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Additional Information

Perception and Wayfinding at Cultural Sites

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Abstract: Projects in historical and cultural heritage have achieved major relevance in recent years. The importance of these sites is based on their intrinsic value and the visitation options to communicate knowledge to everyone, regardless of their abilities.

Wayfinding plays an important role in achieving this goal to make cultural heritage accessible. However, the achievement of accessibility for everyone in these projects is not easy. This requires a sensitive perception of people in their various situations and an exercise of restraint to balance the past and present, memory and invention. It is not possible to develop a single objective and universally valid theory. Each case must be studied to provide useful and respectful solutions.

New technology applications offer a wide range of opportunities which vary from the perceptive experiences that can be produced to the specific nature of future devices and signage systems that can be used to interact with people.

This paper will study several information and signage projects in patrimonial and cultural landscapes that use different resources to make the site more accessible. The variety of visual, tactile and acoustic elements coexists with digital resources to highlight the different spaces. This diversity of stimuli can comprise an efficient and dense network of continuously superimposed tools, signs and symbols, which provide the place with a voice and make it more inclusive.

Keywords: Inclusive Design, Heritage and Cultural Landscape, Signage and Wayfinding

Heritage and Accessibility: The search for balance in Cultural Sites

Works in the Cultural Heritage sector have achieved major relevance in recent years, since there is a modern culture with a new ethical and social philosophy, which ensures the conservation of the Historical and Cultural Heritage. Access to culture is everyone's right, regardless of their abilities. However, the approach between Accessibility and Heritage requires a sensitive perception of the environment and people in their various situations. We must approach this binomial in a cautious and respectful way, based on observation and harmony. It is necessary to reach a consensus and understand that it is not possible to manage accessibility in a historical site in the same way as in a new building. A compatible accessibility criterion must be created which respects the unique character of each place; namely, the search for balance.

Marco Antonio Garcés Desmaison affirms that "the built heritage is better prepared than many examples of recent architecture for its adaptation to the demands of a world without barriers, mainly because all good architecture, and almost always the historical architecture is good architecture, it meets the virtual and material requirements of the society in which it takes place" (Garcés 2008,41). He continues his explanation: "All good architecture is rich in flexibility, textures, good layout and adaptation to the environment. Barriers for those who perceive and go through architectural spaces are not only those that have to do with entrances, exits or transit, but also those that refer to nuances, textures, proportion, orientation, sunlight, the smell" (Garcés 2008,43). Based on our agreement with this thesis, the difficulty often lies in the diversity of situations, which are difficult to adjust to specific canons or regulations. As José Antonio Juncà Ubierna explains, it is not possible to develop a single objective and universally valid theory. Each case must be studied in-depth to provide sensible, useful, reasonable and respectful solutions (Juncà 2007).

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Physical respect is required for the existing elements, materials, bricks, stones, ruins, plants, brands as well as the functions which these places performed in their time period and in the present day. Hence, this requires an exercise of restraint to balance the past and present, memory and invention.

Inclusive design and information. The sensory perception of the cultural landscape

Accessibility to Cultural Sites must be considered as involving more than just the architectural aspects of physical access. Many barriers also exist in the manipulation, use, communication and understanding within environments, products and services (Alonso 2007).

Generally, the design of information, or wayfinding plays an important role in achieving this goal to make cultural heritage accessible. The Anglo-Saxon term “wayfinding” was used for the first time in the book, *The image of the city* (Kevin Lynch, 1960). Although it is generally used as a synonym for "orientation", it has become a crucial concept, compiling knowledge and practices from different disciplines and it always focuses on the person as the major *raison d'être*. It refers to a non-standard individual who is not mainstream; a person with variable capacities to relate to the physical, cultural, or social environment, where said person develops. In short, wayfinding is employed as an orientation process which uses information from the environment.

As Dimas García Moreno explains, the orientation process is configured by perceptual, cognitive and interaction procedures (García 2011). His conceptual model of Wayfinding is based on the context of Design for All. Accordingly, the person and environment are the aspects which the wayfinding design attempts to unite. Both are related through communication: the person who reads the information and the environment which displays the orientation resources. Thus, design intervenes in communication by means of visual, auditory, haptic and comprehensive formalization actions.

The primary considerations on which the design of signaling systems in cultural sites must focus, in addition to the specific items of the entire communication system, are: environmental integration, prevention of physical or visual interference on the environment; environmental differentiation, prevention of excessive mimicry with the environment, with the resulting loss of efficiency, support to the generation of identity and functional autonomy; it is necessary to keep signaling from becoming the support for information outside the specific goals for which it has been created; the inclusion of materials that respect the environment and reinforce the identity of the site, balancing integration and environmental differentiation; and the analysis of the informative contents, structuring them with the criteria of hierarchization and organizing their sequence (García 2007).

The consolidation of heritage sites and their cultural valuation requires different types of resources to guarantee access, encourage their use, and provide personalized experience, essentially their knowledge, understanding and enjoyment.

Visual Signaling for Access to Heritage Sites

A good example which primarily employs visual and comprehensive formalization actions is the Landscape Intervention at Bolonia Cove, Cádiz, Spain, developed by the Cultural Landscape Laboratory. Founded in 2006 and promoted by the Andalusian Historical Heritage Institute, this team aims to integrate the natural and cultural Heritage in a privileged environment, with special emphasis on the Roman city of Baelo Claudia and other elements of Cultural Heritage in the area (Fernández- Baca et al. 2012).

The project's authors considered that displaying the patrimony to the visitor could not be generated with a mere signage project, but it was necessary to establish a view of the landscape and based on its cultural identity, define the possible forms of intervention. The search for this identity became the proposal's references: in an assimilation and interpretation process,

detection of natural and anthropic traces, the tombs and quarries, the rocks in the landscape, the erosion by rain and sea. Hence, they began with a contemporary attitude which incorporates the past as a starting point for discourse.

In the years 2003-2007, Vázquez Consuegra designed a Visitor Interpretation Center for the site: an elongated building in an E-W direction, resting on the slope which descends gently towards the Bolonia Cove. It has a white volume, built in exposed concrete, perforated by five different courtyards. It proposes an image consistent with the rural constructions which characterized the Andalusian countryside and welcomes visitors, by introducing them to the archaeological site. Different interventions have been developed in this site, based on archaeological research. The project is interesting because, founded on the guidelines established in the Cultural Landscape Guide of the *Ensenada de Bolonia* (Alonso et al. 2004), it uses a unique methodology to systematize the actions; it has designed a system of icons associated with four actions: Protection, Visit, Enjoyment, Directions, which materialize in a series of objects that are placed in the territory, which define and qualify the spaces. "Protection" includes vertical boundary elements, which resolve accesses and provide security for intervened areas. The "Visit", refers to different horizontal surfaces that define living areas, guiding the itineraries, structuring the territory, resolving encounters and constructing scenarios as informative supports and visualization platforms. "Enjoyment" includes furniture that is incorporated in different points, so that the visitor may stop and rest. And finally, "Directions" incorporate signaling developed in three levels (nominal, descriptive and orientational) serigraphed on elements that are projected to solve another function (Fernández- Baca et al. 2014).

They offer the manual for the intervention in the Ensenada Cove which provides and defines the intervention language, built from the selection of materials, with screen printing of informative content, and its textures: prefabricated concrete such as artificial stone, stainless steel to minimize the sections and wood whose ageing reflects the passage of time. Accordingly, they have created a specific language that assigns values to the patrimonial assets and emphasizes them with the essential aspects of their design.



Figure 1: Nominative signage of the East City Walls on wood handrail and signage with theater layout. Baelo Claudia. Bolonia Cove, Cádiz, Spain.



Figure 2: Descriptive signage in the Roman site of Baelo Claudia. Bolonia Cove, Cadiz, Spain. *Archivos Digitales Instituto Andaluz del Patrimonio Histórico (IAPH). Jesús Granada 2014*

The aim was the respectful integration of signage, incorporating it in parapets and handrails, and using materials which successfully integrate into the whole. The nominative signs, in steel and wood handrails, sometimes placed on a lateral surface, can be read at a distance; other signs on the upper surface can be read at close distances. Although this aspect is adequately resolved, the inclusion of the ruins’ didactic and comprehensive information, in elegant black print on stainless steel parapets, in Spanish and English, fails to meet various minimum criteria of perceptual reading, such as visual acuity, nor the essential ergonomic area of recommended heights, which is usually adequately established between 75 and 160 cm. In this case, it would have been necessary to orient the information towards the user.

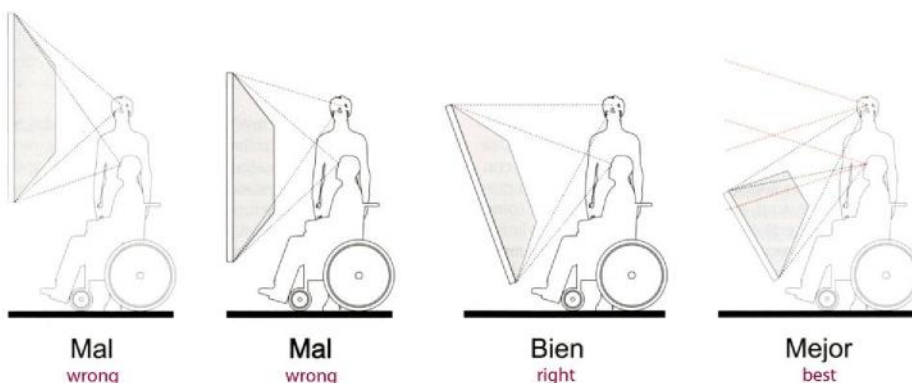


Figure 3: Adapted and accessible signage supports. *Source: García Moreno 2007.*

In several isolated signs, the information is made more comprehensible by their viewing at different heights, adapted to the site's topology. In addition, they display the plans of the monuments' layouts or are used only as orientation or caution signs because the icons are easier to understand. The texts are also more legible when placed in front of a seat, and not in a transit zone. Hence despite the multiple successes of the intervention, this example shows the difficulty of achieving the perfect balance between heritage and accessibility in a rehabilitation project, as well as design information, and in this case, it leans slightly towards the heritage aspect. Nonetheless, it is laudable that this visual signage proposal has been subtly integrated into the heritage, opting to include the signage in other elements of intervention to minimize its impact on the site as much as possible.

Acoustic signaling to support the visual experience

On other occasions with the aim to minimize the elements to the maximum, in respect for the place but likewise not neglecting the information which is provided about the site, other channels have been used to support visual signaling. Thus, the Neapolitan studio, Zelig had to conceive a signage design, as well as a communication and image project for an environment endowed with major significance and history, such as the archaeological excavations of Pompeii. In 1997, the Archaeological Suprintendenza of Pompeii, the agency responsible for managing the archaeological heritage of Pompeii, obtained the required autonomy to manage its cultural assets (Amlesu 2003). As its promotional and communication strategy, the starting point of the Zelig study was to design its own identity, to distinguish the site and make it recognizable. They created a brand that evokes antiquity without falling into the clichés of Imperial Rome. The symbol with a clean and modern character specifically embodies the idea of the ancient iconography, with the aim to unite all its past and present meaning inside its circle.

The problem posed by the creation of the Pompeii signage was primarily the creation of a system able to provide the best respect possible to the integrity of the excavations using a low-invasive and low-impact system which guaranteed good information for users and the required orientation indications.

The project was based on an initial strategic decision: to minimize the number of objects that would be included in the excavations. Hence, they designed signs which contained several data in a single element. They manufactured an elongated and narrow pole for this sign, with an elliptical cross section and two information faces, placed transversely in the route direction. After testing different materials for these signage milestones, they chose to use corian, due to its durability and resistance to atmospheric agents. The color selection predominantly features Pompeian red with black poles and plates for the excavations, which elegantly stand out without supposing a sharp contrast with the surrounding landscape, with tones that blend in with the dominant ochre of the ruins. This element condenses three different kinds of information: in the upper part, the street name; in the center, the names of the houses that can be visited in that street; and in the lower part, indications related to orientation, such as exits or services. This content organization made it possible to significantly reduce the number of milestones needed. The information system that completes the signage consists of an orientation plan and an audio guide, which is distributed in the entrance, and which made it feasible not to install numerous didactic panels that would have been especially invasive on this historical site.



Figure 4: Signaling milestones in Pompeii designed by Zelig.
Source: Amlesu 2003.

Tactile Resources to understand Cultural Sites

The same idea to minimize the number of wayfinding elements is what also prompted the German studio, Firstdesign for its Zollverein signaling project. In this industrial complex located in North Rhine (Westphalia), the infrastructures of a historic coal extraction site have been preserved in their entirety. The site is an exceptional testimony about the rise and decline of this industry, which has been so essential to the economy over the last 150 years. During its extractive period, the Zollverein Industrial Complex was considered as one of the most modern coal mines and one of the largest coking plants. The architects, Fritz Schupp and Martin Kremmer designed this industrial complex by arranging it on two axes, following the principles of precise geometry characteristic of the Bauhaus style, and a building with the Shaft XII and the coquetry, a unique model installation.

In 1986, the mining activity ceased after 55 years of operation; and in 2001, the mine and the coking plant were declared a World Heritage Site, a paradigmatic example of the development of heavy industry in Europe. The general plan, designed by OMA, aimed to respect the original identity of the site, by creating a strip around the historic area, with new installations whose functions are to guide, inform and attract visitors. New buildings and rehabilitation of existing ones were programmed to house services related to leisure, art and culture, among which it features the boiler room of the complex, rehabilitated by Norman Foster, which houses a large design museum; the Sanaa exhibition building, a very bright cubic block newly designed, built by the architects, Kazuyo Sejima and Ryue Nishizawa; and the Ruhr Museum, located in the site where the coal was separated from the stone and impurities, an impressive network of five floors joined by a powerful luminous staircase designed by Rem Koolhaas. Hence, the Zollverein commemorative route leads through the new and industrial buildings, linked by a network of metal arteries, to propose a revitalized industrial landscape with major interest.

The design and communication studio, F1rstdesign, founded in Cologne in 1999 by Christopher Ledwig was responsible for the corporate image and signage. He chose black and red colors for all the elements, as an obvious reference to the site. The logo was inspired by the most representative silhouette of Zollverein, extraction Shaft No. 12 and the use of these colors. In addition, the entire corporate image emerged from those elements. The intention of the designer team was to create a signage system without conventional signs. They created the signage to guide the visitor through a series of minimal but distinctive routes, without confusing them with a large number of signs: "The key is: Silent in terms of quantity, loud in terms of quality" (Cossu 2010: 79).

The system starts with the signs of the car parks which indicate the information panels and orientation models, in which the user can find a map-guide with all the required information. The perimeter ring, which marks the main route, is marked on raised ground. In addition, the buildings are marked with numbering in a coherent way with the plans and other information.

In contrast to the rules of orthodox typography, the signs were made entirely in capital letters, always using the unique typography of Zollverein, and endowed with lighting. The hierarchy was organized using red as the primary color in the titles, and white and gray as secondary colors. The black background is a reference to the site's past as a coal mine. The information panels have a box with guide maps. The whole area was subdivided into functional units (Coking plant, Shafts 1, 2 and 8, and Shaft 12, more representative); initially, each was treated separately and then they were all subsequently integrated. The brochure also includes a detailed outline of the three orientation levels of Zollverein: the tactile elements, the information which the visitor can take with them and the fixed signage.

However, the most important thing in the signage system is the miniature models. They are elements of tactile orientation: miniature representations in cast iron, located in all the entrances. Thus, the enormous dimensions of the place are immediately clear, and visitors are able to locate their positions and easily find their destination. While these elements are not specifically designed for blind people, they nevertheless serve as important elements of inclusive orientation, particularly useful for children, who enjoy playing with them.



Figure 5: Cast-iron scale models in Zollverein created by F1rstdesign studio.

Source: (F1rstdesign Studio) Cossu 2010.

The prominent role given to this orientation element in Zollverein arose from a previous trial in another project for the Muengsten Bridge park in Solingen, where they specifically made a large simplified tactile model of the site, using the Braille system, the typography and the schematic pictography in high relief. The model was developed in continuous collaboration with people with visual impairment to verify the adequate discrimination of all the elements. Hence, the designer's role consists, among other aspects, in selecting the appropriate symbols and textures, easily recognizable and discriminating to the touch, to display specific contents and then use them in the plan with criteria, with special consideration of the free space around them. (Gual Ortí 2015).



Figure 6: *Barrier-free wayfinding system*. Scale model at the entrance of Muengsten Bridge park.
http://flrstdesign.de/en/what_we_do/bridgepark-muengsten

This same method of continuous collaboration with the future user, as a design methodology, was implemented by Marina Puyuelo, Lola Merino and Mónica Val in the Inclusive Design Project in the archaeological environment of the Iberian settlement of Bastida de les Alcusses, in Moixent, Valencia in 2011. The village is included in the “Ruta dels Ibers València” (Valencian Iberian Route), which aims to increase knowledge and improve the tourist use of archaeological sites from the Iberian period in nine inland municipalities of the Valencia province (Puyuelo et al. 2014).

Their main objective was to condition the site and improve the accessibility to the physical environment and information contents, with the utmost respect for the values of the natural landscape and its projection as a cultural landscape through history. The surroundings of the promontory on which the town of La Bastida is located is a rural landscape of the Alcusses area, comprised by isolated buildings on a gentle profile of small hills and valleys (farmhouses from the 18th and 19th centuries) and traditional agricultural vineyards and cereals.

Therefore, the authors opted for the representation of the landscape as a natural context of the enclave in terms of tactile perception, with the inclusion of three tactile models made in bronze, as a means of useful communication for various audiences, and specifically for the blind. In the overall model of the town, different symbolic and figurative forms of the multiple elements, which make up this landscape today, have been represented on scale: nature, trails, buildings and ruins. These elements are reproduced with different textures and reliefs in the model legend and in Braille, which allows the blind to identify them beforehand for their subsequent discrimination and location. A tactile model has been included indoors which depicts the shape and scale layout of an Iberian House.



Figure 7: Tactile models at the Iberian settlement of the Bastida de les Alcusses, Moixent, Valencia, 2011.

Source: Puyuelo 2011.

In relation to the accessibility devices, it is necessary to emphasize that the three-dimensional nature of the scale models provide specific advantages over the existing drawings in the panels: observation from different perspectives and at different detail levels and in turn, facilitate a panoramic view of the complex and the way in which the different elements which integrate it are related to each other (Puyuelo et al. 2014). Once again, this project emphasizes that tactile models are effective as an orientation resource for everyone: touch perception (in the case of blindness and poor vision), high contrast visualization (for all vision levels) and understandable (when there are difficulties in the interpretation of plans, due to spatial orientation difficulties, due to different cultural level or cognitive disability).

Accordingly, more and more heritage sites are resorting to tactile signage. Hence a cultural accessibility project has been launched with the eloquent name of *La Mirada Tactil* (the Tactile Look), promoted by the Local Museums Network of the Provincial Government of Barcelona, focused on the deployment of multisensory modules to bring museums and their heritage closer to groups with sensory difficulties: auditory, visual, reduced mobility and cognitive disorders. Museums are classified according to the approach and accessible treatments (the territory museum, the object museum, the person museum and the museum process); overall, the project addresses the need to establish tactile discourses from the beginning of the visit so that they complement the visual reality of the museum scripts and thus enrich the visit by all audiences.

In this regard, the sensory approach of the Inclusive Study project must be highlighted. Raul Goñi is a designer who has consolidated his role as a Spanish reference in inclusive design. In 2007, he had the opportunity to work in the Señorío de Bértiz Natural Park, a vast natural heritage site mainly covered with trees. Over 100 years old, the Bértiz garden is its greatest treasure.

It is formed by a beautiful network of winding paths, surrounded by large trees of very diverse types, hedges, bushes and floral arrangements; there is a large representation of native species as well as numerous exotic plants.

The designer decided to create a sensorial itinerary; a site created for easy access for all which enhances the maximum sensorial capacity of those who visit it. A simple and beautiful journey, where the spectacle of nature envelops the visitor, to include them as an active part of its energy, magic and poetry. A guide rope, for example, accompanies visitors into a bamboo forest, and invites them to enjoy the journey of temperature, light and sound, which is experienced in a thousand ways and intensities among the bamboo shoots. In another point, the guide rope leads visitors into a century-old oak split into two where they can walk through the interior of its trunk and discover a world of smells and textures. He also designed some “tree huggers”, metal strips that surround the trunk of the tree at its base, to encourage visitors to embrace the ancestral tree and feel the trunk with their own body. Some “tactile shuttles” guide the visitor's hand to fern leaves to discover their shapes, textures and temperatures. In addition, he created “sound tromps” that capture, amplify and offer the auditory phenomena of the Bidasóa River and its surroundings with greater intensity and allow visitors to immerse themselves in the concert of the forest's natural sounds: the rumor of the waterfall and the trees as well as the intensity of the bird songs.



Figure 8: Sound tromps, tree huggers and tactile shuttles designed by Inclusive Studio. Señorío de Bértiz. Navarra, Spain.

Source: <http://www.goni-studio.com>

Digital resources for Access to Heritage Sites

Many heritage sites are associated with accessibility problems inherent to infrastructure, which may be natural or architectural barriers. These limitations hinder the transmission of cultural values to visitors, and especially those with sensory disabilities or reduced mobility. There are two factors required for the active participation of all people: the first is the ambulation space and direct sensory experience, as shown above, and the second is linked to communication of its content. Although both are necessary to achieve full enjoyment of these spaces, the structure of the sites may hinder the realization of a complete visit to their facilities. However due to various devices which exist today, access to their intrinsic elements and values can be guaranteed (Puyuelo et al 2010).

Digital resources can easily complete the information and are suitable for interventions in a natural or built heritage, which may require more explanations and at the same time, they require few invasive elements. They should be used as an accessory, not as the only means of communication, because this could represent a new barrier for some people.

The use of technical resources is perfectly possible nowadays because communication technologies in conjunction with technological tools for graphic and tactile representation are constantly being developed through many emerging applications in objects with many added features. Meaningful visits to heritage sites acquire extraordinary cultural and social value, relying on the concept of situated learning, which assumes that learning occurs more efficiently in a real context which then becomes a significant part of the basic knowledge associated with that learning (Scribner 1986). The gradual integration of technological formats and devices in cultural and heritage spaces provide *in situ* resources that encourage intuitive knowledge based on enjoyment of the place as a particular site.

The importance of ensuring a similar visit for everyone, in terms of time, understanding and enjoyment of the place is important from an inclusive design perspective. Due to the difficulty of modifying certain protected monumental sites or including different elements to make them accessible, it is interesting to consider the inclusion of digital resources which generate similar experiences for all visitors. Some technologies, which use graphic representation to achieve virtual reality, enable new levels of interaction with sites and knowledge, thus generating a new and remarkable exchange of information that can be useful in accessibility situations (Puyuelo et al. 2011).

In the case of cultural sites, the use of Virtual Reality (VR) is on the rise, because it facilitates the display of historical reconstructions that can no longer be visited, and to understand their evolution at different times in their history. On another level, Augmented Reality (AR), a term first used in 1990 by Tom Caudell, (Milgram 1994) is part of the concept of Mixed Reality (Azuma 1997); namely, it indicates that it can be used to combine reality with virtual reality in a physical real world scenario that can include elements, which extend our perceptions. The significant features or landmarks of the site can be made available, by creating reference points and projecting them into our experiential level.

A good example of an AR application to understand heritage is the one experienced in the Gothic-style Silk Market Building called the “Lonja de los Mercaderes” in Valencia (UNESCO Monument Heritage Site, 1996). The project, directed by Marina Puyuelo, Mónica Val, José Luís Higón and Lola Merino, and implemented by the Architectural Graphic Expression Department of the Polytechnical University of Valencia in collaboration with Labhuman, developed the design of an AR application with the aim to explore the options which this graphic substratum technology offers, thus improving the accessibility to diverse contents of this monumental building complex.

Given the features of this heritage site, the authors planned the requirement to incorporate minimum elements in order not to interfere with the overall vision of the monument, assessing both the personal and collective experience with this technology. The authors created a prototype that featured a manageable virtual representation, which mediates in the construction of new forms of interaction, useful for both knowledge and accessibility. This tool allowed access to simulated perceptions which help to overcome the common limits of visual accessibility in this site, derived from the distance or the lighting, as well as those inherent to the visiting users: impossibility to move or approach the details, reduction of their discrimination and visual identification abilities, etc. (Puyuelo et al. 2015). By providing an individual intuitive experimentation which facilitated a collective projection and contact with this technology, it generated a greater interaction of the visitors with the heritage site. Furthermore based on the initiative of the individual visitor, their interests and skills, this resource provides an individual and collective learning opportunity.



Figure 9: Mark of the window tracery. The visitor handles the application in a recreational and intuitive way. Lonja de los Mercaderes, Valencia, Spain.

Source: Puyuelo 2015

The combination of resources to achieve the desired balance

As evidently shown in these examples, the importance of architectural or natural heritage, not only rests on its own intrinsic value but also on its ability to excite, motivate and above all, transmit, communicate, share and spread knowledge, to ultimately allow cultural access for all.

Wayfinding resources require collaborative effort from architects, designers and sign creators. The revitalization of cultural sites primarily requires rethinking the adopted strategies, and in some cases, the redesign of the implemented devices. This process must first identify the identity of the site and its most important content, and discover how to inspire visitors with the site's essence in a comprehensive way. As Lucy Holmes points out; in many cases, working with views and sight lines reveals other ways of controlling and directing movement and emotion in a space, apart from just using signs or digital resources, and this strategy, carefully used, can minimize the impact on a cultural site (Holmes 2015).

The combined use of various resources and technologies can improve access to culture and promote the development of specific applications that respect the site's identity and help to provide value and support for inclusive design strategies in order to experience heritage sites. Always with respect for the place: any symbols or devices used in cultural sites should relate or reflect in some way the identity of the place (Fernández 2017).

The diversity of strategies, virtual resources, visual, tactile and acoustic elements, static and dynamic, discrete and striking aspects coexist to point out and highlight the different spaces. This diversity of stimuli can constitute an efficient and dense network of tools, signals and symbols continuously superimposed, to provide the site with a voice and make it more inclusive. Based on the use of different senses, this task can be facilitated and perhaps the binomial Heritage and Accessibility issue can finally be balanced.

REFERENCES

- Alonso López, F. 2007. “La accesibilidad universal y el diseño para todos: los ejes determinantes de las políticas de igualdad de oportunidades III” [Universal accessibility and design for all: the determining axes of equal opportunity policies III]. De Lorenzo, R. and Cayo Pérez Bueno, L., *Tratado sobre Discapacidad*, Navarra: Aranzadi: 5-6.
- Alonso Villalobos, Carlos et al. 2004. *Guía del paisaje cultural de la Ensenada de Bolonia. Cádiz*. [Guide to the Cultural Landscape of the Ensenada de Bolonia. Cádiz]. Sevilla: Consejería de Cultura, Instituto Andaluz del Patrimonio Histórico.
- Amlesu, Arnaldo. 2003. “El sigilo de Pompeya. El discreto encanto de la señalética” [The secrecy of Pompeii. The discrete charm of signage]. *Experimenta*: 46-50.
- Azuma, R. 1997. “A Survey of Augmented Reality”. *Presence: Teleoperators and Virtual Environments*, (4): 355-385.
- Cossu, Matteo. 2010. “Zeche Zollverein” *Usted está aquí. Diseño de señalética*. Barcelona: Maomao Publications: 70-79.
- Fernández-Baca Casares, Román, Silvia Fernández Cacho, Marta García de Casasola Gómez, Beatriz Castellano Bravo, Julia Rey Pérez and Jose M^a Rodrigo Cámara. 2012. “Intervención paisajística en la Ensenada de Bolonia.” [Landscape intervention at Bolonia Cove], *Paisea* n^o 20, *Paisajes Culturales*. March, 2012: 64-70.
- Fernández-Baca Casares, Román, Marta García de Casasola Gómez, Beatriz Castellano Bravo, 2014. “Intervenir en el paisaje cultural construyendo soportes para mejorar la lectura patrimonial de la Ensenada de Bolonia” [Intervening in the cultural landscape by building supports to improve the patrimonial reading of the Ensenada de Bolonia]. *Informes y trabajos* (10): 7-36
- Fernández Villalobos, Nieves. 2017. “Paisajes patrimoniales: diseño, información e identidad” [Heritage landscapes: design, information and identity]: in Darío Álvarez Álvarez and Miguel Ángel de la Idlesia Santamaría (coord.): *Modelos de Paisajes Patrimoniales. Estrategias de protección e intervención arquitectónica*. Valladolid: LAB/PAP, Dpto. Teoría de la Arquitectura y Proyectos Arquitectónicos, Universidad de Valladolid: 76-82.
- Garcés Desmaison, Marco Antonio. 2008. “Tipología del Patrimonio y Accesibilidad” [Typology of Heritage and Accessibility]. *Actas de las Jornadas de Accesibilidad Universal al Patrimonio*. Ávila: Junta de Castilla y León: 41-44.
- García Moreno, Dimas. 2007. “Señalización informativa y patrimonio” [Informative signage and heritage] *Accesibilidad y Patrimonio. Yacimientos arqueológicos, cascos históricos, jardines y monumentos*, Valladolid: Junta de Castilla y León: 245 – 258.
- García Moreno, Dimas. 2011. “Diseño de sistemas de orientación espacial: wayfinding”. [Design of spatial orientation systems: wayfinding]. *Accesibilidad Universal y Diseño para Todos*. Arquitectura y Urnamismo. Madrid: Fundación Once, Fundación COAM: 36-56.
- Gual Ortí, Jaume. 2013. *Incorporación de símbolos tridimensionales en planos táctiles para la mejora de su usabilidad*. [Incorporation of three-dimensional symbols in tactile planes to improve their usability]. Doctoral Thesis. Barcelona: Universitat Politècnica de Catalunya (UPC).
- Holmes, Lucy. 2015. “The Right Way”, *New Signage Design, Connecting People & Spaces*. Barcelona: Promopress.
- Milgram, P. and Kishino, A. F.. 1994. “Taxonomy of Mixed Reality Visual Displays”, en *IEICE Transactions on Information Systems*, Vol E77-D, n^o12: 1321-1329.
- Juncà Ubierna, José Antonio. 2007. “El binomio Accesibilidad y Patrimonio. A la búsqueda de un equilibrio compatible” [The binomial Accessibility and Heritage. In search of a

JOURNAL TITLE

- compatible balance]. *Accesibilidad y Patrimonio. Yacimientos arqueológicos, cascos históricos, jardines y monumentos*, Valladolid: Junta de Castilla y León: 31-35.
- Puyuelo Marina, Lola Merino, Mónica Val Fiel et al. 2010. "Access to World Heritage Sites: Design Products that Transform Sites into Collective Spaces for Enjoyment and Interactive", *Design Principles and Practices: An International Journal*. Champaign, Illinois, USA: Common Ground Publishing LLC.
- Puyuelo Cazorla, Marina, Mónica Val Fiel, Lola Merino Sanjuán and Francisco Felip Miralles. 2011: "Representaciones Virtuales y otros recursos técnicos en la accesibilidad al patrimonio cultural" [Virtual Representations and other Technical Resources for access to Cultural Heritage]. *EGA* nº 17: 164-173.
- Puyuelo Cazorla, Marina, Mónica Val, Lola Merino and Jaime Vives- Ferrándiz. 2014. "Living landscape in the archaeological site: La Bastida de les Alcuses". Best practices in heritage conservation and management from the world to Pompeii. (Le vie dei Mercanti. XII Forum Internazionale di Studi. Aversa, Capri, Julio 2014). Nápoles: La scuola di Pitagora: 1192- 1200.
- Puyuelo Cazorla, Marina, Mónica Val Fiel; José Luís Higón Calvet and Lola Merino Sanjuán. 2015. "De la representación a la experiencia. Realidad Aumentada para la interpretación del patrimonio monumental en la Lonja de Valencia" [From Representation to Experience. Augmented Reality for the Interpretation of Monument Heritage in "La Lonja" of Valencia] *EGA*, nº 29: 180-189. <http://doi.org/10.4995/ega.2015.4051>.
- Scribner, S. 1986. "Thinking in action: Some characteristics of practical thought", in Sternberg, J. and Wagner, R. K., *Practical intelligence: Nature and origins of competence in the everyday World*. Cambridge: Cambridge University Press: 13-30.

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