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Seeing Valentino Castle through the Hands: Heritage Building Accessibility for Visitors with Visual Impairments

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Abstract: In order to make heritage buildings culturally significant for everyone, they have to become accessible. This should not only be physical accessibility. The information which the buildings contain must also be accessible. Where physical disability is concerned, it is equally important to be able to open the buildings to an ever wider and more diversified public, and to make it possible for everyone to "read" the information. A project with students on degree courses in architecture has made it possible to build a pathway to knowledge of the Valentino Castle for visitors with visual impairments. The castle is part of the Polytechnic University of Turin. Students made use of small scale models, tactile boards and information read aloud through Qr-codes to enable blind and visually impaired visitors to gauge space and to "read" elements of volume, structure, architecture and décor. The students' work, with the support of the Department of Architecture and Design (DAB) laboratory, led to the creation of a "tactile guided tour" comprising scale models and tactile boards, which will be exhibited in one of the main floor rooms of the Castle in the near future, adding to the guided tours which are already in place.

Key words: accessibility, inclusion, blindness, communication

Changes presented by society in recent years demand new access modes to cultural assets in order to make them "accessible to everybody". An *audience engagement* process should be launched to broaden and diversify the audience by defining targeted inclusion policies and strategies. The scope is to open cultural sites to various types of audience by creating a sense of belonging and sharing in locations where each person can be involved in a stimulating and enriching experience designed to suit personal characteristics, skills and expectations. With this in mind, the project presented aims at enhancing the value of Valentino Castle, a Savoy residence and UNESCO World Heritage, by ensuring accessibility to visitors, whose visual impairments make it difficult to perceive the building's shape, dimensions, architectural and artistic features.

Architecture, and even art, have long been considered inaccessible for the blind because they are strongly associated with visual perception. However, understanding space is primarily "seeing with the mind". By activating different mental processes, the blind person is capable of imagining, despite the lack of sight. Hence the importance of finding the right medium for the translation, and of defining tools that, with a *Design for All* approach, are able to remove invisible barriers and encourage knowledge about the asset by focusing on the residual perceptive skills.

Valentino Castle, owned by the Polytechnic University of Turin, is the site of classrooms and offices of degree courses in Architecture. It has long been the focus of didactic activities (and more besides) centred on knowledge, value enhancement and

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dissemination. Professors and students are constantly committed to activities regarding the castle. Following the completion of renovation works in the main floor halls, the Polytechnic University of Turin recently organized a series of guided cultural itineraries for small groups to share its proprietary historical and architectural heritage with an extensive audience. Consistently with this line of action, a workshop was organized with students from degree courses in Architecture[1] to promote reflection on the different modes of perception of space. The workshop offered an opportunity to meet and compare experiences with people who either mainly or solely make use of the senses that compensate for sight disorders. It was mandatory for every student to be personally involved and change perspective to enhance his or her awareness and broaden both personal and professional reasoning skills. Students started by analyzing needs specifically associated with sight disorders and perception modes, and then studied how to communicate about and represent Valentino Castle to the blind.

The experience had a powerful educational and ethical impact on students who discovered, for the first time in many cases, the existence of other ways of perceiving and experiencing the world, compared to what we are usually accustomed to. They learnt to integrate multiple languages of communication and to "see without stopping at the action of looking".

Starting from work carried out with the students, a broader communication project was defined to include the castle. It was based on the integrated use of words and tactile aids, such as 3D models and relief drawings. Indeed, making works of art and architecture accessible to the blind can neither be limited to listening to a description nor to the mere touch. Exploring models and relief drawings takes time, effort and, especially, the aid of appropriate texts that guide the hands by advising the most effective knowledge pathway. They also accompany the reader's interpretation of the item represented. Moreover, words can offer additional information about light, colour and, in a broad sense, about all aspects of reality that cannot be communicated otherwise to the blind.

The guide to exploring the castle, which also tells its story, was recorded and can be activated through *Qr-codes* placed on both 3D models and visual-tactile panels prepared to describe the site and tell its history. The guide describes the local framework where the building is located, the floor plan and volumes of spaces, starting from an overall vision and then enlarging on the specific shape of the various artistic, architectural, technological and structural elements. To date the work has only focused on the aristocratic part of the castle, buildings constructed between the 17th and 19th century that overlook the main courtyard. A "tactile visiting track" has been defined. It comprises scale models and tactile boards that will be exhibited in one of the main floor halls of the castle in the near future, in addition to guided tours that are already in place.

The knowledge pathway starts with 3D scale models to allow simple and intuitive reading based on tactile exploration for everybody and, particularly, for the blind.

The first model, on a scale of 1:500, proposes the construction timeline, underscoring transformations and extensions implemented from the 16th century onwards:

[1] Workshop "Drawings experienced by the hands. Valentino Castle in relief", academic year 2014-15, 4 CFU (100 hours), scientific coordination Prof. Anna Marotta, Prof. Annalisa Dameri, assistants: Maria Cristina Azzolino, Angela Lacirignola, Rocco Rolli (Tactile Vision, not-for-profit); organised with "Funds for didactic improvement projects 2014" of the Polytechnic University of Turin; sponsored by: Italian Union of Blind and Partially Sighted People, Turin branch.
Students: Bertoni Elena, Bianco Marta, Blanco Giulio, Bussi Betsabea, Caranzano Filippo, Catalanotto Chiara, Ciardi Gloria, Cosentino Andrea, Di Raimondo Carmelo, Di Rosa Gianmarco, Donadio Tiziana, Doria Gianluca, D'Urzo Marco, Folco Bruno, Gandino Elisa, Gily Erica, Giori Michela, Guiso Bianca, Melchiorre Francesca, Mura Van Luong, Nicosia Roberta, Paciullo Eleonora, Pinna Ilva, Pintus Martina, Risso Alice, Sartirano Cecilia, Sciuto Valeria, Simone Giulia, Simoni Anna, Sottosanti Laura, Tempesta Mattia, Triolo Francesca, Xipolias Nausica, Zotti Chiara.

- 1564P Villa by the river in the *Vallantinum* region, purchased by Emanuele Filiberto, Duke of Savoy;
- 1621 — Beginning of the transformation of the building by the river into *maison de plaisance* by order of Christine of France, wife of Victor Amadeus I (project by Carlo di Castellamonte); Construction of the main body of the building in parallel with the river;
- 1646 — Construction of the two western pavilions connected by two terraced colonnades to the main body of the building, and by a semicircular exedra that closes the main courtyard *en forme de théâtre* (project by Amedeo di Castellamonte);
- 1858 — Replacement of the terraced colonnades that connected the pavilions with two overground double-storey arms (project by Luigi Tonta and Domenico Ferri);
- 1862-1864 demolition of the semicircular colonnade and construction of two terraced avant-corpses with a view of both the city and the boundary railings.

Created with a 3D printer, using two colours and two different textures to underscore, both visually and to the touch, the elements that were added or, anyhow, which were transformed in each of the four construction sites represented.[2]

A second model, on a scale of 1:200, provides a more detailed illustration of the volumetric and architectural structure of the artefact. It helps to understand the dimensions and proportions of the various construction elements.

It was made of[3] laser cut beech wood, by applying the principles of tactile reading:

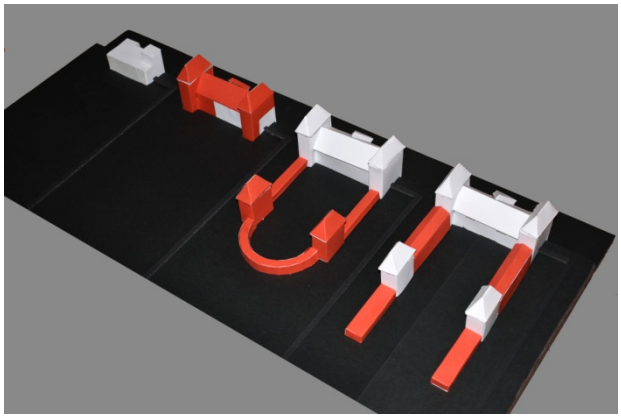


Fig. 1 Model of the construction timeline, scale 1:500.

- the model's scale was chosen to allow those who explore it with their hands to embrace it;
- decorative elements and details to be reproduced were selected to provide all information required to understand the volumetric features and formal consistency of the building, avoiding the minute details that, besides being complicated to produce, hinder exploration and can generate confusion;
- sharp edges and rough areas have been avoided, and the surface has been treated with transparent paint to improve the pleasant feel, while also protecting the model from wear and time in the long term;
- a *Qr-code* activates a story and a guide that underpins exploration of the model;
- a graded line helps to understand the actual dimensions of the building and the scale of representation.

Laser etching has allowed to ensure tactile perception even of the drawing of the large main courtyard's cobblestone floor.

After this first exploratory approach, knowledge of the castle can be increased by a series of relief drawings in which the various elements of 2D representation (dots, lines, surfaces) can be tactually perceived as they are in relief, compared to the surface of the sheet, and can be "read" by the fingertips.

The first boards illustrate the urban location of the castle and its relations with the river, the park, the hill

[2] Model made by trainee Simone Licco at the VirtuaLAB, Department of Architecture and Design (DAD), Polytechnic University of Turin, Polytechnic Citadel of Design and Mobility, scientific contact person Arch. Fabrizio Valpreda, Technical Assistant Dr. Alessandro Dentis.

[3] Model made by trainee Simone Licco at the MODLabArch, DAD, Polytechnic University of Turin, Valentino Castle, Scientific Contact Person Arch. Marco Vitali, Technical Assistants Giovanni Berruto, Dino De Pasquale.

and the city; the organization of volumes and their composition, including the main body, lateral arms, towers, avant-corpses, porticoes, loggias, courtyard; heights; main volumes; and changes in height. Then we find the description boards with prospects and main sections, the aristocratic section, towers, some principal elements, such as the loggias, the drawing of doorways and windows, roof trusses, and decorative systems of the aristocratic halls.

To meet tactile needs, considering that touch has a lesser discriminating capacity than sight, the drawings were simplified and "purified" of elements that complicate the "reading" of images on the part of the blind, precisely, the overly refined lines, the wealth of details, shadows, colour, use of perspective and of axonometric projections. The translation of images rich in details or of very complex images required the drawing to be broken up into a sequence in which elements that it would be either pointless or not productive to present in an overall picture are added from time to time to a constant basic structure.

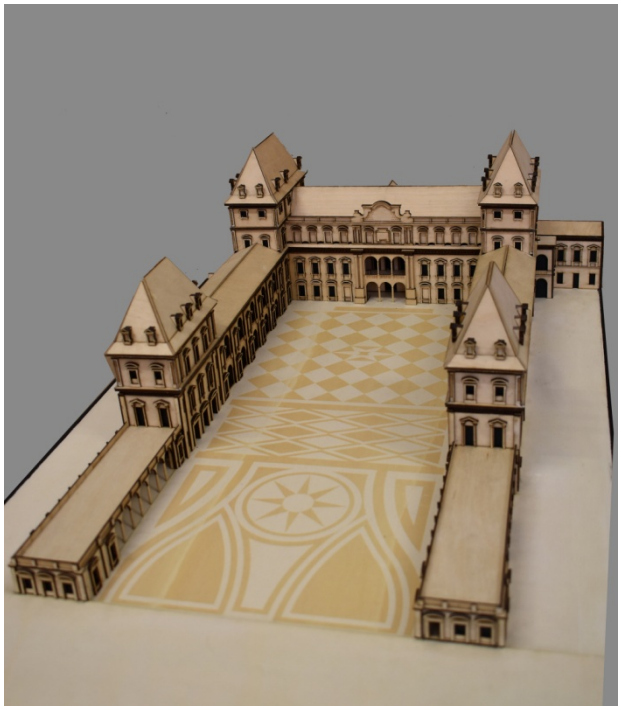


Fig. 2 Model of Valentino Castle, scale 1:200.

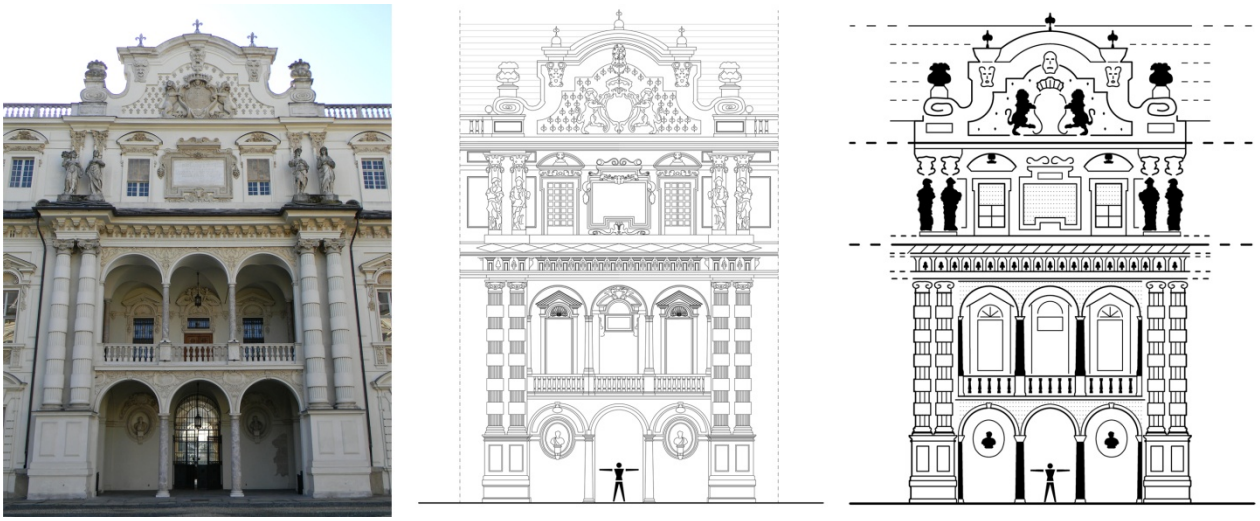


Fig. 3 From the image to the simplified drawing.

Relief drawings were printed with the stereoplasty technique (commonly called "Minolta"), which makes use of a special heat sensitive paper that, in contact with heat, presents all black ink parts of the drawing in relief[4]. Every board presents, in the top left, the title in black *Braille* letters, and in the bottom right corner the *Qr-code* that refers to the audio description and text to be read with the hands.

[4] The Zy-Fuse Heater for stereoplasty printing is installed in the Innovative Technological Systems Laboratory (LaSTIn) of the DAD.

The direct ongoing discussion with the blind[5], deemed the main bearers of interest, allowed to ascertain the efficacy of the processed material, both in terms of formal aspects and contents, and its repeatability in other sites of historical and cultural interest. The project's future developments focus on completing the knowledge pathway for the blind by creating tactile boards to be placed alongside the Italian and English captions for every room of the main floor and for the main decorative elements. At the same time the intention is to improve the informative material with videos for the deaf with subtitles and the translation in Italian Sign Language (LIS).

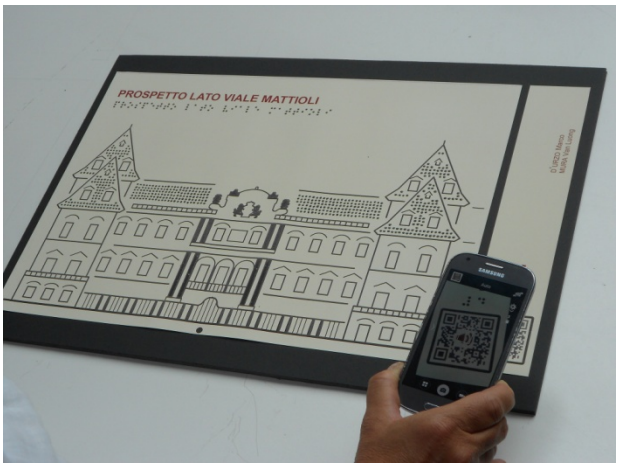


Fig. 4 Tactile table, view of viale Mattioli.



Fig. 5 Guided reading of a visual-tactile panel.

[5] Italian Union of Blind and Partially Sighted People (UICI), Turin branch.

The goal is to offer multiple reading tools, products that can be used by everybody because they are created by taking into account individual skills, needs and ambitions, taking into account the many specific traits. The theme is steadily evolving through the many studies and research developed in the Italian and international framework, and through the growing availability and dissemination of technological devices, software and applications. There are many opportunities to be exploited, and many to be implemented to make the most of and enhance usability and accessibility of the cultural heritage.

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