welcoming and guiding visitors

- Principles of inclusive hospitality;
- Ways of interacting with blind people;
- Techniques for guiding and supporting visitors in cultural venues.

2. Accessible storytelling techniques

- Creating an effective and inclusive narrative;
- Describing environments, artworks and historical contexts;
- Use of simple, precise and understandable language.

3. Toolkit for inclusive communication

- Practical tools for planning the visit;
- Emphasis on sensory elements;
- Use of space and tactile experiences to aid understanding.

Teaching methodology

The module employs a predominantly experiential teaching approach that integrates:

- Lectures;
- Analysis of real-life case studies drawn from the experience of the La Paranza Cooperative;
- Practical examples of guided tour planning;
- Opportunities for discussion and exchange with participants.

For further information and details:

https://www.cr.campania.it/garantedisabili/images/articoli2/LE_catacombe_di_san_gennaro.pdf
https://catacombedinapoli.it/it/eventi/catacombe-senza-barriere/
https://art-up.it/progetto-artup-catacombe-san-gennaro/

Wayfinding and visitor experience (topics covered in Chapters 3–5)

1. What is a museum?

A museum or an event becomes truly accessible when visitors can find information before their visit, reach the building, locate the entrance, find their way around the space, understand the rules, engage with the exhibits and choose the level of assistance they require. Technology is important, but it cannot be regarded as a stand-alone solution: it must be integrated with wayfinding, communication, spatial design, accessible content, staff training and direct testing with blind and partially sighted people.

The simulation proposed by the workshop could involve a real-life scenario, creating a visit to a pre-determined location that enables students to design a route focused on analysing three different objects: a painting, a sculpture and an archaeological artefact, all located within a historic building.

In this case, the scenario allows for the step-by-step application of accessible web design, audio descriptions of the route, multisensory signage, tactile maps, QR and NFC codes, orientation systems, audio descriptions, 3D models, bas-reliefs, human assistance and digital tools. An analysis of best practice highlights that the most effective experiences do not depend on a single technology, but on the coherent integration of multiple tools and co-design with end users.

The programme is aimed at cultural practitioners and aims to provide a practical framework for identifying barriers, designing solutions and assessing the effectiveness of a cultural experience that is also intended for people with visual impairments. The content has been developed in line with the project's guidelines, which call for an interactive session, the use of real-life case studies and problem-solving exercises. As emphasised repeatedly throughout the course, it is essential to:

- to understand that visual impairment is not a uniform experience and that there is no such thing as a 'typical' visitor;
- to analyse the visitor's entire journey, from searching for information through to the end of the visit;
- to distinguish between signage, orientation, wayfinding and the overall information system;

- to be familiar with established, emerging and experimental technologies applicable to cultural sites;
- to evaluate European best practices and identify elements that can be adapted to one's own context;
- simulate the design of an accessible immersive event, assessing its continuity, autonomy and sustainability.

2. Visual impairment in the cultural context

Cultural institutions are traditionally built around visual perception: exhibitions, display cases, captions, lighting and visitor routes often assume that visitors can quickly take in the space as a whole. When this assumption is not questioned, it becomes a barrier in itself.

People with visual impairment do not form a homogeneous group. A person may have been blind from birth, may have lost their sight in adulthood, or may have residual vision that can be utilised under suitable conditions. Low vision can affect visual acuity, field of vision, contrast sensitivity, colour perception or sensitivity to glare. Strategies for independent mobility also vary: a white cane, a guide dog, spatial memory, screen readers, magnifiers, smartphones, voice navigation, audio description or a human guide.

This variety gives rise to a fundamental principle: there is no single mode of access that is valid for everyone. The institution must offer a range of options, allowing visitors to choose. Touch, audio, Braille, large-print texts, contrast, verbal communication, digital tools and personal assistance are not mutually exclusive alternatives; they are complementary components of a system.

3. Accessibility as a holistic experience

The visit does not begin in front of the artwork, nor even at the museum entrance. It begins when the visitor decides to take part and seeks out the necessary information.

The methodological materials of the Olomouc Art Museum distinguish between two inseparable levels: informational accessibility and spatial accessibility. The former concerns the availability, clarity and reliability of information; the latter concerns the safety and ease of navigation, from the route outside the building to finding one's way around the galleries. (Olomouc Art Museum, Accessibility Methodology).

- planning a visit and accessing reliable information;
- the route from the bus stop or car park to the building;
- locating the main entrance;
- initial orientation, ticket office and facilities;
- moving between floors, corridors and exhibition areas;
- engaging with the exhibits and choosing sensory experiences;
- exit, assistance and collection of feedback.

A statement such as 'the museum is accessible' is not enough. Visitors need to know how to reach the entrance, what obstacles they will encounter, whether there are stairs, lifts, audio descriptions, tactile elements, digital texts, trained staff and the option to request assistance. Good information reduces uncertainty and allows people to devote more energy to the cultural experience. (Olomouc Art Museum, Wayfinding and Information Systems).

Often, the greatest barrier is actually gathering and receiving information in a way that is appropriate to one's disability. In Olomouc, at the Museum of Contemporary Art (MUO – our institutional partner), the website is supported by software – or rather, an application – that helps users access the right information whilst navigating the site, using a plug-in dedicated to supplementary communication.

'Includo' is a widget (developed by Delante srl) designed to make navigating and accessing digital content more accessible and inclusive. For example, users can increase the font size or adjust the reading settings – such as for those with dyslexia – as well as increase the contrast of the visual field for the visually impaired, or activate the audio feature with voiceovers. These are all features that enhance accessibility for people with disabilities. It stands to reason that the support is tailored to the museum's specific needs. The widget is therefore a tool that helps people adapt their online browsing experience to their own needs, promoting greater independence and easier reading. For cultural platforms, it provides practical support in bringing a wider audience into contact with heritage and the information available online.

A concrete example is APEX's VPN 02 (as shown in the slides presented), a small remote control used in Olomouc to help blind and visually impaired people find their way not only within the city's various museum spaces, but also around the city itself, with precise explanations for each defined button. By pressing a button, the visitor triggers audible signals or voice messages at points equipped with compatible devices: thus, the visitor can locate an entrance or receive directions to continue their visit completely independently. In a museum, this tool can complement tactile routes and audio descriptions, helping to make the visit more accessible.

4. Wayfinding: from signage to the system

Wayfinding is not simply the installation of signs. It is the process through which a person locates, follows or constructs a route within a space. Signage is one of the tools; wayfinding also encompasses architecture, landmarks, lighting, colours, information, staff behaviour and technologies. Research by the Polytechnic University of Turin highlights the interdisciplinary nature of the discipline and the importance of a user-centred approach. (Finiguerra and Liguori, Polytechnic University of Turin, 2023).

An effective system must provide the right amount of information at the right time. Too little information leads to uncertainty; too much information causes information overload. The design must be consistent, predictable and verifiable. The 'pyramid' methodology

distinguishes three components: the information system, the graphic system and the hardware system. These correspond to the content to be communicated, the way in which it is represented, and the physical or digital media through which it is made available.

For people with visual impairments, a wayfinding system must combine visual, tactile, auditory, digital and human elements. It must also make the most of natural landmarks: a continuous wall, a handrail, a change in flooring, the acoustics of a lobby, the fixed position of the reception desk or a regular sequence of doors. These elements must not be obscured by movable furniture or temporary installations.

5. Technologies for an accessible, immersive event

Technology expands the possibilities for independence, personalisation and access to content, but it must be selected according to the visitor's actual route. Not everyone has the same mobile phone, uses the same app or possesses the same digital skills. For this reason, digital solutions must complement – not replace – a clear layout, accessible information and trained staff. (Olomouc Art Museum, Wayfinding and Information Systems).

5.1 Before your visit

- an accessible website or web app, compatible with screen readers and zoom functions;
- text and audio information on opening hours, admission fees, facilities and accessibility barriers;
- verified directions from the bus stop or car park;
- the option to book assistance or notify the venue of specific requirements;
- digital materials available in advance and kept up to date.

5.2 Arrival and orientation

- discreet audible signals to help locate the entrance;
- highly recognisable codes, such as NaviLens or equivalent solutions, at key decision points;
- tactile maps and simplified floor plans;
- high-contrast signage and enlarged text;
- indoor navigation via smartphones, digital maps, Bluetooth beacons or more accurate positioning systems;
- voice guidance to rooms, lifts, toilets and exits.

Indoor navigation systems can be very useful in complex buildings, but they require mapping, maintenance and updating when the layout changes. A digital code placed without analysing footfall patterns, distances and decision points does not aid orientation: it merely adds an object to the space.

5.3 Access to the artworks

- well-produced audio descriptions that are also available without the need for a smartphone;
- zoomable, high-contrast digital texts;
- essential Braille, consistent with the printed information;
- QR codes and NFC for accessible in-depth content;
- 3D models, 2.5D bas-reliefs, replicas and material samples;
- spatial audio, haptic feedback and multisensory content, where appropriate for the artwork;
- artificial intelligence to personalise language and level of detail, with human supervision.

Artificial intelligence can read texts, describe images, recognise objects and produce an initial narrative. However, it should not be the sole source for cultural content or safety information. Automated descriptions must be verified by curators, audio description experts and people with visual impairments. The risk is not merely technical: a plausible but incorrect description can alter the meaning of the work and undermine the visitor's trust.

5.4 Touch, 3D scanning and haptics

Non-contact 3D scanning enables a work to be captured and tactile copies to be produced, even at different scales. In addition to accessibility, the digital model can contribute to documentation, conservation and reproduction. In the case of Olomouc, three sculptures were scanned and 3D-printed; the surfaces were treated to withstand handling and cleaning. The value lies not only in the copy itself, but in the possibility of linking the model to a brief description, Braille, audio description, QR codes and other interpretative elements. (Olomouc Art Museum, Accessibility Methodology).

Dynamic tactile technologies, such as moving-cell displays, can represent maps, diagrams and simplified images without having to produce a new relief every time. They show promise, but are better suited to advanced installations and experimental projects. For many small and medium-sized museums, static tactile maps and a select number of well-designed 3D models remain the most sustainable option.

6. Simulation of an accessible and user-friendly immersive event

To put the principles outlined into practice, we propose a simulation of a temporary exhibition hosted in a historic building. The exhibition comprises three works: a painting, a sculpture and an archaeological artefact displayed in a showcase. The building has a barely recognisable entrance, an internal staircase, two rooms, a small reception area and a traditional website. The staff are helpful but have not yet received specific training.The aim is not to create a separate tour, but to design a shared experience in which blind, partially sighted and sighted visitors can use different methods within the same event. If we were to summarise the concepts by bringing together the various stages of the visit, we could divide them according to this simplified outline of what each visitor does and follows when planning a potential museum visit:

Stage	Barrier to be prevented	Organisational and technological solution
Before the visit	Incomplete information or information incompatible with screen readers	Accessible webpage; audio version; route description; contact details for assistance; advance information on how to use the service.
Arrival	Entrance difficult to locate	Step-by-step description; audible signal; code recognisable from a distance; outdoor area free of obstacles.
Reception	Automatic reliance on a companion	Trained staff; direct communication; non-intrusive offer of assistance; explanation of available options.
Orientation	Intermittent route between reception and function rooms	Tactile map; high contrast; natural landmarks; voice guidance; indoor navigation at decision points.
Painting	Exclusively visual content	Audio description; 2.5D bas-relief; digital text; sound or tactile content consistent with the artwork.
Sculpture	Original not to be touched	3D model; description from general to specific; scale replica; material sample.
Exhibit in a display case	Reflections, distance and inability to explore	Replica or cast; audio; high-contrast text; accessible QR/NFC; tactile indication of location.
Exit and feedback	Lack of evaluation of the experience	Exit directions; accessible questionnaire; short interview; collection of feedback and updating of the route.

6.1 First stage: preparing for the visit

It is good practice to study and visit the museum before arriving with the visitor with a disability, in order to plan the appropriate route, allowing sufficient time for the visit and breaks for refreshments. The next step is to study and describe in concrete terms what the visitor will encounter: the entrance, the route, any stairs, the location of the reception desk, tactile and audio aids, access for guide dogs, and the option to request assistance. The programme must not be published solely as an image or an inaccessible PDF. The route from the bus stop must be described using directions, distances, crossings and landmarks verified on site.

6.2 Second phase: making the space legible

On arrival, visitors must be able to recognise the entrance and understand where the reception is located. The route to the exhibition rooms must be continuous and predictable. A tactile or acoustic cue only makes sense if it leads to a point where the person can make a choice: to enter, stop, change direction or ask for assistance. Continuity takes precedence over the number of aids.

6.3 Third stage: making the artworks accessible

For the painting, the simulation includes an audio description structured from the whole down to the details, a simplified bas-relief of the composition and accessible digital content. For the sculpture, a 3D model that can be explored from multiple angles is proposed, accompanied by a brief description and a scale model that allows the overall form to be grasped. For the artefact in the display case, a replica, a material sample and a narrative illustrating its form, function and context may be used.

The tactile trail is not simply a collection of objects to touch. Each element must answer a question: what information does it convey? In what order should it be explored? How does it integrate with audio, text and space? The Olomouc methodology emphasises the creation of complete units of information and the visitor's freedom of choice. (Olomouc Art Museum, Accessibility Methodology).

6.4 Fourth phase: staff and support

Staff must address the visitor directly, introduce themselves, offer assistance and wait for a response. They must not grab the person, their white cane or their guide dog. They must

be familiar with how the tools work, the rules regarding contact with the artworks and the procedure to follow in the event of a malfunction. Human assistance complements the system, but must not become a mandatory prerequisite.

6.5 Fifth stage: testing

The simulation concludes with a practical test carried out together with blind and partially sighted people. The assessment must not be limited to the question 'does it work?', but must observe whether the visitor finds the information, identifies the decision points, uses the tools without continuous assistance, understands the artwork and is able to express a preference. Feedback must result in documented changes and regular maintenance.

7. Analysis of European best practices

European best practices demonstrate different approaches, but share certain elements: co-design, integration across multiple senses, attention to the entire visitor journey, user testing and the sustainability of day-to-day management. The following comparison draws on the documented case of Olomouc and the experiences gathered during the international review carried out for this project.

7.1 Olomouc Art Museum – Czech Republic

Olomouc is the most extensively documented case in the project's materials. The museum has worked on the entire visitor journey, distinguishing between informational and spatial accessibility. It has integrated advance descriptions, audio beacons, wayfinding, Braille, 3D-printed tactile models, legible labels, audio descriptions, QR codes and personalised content. The solutions were developed in collaboration with specialists and tested with people with visual impairments. The key lesson is that the tactile route functions as an interconnected system rather than as a mere collection of aids. (Olomouc Art Museum, Accessibility Methodology).

7.2 Omero State Tactile Museum – Italy

The Omero Museum is a European benchmark for the tactile appreciation of art. Its approach highlights the value of direct exploration, architectural models, reproductions and interpretation. For a replicable project, the aim is not to transform every museum into a tactile museum, but to select works and content that can be translated into meaningful experiences, whilst maintaining the relationship between form, material and context.

7.3 The Prado Museum – Spain

The 'Touching the Prado' project has demonstrated how certain paintings can be translated into relief images accompanied by Braille and audio descriptions. The value of this approach lies in the controlled transformation of the two-dimensional image, which brings out the composition, depth and relationships between the elements. The model cannot be applied indiscriminately: the choice of works and the quality of the relief are crucial.

7.4 ARCHES

ARCHES has developed 3D replicas, bas-reliefs, accessible applications and digital tools through a co-design process with people with disabilities. The experience is significant not only for the products created, but for the method itself: designers, cultural institutions and users work together, progressively testing the solutions. This reduces the risk of producing technologies that are formally accessible but of little practical use.

7.5 MuseIT, SHIFT and In-VisIBLe

These European projects explore multisensory platforms, artificial intelligence, haptic technologies, 3D models and personalised narratives. The common aim is to adapt content and modes of engagement to users' preferences. For institutions, these experiences serve as a laboratory for innovation; for application-based projects, they suggest a need for caution: automatic personalisation must be accompanied by curatorial oversight, transparency and user testing.

7.6 NEMO Science Museum and indoor navigation

The case of the NEMO Science Museum demonstrates that an indoor navigation solution yields better results when integrated into a comprehensive overhaul of the website, building, lighting and exhibitions. Navigation technology alone cannot compensate for inconsistent signage, a hard-to-spot entrance or inaccessible content.

Experience	Technologies/approaches	Transferable element
Muo – Olomouc	Wayfinding, audio beacons, Braille, 3D, audio description, QR	Integrate the entire route and test each stage.
Omero Museum	Tactile exploration, models, mediation	Select content suitable for tactile exploration and build meaning.
Prado	2.5D reliefs, Braille, audio description	Translating the visual composition into a legible tactile structure.
ARCHES	Co-design, 3D, apps, accessible games	Involving users in the process, not just in the final testing.
MuseIT / SHIFT / In-VisIBLe	AI, haptics, personalisation, digital models	Integrating technology with the building, lighting and content.
NEMO	Indoor navigation and a comprehensive review of the experience	

8. A replicable operational model

The comparison reveals a five-level architecture, developed as an operational framework for the project. This is not a classification taken wholesale from a single source, but a reorganisation of the principles found in the In-TOUCH materials, the Olomouc methodology and the comparative research on technologies.

- Before the visit: accessible information, preparation, contact details and route description;
- Arrival and orientation: recognisable entrance, decision points, tactile map and multisensory wayfinding;
- Moving around the venue: continuity of routes, voice guidance, contrasts and landmarks;
- Engaging with the works: audio description, touch, 3D, accessible texts, QR/NFC and controlled personalisation;
- Support and continuous improvement: trained staff, remote support, monitoring, maintenance and feedback.

For a small or medium-sized museum, the most realistic combination does not necessarily require complex infrastructure. An initial pilot project could utilise an accessible web app, audio descriptions of the route, a tactile map, recognisable codes at decision points, QR

or NFC codes for content, two or three selected tactile models, high-contrast text, staff training and real-world testing with blind and partially sighted people.

9. Introduction to the Experiential Workshop

The report and presentation constitute the first step towards the Experiential Workshop. In the workshop, staff will be invited to work in small groups on a specific problem, applying a problem-based learning and co-design approach, as required by the project guidelines. (In-TOUCH Teaching Guidelines, Rev. 09).

• mapping the visitor's journey;

• identifying informational, spatial, communicative and sensory barriers;

• selecting technologies based on the problem, not on novelty;

• designing an accessible unit dedicated to a single artwork;

• defining testing procedures with people with visual impairments;

• assessment of costs, maintenance, skills and sustainability.

The activity should not be limited to 'simulating blindness' by wearing a blindfold. A brief experience with simulation glasses may be used with caution and on a voluntary basis, but it cannot replicate the skills, strategies, experience and independence acquired by a blind person. The focus of the workshop must remain on analysing barriers, engaging in dialogue with those affected and testing solutions.

10. Conclusions

An accessible, immersive cultural event is not one that uses the greatest number of technologies. It is one that enables visitors to find their way around, understand, make choices and participate with as much independence as possible. Quality stems from continuity between the period before the visit, arrival, the venue, the content, the staff and follow-up.

European best practices show that the most effective innovation does not stem from technology in isolation, but from the integration of different areas of expertise: curation, museum education, wayfinding, design, typhlopedagogy, communication, digital development, conservation and direct knowledge of people with visual impairments. Each institution must adapt solutions to its own architecture, collections, audience and available resources.

Accessibility is not a favour, nor is it an additional component of the cultural offering. It is an element of the institution's professional quality and a prerequisite for participation on an equal footing. An accessible environment does not make decisions on the visitor's behalf: it provides them with the information and tools necessary to make their own decisions.

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Note on sources

The content relating to OMA – Olomouc Museum of Art, visual impairment in a cultural context, orientation systems and teaching methodologies is derived directly from the materials provided as part of the In-TOUCH project. The structure of the simulation, the five-level operational model and the cross-comparison are original developments by the lecturer, based on these materials and the technological review prepared for the intervention. Specific citations and any use of images provided by the partners are subject to the authorisations stipulated by the project.

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