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Maintaining the built environment through community engagement tools and strategies: playground as experimentation platform.

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Abstract

The proposed research investigates community engagement processes in built and urban heritage care strategies, aiming to control the built environment quality with a view to users' involvement, awareness, and education.

Focusing on places intended for school-age users, the research experiments with methods and tools for transferring a shared monitoring strategy, where parents and children experience tools to detect information about the quality of the playground system and its sub-systems (UNI EN 1177; UNI EN 1176-1; UNI 11123). These tools, designed according to the specific abilities and skills of the users, enable knowledge of their changing needs over the playground's life cycle, guiding managers in planning maintenance and rehabilitation activities.

Through the analysis of two selected case studies, located in settlement systems within the municipality of Naples different for physical, social, and economic characteristics, strategies for the activation of training workshops for playground maintenance and rehabilitation are outlined.

Built environment is assumed in the research as enabler and maintenance as driver for the connection with the community: the user becomes an actor within the maintenance process capable of having an influence on the activities and their scheduling.

Keywords: Playground, Shared maintenance, Community engagement

1. Introduction

European policies emphasise the importance of involving communities in the regeneration of neighbourhoods and toward a sustainable development [1-2-3-4-5]. The international community also recognizes that protecting physical, cultural, economic, and social values is essential to promote human development [6-7-8-9]. Particularly, two main issues are debated in international documents: extending the life cycle of heritages and active stakeholder involvement [4-10-11-12].

The community-centred vision for the care and enhancement of cultural heritage calls into question younger people's responsibility, to let them learn to be custodians of sedimented qualities [13].

The Convention on the Rights of the Child [14], in Article 29, declares the need to educate children to be responsible within the society and to respect the environment. In Art. 31, moreover, play is recognized as an "inalienable right," not only for the physical growth, but also for the social, emotional, and intellectual development of the child. It also becomes a developmentally supportive tool: indeed, numerous research studies have shown that children who have been denied the right to play exhibit socially aggressive and emotionally repressed atypical behaviours [15-16-17-18]. Psychologist Friedrich Froebel recommended playgrounds for children as tools to support psycho-physical development and teach good manners [19].

The article focuses on the enabling processes intended for the care of the built environment, through edutainment activities and tools, aimed at young users and their educators. Playgrounds are the subject of the study, as public spaces designed to develop users' imagination and creativity through play [13]. The work originality consists of the shift from an occasional and discontinuous conception of stakeholder involvement, to one that makes the participation process constant and supported by tools appropriately designed for young users.

The research is structured around the theme of monitoring urban playgrounds' performances. This continuous process over time has the aim, on the one hand, to detect the evolution and changes in the users' needs, and, on the other hand, to ensure the extension of the useful life of these urban presidia. This process has the broader goal of generating in the citizens of tomorrow a fondness and care for the built environment.

The paper is organised as follows: (a) a brief state of the art on the preservation of the built heritage and community engagement, with particular reference to younger people, is provided; (b) the built environment maintenance process as a tool for community engagement is introduced; (c) two case studies of playgrounds are analysed for which to test tools for involving younger people in maintenance activities; (d) an hypothesis of strategies and tools for collaborative maintenance of playgrounds is defined.

2. Built heritage and community engagement: toward the inclusion of children and youth in care processes

Reactivating the symbiosis between built heritage [9] and communities [10] is now a shared commitment to the conservation and transmission of built heritage [20]. International policies and documents are directed toward symbiosis between sites and communities: developing, on one side, issues related to the value system embedded in heritage and, on the other, transformation processes; moreover, they promote the idea of built heritage as [13]: (a) record of historical development and way of life, connecting capital between community and context [10]; (b) representation of creative capacities and man work, support toward community engagement and empowerment [9]; (c) driving force for growth [21].

In Europe, since 2005 with the Faro Convention [9], and still today with initiatives such as The Faro Way [22], the Europe for Citizens Program [23], the enhancement and preservation of built heritage is promoted through community participation in its governance.

The interest in the participation of the youngest, so that they can learn to be custodians of sedimented qualities [13], arose mainly because of the UN Convention on the Rights of the Child [14]. Today it is recognized that their participation is relevant to a broader global interest and could benefit community engagement policies and practices [24].

The Convention on the Rights of the Child [12] is reinforced in 2002 by the report A World Fit for Children [25] where it reported (pp. 66-67) that States need to promote and protect the rights of children by: ensuring their safety; building a world fit for children, where sustainable human development takes their interests into account; and leveraging the issue of listening to children, ensuring their participation.

There are numerous initiatives internationally aimed at creating "child-friendly" cities [26]. In addition, in many countries around the world, and in different ways, children and youth are enthusiastically involved in building cities:

- in Belarus, 2007, the Child Friendly Cities initiative was aimed to create an environment conducive to children's development through the meaningful participation of children and youth in decision-making processes [27];
- in France, the National Committee organises an annual broad consultation with children on their perceptions of their lives and ability to exercise their rights [28];
- in Nepal, July 2011, the Government of Nepal approved the national strategy on Child Friendly Local Governance (CFLG). One of the main CFLG mechanisms for child participation is the mobilisation of child clubs. Through child clubs, about 80,000 children participate in various local governance structures and processes [29].

Planning, design, monitoring, and management of the physical environment are ideal areas for the practice of child participation: "it turns out to be clearer, to them, the vision and understanding of social problems" [30]. Moreover, as emerges from the literature review addressed by [31], it is important that children feel genuinely involved in these processes and that their involvement can make a difference.

3. Planned playground maintenance: a community engagement tool.

Planned maintenance is the combination of activities, conducted according to a predetermined and continuous plan, through which it is intended to maintain the quality levels of the built environment in order to perform the required functions [32-33-34-35-36-37-38]. Since maintenance can be conducted through planned activities exercised for preventive and corrective purposes, it requires an adequate monitoring of the built system [39]. Thanks to the new opportunities offered by digitalization, some phases of the maintenance process, usually under the responsibility of technicians and construction workers, can now be carried out by different expertise [40]. In fact, if the planned maintenance activity

is supported by adequate tools for dialogue with different categories of users, these can be included in the processes of knowledge, diagnosis, control, and monitoring [41]. In this sense, maintenance activity, in addition to providing tangible benefits to communities, in terms of safety and quality of the urban system, can be considered an effective engagement tool and agent of connection between built heritage and community.

The cultural coordinates of maintenance activity, even at the urban scale, have been marked by the overcoming of the role of the user as an outsider to information and decision-making procedures [36-20]. Participatory maintenance processes are not new-found; experimentation with numerous operational practices has shown how such strategies succeed in improving the degree of user satisfaction and the effectiveness of the maintenance process [42]. This is especially recognized when the benefits are perceived in a tangible way, generating a fondness for the asset not only because of the function they perform, but also because of the value attached to it [43].

If properly supported, users, citizens and tourists can be co-responsible actors in the maintenance process, implementing simple maintenance operations and learning to recognize anomalies in the system. Shared maintenance processes foster users' affection and prevent them from engaging in improper behaviours [44].

At the base of participatory maintenance processes there is the need for collaboration and information sharing among different actors [45-46].

Scientific and technological developments have recently produced digital tools for dialogue with citizens to report failures or malfunctions of the urban system to area managers (e.g., through a photo and a comment), following a registration to the mobile application or web platform. These are intended for an adult audience that is responsible and more sensitive to such issues and feature a lack of scientific approach [47].

The purpose of this research is to develop devices that trigger and facilitate interaction and information sharing between area managers and younger age groups. In this way, the latter can become responsible and sensitive to the care of the spaces they enjoy, and active citizens in building a sustainable environment for their future.

To this end, the object of the proposed experimentation are playgrounds, as devices to garrison settlement culture [13] capable of contributing to the children's growth, through the creation of bonds of affection and responsibility in the territory where they grow up.

Therefore, the research proposes to develop, through the initiation of an experimentation on two playgrounds case studies, hypotheses for the implementation of tools to support participation strategies: involving children and youth, with their tutors, in the process of playground care and maintenance.

3.1 Playground: privileged educational platform for urban space care. Two Neapolitan cases

Since its creation, the playground has been a tool for urban redevelopment of residual or underutilised spaces in the city. In the years after World War II, in fact, the interstitial, leftover spaces of cities began to be reused as places for children to use for entertainment and leisure activities [48].

Today, open spaces are recognized as playing an increasingly important role within the urban fabric both for their identity characteristics and for the psychophysical benefits they convey to the communities that enjoy them [9]. These spaces are to be considered as structuring elements of the city, with a strong balancing attitude that is also social in nature [49].

In this context, playgrounds become an intended use for public spaces that, through play, has the potential to stimulate the community dimension of custodianship involving and educating young people in the empowerment of public space [50]. Playgrounds stand, therefore, as an ideal platform for experimenting with innovative strategies of participatory maintenance of public open spaces. An opportunity to establish a dialogue between children and adults.

"Experience indicates that the construction process can begin in different ways: top-down - with a mayoral decree or formally adopted government decision, actively coordinated to reach all levels of administration and all corners of the city. Or from the bottom up-from a small neighbourhood initiative, an initiative led by children claiming their right to play and move around the city safely, demonstrating the potential for citywide outreach. In most cases it is a combination of different approaches" [26]. Diversity of approaches is one of the distinguishing features of the Neapolitan cases analysed (Figure 1): (a) the playground designed by Dominique Perrault Architecture, in Piazza Garibaldi, Naples, 2nd Municipality; (b) the Corto Maltese Park, in Via Hugo Pratt, Naples, Scampia, 8th Municipality.

The playground in Piazza Garibaldi, product of an urban regeneration project by Dominique Perrault's studio, is part of a large urban area that also hosts green and leisure spaces, with soccer and basketball fields. It can be understood as a top-down regeneration effort; in 2004, Metropolitana di Napoli Spa commissioned Dominique Perrault to design the Line 1 subway station and the square in front of the central train station. Moreover, the project is in the public funds "Patto per lo Sviluppo della Regione Campania." The design choices are developed from the needs to redevelop a complex urban area. Piazza Garibaldi is not only a vast area (it covers about 65 thousand square metres), but it is also one of the most important and frequented squares in the city - since 1866 the Napoli Centrale station has

overlooked it - and it is also an area characterised by crime events, as attested by the news reported in local and national newspapers.

The space in front of the central station, built in the second half of the twentieth century following the demolition of the passenger building of the nineteenth-century station, appeared as an urban void interrupted by streets crowded with cars, buses and pedestrians. Dominique Perrault reorganised the open space by dividing it, through the central driveway, into two parts: on the south side the semi-hypogean plaza was designed and built, which includes a shopping arcade and leads to the entrances of the Line 1 subway, and local and national rail lines; on the north side at the same elevation of the street, a multifunctional area has been designed and built, containing a playground, sports space, a green area with gazebos and an amphitheatre, which in addition to leading to the entrances of the Line 1 subway can host musical and cultural events.

The playground is, therefore, located in the northern part of the square close to Vasto district, covering an area of about 5,000 square metres.

The maintenance, cleaning and waste management of the area is entrusted to the company "Asia Napoli," while the maintenance of sports and playground equipment is entrusted to the relevant Municipality. This is also the place of confluence of any reports of breakdown and tampering of the facilities, received by telephone. The reports received are forwarded to an external company that is entrusted to carry out the interventions.

The classification of the environmental and technological system of the playgrounds is proposed in Table 1 to define the types of users and technical elements to be maintained.

Table 1: Analytical sheet of the environmental, functional, and technological systems of the Garibaldi Square playgrounds.

Giardini di Piazza Garibaldi		
Analysis of spaces and functions		
Function	playground; outdoor sports; leisure; crossing	
Type of space	Spatial domain	Users
<i>Open spaces</i>	Pedestrian transit area	Children*, adolescent**, families, seniors, commuters, tourists
	Green area	Children*, adolescent **, families, seniors, commuters, tourists
	Cycle track area	Children, children, families, tourists, commuters
	Play/sport area	Children, adolescent, families
	Performance and event area (Amphitheatre)	Children, adolescent, families, elderly, commuters, tourists
Technological system		
Technology Unit	Technical elements class	Technical Elements
Lower horizontal closure	Floor/ground/ roadway	Pavement
		Flooring
		Cycle path
		Surface for playing football and
Vertical external partition	Protection elements	Walls
		Railings
	Separating elements	Bollards
Inclined external partitions	Stairs and Ramps	Cordonate
		Gradonate
		Ramps and inclined planes
Collective outdoor furniture	Game equipment	Swings
		Slides
		Net and climbing frame
		Football goals
		Basketball baskets
		Swings
	Leisure Equipment	Benches
		Waste containers
	Green System	Trees
	Installations and service provision	Lighting installations
Notes: *Children, between 5 and 11 years old; **adolescents, between 11 and 17 years old		

Corto Maltese Park is in the metropolitan city of Naples, in the Scampia neighbourhood, between Hugo Pratt, Attilio Micheluzzi and Andrea Pazienza streets. It is a bottom-up regeneration project in that it was born from the intentions of the non-profit association "The Green Thumbs", formed in 2012 by a section of residents. The Park represents a project to rehabilitate an abandoned urban area that had become an unauthorised waste dump and the scene of criminal actions.

The association's goal was to improve the quality of the area through the creation of multipurpose spaces for outdoor activities and social integration. These activities have increased the safety and well-

being of the community, returning a space that was now the preserve of crime. The project was funded by the community itself and continues to this day to be so by benefiting from 5x1000 donations.

Corto Maltese Park occupies an area of about 10,000 square metres, and consists of an area designated for sports: a basketball court, a soccer field and a tennis court; and an area for the entertainment and play of children, families, and animals: a dog walking area, an educational garden and a children's play area.

Prefabricated toys and games self-made by the community itself were placed in the children's play areas. Murals were created on the boundary walls, by the association members themselves. Various tree species have been planted in the green areas, benches and waste baskets installed. It is the scene of various events to raise awareness for respecting and caring for the environment, and to combat social marginalisation. Currently, the care, management and maintenance of the areas is carried out by the association "Pollici Verdi" [51], which, as it emerged from the interview conducted with one of the members, is responsible for redevelopment works (such as the installation of new games) and maintenance of technical components, while waste disposal is entrusted to the company "Asia Napoli." For this playground, an analysis of spatial, functional, and technological systems was carried out, aimed at identifying user categories and building shared maintenance strategies (Table 2).

Table 2: Analytical sheet of the environmental, functional and technological systems of the Corto Maltese Park playgrounds.

Parco Corto Maltese		
Analysis of spaces and functions		
Function	Playground; Pedestrian transit; Resting..	
Type of space	Spatial scope	Users
<i>Open spaces</i>	Pedestrian transit area	Children*, adolescents**, families, seniorcitizens, associations
	Green area (park)	Children*, adolescents**, families, seniorcitizens, associations
	Play/sport area	Children*, adolescents**, families, seniorcitizens, associations
	Kitchen garden area	Children*, adolescents**, families, seniorcitizens, associations, farmers
	Dog area	Adolescents**, families
Technological system		
Technology Unit	Technical elements class	Technical Elements
Lower horizontal closure	Floor slab o Floor o roadway	Vegetation
		Garden
		Pavement
		Flooring
		Playing field surface
Vertical external partition	Protection elements	Wooden fences
		Green fences
	Separating elements	Fence walls
		Gates
		Railings
Inclined external partitions	Stairs and Ramps	Cordonate
		Gradonate
		Ramps and inclined planes
Collective outdoor furniture	Game equipment	Swings
		Slides
		Tennis court
		Basketball court
		Football pitch
	Leisure Equipment	Benches
		Waste containers
Green equipment	Trees	
Installations and service provision	Lighting system	Streetlights
Notes: *Children, between 5 and 11 years old; **adolescents, between 11 and 17 years old		

3.1 Digital technologies to support shared maintenance strategies for playgrounds

Based on the systemic knowledge of the user categories of the playgrounds analysed, the decomposition of the environmental, functional, and technological system - according to the UNI 8290 [52] standard- and the literature of some examples of shared maintenance, the research proposes the hypothesis of designing digital tools and applications to monitor the performance of playgrounds, as engagement tools.

In both case studies highlighted in the previous paragraph, the user categories were identified: children (5-11), adolescents (11-17), and tutors, with a substantial difference related to the design and implementation process: the Corto Maltese Park was born from a so-called bottom-up process, desired, supported and funded by the community; while the Garibaldi Square playground from a top-down process, commissioned by the company Metropolitana di Napoli Spa and financed with public funds.



Map of Naples, localization of case studies: 1. Giardini of Piazza Garibaldi, 2. Parco Corto Maltese



Giardini of Piazza Garibaldi. Photos by the authors.



Parco Corto Maltese. Photos by the authors.

Fig. 1: The image depicts the framing of the case studies, within the city of Naples, and some detailed photos.

This difference does not determine significant distinctions in the identification of the system's components, nor of the requirements and performances [53-54-55] but it is to be considered when defining engagement strategies and tools. They could be different according to the categories of users and their degree of involvement and participation in the activities to be proposed.

Specifically, the proposal discussed here involves the design of digital tools and mobile applications for surveying the needs of playground users, designed ad hoc for each identified category. The intent of providing both tools and a mobile application is dictated by the different abilities and skills of the identified user categories. Moreover, in the case of the mobile application, the advancement over previous research¹ and existing applications on the market are related to the construction of a digital pathway measured to the needs of young users. In fact, the following are envisaged: (a) interactive tools, for play, intended for children, to detect their needs in relation to the comfort and safety of the playground; (b) a mobile application for reporting failures and malfunctions, and for monitoring the playground quality over time, connected to a platform intended for the management of the reports received.

Specifically, the mobile application will have interfaces tailored to the age differences, with gamification tools, reward systems, and edutainment mechanisms that will entice users to use it.

Reports from the mobile application intended for children and parents are characterised by a series of information in support of the visual inspection, equipped with photos, labels and comments, useful to the manager in establishing a pre-diagnosis of the built system [56-57-58-59]. The manager can, in addition, through push notifications sent by the web management platform, ask users in the target area who have installed the application, for control of specific elements or areas within the playground. In this way, it is reported an increase in resources useful to the manager for the monitoring.

For what has already been pointed out, it is also necessary to think of ways and strategies for the promotion and dissemination of tools, differentially in relation to the two cases. Within Corto Maltese Park, the process of engagement with the community is already active and the dialogue between users and managers of the area is constant; in the case of Garibaldi Square, it is necessary for the municipal entity to activate channels, or use existing ones, so that, with the tools hypothesised, it is possible to activate processes of engagement with the settled community.

At this point, the continued use of the tools and their success depend in part on the ability of the manager to respond to the users' needs. In both cases users feel responsible for the process of caring for the playground, reducing the phenomena of vandalization and increasing respect for common goods.

To this end, in relation to the types of users identified, the proposed engagement in playground maintenance activities provides that: (a) tutors are reminded of the use of the application through infographics distributed in the area. They have a direct interest in the use of digital monitoring tools because of the need for safety towards their children using the playgrounds; (b) adolescents are engaged through user-friendly interfaces and gamification strategies. Educational infographics around the behaviours to be maintained for the care of public spaces, are provided; (c) children are engaged interactively through the design of totems, as play tools. These tools will be designed to interact with young users using easy questions about the quality of their experience.

The research plans to test the hypothesised tools on the reported case studies. As mentioned above, it will be interesting to assess the dynamics resulting from their use in the two different cases, in relation to bottom-up and top-down processes. It is expected, in fact, that the level of diffusion and use of the applications will be higher in the case of bottom-up practices, where the sense of belonging to the place and responsibility towards the care of such spaces is stronger; in the case of top-down practices, more difficulties are expected in the use of these tools. Above all in socially challenging backgrounds, such as Piazza Garibaldi, where the guarantee of acceptance and use could be mainly related to the ability of the managing bodies to offer a timely and adequate response to the users' needs, as emerges from several experiments of participatory maintenance [42].

The tools hypothesised influence the formation of responsible citizens in the care of the places they live, and positively affect the scheduling of maintenance and potential renovation. The questions around the quality of children's experience makes it possible to continuously monitor their changing needs, ensuring that managers can design and plan appropriate activities and interventions.

In this participatory approach, the achievement of built environment quality objectives depends on the dialogue that users activate with expert knowledge. The latter has to guarantee: relating building technologies, failures and lowering of the performance levels; detecting changing needs; outlining maintenance strategies; organising and monitoring the service provided.

¹ Applications designed for mobile devices, geared toward the conduct of inspections by the common user, have shown positive feedback as revealed by studies carried out earlier by the study group, related to Maintenance Urban Sharing Tool mobile application to support the monitoring of the built system, the subject of two subsequent developments: the first following the METRICS project [46], which had seen apartment buildings in some areas of the city of Naples engaged in the process of diagnosis for the detection of anomalies found on the facades of apartment buildings, in the courtyard and street areas; the second conducted within the doctoral research [60] built on the project of Start Up MUST Srl, which extended the experimentation to the urban system, building an ad hoc digital pathway for users of urban space and heritage.

In addition, through the constant questioning constructed to obtain children's and adolescents' opinions on the quality of the spaces they live in, the manager succeeds in guaranteeing the main rights of children, in line with what is reported in the text "Building Child Friendly City. A framework Action" [26]: (a) "Express their opinion on the city they want," (b) "Walk safely in the streets on their own," (c) "Live in an unpolluted environment."

4. Conclusion

With a view to the sustainable use and management of available resources [11], strategies for building and urban shared maintenance foster participation and complementarity among multiple skills and actors, including non-experts, toward the efficient maintenance of built capital.

In particular, the participation of young people groups incorporates the goals of the sustainable development strategy as defined in the World Commission on Environment and Development 1987 Brundtland report "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Children and adolescents are active players in building a sustainable environment for their future, while gaining awareness of the need for care of the spaces they themselves enjoy.

Starting with young age groups means investing in responsible and active citizens in the development of cities. Education for the care of places, starting with the residents of communities, should be radically reconsidered so that it becomes a priority agent for achieving sustainable development. "The residents of any community know best what many of the environmental priorities and problems of their community are" [30].

By expanding the range of informal and formal spaces for participation, more people could participate, responsibility is shared more broadly, with less reliance on "experienced citizens" [61]. This increases the number of channels through which communication can flow within and between communities and partnerships, avoiding the "bottleneck" of a formal structure or key person [62].

Participation must involve collaboration and dialogue between youth and adults and between communities and government to enable joint projects to explore, understand and respond to community problems as part of a community development process [62].

Today, open spaces for collective enjoyment are recognized as having a driving role in community cultural growth. This research develops the theme of shared maintenance by exploring playgrounds as an ideal platform for experimenting with innovative strategies, which through play can stimulate the community dimension of custodianship based on the involvement and education in the empowerment of public space [50] of an educated-age audience.

Digitization contributes to tailoring the management process, to the specific needs of use of the built heritage, indicated by the users themselves. Thanks to the digital tools hypothesised, the user is transformed into an actor, able to have an influence on the scheduling of maintenance activities and management, to orient the process according to his or her own priorities.

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