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LEARNING (IN/FROM/THE) CITY: RECONFIGURATION OF URBAN SPACE INTO A SUSTAINABLE 'MACRO-SCHOOL'

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ABSTRACT

This paper intends to intertwine the fields of educational space, architecture and urban design, as well as sustainable development, and it is grounded in two main arguments. The first argument is that in recent decades there have been trends of breaking boundaries between independent spatial units within the school building, as well as within the planning/design process, with the ultimate goal of opening the educational environment to public space and public debate. Consequently, as the urban environment is progressively recognised as a canvas of multiple learning experiences, open-air space is approached as an environmental tool for informal/non-formal education and sustainability. The breaking of spatial boundaries within the school building to outdoor spaces and the city renders the city as a sustainable 'macro-school'. This discussion is theoretically framed in the educational perspective about the relationship between education and the city defended by Trilla (1993); the city as a context for education; as a medium for education; and as an educational subject; and in the dimensions mentioned by Palmer (2002): education about, in and for the environment. Thus, open-air learning space is explored as a tool of environmental education, through participatory planning processes, the co-creation of liveable urban spaces, and their use for spatial literacy, socialisation, environmental action and bottom-up activism. The interpretation of a set of examples of individual urban sites, that cover a diversity of purposes and geographies, brings some insights into this debate and enables us to understand how urban space is being reconfigured into a sustainable 'macro-school'.

KEYWORDS

Learning city; education and city; environmental education; urban space; participatory processes.

1. INTRODUCTION

In the 21st century society marked by globalisation and the domination of the digital, the nature of education is being rethought. Learning can be achieved in different places with the utilisation of mobile technologies, a condition that has recently intensified by the implications of the COVID-19 pandemic. In addition, we have been witnessing a growing appearance of out-of-school practices, organisational forms, and curriculum regarded as a remediation, a supplement or a complement of local school systems, with a wider social value of learning (Sefton-

Green and Erstad 2019). These forms of out-of-school education emerge as alternatives to the formality of the rituals, organisation and control of the educational system through the informality in which learners are engaged including the lack of a formal evaluation process (Ladwig; Lames G. and Sefton-Green 2019, 25). In this frame, cultural institutions, such as museums or libraries, and outdoor urban spaces, such as gardens or squares, assume a form of semi- or non-formal learning loci. The idea of expanding the learning process beyond the school boundaries does not imply its extinction, but rather the promotion of a broader and more holistic approach to the learning process and to the role of the environment in it.

In recent decades, the use of open-air urban space has been gaining ground in the debate on the role of the environment in learning processes (Tsoukala 2005). The schoolyard and urban space emerge as new learning environments which we approach through the lenses of informal/non-formal learning and sustainability. This discussion around school/out-of-school learning, its correspondence with formal or/and informal modes of learning and its use for environmental education poses new challenges to the design of spaces where learning can take place. At the same time, the boundaries that have been progressively approached in the process of exceeding the school as the exclusive locus of education, lead us to the investigation of the educational potential of outdoor spaces, with particular emphasis given to the urban environment. From the educational perspective, Trilla has pointed out three dimensions in the relationship between (informal/non-formal) education and the city, which lead us to reflect on the challenges to be considered from an architectural point of view: the city as a context for education (learning in the city); the city as a medium for education (learning from the city); and the city as an educational subject (learning the city) (Trilla 1993). Simultaneously, the urban environment has the potential to constitute a valuable resource for environmental education, in all its three dimensions as defined by Palmer (2002); education about the environment, in the environment and for the environment.

Parallel to this, the school environment needs to be re-promoted as a vital social space, with the provision of a multiplicity of locations and spatial types, in order to compensate for the 'attractiveness of the screen'. On this topic, Herman Hertzberger's structuralist compositional approach is of particular relevance to school architecture by using the complexity of the city as a source of inspiration to his school design projects (Hertzberger, Vall, and Vos 2012). The interpretation of the school buildings designed by Hertzberger allows not only to understand how the urban system can be translated into spatial means within the school space (school as a micro-city), but also alerts to the educative potential of the urban space (city as a macro-school).

Framed in this theoretical context, this paper intends to approach and intertwine the fields of educational space, urban design, as well as sustainable development. There are two main arguments that are defended throughout the paper. The first argument is that in recent decades there have been trends of breaking boundaries between independent spatial units within the school building, as well as within the planning/design process, with the ultimate goal of opening the educational environment to public space and public debate. The concept of exceeding the limits of each unit does not imply their abolition but signifies the exceeding of the classroom and the school building as the exclusive loci of education. The second argument is that as the urban environment is progressively recognised as a canvas of multiple learning experiences, open-air space bears significant potential as an environmental tool for informal/non-formal education and sustainability (Raikidou 2022).

The breaking of spatial boundaries within the building renders the school as a 'micro-city', whereas outside of it, the same process

renders the city as a sustainable 'macro-school'. It raises questions such as: how can public space be interpreted in educational terms? How can it be explored as a sustainable tool of (and for) education (environmentally, socially and culturally)? How can architecture contribute to enhance the educational value of the public space? How does the participative planning of an urban educational structure contribute to a more sustainable relationship between members of the wider community?
In the search for answers to these questions, the article presents first the theoretical framework that supports the following interpretation of a set of examples of individual sites, organised according to Trilla's dimensions. These examples cover a diversity of purposes and geographies, bring some insights into this debate and enable us to understand how urban space is being reconfigured as a sustainable 'macro-school'.

2. BACKGROUND

By extending the boundaries of the classroom and school building, outdoor education gives outdoor physical space an important role in the learning process, requiring a comprehensive approach that adequately and effectively supports and stimulates learning in the city taking into consideration the three dimensions stated by Trilla (1993) (learning in/from/the city) and by Palmer (2002) (education about/in/for the environment).
The three dimensions of the relationship between education and the city mentioned by Trilla in his writing "La educación y la ciudad" (Education and the city) (Trilla 1993). deserve a brief explanation to understand their implications for the design of educational spaces, from the scale of the building to the scale of the city. The first dimension, the **city as a context for education** (learning in the city), considers the configuration of an educational network which includes multiple diverse urban spaces and places (from school buildings or educational centres to the entire civic, cultural and commercial urban network) that provide resources and stimuli combining formal, non-formal and informal modes of education. The educational impact of a city must be seen as the result of a synergistic action, considering not only the quantity and quality of the schools, but also the rest of the institutions and means that generate learning, and how they all interact harmoniously functioning as a system.
The second dimension, the **city as a medium for education** (learning from the city) considers the city as an informal agent of education as it is a source that generate education and socialisation, a transmitter of information and culture. The density of encounters and cultural elements in the city promotes communication, the exchange of cultural experiences and thus knowledge. Additionally, it incorporates different means of information transmission, which convey messages in a random way. In this sense, urban environment can be ambivalent since it can promote culture or civility, or generate marginalisation or indifference, and the way it is designed should be seen as an effective educational intervention.
The third dimension, the **city as an educational subject** (learning the city) considers that informal knowledge generated by the urban environment is also knowledge about the environment itself. Making the city the object of education means overcoming the limits of superficiality and partiality that are often present in direct and spontaneous learning about the urban environment, deepening the informal knowledge of the city, learning to use urban resources, to interpret the processes that shape the territory, to understand its dynamics. The city is a vast reservoir of resources for lifelong self-education, and educational institutions should prepare people of all ages to be able to access the educational and cultural possibilities of the urban environment on their own.
The role of education was early on recognised as crucial in addressing the environmental

concerns of the post-war Western world, thus leading to the emergence of environmental education. Palmer (2002) mentions the framework for environmental education in the interconnection of three trends: education about the environment, in the environment and for the environment, which in turn provides an individual holistic approach on the theme based on concepts of concern, experience and action. The first two dimensions relate to the understanding of environmental issues through environmental information and the collection and analysis of data through in-situ investigation. The third approaches environmental concerns through a holistic and critical approach, by analysing the underlying socio-economic causes, engaging in decision-making processes and taking environmental action.

This interest in public space, its interconnections with education, and the intention to exceed the school as the exclusive locus of education, was intensified with the COVID-19 pandemic (Boys and Jeffery 2021). Attention has been focused on outdoor education (Dyment and Potter 2015; Facer and Buchczyk 2019) and, by extension, on the physical attributes and the spatial configuration of the schoolyard and public urban space for informal and non-formal learning, through the lens of environmental and social sustainability. The interpretation of recent cases relating education with the city considers also concepts associated with the spatial literacy that entails familiarising children with the material and immaterial features of their environment, participatory practices applied in the planning/design stage and in the evaluation of the environment leading to the user's emotional involvement with the social and natural environment (Tsoukala 2005) and acting as an interactive pedagogical tool for spatial literacy, as the school/urban environment is the place where the bar is set for the environmental quality that the individual claims as an adult (Fisher 2005).

3. RECONFIGURATION OF URBAN SPACE INTO SUSTAINABLE 'MACRO-SCHOOLS'

The following examples intend to discuss outdoor initiatives in which the outdoor environment (from the school ground to the city) becomes an innovative tool for environmental education and social justice. They are discussed through the lens of Trilla and Palmer's dimensions. The examples include initiatives implemented by public/private institutions, based on participatory processes, and by educational services of cultural institutions in urban parks.

3.1. Climate shelters network in the city of Barcelona

The programme carried out in Barcelona to create climate shelters to regulate temperatures and create more comfortable surroundings for city residents has implemented close to 200 shelters, including the transformation of school playgrounds (Ajuntament de Barcelona n.d.; Urban Innovative Actions 2021). The plan started with the redesign of eleven school playgrounds combining a package of blue measures (incorporating water points), green measures (spaces for shade and vegetation) and grey measures (works on buildings to improve insulation). The archi-landscape solutions are based on the creation of a sequence of paths that connect new shaded areas that can be used both as small classrooms and play areas through new trees and awnings, the replacement of concrete surfaces by natural land with a combination of different plants, and the creation of new water points and play areas (Fig. 1 and 2).

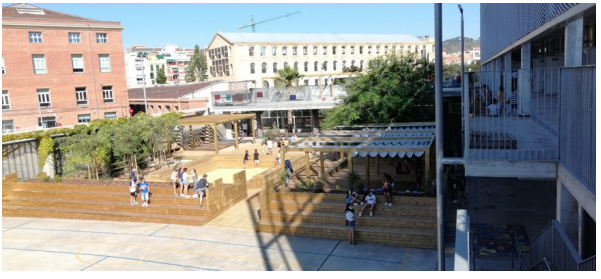
We can read these spaces through the lens of Trilla's dimension Learning in the City: "The city is a container of multiple and diverse education … which is spread throughout most of its spaces" (Trilla 1993, 9). These interventions considered the urban and the physical environment as a context for educational events through the implementation of a pedagogical plan that

involved school community in the evaluation of the benefits of the architectural measures on the mental and physical health of the user. Workshops and participatory activities, besides bringing together three scientific partners of the project, teachers and students, also framed the educational programme in experimentation activities. Students were taught to measure changes in their environment (for example, temperature, humidity, CO2) and to evaluate the effectiveness of architectural interventions on health and how these affect people's quality of life.

Architecture is in the centre of an educational experience through the design of urban spaces that interconnect modes of formal, informal and non-formal education mainly focusing on information and training on climate change. Schoolgrounds design contributes to a broader system of an urban educational environment giving shape to the first two dimensions on environmental education: education about and in the environment (Palmer 2002)

The territorial and social amplitude of schools provides an urban educational opportunity not only for children but also for the community, with the so often neglected outdoor spaces of schools at the centre of an educational programme. The impact at the city level is expressed in the following sentence: "Schools are a strategic intervention opportunity in the city and are assumed to be an equitable space both socially in territorially. All city children go to school, so if we intervene in schools, we give all children the chance to enjoy the benefits because the schools are spread around the city, which means all the districts benefit" (Urban Innovative Actions 2021).

In Barcelona, green spaces and their relationship with educational institutions are mapped on an open access online platform that then can be utilised for the co-creation of participatory strategies, prioritisation and management of green infrastructure projects. Apart from the proximity to educational spaces, other mapped parameters include population density, air and noise pollution and the networks of green and blue infrastructure, as well as sustainable mobility. Learning the City, according to the Trilla's dimensions (1993, 16). Urban greenery has nurturing, healing and recreational capacities and its exploitation presents high potential for the present and future of the city. On the one hand, formal and informal educational activities within green spaces in the proximity of schools could effectively address the health and learning crisis of the Covid-19 pandemic. On the other hand, strengthening the network of existing and future green spaces can contribute to the handling of climate change by identifying and measuring variables that shape the urban microclimate.



Figures 1 and 2. Schoolground in one of the schools in Barcelona. (https://www.uia-initiative.eu/en/news/do-changes-made-climate-shelter-schools-improve-pupils-health and https://uia-initiative.eu/en/news/11-schools-barcelona-project-are-now-climate-shelters)

3.2. Network Community Gardens Berlin

Belonging to the Edible Cities Network, the city of Berlin has a network of free-access public community gardens, collectively managed by citizens' organisations, which act as agents of urban greening, lifelong learning, environmental and social justice (EdiCitNet n.d.). A combination of acquiring gardening skills, understanding ecological conditions, urban politics and the concepts of self-organisation and social entrepreneurship help to develop a sense of belonging in financially deprived neighbourhoods and remind urban populations of their dependence on nature. Usual activities include vegetable production, running cooperative cafés, concerts, art exhibitions and workshops dealing with issues such as urban farming, urban development and social inclusion ("Prinzessinnengarten. Kollektiv Berlin" 2022).

Prinzessinnengarten founded in 2009 in Moritzplatz by the organization Nomadisch Grün is part of this project that has been transforming the concept of urban green spaces, while giving form to an urban network with the main aim of providing education and participation opportunities (Fig. 3 and 4). Herbs and vegetables are grown in built transportable organic plots designing a mobile garden (allowing the relocation of the garden, if needed), disused and converted containers house a café, a kitchen and workshop and storage facilities. These elements design a set of pathways and spaces for working, socialising and learning. Workshops, walks, interventions join activists, artists, architects, researchers and representatives of initiatives working on questions such as gardening, urban and rural resilience, commons, land-politics and social housing. As an example on how architecture provided an opportunity "for a direct and experience-based introduction to a social practice of building that highlights connections between community, city, architecture and environment" is the three-story physical platform built in 2016 in a collective process (with volunteers, students and apprentices, for the Neighborhood Academy and other cultural and educational activities). This vertical platform (The Arbour) created spaces for workshops, film-screening and public discussions, while gaving visibility to the social and ecological dimension of the place (Nachbarschaftsakademie n.d.).

The density of human and cultural interactions that these places offer make the city as an agent of informal education, facilitating the communication and the mixing of cultures, therefore the acquisition of knowledge – Learning from the City, according to Trilla's (1993, 16) dimensions. Together with the organisation Nomadisch Grün, activists and local neighbours worked to put this

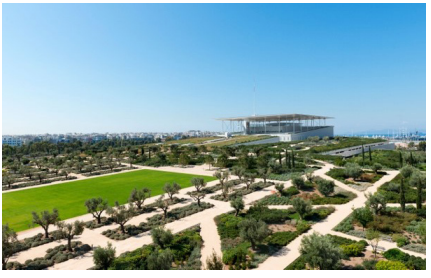
Figures 3 and 4. Prinzessinnengarten, Berlin – general view and training gardening training. (https://www.flickr.com/photos/39367406@N04/11545691785/ and https://www.flickr.com/photos/39367406@N04/11545849803/)

project in practice, transforming temporarily an unused plot into a learning place, As mentioned in the site of the programme: "By trying things out together and sharing experiences and knowledge, we reacquire old cultural techniques, learn a lot together about biodiversity, urban ecology, climate adaptation, recycling, and sustainable forms of urban living"("Prinzessinnengarten. Kollektiv Berlin" 2022). This informal educational approach to urban space, in particular marginalized communities, besides reflecting on new policies and alternative ways of governance the city, also has implications for the design of the city and for the architectural practice by the integration of ecological and social concepts.

3.3. The Stavros Niarchos Foundation Cultural Centre (Athens, Greece) and the Calouste Gulbenkian Foundation (Lisbon, Portugal)

The Stavros Niarchos Foundation Cultural Centre (SNFCC) (2016) is a recent cultural centre designed by Renzo Piano office in collaboration with local architects and landscape architects. The building complex hosts the headquarters of the foundation, the Greek National Opera and the National Library of Greece and is surrounded by a park with an area of 21 hectares (Fig. 5 and 6). The Calouste Gulbenkian Foundation (1969) was designed by Ruy d'Athouguia, Alberto Pessoa and Pedro Cid and is located in a park covering an area of 7,5 hectares. The building hosts also the headquarters of the foundation, a museum, an art library and an auditorium; at one end of this garden is the Centre of Modern Art building. Both parks occupy a central location in city and are recognised by the population from different ages as important outdoor spaces for cultural and educational events.

The park of the SNFCC occupies 85% of the total area and is home to a rich variety of flora, including olive trees and indigenous Greek aromatic plants. It enhances the area's biodiversity, reviving the Mediterranean landscape through its variety of species and the attention to the seasonal blooming, which creates exciting colour schemes and textures, thus attracting various insects and birds to the area. Part of the centre's sustainability strategy is to educate and raise awareness among visitors. In 2017, 2,300 nursery-school, elementary and secondary school pupils visited the park and participated in free environmental awareness programs for schools. There were free workshops on topics related to the environment, gardening, energy and architecture. All the environmental programs are intended to children with special needs and without, adults and the elderly (Stavros Niarchos Foundation n.d.).



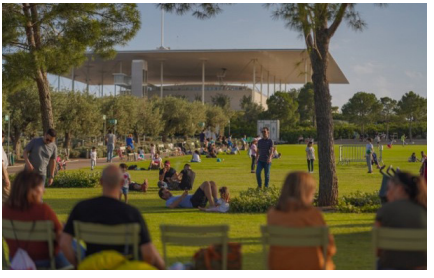
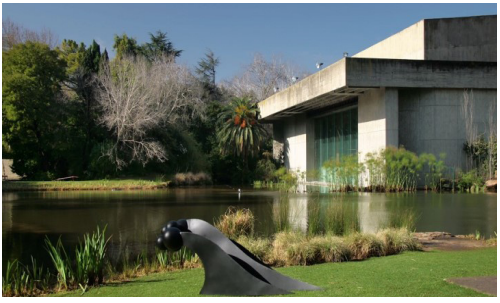


Figure 5 and 6. Park of the Stavros Niarchos Foundation Cultural Centre. (https://www.snfcc.org/en)

The Gulbenkian Park forms an ecosystem which includes more than 230 species of fauna, including 40 species of birds and other various types of animals, and a diverse flora, having a lake, streams, landscaped terraces, trails through groves and an open-air amphitheatre where concerts and shows can be seen. The park has a series of paths that express the main principles which inspired the design of this space: the path of light and shade, the path along the lake and the path along the shore (Fig. 7 and 8). The educational service organises a wide range of activities through workshops, visits, concerts, courses and special projects, which use playful and participatory strategies to captivate, involve and retain the audiences (schools and organised groups, young people, families, adults and people with special educational needs). On the other hand, the environmental, spatial and landscape significance of the park, and the existence of some garden furniture, allows a variety of activities to take place such as meeting, communication, small events, workshops, individual work/study, etc., promoting communication and in- and non-formal modes of learning (Calouste Gulbekian Foundation n.d.).

The concept of the city as an educational subject (leaning the city), the third Trilla's dimension, is explored in both urban parks. Both the biodiversity existing in the park and the architectural attributes of the buildings are used as educational content in activities to a wide range of public. The learning activities promoted by both institutions overcome what Trilla (1993,16) defines as the limits of informal knowledge: superficiality and partiality. Learning the city means a deeper knowledge (not superficial) of its genesis, structure, elements and connections, recognising the diversity of the city's coexisting and juxtaposing urban environments. Collaboration with schools and civil society is an opportunity for children, young people and adults to extend their knowledge to a part of the city that they do not use in their daily life and therefore offers other opportunities for knowledge (not partial). Both parks assume this task of providing informal education, complementing the formal education of schools and facilitating access to knowledge in teacher training and adult self-education from a different part of the city. The nature and its relationship with the built environment are the object of education focused on biodiversity and on the dynamics of the garden as an ecosystem. The



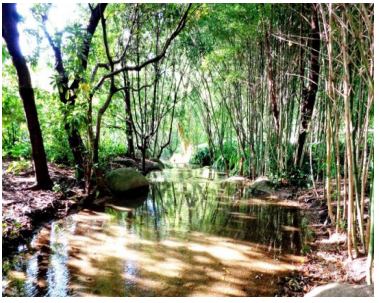


Figure 7 and 8. Park of the Calouste Gulbenkian Foundation. (https://commons.wikimedia.org/wiki/File:Jardim_da_Fundação_Calouste_Gulbenkian_(13943437417).jpg and https://commons.wikimedia.org/wiki/File:Jardim_da_Fundação_Calouste_Gulbenkian_02.JPG)

understanding of their characteristics raises awareness to the role of the urban network of green spaces in promoting environmental regulation, air purification, flood minimisation and to the increase of biodiversity.

4. CONCLUSIONS

One of the main conclusions of the COVID-19 pandemic's impact on education is the consensus that the physical space of school plays a crucial role in guaranteeing equal access to education and in acquiring social competences. But education cannot be restricted within the limits of a building and these goals should also be extended to the physical space of the city and in its relationship with education. The interpretation of the examples confirms that outdoor education is an effective mean to acquire knowledge, complementing local school systems, and to develop life-long learning strategies to promote individual and civic adaptation to social and environmental challenges (Facer and Buchczyk 2019).

Schoolgrounds, urban squares and parks are being rethought by public institutions and private organisations, becoming innovative instruments for environmental education and social justice through participatory planning processes and the co-creation of liveable urban spaces, and their use for spatial literacy, environmental action, social skills or bottom-up activism. Exceeding the intangible boundary of the planning/design process through participatory processes emerges as a crucial tool for the achievement of these goals. At the same time, practices such as combining urban culture with cultural and political action at the community level, collecting environmental data and mapping green spaces, and re-appropriating public spaces by civil society groups give the characterisation of sustainability to newly emerging 'learning cities'. The physical and spatial attributes of the urban space play a central role in the spatial translation of these values and goals.

Architectural design practice is also being rethought by embracing a interdisciplinary and more community-oriented approach in seeking spatial means to enhance urban space as a rich container of educational resources, a transmitter of information and culture and a subject to be learned and decoded in their multiple principles. In the examples above these spatial means are achieved in the form of a system of interconnected outdoor and complementary spaces (paths, open informal 'squares', nooks, supporting indoor facilities) built with sustainable, reused and transportable materials and cost-effective solutions (sometimes self-construction).

With its spatial and programmatic complexity, its diversity of environments and social mix, urban space embodies the distinct forms of education. Improving the relationship between education and the city contributes to more environmentally aware citizens, who will participate more actively in building a better city, based on informed and critical reading. Architecture and urban design have an active role in understanding the educational meaning of the city and incorporating this concept into the design of fairer and more inclusive urban structures (learning cities), considering spatial justice as a form of social justice, a pedagogical tool for spatial and environmental literacy.

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