

Wayfinding Design and Accessibility

Experimental Research of new ways to approach the Landscape and Cultural Heritage for wider range of users

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I. INTRODUCTION

The aim of the research project is to reinforce the shared identity of Northern Lombardy (Italy) and Southern Ticino (Switzerland) by preserving and enhancing the shared cultural heritage present in the historical network of footpaths that connect the regions concerned. The research is part of a wider cross-border program, the aim of which is to implement measures to protect, enhance and promote the landscape and the historical and cultural heritage of the area.

In addition to the Politecnico di Milano in the role of leader, the partners in the program are: the Fondazione Politecnico di Milano, Iubilantes Association, Mountain Community Lario Intelvese, University of Applied Sciences of Italian Switzerland, Office of Cultural Heritage of Cantone Ticino, Mountain Community Lake Como and Lugano valleys, Museum of Via Spluga, Town of Cernobbio, University of Pavia.

The “Via Regina Lariana”, from Como to Sorico, is one of the oldest routes of historic and cultural exchange between Italy and Switzerland. The beautiful Swiss-Italian footpath along the Via Francisca and Via Spluga, with which it forms a continuum, is a fundamental “system” of transalpine soft mobility, the potential of which for European development has so far not been adequately grasped. It possesses all the characteristics required to be identified as part of a Major European Cultural Route [1]: a trail and a territory, therefore, to know and to protect, and to maintain intact for those who travel on foot.

The specific objective of this project, called “I CAMMINI DELLA REGINA”, ID 33829732, Misura 3.1, P.O. Cooperazione Transfrontaliera – INTERREG IT-CH 2007-2013”, born from the synergy between cultural experts, local museums, government departments, landscape designers,

architects, designers and geomatics engineers, is to create an adequate tool for the full development of this important route and the surrounding area.

II. WAYFINDING DESIGN AND ACCESSIBILITY

“When someone loses vision, or hearing, or use of their legs, they don’t also lose their need or desire to enjoy nature. Nor do their experiences become less rich and rewarding than those of people who have all their senses and limbs”.

[\(baynature.org/articles/opening-the-door-to-nature-for-people-with-disabilities/\)](http://baynature.org/articles/opening-the-door-to-nature-for-people-with-disabilities/)

A. What wayfinding design can do for accessibility?

We usually use the term “accessible wayfinding design” to indicate all the graphic, visual, tactile, textural and sensory elements, that represent a support for the user “differently abled”. Someone who wish and want to take advantage of the services and goods in the territory, but that for different reasons can’t reach them in a standard way.

Whenever a person who has a particular difficulty (visual, auditory, motor, ...) encounters an obstacle, it must find an alternative way to circumvent it. Or otherwise he give it up. Especially if that occur during a walk on a particular path immersed into nature and history like the Via Regina Route on Como Lake – Italy.

This path is rich of suggestive panoramic views on the lake and many cultural places to visit but there is a fundamental lack of communication all along his way. So why not to think to a wayfinding system which is really accessible, to permit to everyone to benefit of the beauty of this place?

Absence of design or presence of a bad one.

In the case of wayfinding design, it can be a panel set too high, a text written too small, a path which is not feasible, a

sound which is not audible, in a society and space around us which is becoming more and more complex. How much disease can generate a bad design?

Another aspect to consider is the emergency situation; it is important that the information about how to do and who to contact in case of an accident - during a walk in the mountains, for example - are very clear and understandable.

The categories involved with disabilities are not only the classic ones but also people suffering from a temporary disability due to illness or accident, the elderly people, the parents accompanying small children who often have specific needs and whom capabilities are not yet fully developed, people suffering from allergies, and even those who, for example, does not know the language of the place.

Hence the need to take inspiration from good design so that it can carry useful examples of 'human-centered' wayfinding systems in which objects and supports are accessible to everyone, without distinction, to overturn the obstacle into a free-path and the disadvantage into opportunity. "[...] on the one hand we have to think to the supports that help the person overcome the obstacles to a normal communication, on the other hand we must try to reduce the obstacle itself" [2].

In practice, here are some aspects to be taken into consideration that originate from ergonomic studies and from different experiences in the field [3].

The roads width should be not less than 1.40 mt; to the readability of the panels it is recommended a font size that is at least 3% of the reading distance; it is preferable to use letters and pictograms of 30 mm and 50 mm size respectively, for a distance of 1 meter, while 150 and 250 mm for a distance of 5 meters .

The font is preferable in sans serif version, in one or maximum two styles (Futura, Century Gothic, Arial, Frutiger, Gill Sans, Helvetica, Univers, ..), at least 18 points with 1.5 line spacing. The height of the panels should be 1.50 mt for the readability even from below.

When the information cannot be provided to users on other media, the height of the fonts must not be less than 4.5 mm and 15 mm for items related to the orientation signs. It's a good practice to provide information panels all along the way, especially in the decision points that indicate where you are and what you are getting.

Also, for those who cannot see, it should be added to the information panel a reminder signage on the ground, to pay attention and to announce the near panel (in relief).

In the case of visually-impaired people it should be used

the colors, contrasts and shapes suitable for an optimal understanding of the message you want to convey (at least 70% contrast).

The same principle should be adopted for the sounds, as auditory sensitivity is frequency-dependent (Haverkamp 2013); frequencies in a mid-high range are more audibles at a low volume than the low frequencies. The speech has to be without cadence and with a good pronounce.

%	Beige	Blanc	Gris	Noir	Brun
Rouge	78	84	32	38	7
Jaune	37	16	73	89	80
Bleu	75	82	31	47	7

Detail to perceive	Distance of usual vision Real dimension of detail	Contrast of luminance		
		High	Mid	Low
Minuscule	4 100	1 000	3 000	10 000
	3 200	500	1 500	6 000
Verythin	2 450	200	700	2 000
Thin	1 900	100	300	1 000
Thin enough	1 500	50	150	500
Middle	1 150		70	200
Big	850			100

Tables above:

1. Example of the contrast ratio obtained by different combinations of colors. Optimal up to 70 %
2. Summary table of necessary distances for optimal perception of the visual elements and details

(source:

<http://www.culturecommunication.gouv.fr/content/download/23604/199384/file/guide.pdf>).

For the blind people it's useful to place vertical pillars all along the way and support them with tactile elements on the ground to contain the direction of walk, in addition to descriptive information panels in Braille placed especially in the crucial points of the route and in front of the main points of interest.

<http://www.architonic.com/pmpro/marcal-signaletique/3103170/2/2/1>

A useful application is to make small-scale sculptures that represent some subjects that we find on the path: a building, an architectural element, a typical animal or material (natural or artificial) that the blind user can touch to realize the real features in their totality. This is called 'haptic approach' [4].

It helps the blind user even the inclusion of limit supports all around the exposed natural elements. This allows the blind people to realize the size and shape of the actual items they encounter along the way .

The tables in Braille or the multi-sensory plans (which schematically represent the structure of a path in relief, with big characters and Braille) should have a space below of about

70 cm to allow the approach of a wheelchair, and a height of 80 -130 cm for the readability [5].

The Ariadne's wire is and remains one of the most adopted systems, it consist in an horizontal embossed line with which the blind is fitted with stick helping him to understand the direction of the street; it is mainly used for indoor spaces but it is increasingly being applied in the outside too (think of the platforms of the train stations) .

A recent application also allows you to read the position of the Ariadne's wire on the ground and to provide an auditory guidance (when the line is under your finger, your smartphone intercepts it via webcam and emits a vibration) .

<http://www.webnews.it/2014/01/09/arianna-il-bastone-virtuale-per-i-non-vedenti/>

From the point of view of the hearing-impaired and deaf people is important to point out, when available, the presence of magnetic field for a listening using telecoil hearing aid. Usually the presence of magnetic field is indicated by a specific icon (an ear strikeout and T). This allows hearing-aid wearers to exclude background sounds and concentrate on listening to the speaker connected to the system.



Some pictogram (best if created with the Fibonacci Rules [6]):

1. people with hearing impairment;
2. presence of magnetic field for telecoil;
3. people with visual impairment;
4. support and accessibility for people with mental handicap;
5. people suffering from mutism;
6. people with motor deficit on inclined route;
7. accompaniment for people with motor deficit;
8. accessible elevator
9. accompaniment on the mountain [7]
10. wheelchair on a path [7]
11. wheelchair into the forest [7]

It's useful to provide the route with information kiosks to receive multimedia explanations, placed at strategic points

along the route; video explanations should be clear, with a speaker in frontal position, using simple language and a proper diction and accompanied by clear subtitles.

If the speaker is out of range but the speech is on, it is necessary to accompany images with subtitles.

Another useful device is the 'shower sound', which delivers sound from a specific point where the user is located in, under it, so that he can aim informations without disturbing people all around.

<http://www.euphonia.fr/douche-sonore.html>

The QR-Code and the dedicated app for smart phones allow you to access information (mainly sound but also video with subtitles) that enrich your knowledge about the path you're walking on, it is friendly-user with an easy approach for an individual use, to allow a more complete experience of walking

Finally, for an approach that is as natural as possible even for those who can't easily make the walk due to motor problems, the roads should be maintained in a standard width of 140 cm, some steps can be equipped with special elevated pedestrian facilities that allow the passage without drastically change the natural habitat; it would be preferable to privilege areas that do not involve obstacles instead of places where there are natural barriers [8].

Panoramic points are another important element in a walk, they allow us to see the beauty of a whole natural landscape; for those who want to enjoy the scenery but have difficulties to reach it, it is useful to implement the structure with specific devices, and if possible it should be equipped with all the tools described above (tactile boards , subtitled audio-visual interfaces , ..).

For the displacements it is required an unobstructed area of 150 cm in diameter and an area of vision between 60 and 100 cm. If the space of observation is closed, please provide some opening points of observation at different heights (at least one at 90 cm) and an access compatible with the encumbrance of a wheelchair.

B. Some Examples

1. City of Sain-Etienne, **Espace Boris Vian** (FR), proposed path with horizontal colored band
2. Accessibility to public transportation in the city of **Saint-Etienne** (FR) Proposal for a graphic manual for the line of transport of Saint- Etienne Métropole
3. City of Saint-Etienne, **La Voie Verte** (FR), wayfinding system for the entry to the park, after the preliminary study and a confrontation with disabled users. (Beo Design),
4. Contrasts and font size are well exploited in the interior and exterior signage of the **town of Tartaras** and **Novacières Park** (FR)



perception of the surrounding landscape through touch, hearing, sight and smell inviting people to embrace a tree, to make a free walk on a sand path or on the foliage in the forest, to stop and listen and smell.

- Some installations of Sensory-rich Trail in the **county of Nillumbik** (Australia). The project aims to explore the place and route, in the countryside, with a sensory approach involving touch (barefoot), sight, hearing, smell (smell the environment) and a mix of these.

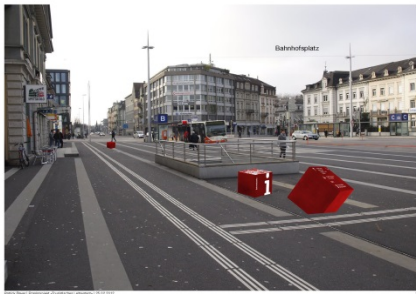


- Next figures below:

F1rstdesign (DE) – **Touristisches Leitsystem Stadt Solothurn**;
 Deuce Design Studio (AU) – **Beare Park**;
 BuroNorth (AU) – **Fall Creek Alpine Resort**;
 E-Moebius Studio (Argentina) – **Delta Terra**;
 F1rstdesign (DE) – **Zeche Zollverein Unesco Welterbe**;

An example of a sensory path, in this case specifically designed to make certain sensory experiences the Sensory-rich Trail by Sensory Trust [8] of Nillumbik Shire Council (Melbourne, Australia) with the aim of stimulating the

Adler&Schmidt Studio (DE) – Kartografie für Berlin;



III. DESIGN OF A PUBLIC RESTROOM FOR THE VIA REGINA ROUTE

A. Sky Window project

Often walking trails that meander in cross-border areas analyzed are tortuous with uneven surface and funds with a significant amount of architectural barriers, which, in fact, prevent a wide range of categories to benefit from the beauty of the landscapes that can be enjoy these rough trails.

In addition (and this applies to all groups of users) the analysis revealed the almost complete lack of toilets along the route, which involves the discomfort of the hikers. In this context emerges the interest in design solutions that have been addressed to meet the needs of the most disadvantaged users that, a fortiori, most affected by limitations due to architectural barriers and, in the specific case analyzed, needing to use the toilet.



The one proposed here is a solution of toilet ambivalent (in version for both able-bodied and for people with disabilities) that was built entirely dry, it can be easily integrated into and positioned along the route.

The module is imagined as a place of perceptual interaction with the sky and the surrounding landscape, while ensuring Privacy Policy. The project by Guangkai Chen has been prepared within the graduate program in Furniture Design of the Politecnico di Milano, Como Campus.

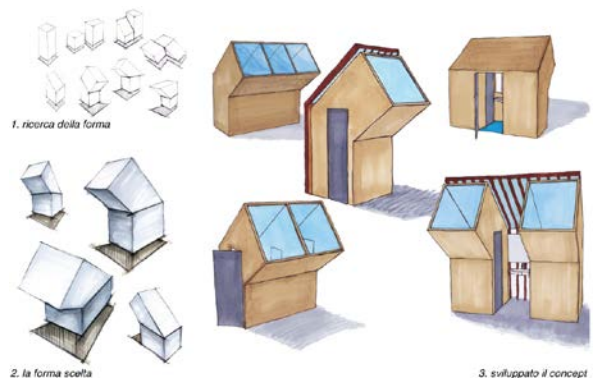
The formal core of the public bath, consists of a prefabricated pavilion, constituted by a parallelepiped bent. Rain and snow slide on the glass roof from which you can enjoy the view of the sky and the surrounding landscape. The bathroom is a module that can be used alone, or can also be used in combination with other elements.

The schedule consists of 4 different combinations of components. The most important, it can form a hut. In densely populated areas can be positioned more modules. In the solution for the disabled, which fulfills the law and the ergonomic requirements laid down for this category of users,

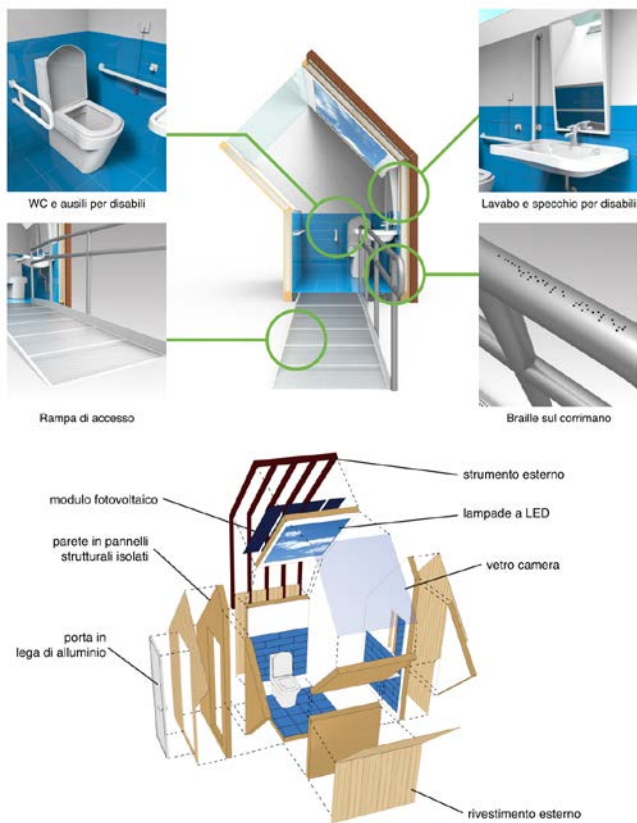
modules encourage wider interior space and usability. The wall is made of blocks of wood structural panels (OSB) and polystyrene, the exterior is clad in planks of chestnut (the use of wood gives a natural feel and warm that recalls the abundant presence of wood in the pre-alpine valleys); the floor and the inner lining tile are porcelain tiles, blue color. This will involve the use of solar panels for night lighting, with LED lamps, which give the effect of a blue sky even at night. It is a system of energy consumption equal to zero that integrates perfectly into the landscape and in the natural environment of Lake Como meeting the needs of users who are particularly disadvantaged.



Figure above: Historical-typological analysis of public bathroom.



Figures above: Study sketches and setting of the solution for people with Disabilities



Figures above: Construction details of the solution for people with disabilities and exploded view of the components dry stratified.
 Figures below: Locations in the landscape of Lake Como



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