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Veronica Riavis
Architect and Ph.D Student in Architecture at the Department of Engineering and Architecture, University of Trieste / University of Udine (inter-university).
She deals with inclusive representation for cultural heritage through advanced technologies.

Discovering Architectural Artistic Heritage Through the Experience of Tactile Representation: State of the Art and New Development

The current purpose of many national and international regulations is to ensure accessibility and fruition to the artistic and architectural masterpieces of cultural heritage. The aim of different public institutions or private associations is to allow everyone to discover and appreciate works of art.
Understanding the different form of art is very complex especially for a person with a visual disability, who becomes aware of the surrounding reality using predominantly the sense of touch.
Disability includes a set of problems that correspond to different solutions for the fruition of cultural heritage. Accessibility is guaranteed for people with motor disabilities by the removal of architectural barriers, for deaf and hearing problems people by the communication of the insights, for mental disability with laboratory activities. Instead, blindness requires a different approach, as it proposes problems and requires specific operations.
The article focuses on the issue of accessibility of heritage to blind and visual impairment people, presenting the consolidated techniques and the most innovative ones adopted to communicate the different forms of art, constituting both a source of knowledge and aesthetic pleasure.

Keywords:
Tactile representation; cultural experience; accessibility to heritage; tactile museum

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MUSEUM ACCESSIBILITY

Museums and all public, private and religious institutions that aim to protect, improve and promote the fruition of the building itself and its cultural contents, must be transformed from exclusive places for conservation and collectibles to learning sites.
Therefore, museums and exhibition spaces, according to the directives of the current regulations, can have a social, educational and cognitive role through identity and cultural heritage.
In particular, museums must guarantee to all visitor / user categories access to exhibition spaces by removing architectural barriers (according to the principles of design for all), allowing them to consult documents and works of art, involve them in scientific and cultural activities, and inform them about exposed contents. However, it is also essential to provide appropriate assistance technologies, adequate aids and services, and staff training so that the reception to the public could be positive and proactive. Indeed, it is important that, with its social and educational function, a museum plans appropriate inclusion strategies for people with disabilities.a long time now, blind people have been asking to access to artistic and cultural heritage. Italian and foreign museums are organizing special guided tours; and are promoting initiatives or temporary exhibitions dedicated to the blind and multimedia products. In addition, the cities place the tactile maps not only in public places, but also inside buildings with architectural and historical value, or in particular urban sites. (Bellini, 2000)
To make the cultural heritage accessible to blind and visually impaired people, it is necessary to provide a dedicated museum itinerary with a selection of significant works of art that visitors can explore by touch. The history of the building, the exhibition rooms and the works of art must be described through Braille and enlarged characters (according to the principles of legibility and readability), audio guides (a comprehensive solution for users with low vision or those who are not familiar with Braille reading) and visual-tactile maps.
The museum staff must be competent, specialized in the artistic contents and in the specific needs of the visitors. The touchable masterpieces can be sculptures (original or copies) or paintings (for example as drawings in relief [1]) compatible with the needs of security and conservation of the artistic assets.

Fig. 1 - Tactile Museum "Omero" in Ancona: copies of well-known sculptures and tactile architecture models.

THE EDUCATION OF THE SENSES FOR THE CREATION OF THE MENTAL IMAGE

The sight knows the reality quickly and effortlessly, and controls the space in an extended field of view. Instead, tactile exploration presents a reduced perceptive field approachable through the interaction of hands with the environment.
The blind person investigates the space in a sequential and partial way, and analytically appreciates the details of the objects (such as the surface finish or the consistency of the material) through the micro-movements of the fingers.
Blind people trained in tactile exploration are also able to analyze the object with haptic movement sequences that measure the parts investigated.
The cognitive movements vary in terms of methodology and rapidity, they can be attentive or distracted (similarly to the visual perception of the eye, not always careful) in capturing details, shapes, dimensions and meanings.
Tactile exploration is a process that requires time and concentration due to the reduced ability to discriminate, unlike the sense of sight.

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It is not possible to transmit in a drawing in relief the same amount of information perceivable through a visual representation of the same size [2], and the sense of touch is not able to perceive the variations of lights and colors obtainable by the eyes.
The perception of the world for the blind is partially different from those who can see: less detailed but objective, where the senses of touch and hearing are more trained and have a "vicarious" role (Grassini, 2000, p. 20). In fact, hearing and touch allow to perceive the sense of space, the distance between objects and their movements.
Near objects (within the length of the arm or the white stick) are known by touch. Instead, hearing perceives distant events, such as voices or footsteps. The sensations are useful for identifying the points of reference and for the orientation within an environment.
Touch perceives the shape and size of the things, such as the type of surface and the consistency of the materials. However, the ability of sight to perceive colors is not replaceable: an object is recognizable through other indications, but the chromatic qualities cannot be referable with the other senses. A person blind from birth has no possibility to understand the description of a color. "For a blind born color is just a name, an abstract word" (Grassini, 2000, pp. 20-22).
The hearing education involves the distinction of different types of sounds (acuity, rhythm, timbre).
In addition, the use of touch should be disciplined. For blind people, it is necessary to teach them to explore by moving both hands, and possibly all fingers. The exercise refines the ability to recognize and interpret forms, reliefs and contents. Touch must also allow the different materials to be recognized (plaster, wood, metal, etc.), the different types of fabric (cotton, wool, silk, etc.), the tactile characters of a surface (smooth, rough). The formation of the mental image therefore requires a series of steps that take a certain time.
If the object to analyze has large dimensions, the blind person must understand its characteristics through two steps: a quick and brief initial exploration, and a subsequent one to acquire the details. At first, the blind person forms a mental idea of the general form, and then proceeds to an analytical exploration to identify the details and insert them correctly in the right place in the constructed mental scheme (reference to the context). These abstraction and memorization abilities are the fundamental elements without which no tactile representation would be possible.
Even the interpretation of figures in relief may involve a considerable effort in learning. The base of the vision is two-dimensional: the images that form on the lower part of the retina are two-dimensional. At the brain level, the comparison occurs between the images of the right and left eye, formed with the two perspectives slightly different for the distance between the two eyes that involve different angles. However, a blind person is used to knowing and touching objects in their three dimensions: flattening and abstraction operations are not easy to elaborate in short time (Grassini, 2000, p. 28).
The tactile figures can be useful if realized correctly, but it is necessary for the blind person to be able to decipher and recognize them. The sense of touch, less able than sight to perform refined analyzes, requires tactile images very simplified, schematized or enlarged.
In addition to the issue of color, another serious problem for a blind person is understand the perspective, an optical illusion of which the blind will never have experience. The painting took over the technique of perspective construction after many years of experience in the figurative field. The perspective mechanism is explainable and understandable only at a conceptual level, but the blind person does not have a perceptive experience in this regard, understanding is possible through a high level of abstraction not always possible with subjects in the developmental age (Grassini, 2000).

Fig. 2 - The all-round reproduction of a sculpture: "Nike of Samothrace", tactile copy at the "Omero" Museum in Ancona.

DISCOVERING THE ARTS THROUGH THE EXPERIENCE OF TOUCH: REPRESENTATIVE METHODS

Art is a fundamental component of our culture. Visual impaired people cannot always make use of a valid and meaningful aesthetic education and neither can they explore artistic assets. In the past, there was a little attention to the needs of the blind on the issues of cultural accessibility.
Only in the last few years, there is the interest in solving these problems, in order to give to the blind person concrete possibilities to enjoy artistic assets. It is necessary a long and careful educational process that involves the blind person from the kindergarten.
The artistic culture of a blind man has a significant gap related to the absence of serious education in the field of figurative and plastic arts, often with limited notional information.

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Fig. 3 - Volumetric map of Ljubljana. The plastic model reproduces altimetry and urban core.

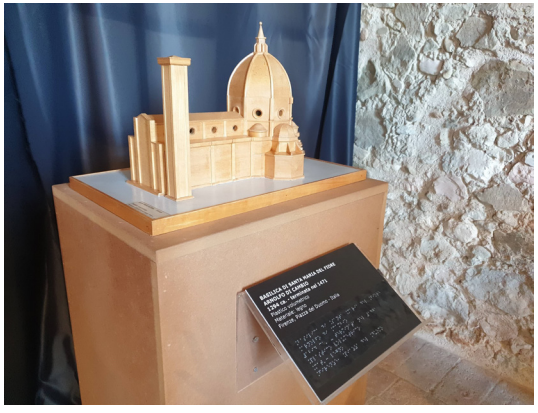

Fig. 4 - Model of the Basilica of Santa Maria del Fiore in Florence. "Omero" Museum of Ancona.

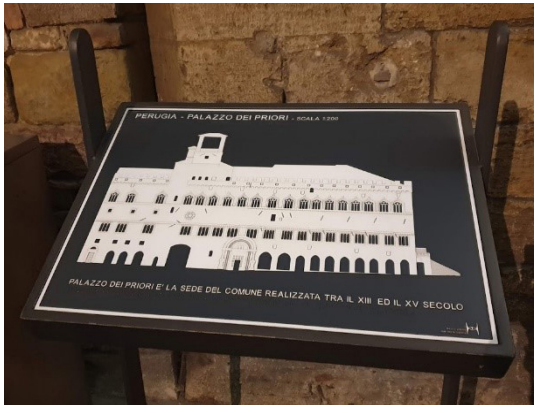

Fig. 5 - Facade in relief on the rigid support of the Palazzo dei Priori in Perugia.

The blind person will be able to appreciate the aesthetic value of a sculpture or architecture known through relief reproductions if he has been educated to understand and interpret art through tactile exploration and if he can benefit from direct experiences on site. (Grassini, 2000)
A fundamental aspect is to ensure that blind people have an adequate aesthetic education for all forms of art and for the use of touch. In fact, after reconstructing the process of forming the mental image, it is also necessary to transmit to the blind the aesthetic value of the artworks, in the case of accessibility to the cultural heritage. The tactile exploration of a work of art is a process of gradual selective reading (Gualandi & Secchi, 2000).
For the learning of art, blind people must not only know the notions related to the different civilizations, the historical periods, the artistic current and the specific artists, but the intrinsic aesthetic canons, too. Another fundamental aspect is the knowledge of the symbolism used in the different contexts. The arts have different characteristics and problems, but can also be made accessible to people with visual disabilities, as evidenced by the various initiatives and experiments proposed by some national and international museums that aimed at addressing these issues.
More and more museums are aiming to break down cultural barriers hindering the access to the artistic heritage to those who have visual impairments.
The all-round copies of sculptures and reproductions of architectures are easier to understand, because the blind person is more familiar with three-dimensional reality. Instead of the two-dimensional figures in relief, often used as reading and communication tools for paintings, and bas-reliefs present many more difficulties than a sculpture in the round.
The correct understanding of a tactile representation depends on multiple factors, including the coherence of the object to explore with the characteristics of the sense of touch, the motivation and the culture of a person, the education of the sense-perceptive-motor system of "the hand" and the good knowledge of the blind user of the representation specificities he is exploring.
The sculpture is certainly the simplest and most accessible form of art for the blind. A careful tactile investigation defines in the mind of the blind person the correct mental image of the work.
The reading of a bas-relief is more difficult, because it implies a greater sensitivity and preparation of the user.
To describe a sculptural work, especially a bas-relief, it is appropriate to refer also to the content, as well as to historical information and aesthetic values.
The large sculptures can be made accessible through their reproduction in small scales (to understand the general scheme of the artwork) and by real-size details (for an analytical exploration). The variation of scale factor value is also applicable to make the details of small sculptures perceptible. In addition to the production of casts and copies of the sculptural works of art (specially designed to be touched), it is important to give the opportunity to explore some artworks preserved in museums and galleries, overcoming, where is possible, those prohibitions that do not allow to touch the artistic assets. In any case, a fundamental aspect is to integrate tactile exploration with careful and adequate verbal support.
In architecture, the conceptual element assumes greater importance. Geometric relationships have a decisive role and the architecture is connected to a practical destination with functional purposes, whose awareness contributes to an aesthetic judgment.
To discover the architecture it is important to provide scale models or models that faithfully repro-

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duce the monument or the original building, to give an overview of the work and to facilitate the understanding of the styles (structure and details). In addition, openable models allow a better understanding of the structure of the building, its internal distribution and the construction elements.
Sometimes, inside some important architectural buildings are available tactile models of them. This also allows a direct visit to the monument: it is important, because the blind can touch certain parts of the building, recognize architectural elements, walk inside, perceive the dimensions and appreciate the atmosphere.
Furthermore, the relief drawing is another useful representative method to describe elevations and plans (such as tactile maps) [3].

Fig. 6 - Detail of the bas-relief reproducing "Guernica" by Pablo Picasso at the "Omero" Museum in Ancona.

The approach of the blind to painting, photography and graphic arts in general is more complex.
The visual arts seem to exclude those who do not possess the sight from any kind of possible enjoyment and fruition.
The issue of painting or two-dimensional and chromatic representations constitutes a "perhaps insoluble" problem for blind and partially sighted people (Grassini, 2000, p. 34).
It is important that the blind person, despite not being able to appreciate the chrome-luminous characteristics of an artwork, knows its content and the stylistic peculiarities. In this way, the user can refer to the overall work of a certain author, to the historical period and to the cultural trend, as well as to the biography of the artist and his personality. These aspects constitute knowledge of the painting, although the colors and depths of the scene represented are not fully appreciable. Unfortunately, the artistic education for a young blind person is limited to simple notions of the history of art and in some drawings in relief.
Several art museums use transpositions in three dimensions of some famous artworks as the interesting and pioneering study and research activity undertaken by the Tactile Museum of Ancient and Modern Painting "Anteros" of the "Francesco Cavazza" Blind Institute of Bologna.
The paintings reproduced are in perspective bas-relief form: the shape of the objects and composition of the scenes represented are perceptible by touch. The expert staff of the "Cavazza" Institute handcrafts these three-dimensional copies of the paintings (figg. 7-8). The transposition from painting to bas-relief takes place by appropriately modifying the artworks according to the principles of tactile perception, without distorting the work itself. It is necessary to evaluate the legibility level of the relief in respect of the tolerable tactile thresholds. The plasticity degree of the relief depends on the interpretation of the aesthetic qualities of the translated artwork and on the need to ensure adequate legibility.
The design requires a teamwork between the modeler-sculptor, art historian, tiflologist assistant

Fig. 7 - Perspective bas-relief of the altarpiece "Madonna and Child with St. John the Baptist and St. Nazarius" (1523) by Ferrari. Created by the Cavazza Institute of Bologna. Royal Palace of Turin.

Fig. 8 - "The birth of Venus". Perspective bas-relief at the "Anteros" Museum in Bologna.

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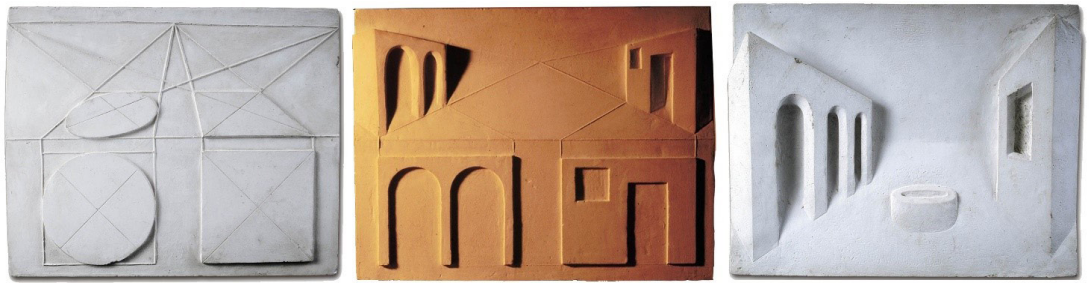

Fig. 9 - Preparatory tables. Perspective representations of geometries and architectural spaces (Istituto Cavazza - Museo "Anteros" Bologna).

and the pedagogical expert.
During the realization and completion phase, blind people, who have gained experience in the field, test the reproduction of the bas-relief paintings. This work implies an enormous level of competence.
The ability to know how to read an artwork requires an extensive preparation of the user.
Knowledge of perspective representation is essential for understanding painting, such as the concepts of visual cone, and partial, frontal, profile, foreshortening views. However, it is not so easy for the subjects blind from birth to understand the rules of the sight. It is necessary for them to follow a learning path, through an adequate work of didactic mediation, in order to mature the spatial and imaginative-motor concepts. To undertake this kind of path, the person must have a great motivation.
The importance of the propaedeutic tables (fig. 9) in which there are objects represented from different points of view, the tactile reading starts from an all-round sculpture and arriving at the unit of measurement of the perspective bas-relief depth. Only through this gradual educational approach to the image, a blind user can appreciate increasingly complex artworks.
However, the bas-relief has its limits. It is effective in expressing forms, but it is not when it comes to highlighting the chromatic values of a work: in fact, colors cannot find a plastic translation. To try to communicate the chromatic effect, it is appropriate to speak, making analogical associations and evoking the previous sensorial experiences of the blind person.
The painted bas-reliefs are useful for people with low vision. In this way, the user approaches the knowledge of the color in relation to the shape.
Even enlarged details of the artworks ensure the partially sighted an excellent support to the tactile experience and they facilitate the fixing of meanings. The audio support and the descriptions in Braille are indispensable to reinforce the haptic perception with historical and artistic knowledge.
The tactile representation of paintings includes different methods of drawing in relief (fig. 10). These are images specifically designed for blind people. In this case, the relief has lost its function of directly recalling volume of the objects; it makes perceptible by touch points, lines, surfaces and different elements of an image. It is possible to communicate to the tactile reader the essential form of the objects (including the volume) and their reciprocal relations strictly in the context of a two-dimensional representation.
The drawing in relief appeals to the potential of haptic perception, but it must also confront its limits and its specific characteristics.
To represent complex and three-dimensional objects through plane figures (flat surfaces) and therefore with only two dimensions, orthogonal projections (and not perspective) are the most direct and effective method of making possible this kind of graphic translation.
The drawing in relief, in order to respect the requirements of touch, in addition to imposing the assumption of a particular representative code, requires a specific effort of interpretation of the

Fig. 10 - Louvre, Petite Gallery, Exhibition "myths of the founders From Hercules to Darth Vador" (12 October 2015 - 4 July 2016). Translation from oil painting to tactile graphics. (Tactile Studio)

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Fig. 11 - "Cathedral of Santiago de Compostela". Reproduction Hall of Spanish National Monuments, Madrid Tiflological Museum. Model by José Santamaria. Scale of 1: 100.

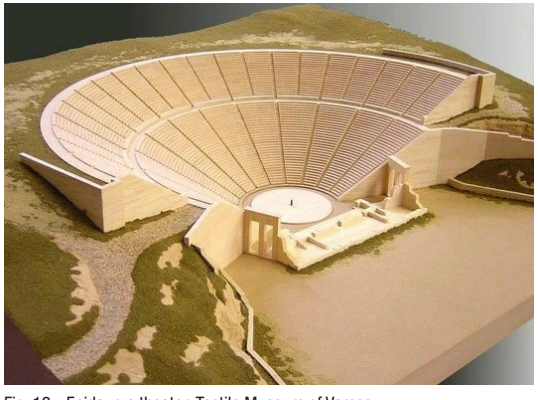

Fig. 12 - Epidaurus theater: Tactile Museum of Varese.

surrounding reality, intended to select the essential elements and, at the same time, those most easily represented through this code.
The role of the designer is fundamental: he, with his awareness and professionalism, is a mediator between the images and the user. The relief drawing is very useful to represent simple and schematic objects, maps and floor plans of buildings, graphs and geometric drawings.
The images represented with this methodology, despite all their limitations, guarantee a greater amount of information and a faster approach than a simple verbal description; then they imply a much smaller expenditure of means compared to models in three dimensions or representations in high relief.
Drawings in relief and three-dimensional reproductions, obtained with traditional and technological methods, are effective if: real artifacts, buildings or parts of them are physically inaccessible; the reproductions have been simplified and change the level of detail based on the scale reduction; the relief thicknesses used are understandable on touch threshold; the materials are suitable and the surfaces are finished.
There is no a better representation technique than the others, but the most suitable depending on the type and range of users, topic and situation: aspects that require careful analysis of limits and advantages according to the needs to satisfy.

TACTILE MUSEUMS AND NEW ACCESSIBILITY INITIATIVES IN TRADITIONAL MUSEUMS

The various associations for the blind are often promoters of multiple initiatives aimed at allowing the blind to access the artistic heritage.
The most important experiences regard the establishment of special exhibition structures, such as the dedicated tactile museums, and "adaptation" interventions and integration measures in traditional museums (guided tours, information in Braille and enlarged characters, temporary exhibitions and tactile artworks for all). The copies and models reproduce international artworks that are often difficult to reach, but also inaccessible (artworks placed on tall pedestals, protected in glass cases or it is prohibited to approach them). Hence, the need to create museums that collect reproductions of the most significant masterpieces, possibly dividing them according to different categories of historical or aesthetic interpretation.
The dedicated tactile museums are places expressly - but not exclusively - intended for people with visual disability. These structures aim to make the cultural heritage accessible through its transposition with appropriate representation modes in terms of tactile exploration and a qualified training and assistance activity for understanding the contents of the artworks.
In any case, the visit to a tactile museum needs a previous and specific study of the artworks that you intend to explore through touch. In fact, the exploration to a museum is more tiring for a blind than for a sighted person, and to facilitate the visit it is necessary to avoid presenting too many artefacts. The maximum number of works (unknown) that a blind person would be able to remember without confusion is about 15/20.
These museums are entirely accessible to the blind, specially designed for them, but sometimes

Fig. 13 - Pablo Picasso, "Bust of a Man in a Striped Shirt", (1993). Peggy Guggenheim Collection, Venice ("Doppio Senso").

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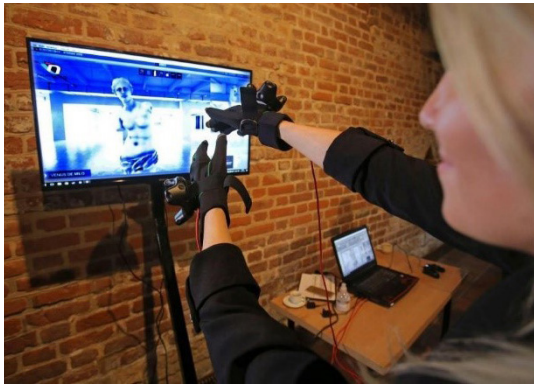

Fig. 14 - Haptic exploration through data gloves of the "Venus of Milo" in a virtual environment. "Touching Masterpieces", Prague National Gallery. (Neuro Digital Technologies, Leontinka Foundation)

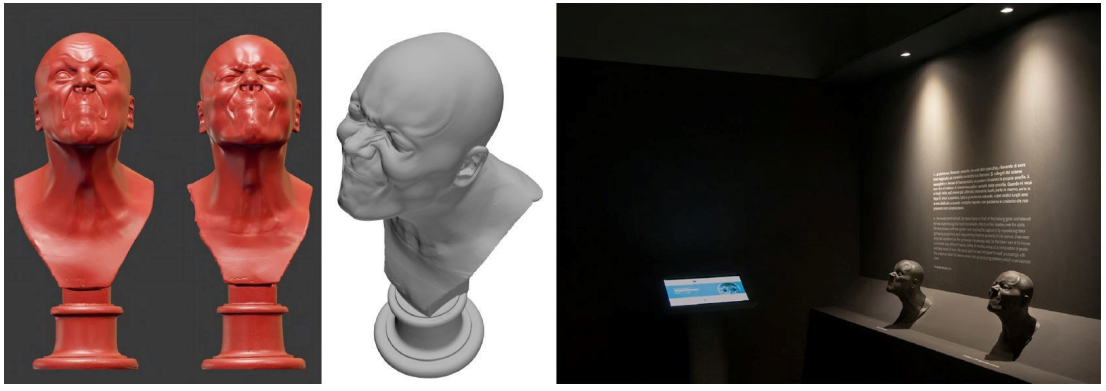

Fig. 15 - Digital processing after the no contact survey in structured light and prototyping of the two "Character Heads" by Franz Xaver Messerschmidt at Palazzo Coronini Cronberg in Gorizia (ADD.lab Units - Loudlab). (Project "Gorizia ConTatto").

offer activities also for the sighted visitors, such as educational workshops for children and students. Sometimes they testify to the evolution of the typhlologic discipline. The Tactile museums are places of education, which provide the cognitive tools necessary to better appreciate the different types of experiences of use of the tourist-cultural heritage proposed to the visually impaired in the most disparate contexts.
The memory of a tactile image is much more unstable than a visual one and it needs to be renewed over time. The advantage of these special museums is to give to the blind the opportunity to discover new things and to repeat the experience by revisiting those already known in the past.
The main European museum is the Tiflologico Museum of Madrid, famous for the reproductions of the well-known Spanish and international architectures (fig. 11). In Italy, the Tactile State Museum "Omero" of Ancona, important for reproductions of architecture, sculptures and paintings from different eras (from Ancient Greece to Contemporary Art). The Tactile Museum of Varese known for the models representing from the territorial context to the architectural detail (fig. 12). At last, the "Anteros" Museum of the Cavazza Institute of Bologna, where famous paintings become three-dimensional as perspective bas-reliefs.
In addition to the dedicated tactile museums, it is increasing the number of museums that aim to remove cultural barriers and to create exhibitions and tactile initiatives in which the artworks are accessible also to blind and partially sighted people through traditional methods and new technologies.
Among the most interesting and modern initiatives for accessibility to the artistic heritage: the temporary exhibition "Hoy toca el Prado" at the Museo del Prado in Madrid, with some tactile reproductions of famous paintings obtained with 3D printers. "Doppio Senso" at the Peggy Guggenheim Foundation in Venice (fig. 13), a tactile itinerary in which some artworks of the collection are reproduced in relief in termoform or minolta). The most innovative exhibition is "Touching Masterpieces", at the Prague National Gallery, in which famous masterpieces such as the "Venus de Nilo" (fig. 14) or the "Bust of Nefertiti" can be explored and appreciated with the sense of touch with the data gloves (virtual haptic gloves).
However, even in small Italian cities, the interest in the heritage accessibility has had its results. For example in Gorizia, in Friuli Venezia Giulia, it was organized the project "Gorizia ConTatto", whose initiative includes several tactile installations in the most significant architectural sites of the city. The project, conceived by Italia Nostra, involved the creation of maps of places in relief (of the city castle and of the Jesuit church), the reproduction of famous buildings of the city and the copy of two "Character Heads" (fig. 14) by Franz Xaver Messerschmidt (1736-1783). The innovative aspect was the integration of no-contact survey technologies (laser scanning, structured light scanning, photogrammetric tests) with the rapid prototyping 3D printing (FDM - fused deposition modeling technique).

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NOTE

[1] The image in relief is composed of points, lines and surfaces perceptible by touch. The drawing must be simple and essential, to allow the formation of the mental image of the represented drawing. The different levels of relief and textures communicate the idea of colors.

[2] A drawing in relief with too many details could create confusion and disorientation for the blind reader.

[3] There are many drawing techniques for blind people. They differ in the complexity of construction, the costs of production, but above all the height and precision of the drawing in relief. The most important are the Braille in graphic mode, the gaufrage, the thermoform, the serigraphy, and the microcapsule paper process. But also the collage and the rubber top, used for educational purposes. Cards with drawings in relief representing the plan or facades of an architectural complex, made in termoform or with other relief techniques and methods, are very useful.
These cards are easy to reproduce and distribute to the users, printable at home on microcapsule paper and the Minolta oven.

REFERENCES

Agostiano, M., Baracco, L., Caprara, G., Pane, A., & Virdia, E. (Eds.) (2009). Linee guida per il superamento delle barriere architettoniche nei luoghi di interesse culturale (II rivista e ampliata ed.). Roma: Gangemi.

Azzolino, M. C., Lacirignola, A., & Rolli, R. (2015). Strumenti di comunicazione inclusivi per persone con disabilità visiva: il disegno in rilievo. In A. Marotta, & G. Novello (Eds.), Disegno & Città. Cultura, Arte, Scienza, Informazione. Atti del 37° Convegno internazionale dei Docenti delle discipline della Rappresentazione, XII Congresso UID, Torino, 17-19 settembre 2015 (pp. 905-910). Roma: Gangemi.

Barcarolo, P. (2015). 'Modellazione 2,5/3D aumentata' per la stampa 3D del Patrimonio Culturale fruibile anche da parte di persone con disabilità visiva e cognitiva. In La ricerca che cambia. Atti del primo convegno nazionale dei dottorati italiani dell'architettura, della pianificazione e del design. IUAV Venezia, 19-20 novembre 2014 (pp. 700- 715). Siracusa: LetteraVentidue Edizioni.

Bellini, A. (Ed.). (2000). Toccare l'arte. L'educazione estetica di ipovedenti e non vedenti. Roma: Armando.

Empler, T. (2013). Universal Design: ruolo del Disegno e Rilievo. Disegnare Idee Immagini (46), pp. 52-63.

Grassini, A. (2000). I ciechi e l'esperienza del bello. Il Museo Tattile Statale 'Omero' di Ancona. In A. Bellini (Ed.), Toccare l'arte. L'educazione estetica di ipovedenti e non vedenti (pp. 17-47). Roma: Armando.

Grassini, A. (2015, 2019). Per un'estetica della tattilità. Ma esistono davvero arti visive? Roma: Armando.

Gualandi, P. & Secchi, L. (2000). Tecniche di rappresentazione plastica della realtà visiva. In A. Bellini (Ed.), Toccare l'arte. L'educazione estetica di ipovedenti e non vedenti (pp. 49-98). Roma: Armando.

Hemsley, J., Cappellini, V., & Stanke, G. (Eds.) (2005). Digital Applications for Cultural and Heritage Institutions (I ed.). London: Routledge.

Meschini, A., & Sicuranza, F. (2016). Per una rappresentazione "sensibile": la comunicazione della forma per la percezione aptica. In S. Bertocci, & M. Bini (Eds.), Le ragioni del disegno. Atti del 38° Convegno Internazionale dei Docenti delle Discipline della Rappresentazione, XIII Congresso UID, Firenze 15-17 settembre 2016 (pp. 1515-1522). Roma: Gangemi.

Museo Tattile Statale "Omero" (Ed.) (2005). L'arte a portata di mano. Verso una pedagogia di accesso ai Beni Culturali senza barriere. Roma: Armando.

Riavis, V., & Cochelli, P. (2018). Toccare per vedere: la conoscenza di architetture attraverso la rappresentazione tattile. In R. Salerno (Ed.), Rappresentazione materiale/immateriale. Atti del 40° Convegno Internazionale dei Docenti della Rappresentazione, XV Congresso UID, Milano 13-15 settembre 2018 (pp. 1359-1366). Roma: Gangemi.

Sdegno, A., Cochelli, P., Riavis, V., & Camponogara, R. (2017). Modellare smorfie. Rilievo e rappresentazione aptica di due teste scultoree di Franz Xaver Messerschmidt. In A. di Luggo, P. Giordano, R. Florio, L. M. Papa, A. Rossi, O. Zerlenga, S. Barba, M. Campi, A. Cirafici (Eds.), Territori e frontiere della rappresentazione. Atti del 39° Convegno Internazionale dei Docenti della Rappresentazione, XIV Congresso UID, Napoli 14-16 settembre 2017 (pp. 969-976). Roma: Gangemi.

Secchi, L. (2005). L'educazione estetica per l'integrazione. Roma: Carocci.