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Advances in Design for Inclusion

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10th International Conference on Applied Human Factors and Ergonomics and the Affiliated Conferences

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Inclusive Design Practices for Natural Parks. Products and Services for Experience-Focused Solutions in Places of High Naturalistic Value

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Abstract. The research investigates the possibilities deriving from inclusive design methods in contexts of high naturalistic value. Natural parks, reserves and public gardens play a strategic role from an ecological, social and cultural point of view. Therefore it is necessary to place them at the center of a new scientific debate on methods for the study, the development and the governance of these assets. They are particular and multi-functional contexts in which today it is necessary to operate both in terms of environmental and landscape protection (ecodesign), and in relation to the evolved needs of their users (user-centered design). After a deep analysis concerning international case studies, the research proposes a new possible model of inclusiveness for design practices oriented to territories enhancement. A model capable of acting both in the metaproject phases (introducing interdisciplinarity and co-design practices) and in the properly design phases (according to the principles of design-for-all).

Keywords: Design for territories · Natural parks · Inclusive design · Integrated services · Eco-social development

1 Natural Parks as Inclusive Places. Design Models and Methods for Territories Enhancement

Starting from the evidence that the parks are protected areas characterized by high naturalistic and landscape values, the so-called "design for the territory" - in its vocation to promote initiatives for local development and for territorial protection - is the preliminary instrument to operate in these places through actions and methods

The research "Inclusive design practices for natural parks. Product and services for experience-focused solution in places of high naturalistic value" derives from the scientific activities of the II level Specialization Course "Natural capital and protected areas, planning, design and management", promoted by the Department of Planning, Design and Technologies of Architecture (PDTA) – Sapienza University of Rome. The research is coordinated by Professor Carlo Martino and Professor Vincenzo Cristallo – with the scientific support of PhD Ivo Caruso. The general aim of the research is to analyse the system of physical and intangible tools which implement, give value and new functions to naturalistic areas, through specific "integrated services", able to create connections between products and communication design.

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which promote models of widespread and inclusive planning. These models are targeted to the use and enjoyment of environmental assets by combining the ecological and social priorities with the services provided though products [1]. For this reason, the enhancement of a choral way to project by an extensive system of stakeholders (local administrations and institutions, public or private organizations, companies, researchers and professionals, private citizens) is an indispensable condition for every project with a territorial vocation. It means a project in which the territory is concretely and rhetorically co-authored and in which it is required a network of different skills. Transversal and complex skills which can concretely give value to the specific typicalities of a territory heritage [2]. This is why to design starting from the territorial point of view means recognizing and preserving the identity of a "local culture" that can generate "local products" through its "local resources", of any species. And, "local product" is everything that has a close relationship with the territory and with the community that generated it, even casually. The protection of a territorial vocation therefore becomes the starting point of any planning hypothesis which provides, depending on the case, the relocation, revaluation and reactivation of material and immaterial resources of a given eco-system. However, these are resources (skills and qualities) that must be recognized and shared. Design actions for the territory are aimed to: "read" the territory heritage, interpretate it, visualize it, share meanings and visions, promote forms of participatory planning, transform visions into feasible initiatives, design specific products and the interfaces of the services deriving from them, promote an effective communication of the whole processes. That is to say that design and its system can direct actions towards an environmental sustainability that has a strong relational and social component on a territorial scale. As a consequence, sharing becomes a form of co-definition of the project plan through cooperation actions between proponents and recipients. It is therefore important to recognize that when the goal is to introduce innovative processes on the territory - fostering the connections between places and people, the continuous learning, the enhancement of the material elements, knowledge, culture and local traditions - it is necessary to adopt an approach that supports a community-based form of project; so able to act simultaneously on strategic and services levels. Levels that, in order to generate appropriate and long-lasting actions, must consider the theme of the project of the identity of places as an indispensable value that requires constant monitoring and planning to act in the direction of development and protection of natural heritage. However, the concept of identity is often misunderstood by a pre-constituted representation of its value, considered above all as belonging, defense, opposition. Nonetheless, the objective to be pursued - also understanding the difficulty of many to adhere to a more complex and variable meaning of the term identity - is to ensure that designing identity is equivalent to proposing an updated vision of the word "localism". Consequentially it is fundamental to contemplate territory's multiform nature, its plurality of meanings referable to cultural, normative, economic and political aspects. These aspects need a circular and extended design attitude, focusing on the experiences of the last years that have pushed on themes such as the access to resources, the protection and the use of goods,

the environmental enhancement and the sustainable development. Finally, it is necessary to define an idea of a localism that has been updated in the contents by examining the value of typical resources according to a definition ascribable to the sequence of relationship between product/context/identity. Such a linking indicates that what we sometimes identify generically as territorial-environmental resources are assets to which we can recognize such complexity that can fully distinguish the area of origin and its main identifying properties. Moreover, the economic studies referring to the productions that belong to the typical resources consider the territory as a diffused company - or the environment as a systemic enterprise - and recognize in it economic models, often informal, where the originality and the quality of local products, including those of an environmental nature, is given by the particular combination of territorial resources and the typicality of the goods resulting from a specific "Productive Habitat" [3]. This "Habitat", considerable as a place composed of parts in reciprocal stability (balance of relationship and position), results in a peculiar balance between material and immaterial elements. These elements represent the structural, organizational and dimensional typicality of a given context. These arguments are even more evident if the products in this habitat can be considered as identity marks. In this case we can state that the contribution of the design can activate a process of configuration of the product/context/identity relationship acting with bottom-up strategies, with appropriate enhancement actions for the different levels of territorial identity. For this type of interpretative paradigm the design disciplines, starting from the analysis of the existing typicalities, have the task to take advantage from these initiatives of recognition and networking, turning them into competitive factors for a territorial emancipation on economic and social bases [4]. In conclusion, identity, understood as a cultural matrix of places and territories, has a crucial value for local development. It is a resource to be recognized, protected and communicated. By joining the theme of identity and the design action it is possible to increase the relationship between development and enjoyment of environmental assets, and it is possible to enhance the dynamics within scenarios of inclusive and sustainable use of local resources. Design culture, with its aim of manipulating the shape of the cultures and knowledge present in the territory, becomes a real engine of development for goods and services and helps to recognize the leading role that cultural-environmental assets have in the development of local systems. Therefore, developing the territory through the design principles means modifying the reference center of any planning activity from the subjects to the contexts. Through the use of different disciplinary levels and on different fields of action (social, economic, cultural), the action of design on a territorial scale must therefore offer solutions to increase social, economic and technological innovation processes, taking into account the specificity of local resources. This result can be pursued above all by recognizing that the "project for the territory" always plays in a general key a "narrative" role as it strives for a sort of "staging" the territory. Creating a "script" is equivalent to making a subject fit to be represented. It means to be able to portray the complexity and originality of the different components-actors that are present in the scene-territory with different roles.

2 Natural Parks as "Spaces for the Experience". Practices and Artifacts for Inclusive and Sustainable Fruition

In reference to the complex global challenges facing humanity today, nature and man turn out to be fatally interdependent. With regard to this, in the era in which is taking place what Jeremy Rifkin defines "Third Industrial Revolution", we are facing an important change of scientific paradigm, which considers nature no longer as a sum of objects, but as a sum of relations. "Old science is characterized by the values of detachment, expropriation, dissection and reduction; the new one from responsibility, integration and holism. Old science is focused on making productive nature; the new one on making human activities sustainable. Old science seeks power over nature; the new one aim to a partnership with nature. (…) The new science makes us go from a colonialist vision of nature as an enemy to despoil and force to slavery to a perception of nature as a community to feed" [5]. To have the possibility to live in a salubrious place, or to have (at least occasionally) the possibility to stay in direct contact with places characterized by a great naturalistic value, increases the quality of a person's life, and increases the quality of people's health (both from physical and psicological point of view). Moreover it has a positive impact on social skills, local economies and citizens' behavior towards the environment. Making nature simultaneously protected and usable therefore put in connection people and the environment, thus making people more aware and empathetic towards ecological issues. This condition is fundamental for the definition of the territory as a "choral work of art produced through the dialogue between living entities, man himself and nature, in the long time of history. That is, as a work that arises from fertilization by culture" [6]. The challenge (concerning planning, management and cultural aspects) can not therefore be limited to the ergonomic requirements of accessible tourism, but it must aim at creating the real conditions of sustainable coexistence between the emergencies of nature and the needs of the widest range of possible users. In this way it is possible to experience a model of inclusiveness that becomes a fundamental factor for the creation of places that themselves become "ecological tools through socialization". According to John Thackara one of the reasons why the so-called "new economy" is failing is the lack of interest in the contexts. In the book "In the Bubble", Thackara defines in the concept of "territorial patrimony"; a set of natural beauties, cultural heritages, unique specificities of the territory, social cohesion, civic sense, memories [7]. All the actions oriented to "localization" so contribute to the redefinition of social structures and relationships between resources, activities, nature and communities. Natural parks, as we said, are aimed to maintain the environmental balance of a specific place, increasing or protecting its biodiversity, and at the same time providing services (scientific, educational, touristic, recreational) to ordinary or occasional users. "Accessibility is a function of the interaction between the user, with his skills and demands, and the environment, consisting of natural resources and the organization of equipment, personnel and tools aimed at the enjoyment of the natural environment" [8]. The model of the "sanctuary" precluded to anthropogenic contaminations has to be substituted by places where ecology and ecotourism can coexist. These are places able to provide visitors with high-quality experiences. In this sense, the park can be a place in which natural and artificial factors interact; and its

fruition is managed by a "complex and articulated system of elements, interconnected or interdependent, which allows the user to tend to the targets of autonomy and self-sufficiency" [9]. The design of these specific products and services is not limited to solve problems of accessibility, interaction and usability, but includes the study of needs, expectations and behaviors of different kind of people. It is important to take into consideration the fact that the theme of diversity has been affected in recent years by a substantial re-reading. "Individuals traditionally considered disabled (of which only a part - less than 50% - are mobility impaired) constitute a significant and growing percentage of the whole population, if we consider, in addition to permanent disabled people, temporary ones, those who are not considered part of the statistics as they are not registered as disabled, those whose handicap is a natural condition (pregnant women, parents with young children, children themselves, elderly people)" [10]. This "integrated landscape" can be composed by: supports for communication and wayfinding (vertical signs, physical information panels, nowadays "augmentable" with virtual contents); furniture and equipments (seats, covers, lighting equipment, delimiting and monitoring systems, instruments for waste management, playgrounds, tools for sports or leisure); equipped areas for rest breaks and reception (so capable of foreseeing and put in connection all the functions necessary for the various activities related to welcome services for visitors, including information, programming, security, lounge or refreshment areas, logistical support); intermodal mobility solutions; permanent or temporary micro-architectures that can be more or less capable of mimesis in the context (observation towers, paths, shelters, exhibition places, research centers or structures hosting initiatives for enhancement of the territory).

Micro-architectures for naturalistic areas are particularly interesting design practices. Although sometimes presenting important sizes, they are conceived in an intermediate conceptual dimension between the sectors of building and set-up design and, often, they experiment, with a particular attention to sustainability and to integration with natural elements, constructive practices based on the standardization of the components, on the use of innovative materials, on prefabrication, on modularity, on lightness, on reversibility, on spatial adaptability. These techniques and instances are usually adopted in the sectors of exhibit and industrial design. Moreover, these constructions are real examples in which a responsible design approach can adopt the guidelines and the rules of inclusiveness as an opportunity to optimize costs (avoiding future adaptations) and to achieve a widespread approval and use deriving from the elimination of obstacles and possible conditions of discomfort, danger and exclusion. Since there are often large areas available, many of these structures are characterized by the use of suspended ramps and walkways that solve the accessibility problems of traditional towers. Long "stripes" (treetop walks) can thus elevate the visitor to allow him to enjoy magnificent bird's eye views that give the sensation of being in direct contact with nature, being able to almost caress the trees, being able to observe the landscape from a privileged and immersive position. One of the first examples of inclusive design for natural parks structures is the Clingmans Dome Observation Tower, designed by Bebb & Olson (Hubert Bebb) in 1959 and built at the highest point of the Great Smoky Mountains National Park, on the border between Tennessee and North Carolina (USA). The designer refused the exclusive use of local materials and the "rustic style" (adhering to a certain traditional imaginary) and outlined a modernist-

inspired reinforced concrete walkway that leans on cylindrical columns and leads, above the treetops, to a "circular covered terrace" from which the visitor can enjoy a 360° view. The Shark Valley Tower (1964) in the Everglades National Park, the Look Rock Tower (1965) in the Great Smoky Mountains National Park and, on a smaller scale, the Wooden Birdwatching Observatory designed by the LJB studio in 2017 in Herdla (Norway) have been designed on the same composition scheme (Fig. 1).

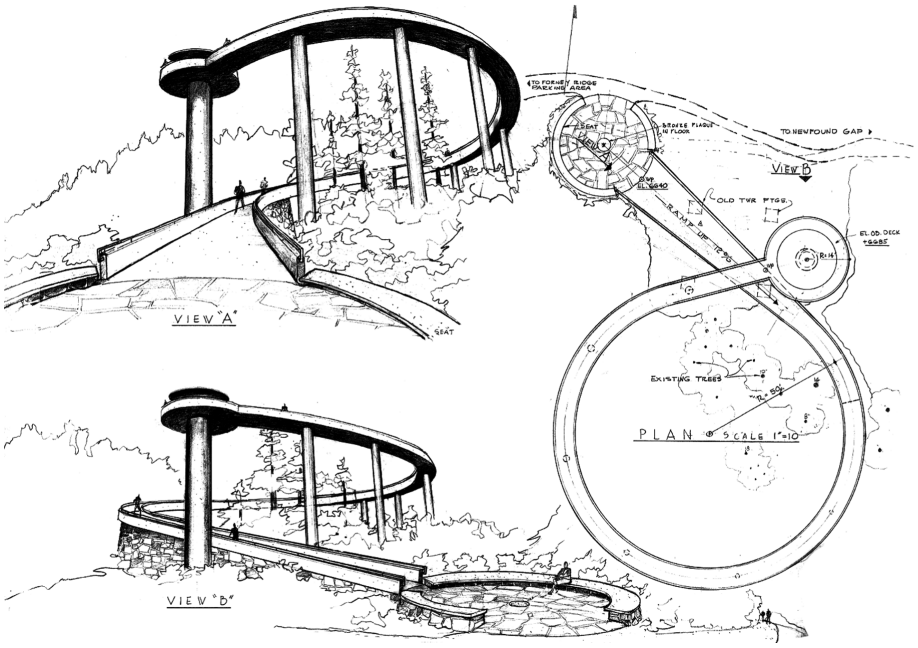

Fig. 1. Clingmans Dome Observation Tower, original drawings by Hubert Bebb, Bebb & Olson, 1959 Great Smoky Mountains National Park (USA). This pioneering project can be considered a fundamental archetype of modern observation tower strongly oriented to accessibility and standardisation of processes.

The project "A Path in the Forest" designed in 2011 by the Japanese studio Tetsuo Kondo Architects and temporarily set up in Kadriorg Park during the LIFT11 (Urban Installations festival in Tallinn - Estonia), pursues the idea of creating the possibility of a new perceptual relationship between people and the secular forest through a suspended path capable to provide alternative points of view. The project consists of a simple structure, 95 m long, and light enough to be able to anchor itself in a symbiotic way to the trees themselves, thus renouncing the need for additional support pillars. In 2012 the Tree Top Walk was inaugurated in the Bavarian Forest National Park, in Neuschonau (Germany). A wooden spiral ramp of 500 m allows visitors (even those with motor disabilities) to reach a height from the ground of 44 m. A similar case study is the Camp Adventure Park - The Treetop Experience, designed in 2017 by EFFEKT - ARUP for the Glisselfeld Kloster Forest, in Haslev (Denmark). An iconic hyperbolic

tower made of corten steel can be reached by a system of inclusive paths designed to define diversified functional segments. The user, walking through the foliage of the trees, explores bridges, spirals, aviaries, observation balconies, ramps and common seats. The Wild Walk, designed by Charles P. Reay in 2015 for Adirondack Park (Upstate New York - USA), was also conceived on the model of the "treetop walk". A large system of suspended paths that foresee various activities and create a context of strong visual impact that, at the same time, aspires to provide recreational experiences, but also to encourage people of all ages to explore and understand the surrounding natural environment through exhibitions and scientific events. In 2017 the Latvia Nature Conservation Agency launched an international design competition for an observation tower for the Kemeri National Park (Latvia). All the selected and mentioned projects (the results have been announced in June 2018) propose solutions strongly oriented to inclusivity. This fact confirms that today designers can become the spokespersons of a shared awareness according to which the contemporary natural park can be conceived as a "space for experience"; a place to experiment, to acquire information, to make discoveries, to share activities (and therefore socialize), to rediscover the pleasure of the contact with nature, stimulating virtuous behaviours (Fig. 2).

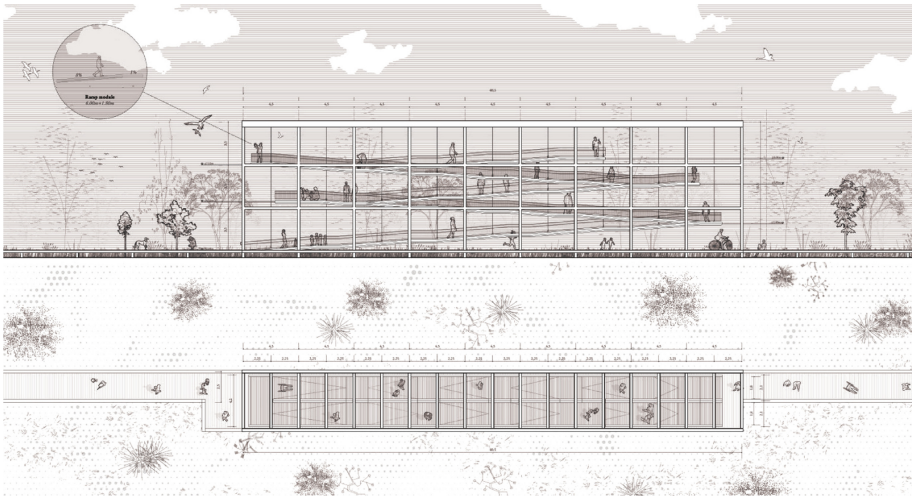

Fig. 2. Funambulist Landscape, Ernesto Urquízar Quesada, María Cervantes Lardón, 1st prize project of the International Architecture Competition Kemeri National Park Observation Tower, 2017. The observatory has been conceived as a sensorial and inclusive promenade, a multiple viewpoint to establish a continuous relationship between nature and visitors. The components of the structure are designed to be easily prefabricated offsite and to be assembled without the use of heavy equipments. It is important to note that all the awarded projects consider as key factors wheelchair accessibility, durability, ease of construction, and budget optimization.

The critical objective consists in conceiving the park no longer as a "sanctuary", a "container of wonders", or even worse as a "themed lunapark" only dedicated to recreational activities. The "park for experience" must instead be a values-amplifier, a determining instrument for the narration of the territory, for the strengthening of the local identity and of the environmental awareness of its users.

3 Natural Parks and Inclusive Services, Design Practices in Communication and Tools for Wayfinding

In the last 10 years, the international system of park authorities and the network of the numerous stakeholders involved in the management of the "Natural Capital"[1] of our planet, has shown to understand the relevance of design in the strategic project of protection and enhancement of the main heritage of humanity, demonstrating, in comparison to the past, a real "paradigm shift".

As the Italian Ministry for the Environment clarifies: "The concept of 'Natural Capital' has been instrumentally borrowed from the economic sector to indicate the value in physical, monetary and welfare terms offered by biodiversity to the human race, also in order to guide the choices of public decision-makers"[2], and it is perhaps precisely this new induced awareness that led this change. As how it happened for urban design practices [11], the "integrated tools" for parks fruition derive from innovations that have been developed in the more general field of outdoor design. From the analysis we carried out about some of the most important recent international projects, which affect the relationship between design and "Natural Capital", are emerging important signs of orientation of the "public decision makers" towards quality choices that are possible to made at various political scales. The research took into consideration good practices affecting a national level, as demonstrated for example by the systemic and coordinated projects developed in Norway, Japan and Croatia for their national parks networks; but also highly innovative specific projects affecting more circumscribed, regional, supra-municipal or local territories.

In these projects, design culture has been applied in order to contribute on different tasks: in graphic and visual communication components, in corporate-identity projects, in solutions for signages and scientific communications, in spatial and exhibit components, in the conceiving different kinds of infrastructures for both external and internal activities. Less known, or less visible, is undoubtedly the component of the project that today invests service design practices, but that are already present in embryonic ways in those projects both of visual identities and of infrastructures, designed in close synergy with the services they provide. The identity projects, for example, are today often integrated with specific digital Apps, so with tools for

[1] The term 'natural capital' was first used in 1973 by E.F. Schumacher in his book Small Is Beautiful and is closely identified with Herman Daly, Robert Costanza, the Biosphere 2 project, and the Natural Capitalism economic model of Paul Hawken, Amory Lovins, and Hunter Lovins. Recently, it begun to be used by politicians, notably Ralph Nader, Paul Martin Jr., and agencies of the UK government, including its Natural Capital Committee and the London Health Observatory.

[2] http://www.minambiente.it/pagina/capitale-naturale-e-servizi-ecosistemici.

exploring the park which provide scientific information and guidance services, as well as the design of infrastructures - towers, birdwatching cabins, etc. - it is developed with full awareness of the "performance" [12] that they can provide to their users, in terms of accessibility and hybridization with digital services.

Since the highest international institutions for environment protection conceive the Natural Capital as the set of "ecosystems which provide essential goods and services" to humanity, and since the same concept of Capital, borrowed from the economic sciences, encourages users and decision-makers to be well-aware of the value and wellbeing that derives from the natural heritage, it results that the design sciences are called today, more than before, to develop increasingly integrated solutions able to connect systems of products and services.

As previously said, this need strongly emerges from the analysis of some of the most successful projects of branding and scientific communication for national parks and protected areas. These case studies have in common that they are fully conceived as systems able to integrate the visual narration with users experiences, starting through the careful study of the peculiarities of each park or system of parks, and admitting the possibility of offering both traditional and innovative services.

3.1 Visual Identities

"Every organization is unique: its identity can only derive from its roots, its personality, its strengths and its weaknesses" [13].

As stated above, if it is possible to conceive of nature as a capital, the theme of identity design for parks must be able to make an association between company branding and place branding, and then imagine the institution of management, protection and enhancement of parks just like an organization that, to express its identity, has to be based on its specific peculiarities. The design of park identity becomes therefore more effective when it succeeds in carrying out this transposition, i.e. translating characteristics and peculiarities of supranational, national and/or local natural heritage into "visual stories" and integrating them into an overall project that offers unparalleled services and experiences.

The identity-experiential storytelling is in fact at the base of the 2015 project of Snøetta Design Studio for the coordinated identity of 44 Norway's National Parks. The logo is characterized by a squared portal, resting on the variable silhouette of a hill. It represents the visual translation of the story of a passing experience: "A portal is an entrance, or a gate, which symbolizes the transition between two dimensions; the traversing between the cultivated and the natural. The new, unifying visual identity opens a gate to these new experiences, it lowers the barriers for visiting, and facilitates the increased knowledge of our precious surroundings"[3].

Japan faced the problem of defining a national identity of the park system in 2017. The project have been developed by Yamaguchi Moeko of the Nippon Design Center. The designer cited the identity theme of the Rising Sun, the secular "logo" well-imprinted in the global collective consciousness, actualizing it through chromatic gradients that move

[3] https://www.domusweb.it/en/news/2015/04/17/norway_s_national_park_s_sn_hetta.html.

away from the full red of the national flag sun. The logo in this case symbolizes the sunrise experience, also sustained by an animation clip, with the shape of the Rising Sun in a typical foggy landscape of Japan: "The logo represents a unique Japanese landscape, the misty moment the sun rises"[4]. These two experiences demonstrate how the identity of a complex system of parks can integrate national themes and symbols with dynamic and experiential elements, able to reach a great emotional impact (Fig. 3).

Fig. 3. Norway's National Park, visual identity, graphic design, signage and wayfinding systems, Snøhetta Design Studio, Miljødirektoratet (The Norwegian Environment Agency), 2015. Photographer Øivind Haug.

3.2 Wayfinding

Wayfinding is an integral part of the communication project. If it is designed according to the logic of consistency and iteration of the identity codes, it plays a fundamental reinforcing role of the identity system and it has a significant functional role in terms of accessibility and security. In fact, the orientation and the "signaling" of predefined paths assumes a central function in a naturalistic context that offers great possibilities for the fruition of the different ecosystems (landscapes, views, etc.) so making users safe from potential risks. In the natural parks context, signaling has more than elsewhere the primary task defined by Arthur and Passini as "Problem Spatial Solving" [14], meaning the ability of the wayfinding to favor the achievement of the goal

[4] https://www.ndc.co.jp/en/works/national-park-vi_201711/.

through the resolution of a spatial problem. The most recent wayfinding projects for parks, that we analyzed in the research, have assumed all the functional constraints defined by Massimo Vignelli[5] in his manuals, such as the "Hierarchy", the "Repetition" and the "Sequence" [15], surpassing them also in favor of an extended audience. For example, the recent wayfinding project for the Parc Riu Llobregat by the Spanish studio Claese Bcn elegantly included tactile maps in the whole signage system. Fitzpatrick Woolmer in 2012 designed the signages for the Brecon Beacons National Park, in Wales. In this case the designer used the surfaces of the wooden benches as communication surfaces, so engraving tactile maps on the pieces of furniture that have been installed along the path.

3.3 Interpretive Panels

It is common practice in the functional project of parks and green areas of particular value, to provide some significant points of the paths with graphical panels carrying informations on the ecosystems to be observed, with the emphasis on the faunal and floral species present on the site. The interpretive panels are fully part of the coordinated communication project of the park, often adopting the same codes and identifying characters. These panels are particular examples of infographics. They descent from an analogical world that wanted to bring scientific information, managed with a manual approach and with a simple and informative language, to the public of visitors, often imagined as it was overall composed by children. In some of the most recent communication projects for the parks, the interpretive panels have been conceived as hybrid interfaces - analog/digital - able to increase inclusiveness of communications. So from the simple integration of tags in the graphics of the panels that refer to the online world, we witness the transformation of the same into three-dimensional tactile maps also including short braille texts, so usable by an extended range of users. Important examples are the ones designed by Atlantex Creative Works for the Canadian Fundy National Park, or the ones installed in the botanical garden of Porto Caleri in Italy.

4 Conclusions

This ongoing research demonstrates the need of a paradigm shift in redefining the "eco-social" role of parks that, if redesigned through scientific and interdisciplinary actions, can become places for promotion of health, culture of respect for nature, socialization and valorization of the territories. Natural parks can contribute to the contrast of the fragmentation of the territories and can act as a mitigation instruments between urban, periurban and rural areas. Tools of diffused ecology, economy and education, markers of sustainability and wellbeing. Design sciences play a strategic role in redefining priorities, anticipating transformations, giving identity and new meanings to places, artefacts and services, involving different actors in research-action paths oriented to

[5] Massimo Vignelli, graphic designer, in 1977 he realized, in collaboration with his wife Lella, the Ungrid project; one of the first integrated projects of corporate identity, wayfinding and communication for parks. Client: Natural Parks Service (USA).

sustainability. Design do not only has to propose "constructive practices", but "strategies of resemantization and refunctionalization" to gain true models of inclusiveness and social development. With this in mind, the design of new solutions for parks has the task of updating and redefining the rules of coexistence between nature, people and artefacts and therefore the possible degree of anthropization of nature; and planning new models of use that include new users, new priorities, new sensibilities and new awareness.

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