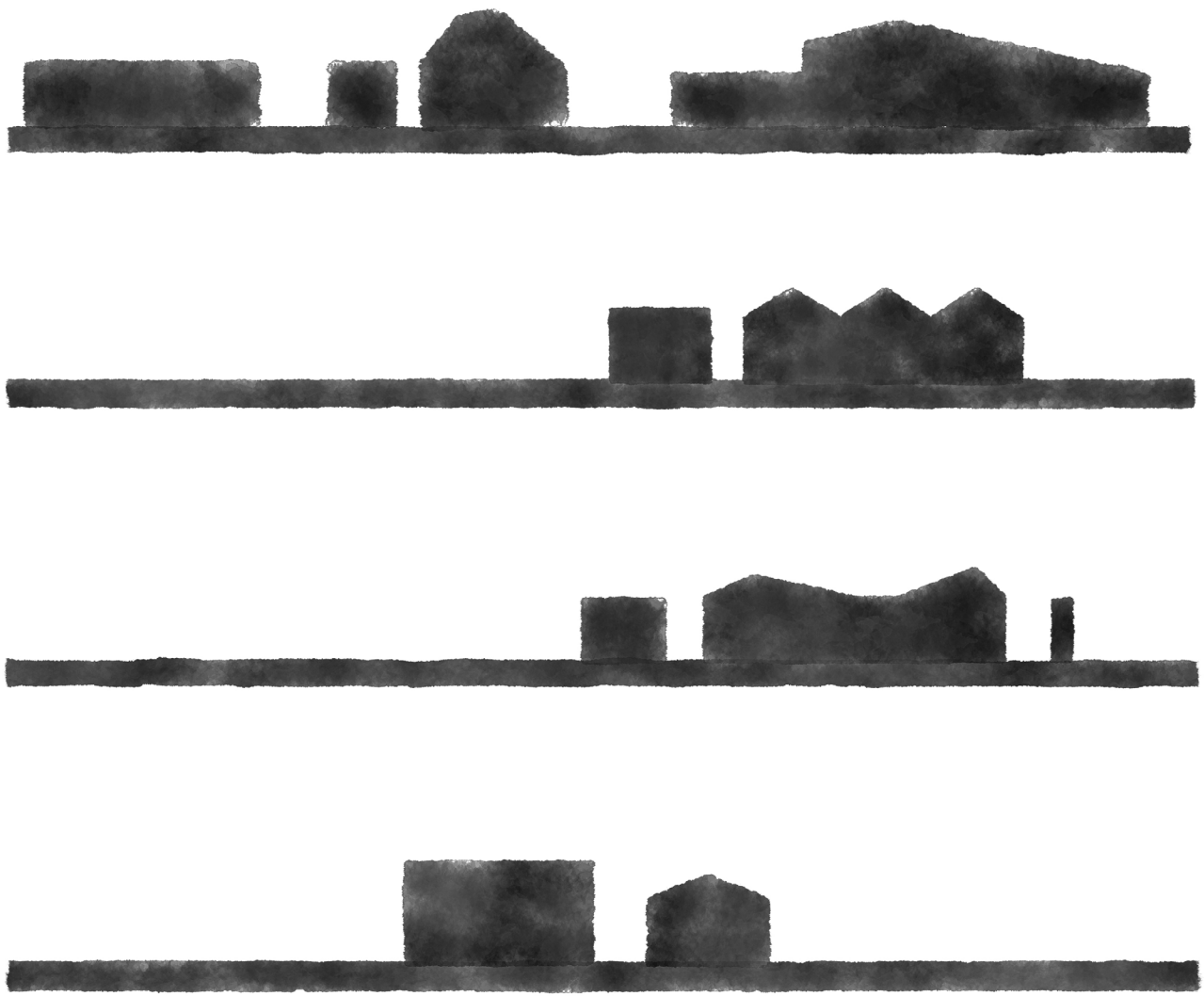

Politecnico di Milano
Faculty of Architecture
Architecture and Preservation

A School Complex in Sardinia

Between pedagogy and architecture

2016.2017
Master Thesis

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Supervisor Professor Vittorio Longheu

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Abstract

The present thesis elaborates a project for the design of a school complex. The red thread connecting all the subparts of the work is the link between pedagogy and architecture. In the first chapter, we first provide an historical overlook of how educational architecture has changed over the years and then analyze the more contemporary approaches that lie at the basis today's philosophy. In the remaining parts (chapters 2, 3 and 4) we describe the idea, the development and the technical realization of our case study by carrying out a careful urban analysis of the project site and the final translation of the designed spaces. The present project develops the school building theme proposed by the competition La nuova scuola di Ottava – Istituto Comprensivo Salvatore Farina, announced by Europaconcorsi and sponsored by the municipality of Sassari. The program of the competition includes the realization of a school complex composed by a primary school, a kindergarten and common areas that can be also used by all citizens after school hours. Besides – both inside and outside – some common areas are not only dedicated to teaching activities, but also represent a social gathering point for the community of Ottava.

Introduction

The idea of a new school complex comes from the necessity to relocate the school to a larger and more central area (of the town) than the one it currently occupies. In doing so, the suburbs – now lacking all services – would overcome the isolation and marginality they have been experiencing and would become part of the "living city". In this perspective, the school stands as a fundamental resource for the local community, a socio-cultural pole capable of fostering the best products of this territory. My interest toward this project comes from the intention to study in depth the design of new education-related spaces – a topic which can no longer be neglected in our country. I think it is time to reshape our awareness of how the environment is changing so as to go back to a more intimate relationship with nature through our knowledge. In this respect, a pathway that could lead toward a "real progress" could be the focus put in a nutshell by Albert Schweitzer "Sono vita che vuole vivere, in mezzo a vita che vuole vivere".[1] Along these lines we could pass from a destructive industrial society to a life-oriented one.

Hence, this thesis stems from the analysis of the relationship between pedagogy, different teaching approaches and architectural spaces whose connections are condensed and exemplified in the project hereby presented.

Le scuole iniziarono a esistere quando un uomo sotto un albero, ignaro di essere un insegnante, cominciò a discutere la sua presa di coscienza con pochi altri, che non sapevano di essere studenti.

(Architettura è)

– Louis I. Kahn

Chapter 1
Research Field

Educational Landscapes: A Historical Perspective

In order to understand the relationship between pedagogy and architecture we must first consider the historical context, focusing specifically on the factors which contributed to the shaping of the contemporary way of thinking about education. Possible future developments, while important, lie outside of the scope of the present work and are left to the imagination of the reader.

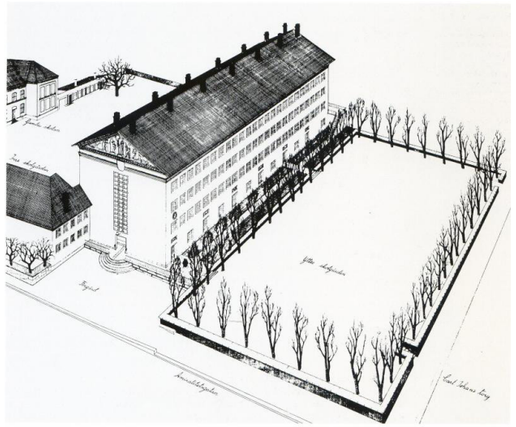
Three cartoons by Léon Krier illustrate – in their plain caricatural style – the historical development of the Western school type:[2] from the 'negative models' of the nineteen-century where school was an institution hostile to the pupils capable of only inculcating discipline, passing through a functionalist school with outdoor classes but still detached and strictly structured, we finally get to the so-called 'composed-like-a–city' school. By using this expression we intend an organism articulated (monument-like) in different parts where the active participation of the students is encouraged and fueled.

In the 19th century the school, from an exclusive center for the cultivation of the elite, turned into an institution accessible by ample portions of population. However, this rapid change entailed a complete transformation in the way subjects were taught. As a result, the (current) negative connotation of the nineteen-century model comes probably from the fact that providing a correct education for large swathes of student,

translated into a rigid face-to-face lecture system in which the government had the final word on what the teacher could teach and what the pupils were supposed to learn. For instance, in 1894, the Italian Minister of Education Guido Baccelli in the preface of the new School Reform stated

> (...) Bisogna insegnare solo leggere e scrivere, bisogna istruire il popolo quanto basta, insegnare la storia con una sana impostazione nazionalistica, e ridurre tutte le scienze sotto una unica materia di 'nozioni varie' (...) non devono pensare, altrimenti sono guai![3]

Consequently, the architecture of the traditional 19th century school is a monumental building quite unresponsive to the physical and emotional scale of its "little users" manifested in the blunt homologation of different serial spaces dedicated to numerous activities.
Nevertheless, in the early 1900s such school building prototype started to be perceived as a spatial device noxious to the psycho-physical well-being of a child. According to the (back then) new experimental teaching methods (Pestalozzi in Switzerland, Petersen, Oestreich, Steiner in Germany, Montessori in Italy, Morris in England, Dewey e Dalton in the U.S etc.)[4] the child was no longer considered a passive subject in the hands of the educator, but became an active and independent agent who – to reach a thorough self-development – responded also to the stimuli and cues coming from the environment. In this phase of design reflection the far-reaching implications of these pedagogic conceptions were not considered as an isolated, self-sustaining system, detached from the quality of the spaces of the building in which the teaching took place. Conversely, they mutually developed along with such spaces, thus promoting both a renewed interest toward the individual, intended as a new man in harmony with his body, his mind and the nature that surrounds him and toward the exigency to coherently redefine the places dedicated to education.
The solicitations of the new didactic methods based on the stimulation of observation skill, on social and motion abilities, not to mention on the overall psycho-physical development of the child, met the experimental vanguards of architecture which, in return, agreed on the necessity to dismantle the rigidity of the 19th century design typology. The latter usually included an array of classrooms distributed along a single central corridor: a structure which reflected the immobility of the education system in force. On the other hand, architects began to investigate new design typologies such as: 1) single-storey structures in touch with nature; 2) compact building blocks equipped with common rooms and areas for outdoor and collective activities distributed on different floors and at different heights.
Along these lines, the main element of the 'traditional school', the long central corridor with classrooms regularly arranged on both sides – still used by Asplund in his Karl Johan School project between 1915-24 – got substituted by the so-called 'side-corridor school principle'. This new element paved the way for more articulated typological possibilities all oriented toward a symbiotic relationship with the external environment, now conceived as the natural and logical extension of the internal spaces. The reasoning revolving around this theme culminated in the single-storey school. Moreover, the single-storey school was also fostered as an ideal solution by health and hygiene-related issues concerning the prevention and treatment of tuberculosis.
In this new school typology the classrooms, by getting gathered into a pavilion, became the centerpiece regulating distribution. They also included a direct opening onto the garden. In so doing, not only were outdoor activities promoted, but architects could better control the overall diffusion of natural light while dismantling the principle of the 'central corridor' which, more often than not, had impeded a satisfying illumination not to mention an adequate air renewal.
However, the outward opening of the school remained limited to improve the supposed psycho-physical well-being intended as a mere health issue. In fact, on the one hand, the transparency of the walls did not deconstruct neither the seriality of the classrooms nor the rigid teaching methods, while on the other hand, the lateral corridor kept representing just an access point.
Although infused with architectural novelties concerning children's health, the single-storey school, in many cases has not been able to affect neither the teaching methods nor the overall pedagogic aspect.
For instance in Italy, with the introduction of Carta della Scuola in the 1930s by the fascist regime, the school and the culture as whole got re-established in accordance with the principles which sustained that specific ideology. As a result the child - from childhood to ado-



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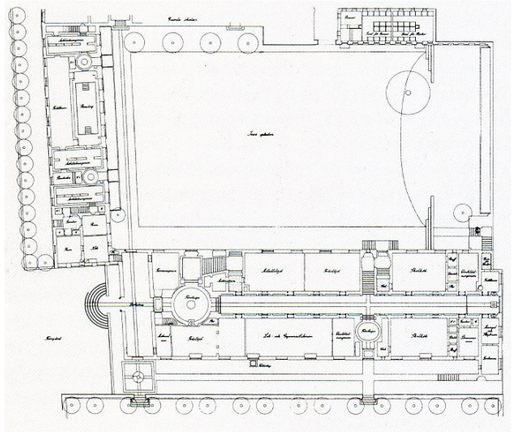

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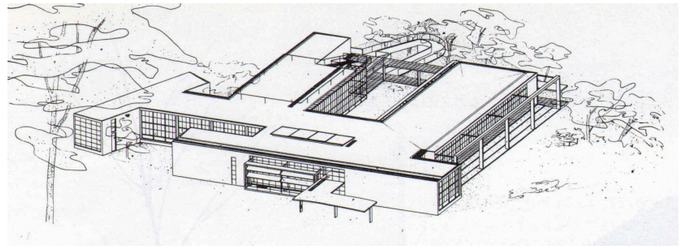
lescence up to military discipline and training - underwent an "integral national education". Hence, the school building inserted in a larger education perspective that encompassed new "free time" facilities for the whole population (summer camps, sport facilities, recreational associations, local community areas and Opera Nazionale Balilla"). As pointed out by Alberto Sartoris in his book "Luci sulla scuola moderna"

> L'ideologia investe anche la pedagogia, anteponendo alla 'libertà parolaia' delle teorie 'pseudosocialistiche e pseudoliberali, sventolate ancora nei paesi a regime capitalistico', la 'libertà armonizzata nel quadro dei doveri.[5]

In the Sant'Elia kindergarten, realized by Giacomo Terragni in the south periphery of Como (1932-37), the 'hygienic issue' of an outwardly oriented architecture - which turned into the so-called 'open-air school'[6] - is clearly present together with all the requirements for the educational mission of the regime. However, it cannot account for the complex weft of visual relations which the transparency of the glass walls, the exposure of the pillar structure and the independence of the infill walls guarantee to the original matrix of the open-court plan. Outside the structural frame emerges, separating itself from the facade, and configures little diaphragms thus deconstructing the front. The instability of the original matrix is further contaminated by the interplay between some minor volumes (a platform roof, the kitchens' body, a flight) which possess an autonomous nature and are gathered around the main body under a roof.
If we briefly focus our attention on the American scene, a new research line toward the free architectural plan – precursory of the postwar period developments (WWII) – popped up with the Histon and Impington Village College (Impington, Cambridgeshire 1936) by Walter Gropius and Maxwell Fry. The free-plan college inaugurated a new organic kind of school in which the functions were organized in different spatial groups i.e. a variable array of wings hosting the classrooms with personnel and common areas making up the rest of the building. All of these different parts were linked by corridors, halls and platform roofs whose number depended on the size and on the type of the school.
Coming back to Italian case, in the postwar period, the cutting on public expenditure took school-building projects away from architects to bridle them in bureaucratic quibbles put for-



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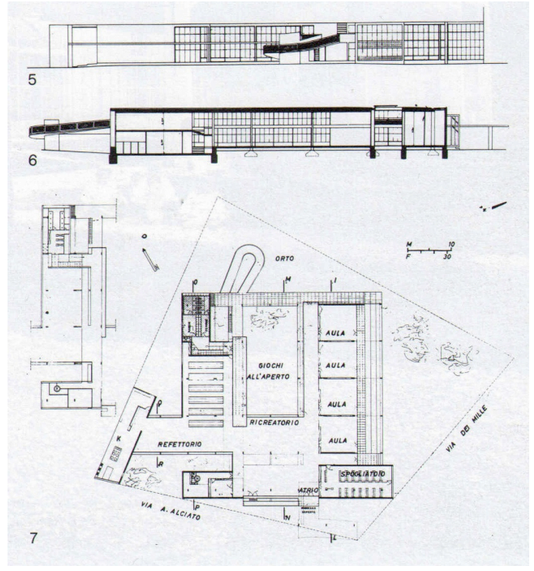
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VIA A. ALCIATO
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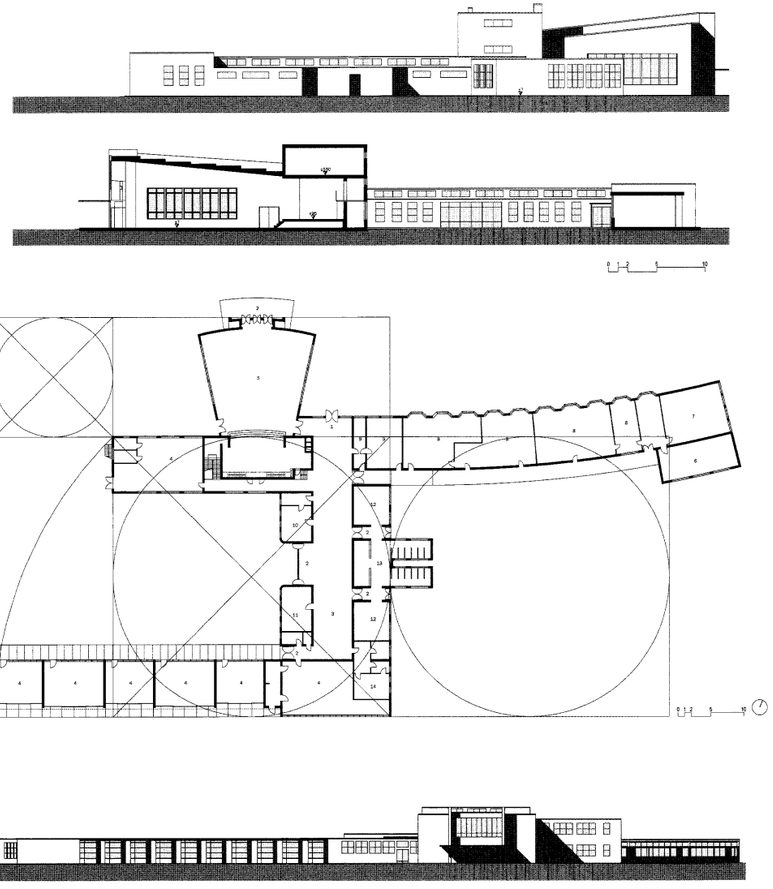

ward by each technical apparatus. All of this led to a two-fold disastrous result: on the one hand the pedagogic potential of schooling was devalued while, on the other hand, the peculiarities of the landscape were levelled out in favor of a sterile box-type prefabrication.
In a 1947 editorial Ernesto N. Rogers pointed out the necessity of an 'educational architecture' in order to face serious education issues

> È fuori di dubbio che una pedagogia progressiva richiede un'architettura adeguata, cioè organismi funzionali, flessibili alle complesse esigenze di un metodo educativo il quale non si accontenta di considerare gli allievi come una massa indiscriminata, ma vuole favorire lo sviluppo di ciascun individuo (...). Se un sacrificio si impone, nessuna voce di bilancio è meglio giustificata (...) ma è bene mettere in conto che i problemi dell'istruzione non possono compiersi senza un'architettura educatrice.[7]

At the XII Triennial in 1960 – titled "La casa e la scuola" – the urgency to deal with this theme moved to an international scale. For more than a decade, in fact, the shortage of school buildings – due to a growing population, to massive migration fluxes and to the reconstruction process following WWII - had placed school as the number one problem on the agenda of almost all the European nations.
In the Triennial's park an English elementary school prototype was built. It was this very building that demonstrated, however, how the supposed Italian appreciation for modern architectural codes and materials, upheld both by local administrations and bureaucrats, was still afar from a real educational architecture.[8]
Moreover, the section dedicated to the rural context, where the school was presented as a single 'pluriclasse'[9] with a separate housing for the instructor, contributed to indicate the conscious segregation of the rural community since childhood in a country that, on the other side, was undergoing a huge economic boom.[10]
This international meeting highlighted, among other things, how the project-type, designed by the municipality of Milan - to face a growing immigration while, at the same time, adapting to the new school Reform (which established a single middle school system, 1962) – represented both the negation of the contemporary pedagogic experiences and the flattening of the spatial complexity and urban values of architecture.
From a typological point of view, in the postwar Europe, there was a predilection for single-plan schools. As far as hygienic and pedagogic reasons are concerned, they were considered more appropriate than the previous generation of 'open-air' schools. What is more, they allowed a greater freedom in the organic articulation of single groups of 'activity-spaces' in which the school building started to get decomposed. Lastly, the single-storey guaranteed a free manipulation of the openings, thus improving the lighting conditions (through double openings and skylight roofs) and the ventilation – natural and criss-crossed – of the rooms.
As regards this new typology of schools Ciro Cicconelli – winner of the 1949 contest – identified the concept of 'functional unit' as the building block of social life through the semi-autonomous pavilion which gathers five sliding-wall classrooms around a shared central space.
The pavilion device, however, entailed a larger soil use and a greater dispersion at a school life level. But the cultivation of social relationships within the school population and a general openness of the building toward society at large became the two pillars on which educational architecture stood. As a matter of fact, the 'open-air school' acquired new spaces for collective activities, thus coming closer both to the environment and to the local community. We entered a new order of form in which all the parts and the functional units are articulated around a common "gravitational center". The entrance of the building turned from a simple distributive space into a multi-purpose hall that absorbed all the surrounding distributive spaces, thus acquiring both a didactic and architectonic importance.
In so doing, the 'functional unit' broke away with the conventional squared classrooms-corridors model – originally developed in accordance with the 19th century authoritative education, but partly inherited by the reformed schools of the Modern Movement – and allowed a flexible organic relationship with the entire school complex.
This is the case of the so-called Anglo-Saxon schools like the one in Nagele designed by Aldo van Eyck (Rotterdam 1956). Here the entrance hall becomes a common room which encompasses the progressive centrifugal offset of all the classrooms. This, in return, creates a fanlike pattern toward the landscape. Furthermore, such centrifugal offset turns the distributive spaces into little hallways, each serving its reference functional units.
Following these lines, the project of Herman

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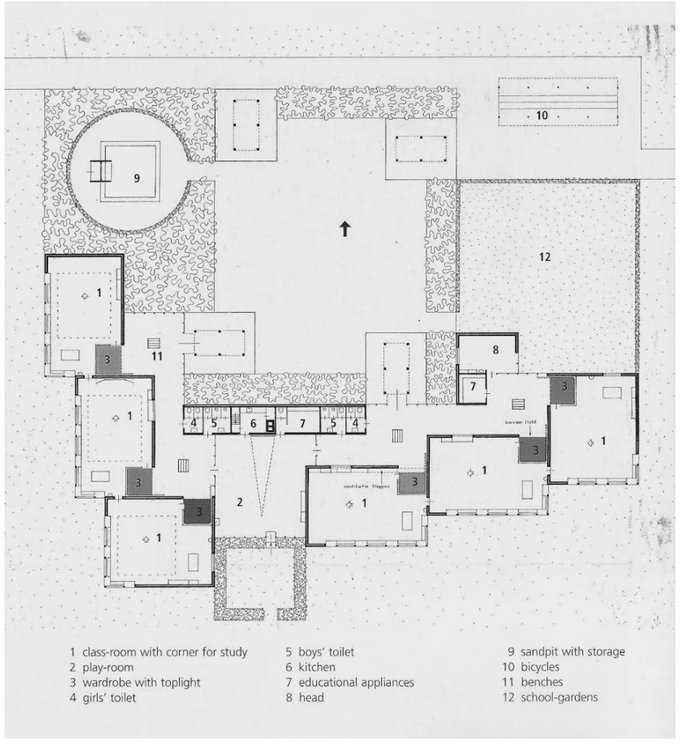


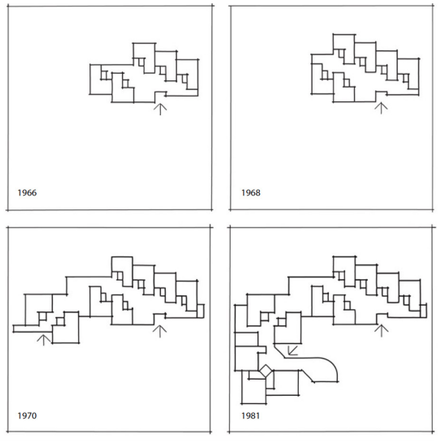
Hertzberger for the Montessori school, built between the 1960-81 in Delft, developed the relation between the formally completed unit and its foreseeable expansion throughout time. In order to do this, it took the central multi-purpose hall as a model. In particular, the aforementioned van Eyck's school represented the reference point for transforming the corridor into an articulated hall stemming out of the progressive slippage of the classrooms which rendered it expandable in both time and space.

Thanks to a room-hall compact spatial nucleus, expandable according to a foreseeable (but not serial) configuration, Hertzberger abolished the corridor in favor of a continuous hall toward which all the rooms converge. This way they created an L-shaped form, articulated in different levels, so as to reflect the Montessorian educational program which included the co-presence of different activities.

According to this method, in fact, the child evolves in a stimulating, obstacle-free environment where he is free to choose the activities that he prefers. A sort of self-teaching approach where the teacher serves as support and guide to his (the child's) freedom. Space has a pedagogic value since children are guided by what they see: by taking a walk (promenade) in the school they discover the different possibilities and can pick the ones that best fit them. In the 20 years long final plan, the system gave rise to a dynamic and multi-centered configuration along an internally articulated structure. The latter was constituted by the sequence of joint collective areas overlooked by the classrooms.

While working on his school in Delft, Hetzberger designed another Montessorian school building in Amsterdam with a central cross-like plan. Again the hall was not a mere distributive space but a full-height stepped "reservoir". Illuminated sideways and surrounded by walkways, the schoolboys could meet and work also outside of the classroom proper in a sort of transitional space between the classrooms and the corridors. If the school in Delft, developed around the theme of the educational promenade, where the classrooms are like houses linked by a road, here the matrix is the square. Hertzberger's research moved between these two foundational archetypes and took him to build numerous schools along the '80s and '90s which had a massive impact on contemporary experimentations.

Getting closer to the 21st century – which has also been defined by some economists as 'the Century of Knowledge'[11], the Lisbon Agenda held in 2000, established the objective of an



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economy based on knowledge as driving force for the urban economic development, a force capable of transforming European cities into societies of knowledge. The strategic use of such knowledge should lead the creation of the so-called 'smart cities': places that, rather than exploiting new resources, prefer to maximize the already available ones. In so doing, the future development becomes a sustainable development at whose hub there lies education. In fact, the advocates of such a strategy have pointed out how, in order to uphold and sustain such an ideology, massive investments at all education levels – starting with elementary school - are needed. From this vantage point, indeed, only in a country of conscious, creative and learned citizens, this model of sustainable development can be implemented.[12] Let us give now a concrete example of how this program has been put into practice.

In the United Kingdom, already in 2003 the Department for Education and Skills (DfES) started the Building School for the Future (BSF) program. According to this design method, all the schools built between 2003 and 2007, follow two functional models which – taken single-handedly or in their combined form – are rooted in the phase of typological experimentation inaugurated in the '50s by Schauron and van Eyck. A phase where two main elements stood out: 1) the 'main street' for collective activities, surrounded on both sides by classrooms; 2) the 'learning cluster' in which a series of classrooms gather to form autonomous pavilions linked by a pathway or a covered square.

Nevertheless, in spite of the numerous benefits offered by the aforementioned models, most school buildings in Europe kept following a traditional approach. In other words, architects were still hugely fascinated by the 19th century totem-like building whose potentialities were conflated in its 'skin'. While on the one hand the building represented a recognizable landmark, on the other hand such structure affected its inner spatial articulation by limiting the fluidity of the pathways the user could choose.

One of the reason why these new experimental models were initially rejected was their intrinsic incompatibility with well-established cultural practices. The latter, in fact, privileged identifiable but non-functional buildings over functional but less notable ones.

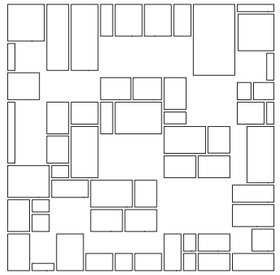
The only common element to the projects designed in the last thirty years – thirty years which has suffered from the absence of a cultural 'koinè' - seemed to be the lack of a general

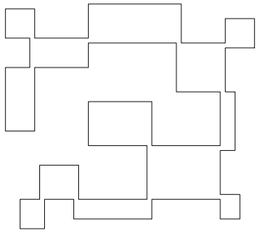
distinct character of the school building. All of this translated into an overall difficulty to design buildings in which a high degree of expressivity could properly go along with its complexity. As regards this point, without a fruitful relationship between function and form - intended here as the idiosyncratic character of each individual building – there is no architecture.
As a result, nowadays, few projects seem to be new prototypes: unique pieces, but at one and the same time, representatives of a more general picture whose contours are adaptable and reproducible not as functional models but as theme of composition. These projects certainly take inspiration from more classic 'learning models'. However they perform a never-ending dismantling and reshaping operation so as to test new ideas, spatial articulations and more complex diagrams. The final aim of these innovative figures is to accommodate contextual specificities and changing social needs through a vast array of re-elaborations and typological inventions.
In the inward system of the Centro Escolar designed in Vila Nova da Barqinha by Aires Mateus (2006-11), the void becomes a component of the project. In fact the inner patios, enclosed by a perfectly square paddock, are randomly arranged thus creating a chessboard-like module. Originally designed for 300 students, the project rises on a campus and extends its services to the whole community. Indeed, the project includes both areas dedicated to lifelong formation and a center for the promotion of basic scientific knowledge.
Through excavations and subtractions, the voids end up creating a complex inward morphology which develops around small interconnected squares. The latter separate the four groups of classrooms – gathered at the center of the plan – from the spaces making up the paddock where activities dedicated to the entire citizenry take place.[13]
In Italy, the Spanish architect Alberto Campo Baeza, in collaboration with Massimo Benetton, design the "Ponzano Children" kindergarten. Commenting on his work, Campo Baeza says

> Our aim was to create a nursery school that not only functions impeccably, but is also able to offer a series of diverse spaces; a living building where children can dream and be happy.

The architectural project concerned separate areas: the school's main, square building, with a central, square 'tower' which is taller than the main building. On the four sides of the school, the areas between the circular perimeter wall and the main building are in part covered and in part open to the sky. The four, open-air teaching and recreational areas, are outside the classrooms and the dining room. Each area is paved with a different material: sand, wood, stone or grass. The circular 'crown' around the school not only forms the outer wall but also provides a covered, continuous 2m-wide space with storerooms, play areas and toilet blocks to be used during the warmer months. The external green space of some 4,710 square meters is divided into two areas: the orchard, with fruit trees planted in tidy rows; and the wood with different kinds of forest trees planted in a random pattern.[14]
Another interesting case study is the new German teaching elementary school in Vipiteno, signed by the architects Carlo Caldara and Rinaldo Zanovello, configures itself as a platform laying down on a swampy landscape. The trunk skin structures the perimeter, mirroring the woodland landscape and creating a filter between the classrooms and the yard. Developed on two levels, the building volume finds in the double-height hall and in the void of the inner courtyard, the generating elements of space. As Caldara explains

> Se i bambini devono andare in una scuola strana, perché è una scuola di pianura, una scuola d'acqua addirittura, si apre un tema anche dal punto di vista pedagogico. Se io dalla zattera d'ingresso salto giù e mi bagno i piedi, questa è una microesperienza che va celebrata, non è per niente scontata. Avremmo potuto bonificare tutto, alzare il terreno di due metri e tutto sarebbe rientrato nella normalità. Invece questo gioco a livello dell'acqua è anche un messaggio pedagogico. Ma gli insegnanti forse non si rendono conto, non è nel programma, non ce n'è bisogno. Per noi questa esperienza andava protetta, altrimenti il senso della palude non c'è più.
> Peccato che non ci hanno mai chiamato per spiegare la scuola ai bambini. Avrebbero potuto fare una cerimonia dove qualcuno avrebbe raccontato la storia di questi luoghi. Anche per dare un senso ai maestri, perché non sono più quelli con i quali avevamo a che fare in passato, non ci sono più (sono andati in pensione, sono andati altrove)... e i maestri attuali non sanno niente di questa scuola.[15]





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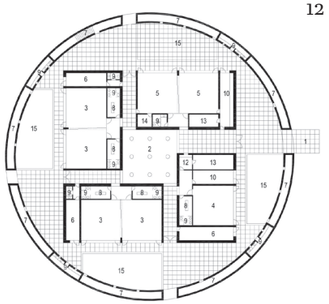

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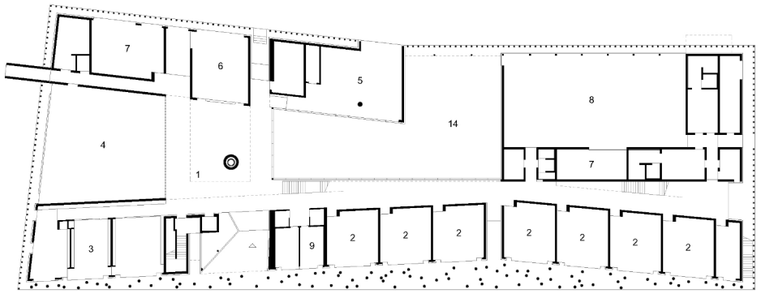

legenda

1. ingresso
2. aula
3. amministrazione
4. aula magna
5. biblioteca
6. sala professori
7. officina
8. palestra
9. bagni
10. mensa
11. cucina
12. sala musica
13. appartamento
14. corte
15. terrazza

piano terra

14

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Between Pedagogy and Architecture

Designing education spaces cannot disregard the bond between two fundamental themes: architecture and pedagogy. In this section I will describe how these topics correlate with a particular eye for contemporary kindergartens and primary schools.

Architecture, as far as we are concerned, plays a crucial role in the development of personality. We must be aware of how, a spoiled environment – both in terms of formal and functional features – can negatively affect the delicate type of users – from young kids up to late teens - who inhabit and use it.

To be honest, as pointed out by Guido Canella, when it comes to school buildings, there is a widespread belief that all we need to do in order to obtain a satisfying result is to create or highlight the correspondence between the progress of pedagogical behavior and the distributive diagram.[16]

Simply put, there exists a gap between the "inner landscape" that regulates the structure of a school based on the idea of active participation and its capacity of relating with other activities and contextual elements which make it the "public building par excellence": a urban pole of attraction and identification.

In other words, when designing education-related spaces, on the one hand we need to comply to construction requirements, but on the other hand, we also need to take into account the relationship between the single individual and the

environment he lives in.
We cannot talk about a piece of architecture without having first inhabited and measured it out with our own body. Its atmosphere is what gets stuck in our memory and what gives to these spaces their own qualities. With regard to this point Peter Zumthor urges us to think of space as the privileged site of perception which comes before form

> Questo è il procedimento che preferisco: dapprima pensare l'edificio come fosse una massa d'ombra e solo in un secondo tempo, come in un processo di scavo (...) sistemare consapevolmente i materiali e le superfici in una certa luce (...) guardare come riflettono i materiali e a quel punto lì si sceglie per creare un insieme coerente.[17]

According to the Swiss architect form "uses" space to escape conventions so that we can see how it resonates in the perception of light, of the materials, in its role as modeler of moods and emotions.
As a consequence the child must not be considered as a weak fragile subject needy of special care and attention, but he becomes the catalyst of positive future-geared values. Hence he needs an environment capable of welcoming him in the complex social context in which he lives.
On the one hand, this entails the capacity to accommodate the subjectivity, the uniqueness and the idiosyncrasy of each single individual while, on the other hand, planning self-generating spaces where every kid can potentially become the designer of new viewpoints and opportunities.
School is a living organism that – in touch with the pumping heart of life – develops and modifies through time. Moreover, as shrewdly suggested by philosopher and sociologist Edgar Morin,[18] schools should be (aesthetically) "pleasant" so that students feel welcomed and loved. This would surely stimulate their emotional intelligence and promote their sense of safeness which make them open to discussion, to discovery and to building new personal relationships while, at the same time, improving their learning skills.
Following the lines of the systemic ecological approach proposed by Bronfenbrenner[19], we identify the school as a macro-cosmos with and internal dimension made of dynamic active subjects who grow up in an environment in close contact with the "outer" landscape and its community. In so doing, the final outcome turns out to be a synergetic reciprocity between the individual and his environment. Learning is not the simple oral transmission of knowledge nor the automatic repetition of concepts; it rather configures itself as a building process for reasoning over the meanings of the sense of things. In other words, learning is both a self-making process and a relational socially constructive one since, to build our character, we use interpretations, ideas and reasons elaborated by others. The attention to the formation of new school behaviors – no longer static and desk-oriented behaviors, but dynamic ones articulated in a rich program of spaces and activities – dismantles the single compact building, thus fostering the decomposition of the spatial unit. The latter gets developed in compliance with the different stages of the educational process and includes: regular classrooms, dedicated laboratories, a variety of common spaces, sport facilities, pedagogic promenades, playgrounds, parks and recreational areas etc. Each part of the program can possess its own autonomy and site design.
In this perspective the classroom is no longer an exclusive place for teaching nor are the other spaces simple complementary prosthesis for frontal classes. Classrooms become part of a more complex organism; they sort of dilute with the school environmental fabric just as learning dilutes with "real" life experiences. As a result, a great deal of importance is awarded to non-material aspects of architecture such as light, color, acoustics which significantly contribute to the quality use of the spaces and to the well-being of those who inhabit them.
We must abandon the conception of the traditional school experience in favor of a school as life experience. Only in this way can we think of school as an evolutionary space in which a collective community develops into a system open to political and social transformations, capable of assimilating and of analyzing the contributions coming from learning research. Eventually, by doing so, school itself turns into a fertile ground for experimentation.
School presents itself as a learning community, an organized system whose final aim is the full-round transmission of knowledge; a system constituted by a multitude of mutually-related actors whose action is geared toward sharing, transmitting and ultimately renewing knowledge through a participatory and reciprocal culture.
The aforementioned community configures itself as a place that offers to both students and teachers the opportunity to develop their own identities. Moreover – through active partici-

pation and collective activities – it encourages everyone to create a shared system of meanings to define oneself and the environments we all live in. In order to achieve this model, we do not want to erase but rather modify the 17th century education model which considered the classroom as an isolated unit.
In the new approach put forth by current research study conducted worldwide, the classroom, unlike in the past, is no longer conceived as a space dedicated to frontal classes, but it has opened itself to change so as to become a learning space which includes the active involvement of the user.
Consequently, school furniture has change and come to perform a different function according to a new perspective which follows three main conditions:

- Connectivity: the capacity to integrate new technologies to improve teaching and learning.
- Sharing : the capacity to offer adequate solutions to sharing and cooperation pattern among students.
- Modularity: capacity do flexibly reconfigure different solutions according to changing contexts of use.

From the 2012 "Indicazioni nazionali per il curricolo della scuola dell'infanzia e del primo ciclo di istruzione", it emerges that particular attention must be placed on the design and set up of the learning environment, intended here as an active agent in the meaning making process.[20]
Along these lines, Loris Malaguzzi[21], pedagogue and founder of the Reggio Children philosophy, claims that the physical environment is not neutral; its structure, inclination and conformation articulate a sort of "third educator" which exerts a massive impact on the people living in it.
More specifically, in the "Indicazione per la scuola dell'infanzia" we read that

> l'organizzazione degli spazi e dei tempi diventa elemento di qualità pedagogica dell'ambiente educativo e pertanto deve essere oggetto di esplicita progettazione e verifica. In particolare: lo spazio dovrà essere accogliente, caldo, ben curato, orientato dal gusto estetico, espressione della pedagogia e delle scelte educative di ciascuna scuola. Lo spazio parla dei bambini, del loro valore, dei loro bisogni di gioco, di movimento, di espressione, d'intimità e di socialità, attraverso l'ambientazione fisica, la scelta di arredamenti e oggetti volti a creare un luogo funzionale e invitante.[22]

Equal attention is dedicated to the definition of learning environment in the "Indicazione per la scuola primaria"

> l'acquisizione dei saperi richiede un uso flessibile degli spazi, a partire dalla stessa aula scolastica, ma anche la disponibilità di luoghi attrezzati che facilitino approcci operativi alla conoscenza per le scienze, la tecnologia, le lingue comunitarie, la produzione musicale, il teatro, le attività pittoriche, la motricità.[23]

Once again, the above reasoning highlights the necessity of conceiving the school as a unique integrated space where different micro-environments – dedicated to a vast array of activities – are ascribed the same dignity of the traditional classrooms. This is so because they present habitable and flexible characters able of adjusting different sorts of users and of activities through a high degree of functionality, comfort and well-being.
An efficient learning environment must: a) promote exploration and discovery; b) value experience and the knowledge acquired by the students; c) encourage cooperative learning; d) properly integrate diversities; e) foster one's own awareness of the efficacy of the learning method; f) include lab activities.
The relationship between spaces and learning environments has also been tackled by the Organization for Economic Co-operation and Development (OECD) starting from the definition of learning environment as an organizational space that supports different typologies of learning suitable for different students and contexts in which it occurs.[24]
The interaction between these elements leads both to the creation of suitable conditions for learning and to an enhanced focus on some aspects capable of improving the learning process as a whole like, for example, cognitive and physical aspects linked to the general well-being of the students.
The concept of learning environment concerns physical space as well. With this expression we intend both the space in which didactic activities – formal and informal – take place and the relational processes that involve all the elements included in the school system (students, teachers, materials, contents and technologies).
As regards this point, the studies conducted

by OECD pointed out five different perspectives from which learning environments can be analyzed. Each perspective is at once student-and-teacher-related (OECD 2011)

- The configuration of physical space represents for teachers and students the opportunity to execute didactic activities in different modalities. For example there should be adequate room both for group and individual projects and, at any rate, the teacher should be helped in identifying the best way of teaching to reach different objectives.
- The social aspects of the learning environment affecting the complex teacher-student relationship.
- The available technological tools which should be integrated in the learning process have to provide a technical support in the acquisition of knowledge.
- The local context, i.e. the relationship between school and other educational spaces on the territory (museums, libraries and other public areas).
- Didactic spaces proper: how spatial configuration can itself be a pedagogic no to mention didactic tool.

These five perspectives allow us to identify three concepts around which the design of physical environment revolves: spatiality, connectivity and temporality (OECD 2011).[25] Different studies have taken these three concepts as parameters for analyzing human interaction in space. The evidence gathered so far has emphasized how the health and well-being of the individual depend on the surrounding environment.

More importantly, spatiality "shapes" social relationships both at school and in the community. As far as connectivity is concerned, technology in the last decade has permeated the social practices involved in the teaching/learning process. The use of this tool, even in an informal context, (household) has a significant impact on the improvement of the students.

Eventually, temporality refers to the reorganization of school time, due to the creation of new spaces. The latter, in fact, entail a rethinking of the way we school. More specifically, the teacher needs to "metabolize" the new flexible and multipurpose spaces. In other words, there is going to be a time lapse in which the teacher will pass from a traditional frontal teaching approach to new group-based modalities, weighing the benefits of different teaching methodologies (from team teaching to problem-based learning and so on).

Experts observed and studied the social aspects of learning – considered a crucial part of the growing process of the individual – focusing specifically on the student-teacher relationship, group work abilities and communicative skills. Furthermore, affective components of the learning process – like the sense of belonging and self-efficacy perception – have not been neglected. Finally, data may highlight some behavioral aspects which can lead to school absenteeism or dropping, or to some general inappropriate behaviors during class.

In order to deepen our understanding of the relationship between space and learning processes, the OECD has started a project called Innovative Learning Environments (ILE).[26] The 3 years project, concluded in 2013, has shed some light on learning processes as far as the organization of the context is concerned. The field work analysis of the learning dynamics is carried out in the school environment itself, intended here as a complex ecosystem under the mutual influence of different social contexts and interactions.

The traditional classroom equipped with a teacher desk, a slate blackboard and multiple rows of desks gets overcome – as indicated in the project Flexible Space (classroom 3.0) – in favor of a new setting which includes more innovative furniture. In so doing, the classroom turns into an active research laboratory where the latest technological devices cooperate with a functional furniture and with a teaching approach based on the concepts of cooperative learning[27] and of learning by doing.[28] The latter, in fact, are publicly recognized as tools capable of encouraging a positive interdependence through both a constructive interaction and the implementation of group responsibility. The teacher bases his learning method on enquiry learning[29] that implements cooperation, research, reflection, construction and the sharing of knowledge. In this changed perspective students and teachers live a new centrality: the teacher does not give up his role, but rather revisits it by turning, from a mere knowledge transmitter into a co-creator of culture, thus willingly accepting the new "vulnerability" of this role with all the doubts, mistakes and curiosity that goes with it. Therefore, school becomes a research area where pupils and teachers alike are the protagonists of the knowledge process.

From this new vantage point the core action is listening: a clear manifestation of openness toward what other people have to say. In other

words the school allows to actively hear what Loris Malaguzzi defines as the one hundred languages of kids that include all the spectrum of senses.[30]

As Carla Rinaldi reminds us, to listen/ hear is an active verb as it is not about the mere recording of the message, but it involves its interpretation.[31] Put differently, the message acquires meaning in the moment in which the listener accepts it as valuable. Moreover, to listen is a reciprocal verb in that it legitimates the interlocutor to form his own interpretation. In other words, to listen is a fundamental component of communication and triggers off a communication act in which the very same act of listening produces significant and reciprocal modifications to the overall situation.

In our specific case, listening should enable the teachers to create a context in which the children feel comfortable, motivated and valued in their existential and knowledge processes.

School configures itself as a permanent laboratory where the "research projects" of both children and adults are firmly entangled. As a result, a crucial element is the co-construction of an aware knowledge – together with all its building blocks – by the student. A knowledge that passes also through the progressive internalization of the spatial structures and of more general skills that either single child or the entire schoolchildren are developing.

Along the lines of the "Indicazioni nazionali", the present project aims to create a school which pushes students toward a conscious development of identity, of autonomy, of skills and of citizenship. (Indicazioni nazionali per il curriculo della scuola dell'infanzia e del primo ciclo d'istruzione, 2012)

Identity consolidation means to peacefully live one's own bodiliness while feeling protected in the surrounding social environment; it also means to know and accept the other while being recognized as a unique and distinct person. In other words, it means to experiment new various form of identity. (Indicazioni nazionali, 2012).

Autonomy development means to be self-confident and confident in others; it means to be autonomous and to ask for help when needed; it means to learn how to show one's own feelings; it means to be able to make negotiations and decisions while justifying opinions, choices and behaviors; and finally it means to display conscious and respectful attitudes.

Skill acquisition means to learn to ponder over one's experience using exploration, observation and a positive attitude in public debating; it means to tell and remember past deeds and experiences while translating them into personal and shared marks; it means to describe, represent and imaging situation and action using a multitude of languages.

Collective citizenship experiences are the best way to know other people and their needs. They highlight the necessity of shared rules in everyday life and favor a sense of belonging. They also entail the development of a proactive dialogue whose cornerstones are the recognition of other people's rights and viewpoints. In other words, these collective experiences are a tool to build the foundations for a democratic ethically-oriented society, a future-geared society respectful of both the environment and its citizens.

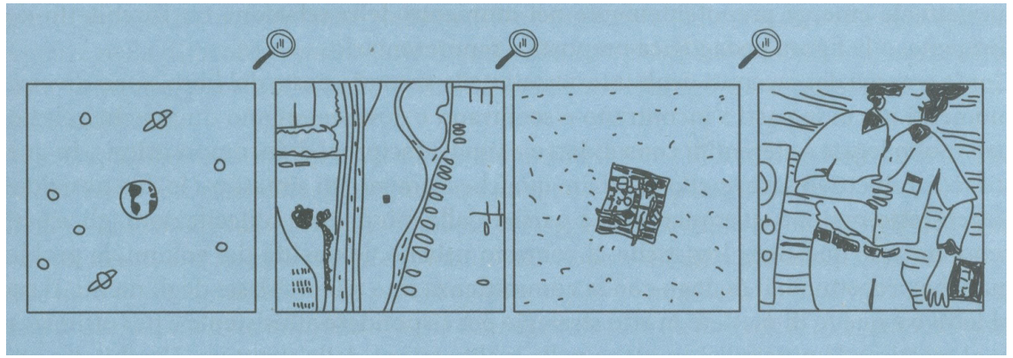
The school's essence is made of the entangled sets of relationships between pupils, teachers and families. Moreover, the overall education project is inserted in a complex frame of interdisciplinary up-to-date teaching approaches in which new ideas that orientate the system of meaning are developed.

The school is the first environment in which children undergo and live a sense of belonging to a specific community. For this reason, the school must end up being a meeting point that promotes a sense of belonging and of participation to collective life, thus reinforcing the other existing relationships within families and within the territory.

Design Methodology

When it comes to developing a school project, two opposite views are usually taken into account. On the one side, there is the particular-general approach that starting from furniture details and school spaces and passing through the school building, volume and urban locations ends up focusing on its relative position in the city and on the relationship with regional authorities etc. On the other side, there is the general-particular approach which conversely starts from the location in the block and goes down to school spaces, classrooms and didactic tools. Oftentimes in a shared project, it happens that the architect and the pedagogic figures operate from two different stances. Consequently, to reach a mutual agreement, it is necessary to be aware of every person's viewpoint.
According to Hans Georg Gadamer (1960) the capacity of integrating different vantage points – without the urgency of imposing one's own, but rather with the desire to discuss and accommodate one's views – is the best way possible for fruitfully conceiving one's research object.[32]
To understand the different perspectives involved in a project, architects Charles and Ray Eames made a compelling video titled Powers of Ten (1968-77).[33] This magnificent production revolves around the relative distance measurement in the universe and the effects produced by adding or canceling a zero in the prospective scale. The outcome is an interesting image-guided trip between the infinitely small

and the infinitely big (from a couple enjoying a picnic on the banks of Lake Michigan to the city of Chicago up to the borders of the universe).
Participating in a school building project goes beyond the creativity (however huge) of professional architects. It encompasses a shared host of intents among the various team members.
To do this, the basic perceived project must undergo a process of shared planning. However, shared planning alone is not enough; to be really effective we need to base our work on a precise vision of the change we intend to make.
User participation in the conception and distribution of school spaces has set foot in Italy as well. This new approach, supported not only by a functional practical plan, but also by the overall cultural context, proves the progressive takeover of a new dialogue-oriented perspective.
The learning environment represents a community meeting point from which to start an identity building process. This is why the active stakeholders participation is encouraged and ends up being a crucial component for constructing an emotional attachment to the school. What is more, such active participation helps define the attributes a space requires to respond to students' educational needs and – no less important – to the needs of the community in which the school lies.
As a result, participation represents an educational strategy that characterizes this new way of schooling. The new school building promotes the active participation of children, of families, of teachers and of the whole community – a participation intended not as "merely partake in something" but rather as "being part of something". Once again Rinaldi describes the fruits yielded by this strategy when she says that in such perspective education and participation conflate: the what (education) and the how (participation), merges becoming form and substance of a single building process.[34]
First of all, participation configures as the active behavior of children, of teachers and of parents in the education project. The idea of participation is based on the conviction that the school is a public place, a resource for the community that, in return, moves in a synergetic way with it, thus becoming a proactive agent. By being part of a common project, all the involved actors are stirred toward the creation of a sense of belonging which generates feeling of solidarity, availability and responsibility.
The image of a participated school encompasses the idea of (self) formation of its users who are always hungry for new knowledge, meanings



and interpretations: a place for (self) education. Children are active builders of their learning, producers of new points of view that, by coming in contact with other points of view, can project our childhood culture onto the social fabric. Adults' task is to elaborate strategic visions and innovations as far as pedagogy and childhood policies are concerned while having a keen eye for everyday school life. It is through participation that an adult can discover possible improvements to his parenting while working for a better future for his community and school system. Moreover, adults participation can be the mirror image of and lead to a cohesive relationship with their offspring participation.

From a different angle, participation is a complex systemic research process based on intersubjective action in which the same definition of the term comes out of a negotiation process rooted in the principle of learning from experience.[35]

Participation in the projects follows a bottom-up structure with the complete involvement of the users and all the other entities implicated in the different phases. Such an approach has the merit to improve, at least in local projects, the democratic stances of the project itself. It has been formalized in the Project Cycle Management[36] method which explains how information, perceptions, knowledge and all the gathered data are shared and become part of the design.

Recently new models and strategies of governance has replaced the traditional government systems. In so doing, the cases of participated design – where all the interested subjects can have a say both at the beginning of the design history and in the decision-making phase – have skyrocketed.

For instance Agenda 21, PIT (Progetti Integrati Territoriali), Regional Social Plans, Zone Plans and other particular plans (e.g. Equal Interreg Leader) all use this kind of design. The aforementioned projects all concern the ecological domestic planning development with a special focus on environmental sustainability and service quality while restricting to the legislation coming from integrated public policies and local development policies.

In order to achieve an effective result innumerable strategies, methods and tools have to be applied. As regards this point, in fact, the researcher Beate Weyland and the architect Sandy Attia claim

> serve un processo di riflessione e di appropriazione da parte di tutta la comunità, che permetta di ritagliare sul luogo demandato allo sviluppo della conoscenza e della cultura il vestito che le è più congeniale.[37]

Chapter 2
The Competition

The project presented here has been naturally designed for the requalification of the whole hamlet of Ottava - municipality of Sassari – which in its barycenter does not show a defined situation. Our aim is to offer the entire community an urban requalification capable of integrating and connecting the urban fabric that, right in its very center, lacks a precise design. Furthermore, another goal is to realize a cultural center with a vast array of functions and services currently absent.

The objective of the design plan is a new school complex as the hub of the requalification of the context that, over the next few years, will be affected by privately funded design initiatives. The idea for the construction of a new building wants to grasp the opportunity of locating the school in an ampler area and in a more central position than the one occupied by the current one. In doing so, the peripheral areas of the hamlet – now lacking basic services – will exist the marginality, dependence and isolation from the center it has been suffering.

The new school should be inserted in the urban fabric and will configures itself as an organism open toward the environment in a never-ending communication with residential neighbors. In this perspective, the school must become a local resource by offering to the community a socio-cultural pole able to fulfill social, educational and cultural needs. The school identifies as a place of the community for the community

where to prevent and fight dropping out, while granting a development space by promoting integration, hospitality, active citizenship, pupils and citizens participation in all the initiatives designed for them.
The project should take into account the main road system, constituted by the highway SS131 which touches the construction site and divides the village into two. Such division renders pedestrian crossing really dangerous and also isolates all the inhabitants dwelling in this urban center, a urban center characterized by buildings facing small plots of land.
The secondary road system will guarantee safe accesses to the school area while creating filtering spaces apt for the simultaneous transit of numerous people and vehicles.
The current school, consisting of two early '60s-buildings, due to its small dimensions and progressive aging, is no longer adequate for its job. It would necessitates of multiple adaptations hardly feasible on the existing buildings. The dimension of the current school cannot be expanded by simply adding new additional surfaces. Moreover, it lies in a marginal position when compared to the hamlet of Ottava, whereas the creation of a new school pole in a barycentric area – defined by the planning tool in force as an area dedicated to services – would yield multiple benefits:

- There will be no inconveniences to the regular teaching activities which can go on uninterrupted during the realization of the new building as the students will not be moved in other temporary facilities.
- An expansion of the kindergarten with an extra section as compared to the two current ones which in many instances present overcrowding.
- The possibility of a future expansion of the primary school (one extra section) should the school population grow over the years provided this area is not currently under expropriation.
- A more healthy location of the school complex as it would be far from a concrete factory.
- The possibility of building a brand new complex in accordance with contemporary, distributive and didactic schemes and exigencies.
- Dispose of an outdoor area more extended than the one currently available; moreover the latter would be further reduced in case of expansion or restructuration
- A better location in relation to both the village's traffic viability and in the village's morphology.

The project idea entails the realization of a new single-storey building in the area dedicated to social services, an area which will be the hub of the new expansion of the village of Ottava. Both the schools will be embedded in a single complex within this area.
Both inside and outside there will be a series of spaces that – apart from teaching activities – are going to single out as a socio-cultural reference point for the community of Ottava. The additional presence of an olive grove can represent a relevant opportunity for designing the outdoor spaces.

Functional and Architectural Objectives

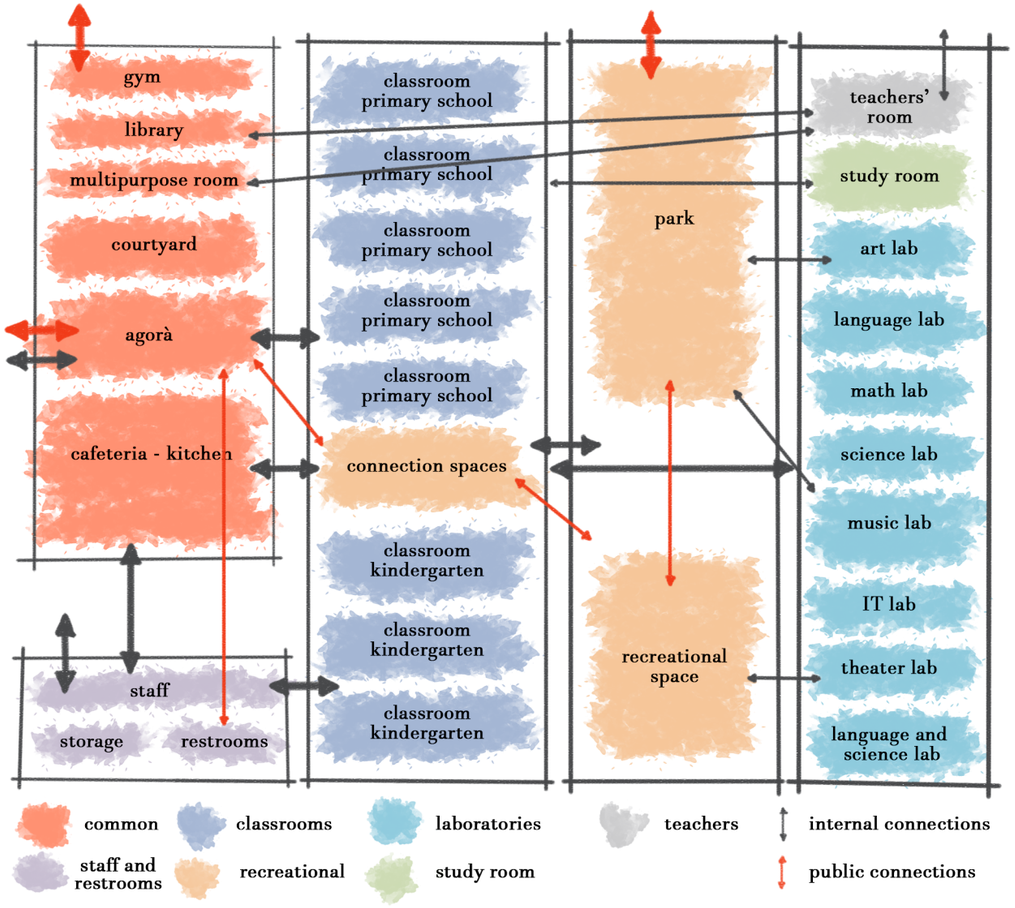
The shape and the external look of the building have to interact with the environment so as to requalify the village of Ottava by standing out as a recognizable urban place, an attraction pole for culture and education. The overall intervention will be perceived as a representative act by the surrounding habitable areas and will give a general orientation to the entire hamlet since the building will not simply function as a school but it will soon become a socio-cultural and aggregation point for all the villagers.
The architecture should be able to interpret the strategic elements and the available contextual resources, thus building a coherent relationship between the pedagogic exigencies and new educational methods whose learning purposes are dislodged from the ones of the past.
The necessity to keep in mind extracurricular activities impinges on the configuration of the school. The different access necessities, the possibility to divide and "compartimentalize" the spaces, the use of outdoor spaces in different parts of the day are just some of the elements to be considered in the overall architecture of this new urban hub.
For this reason one of the goals is a proactive relationship between the building configuration – embedded in an olive grove – and the external space: with regard to this the garden/park is part of the architecture of the new school, a strategic space whose accessibility can be the starting point of the regeneration process of

the hamlet. In other words, a public pedestrian place which could fill a huge gap of the hamlet: moving around. Throughout the village po0ple move around using motor vehicles and break points or open-air public spaces are nonexistent or unused.
The materials employed for the realization of the building should contribute to its iconicity as a place of knowledge an of learning. This would be a first step to try to stop the aesthetic devaluation of these important education centers.
As for the kids, it is of paramount importance that their learning environments are rich with stimuli, enjoyable so as to make them activate all the human sense. Materials quality depends on how they are mixed, used and enhanced. Plus on them rely the form/function and the overall envelope of the building.
The designed spaces should be easily usable by users, pupils, teachers and school staff. They should be conceived using the following criteria:

- usability
- functions and pathways recognition
- space interaction
- barrier-free architectures.

Starting from the above list, for the school complex we propose the following space articulation:

- Classrooms must be open, scalable and easily reconfigurable. The classroom has to become a flexible space, adaptable to new didactic exigencies so as to facilitate group works and student-teacher interactions. This way the tutor can perform a comprehensive "online check" of the teaching program.
- Laboratories are spaces for doing, "ateliers" where the student observes, explores and creates. Depending on the subjects and on learning goals, they will be hosting different tools and resources. For this reason, the space has a multiple suitability for being equipped and adapted to immersive contexts and real-life scenarios. These labs, thanks to their technological innovations and movable furniture, become open specialized spaces. High attractors, by being dedicated to different subjects, they provide the pupils with a vast array of possibilities. Their division is predicated on environmental characteristics (silence, space, flexibility, devices, light) which best fit the ongoing teaching activity.
- The relax or informal learning areas are spaces where children can "clock out" from classes and interact with their mates by using the playground or other non-teaching facilities. Such areas support an assorted variety of informal activities: entertaining resources (books, audio, videos, the Internet), resting or taking a break, group games or making different gadgets. In particular the space must guarantee a certain degree of privacy, obtained by the interaction between artificial and natural elements. Students must enjoy an adequate psycho-physical comfort that will be the joint outcome of proper furniture - soft furniture, comfortable seats, puofs and rugs – and ideal hygrometric conditions.
- Individual learning spaces are the voids dedicated to personal studying, reading and other activities. Here the student can access different technological devices to help him organize his personal schedule. Moreover, these space are workstations for research, teacher-student interactions and Internet access. On the other hand, collective spaces are dedicated to hosting events, manifestations and families. The final aim is to create a space for the proactive interaction of all the school members, the students families and the entire community of Ottava. Furthermore, these spaces can be completely insulated when used outside of school hours.
- Spaces for teachers are dedicated to relaxing, meetings and teacher-parents talks. All of these activities are currently held in the classrooms and, as a result, do not allow a proper ventilation and sanitation of the spaces.
- Service spaces are all those areas dedicated to the proper functioning and management of the school (toilets, dressing rooms, CCTV room).



Function		Sq m
Kindergarten		
Classrooms	Classroom 1	55,00
	Classroom 2	55,00
	Classroom 3	55,00
Total		165,00
Laboratories	Theater Lab	
	Language and Science Lab	
	IT Lab	
Total		88,00
Recreational	Recreational area	
Total		60,00
Teachers spaces	Teachers' room	
Total		20,00
Service spaces	Reception	
	Dressing room	
	Staff room	
	Students' restroom	
	Teachers restroom	
Total		25,00
Total Kindergarten		**358,00**

Primary School		
Classrooms		
	Classroom 1	45,00
	Classroom 2	45,00
	Classroom 3	45,00
	Classroom 4	45,00
	Classroom 5	45,00
Total		225,00
Laboratories		
	Science Lab	
	Math Lab	
	Language Lab	
	Art Lab	
Total		120,00
Individual study space		
	Study room	
Total		14,00
Teachers spaces		
	Teachers' room	
Total		25,00
Service spaces		
	Staff room	
	Students' restroom	
	Teachers' restroom	
Total		12,00
Total Primary School		**396,00**

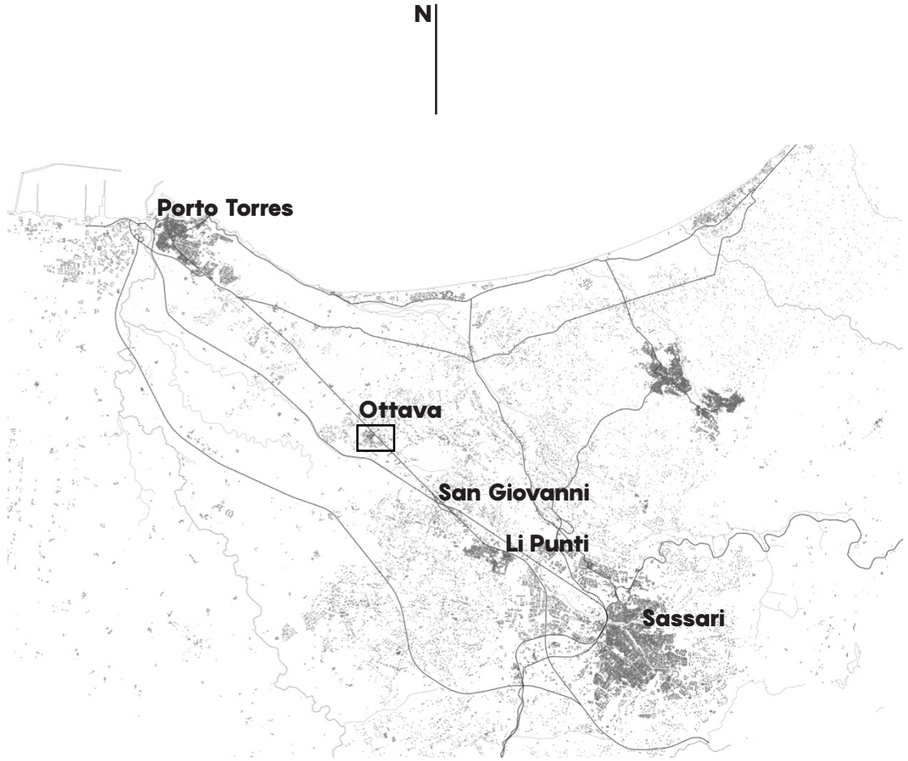
Common Areas		
Laboratories		
	Music Lab	
Total		40,00
Recreational spaces		
	Connection area between the two schools	
	Connection areas	
Total		100,00
Areas of relationship		
	Agorà	156,00
	Library	16,00
	Gym	330,00
	Multipurpose room	40,00
	Cafeteria	200,00
	Kitchen	
Total		742,00
Service spaces		
	Storage	
Total		13,00
Total Common Areas		**895,00**

Floor area (Kindergarten + Primary School)	1649,00
Parking lot	2000,00
Playground	100,00
Pathway (10Sq m x 10Sq m per activity)	100,00
Sport facility (25 X 15 football/basketball)	400,00
Botanical garden	100,00
Recreational outdoor space	100,00
Park	2158,00
Total School Complex	**6607,00**

Chapter 3
The Project Site

Geographical Location

The land that, from Sassari's plateau, extends northwest toward the sea penetrating the Nurra's plain hosts the natural settlement arch for the urban development of the city of Sassari.
The rural hamlets which delineate the historic settlement – flourished around gardens and orchards that supplied the city – belong now to an urban fabric endured by the massive changes involving the general urban asset. Yet they still offer to the eye continuous reminders of the original structure that is getting more and more embedded in the new functions of a city whose main source of expansion remain the countryside.
The village of Ottava developed spontaneously in a fertile area between the cities of Sassari and Porto Torres that, thanks to the job opportunities created by the petrochemical industry in the mid '60s, attracted numerous families.
The spontaneous unstructured growth stretched southward with densities, in the southeast part, superior to the ones of the already fractioned outposts. The village population has further grown in the last few years, even though at slower pace than in the previous decades. The existing primary school and the kindergarten, built respectively in 1958 and 1961, have been erected in a peripheral area untouched by the expansion movement. Hence, there are no visible buildings in the south part where, at a distance of 450 meters, the Ottava river runs. Westward, in a 300 meters radius, there rises a cement and concrete



factory which negatively impacts the surrounding area with its polluting dust and molesting noises. However, not only do the forecasts of the Plan not affect manufacturing, but production abilities get expanded toward the township.

The new school plan location follows the morphology of the hamlet and is far from the manufacturing activities of the village. The new area – currently a private property – covers around 10.000 sq., but only 6.800 sq will be effectively used for the project. Thus, this will allow us to dispose of suitable spaces for the realization of a three-section school complex for the kindergarten (with a possible future extra section) and of one section (five classrooms) for the primary school. Moreover, we have additional spaces for other indoor and outdoor spaces.

The position and conformation of the new building have to take into account a possible future expansion of the primary school in the 3200sq left. The area defined by the planning tool is a squared service area S3p, delimited northeast by the province-managed SS31, closed northwest by M. Murenu street, while in the south side it is "blocked" by Riccardo Bacchelli and M. Murenu streets. As for driveability, the area, being surrounded by secondary streets, circumscribes an ideal location for the safeness of the users. In fact, school entrances and exits can be regulated by "special filters", while first aid and maintenance vehicles can be granted separated lanes. The gym can have its own entrance as well so that non-students can also use it. In the following the figures highlight one of the main features of the area: the olive grove allows to create shadowed and quality environment spaces for recreational activities

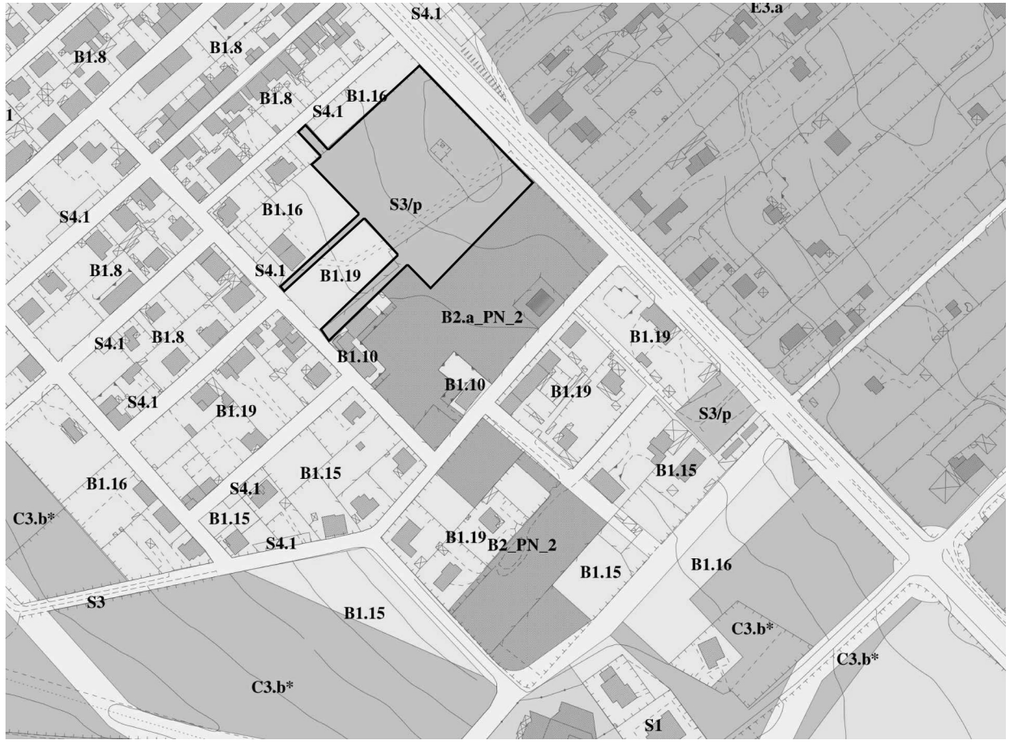
Urban Analysis

The building area for the kindergarten and the primary school has been qualified by the Piano Urbanistico Comunale as an urban standard S3p. It is "barycentered" with regard to the housing expansion of the village of Ottava.[38]
Below a few normative regulations are reported.
The municipality regulation which establishes the use of the area undergoing modifications is is art. 78 delle N.T.A., "Technical Regulations for the Realization" of the planning tool in force which describes: NEIGHBORHOOD SERVICE – "S" ZONES. Definitions and relations with the PPR Areas dedicated to buildings, facilities and housing sites with a minimum standard of 18 sq per inhabitant (art. 6, D.A. 20.12.1983 n° 2266/U).

They are divided into

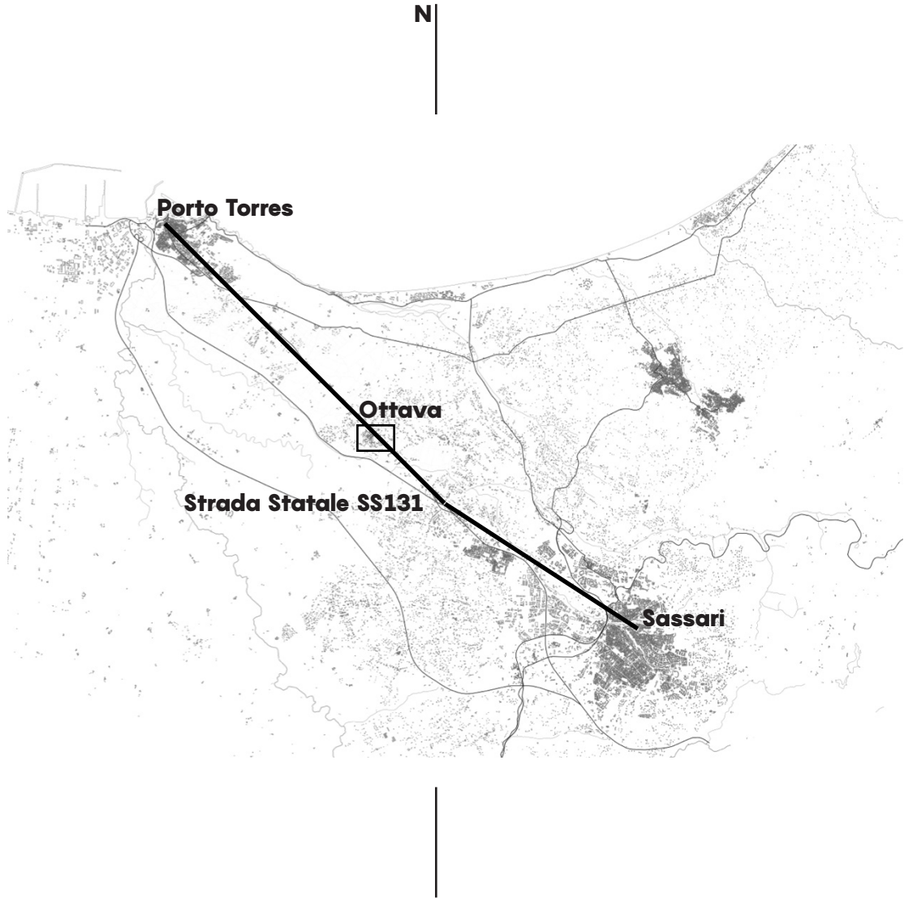
- Subsection S1 education facilities including nurseries, kindergartens, primary schools, secondary schools with a minimum quantity of 4,50 sq per inhabitant.
- Subsection S2 common facilities including health facilities, religious facilities, social life facilities, social communication facilities, recreational facilities with a minimum quantity of 2,00 sq per inhabitant.
- Subsection S3 public spaces, sport facilities and parks including different typologies of green spaces, kids areas, playgrounds and sport facilities, neighborhood parks with a min quantity of 9,00 sq per inhabitant.

Excerpt from the Piano Urbanistico Comunale.



– Subsection S4 car parks including parking lots with a minimum quantity of 2,50 sq per inhabitant.

The area is part of the “Progetti Norma” of the Municipality Urban Plan and conforms to the minimum standard values enlisted in the tables of the “Scheda Norma”. Even though these values should exceed the ones listed above.
Progetti Norma are rule-of-thumb projects which regulate the developments of specific areas by individuating the areas which will remain untouched, the areas for the community and those areas housing facilities.
Public connections, are assured by the bus line headed toward the city center. The bus stop is 300 meters away along the SS131 axis. There are no train or tram stops within one kilometer. The school can be also reached by car or motorbike but there are no bicycle paths, even though future plans include the latter. The project should consider the main S131 axis which divides the village into two and constitutes a possible danger for pedestrians or cyclists crossing it. Hence the connection of the two parts must be taken into account at project level.


N
Porto Torres
Ottava
Strada Statale SS131
Sassari


Vicolo chiuso M. Murenu
Strada Statale SS131
Via M. Murenu
Via R. Bacchelli

Chapter 4
The School Complex

Considering the requirements and the preliminary analysis, the project aims to build an open urban school that gets integrated in the larger organism of the village of Ottava. This school is a place for culture, sociability and identity. It aspires to being inclusive and welcoming: a space for learning and sharing where the community can explore a vast array of contemporary languages (art, theater, music, dancing). In the long run the school should become a cultural center and a reference point for the whole citizenry.

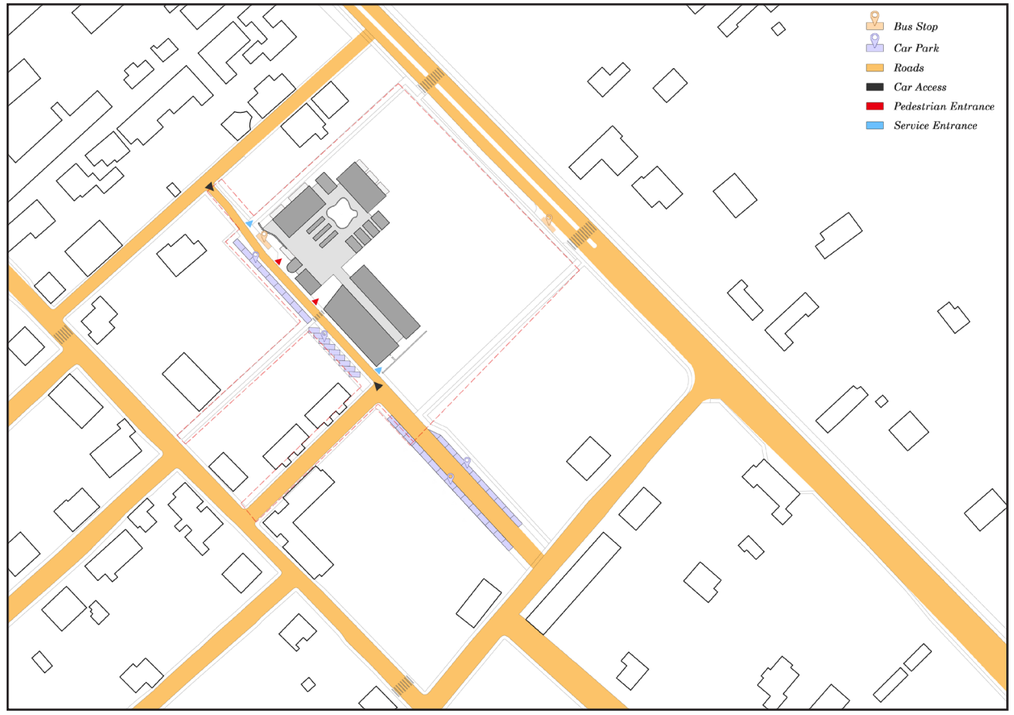
School complex in the morning, while in the afternoon the building and its surroundings turn into a giant collective space or meeting point i.e. “the city for all”. In other words, the library, the gym, the labs and the ample agorà space open up to the community, thus becoming a city.

Moreover the school becomes a source for the re-qualification of the territorial and social context, standing up for the local community as a socio-cultural pole capable of answering to social, educational and cultural need. Simply put, it becomes a place of the community and for the community.

Before delving into the internal space articulation, I intend to show how the school gets embedded in the fabric of Ottava.

As it will be pointed out in the following pages, the access to the building will be granted by a new street, parallel to the state street SS131. The construction of a new street, in fact, will

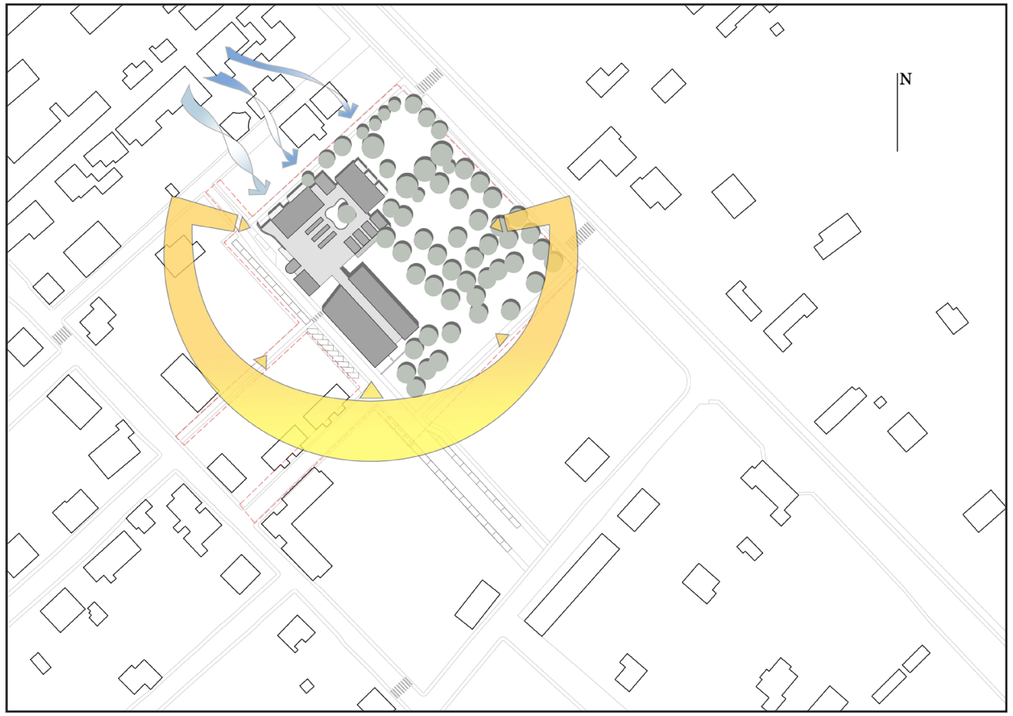
Car circulation - Parking lot - Entrances



allow to create a school-dedicated path for cars and pedestrians, thus defining a protected zone where the kids can be safe from traffic dangers.
Parking lots for the staff will be built in the same area. In so doing, all the traffic vehicles will be gathered in a single point. Furthermore, future pedestrian and bicycle paths will make the school a central pivot by linking the main access with the SS131.
The school building's orientation follows the urban texture of the village, but the internal articulation is designed to guarantee both the recovery of waste heat in the winter and the sunlight protection in the summer.
On the south side there will be the common space like the agorà or the gym while the north side, where the light is more soothing during the school year, will host the classrooms of the kindergarten and the primary school.
Vertical and horizontal mobile shading systems – made out of materials like bamboo – allow to exploit at best the light intake in the winter while waning the excessive sun irradiation in the summer. In addition the olive grove and other plants function as a natural screen against the wind and the hot Sardinian sun. Externally, the school presents itself as the aggregation of a series of volumes with coverings whose inclination variates according to the function of the internal void.
The choice of locating the kindergarten and primary school classrooms in that precise point of the site is not random, but is dictated by the competition notice which foresees a possible future expansion.
In the following pages the main sections of the project – primary school, kindergarten, civic center and equipped park – are presented, each of them considered both as an independent unit and as an integral part of a sole complex.

Pedestrian and bicycle circulation

Sun path and wind direction

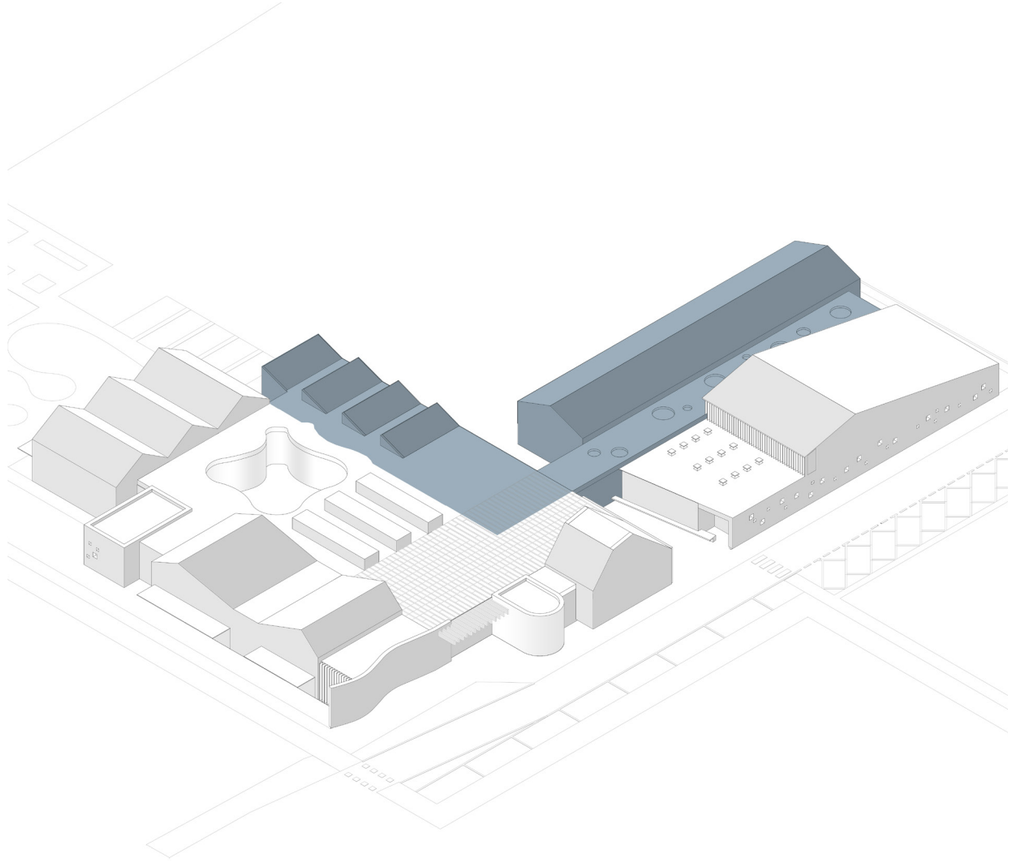


General site plan

General site plan with the possible future expansion

South-East view

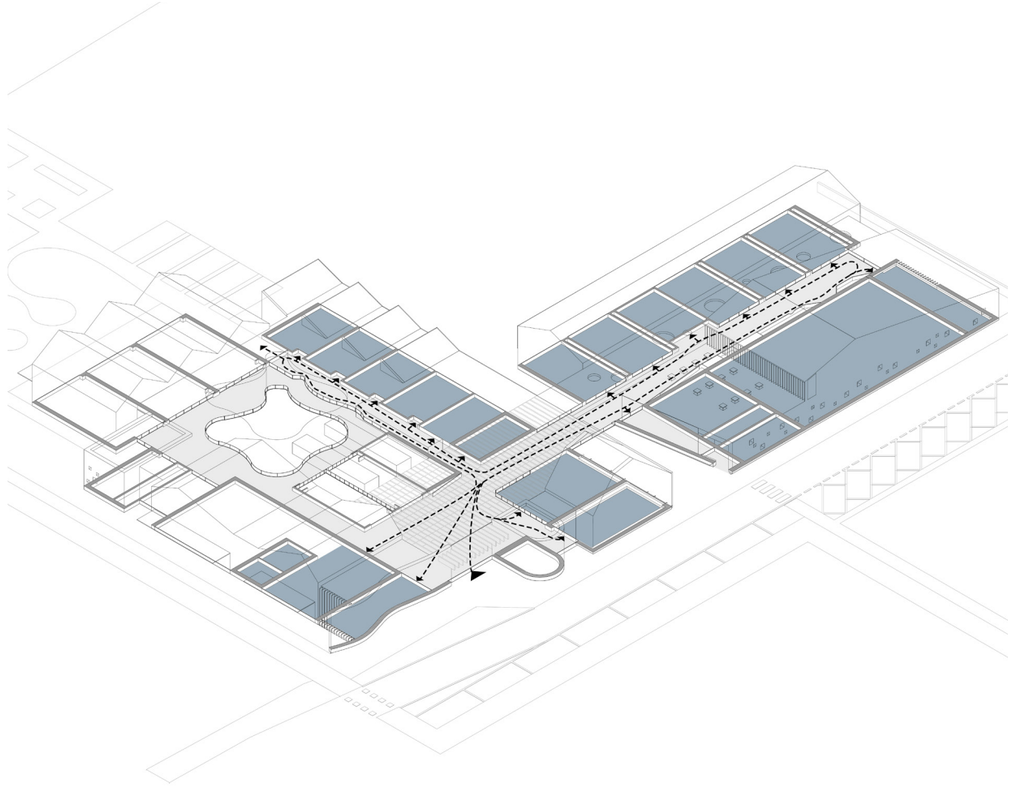
North-West view



Primary School

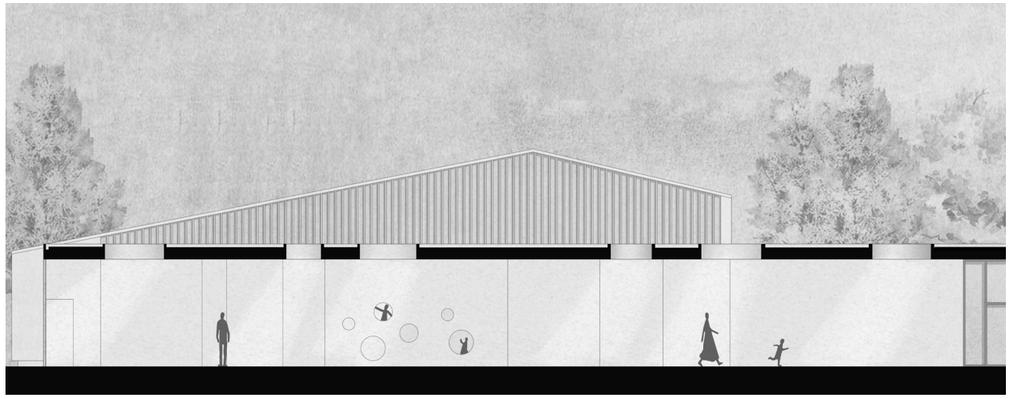
The area occupied by the primary school – marked in the isometric projection on the side – develops along two main axes which define the distributive space, from the classrooms to the labs. Nonetheless, they are to be also intended as sharing and common spaces.
The connection and access axis to the classrooms includes a “playing wall”: the circle becomes the formal element which translates into a “ludic excavation”, while, at the same time, functioning as a light impluvium for the downward irradiation of the internal spaces.
The classrooms are conceived in accordance with contemporary education theories that is, they are voids with mobile, modifiable and combinable furniture according to teaching necessities.
The labs follow the aforementioned system, but every space – having a specific function – presents a different furniture typology suitable for that specific room. All the spaces dedicated to didactic purposes face the olive grove through a “transparent wall”.
As far as the volume is concerned, the primary school follows the logic of the entire complex. This means that the different micro-functions of every section develop in height in compliance with the shapes and inclinations of the covering. Such principle denotes the willing of projecting outwardly the complex internal articulation, while maintaining a sense of unity that entails always the same logic.

Primary school circulation

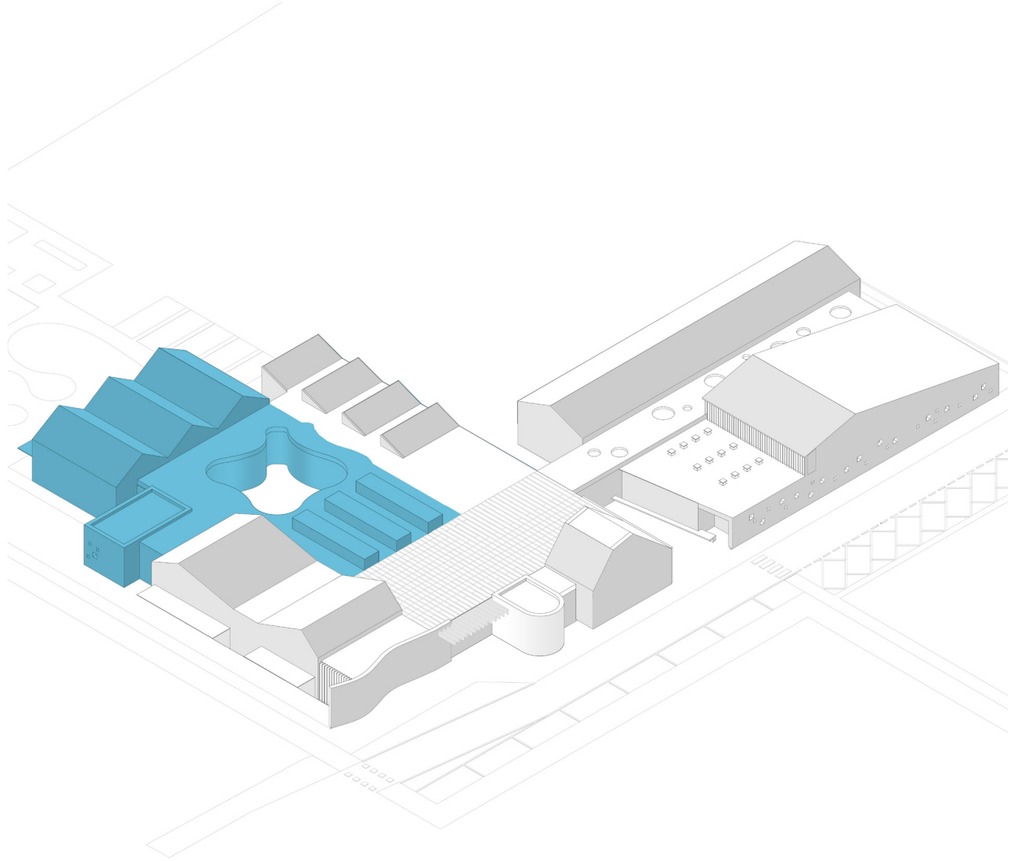


Areas used only by the primary school

Excerpt from a section on the recreational and distributional space



View of the recreational and distributional space

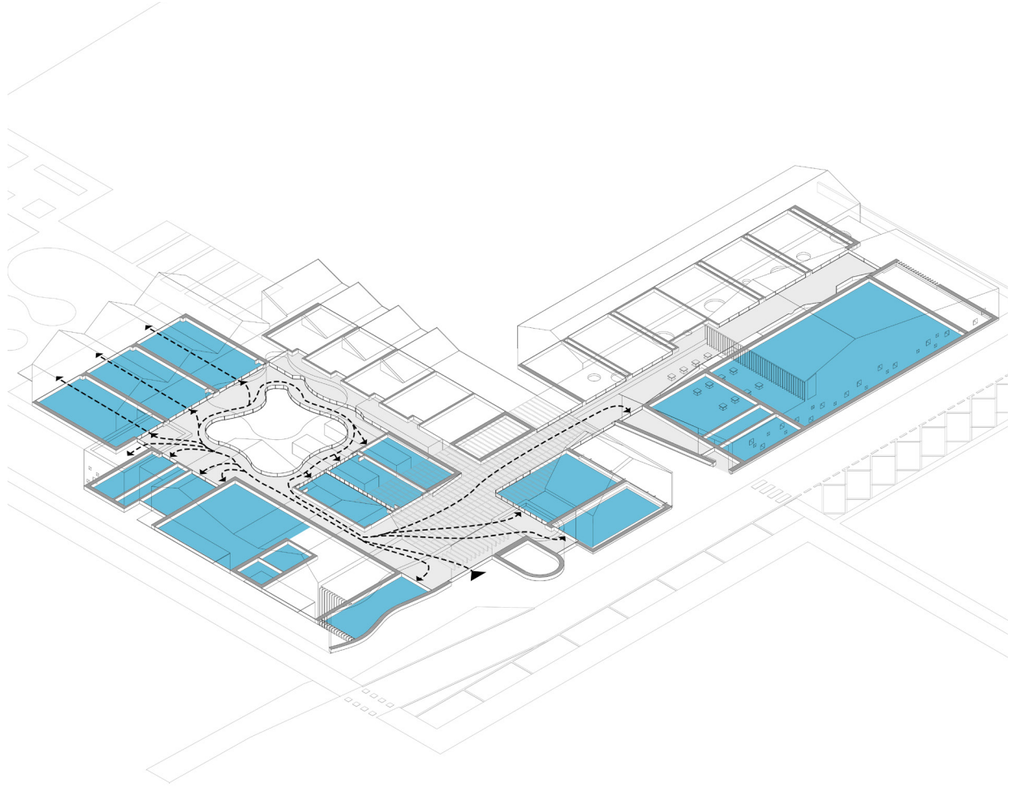


Kindergarten

The kindergarten, just like the primary school, is composed of labs and classrooms. However, it presents variations due to different teaching purposes exclusively tailored for the age of its little users.
Outwardly the volume is marked by the covering which is divided into three equal parts – in the plan they correspond to the sections.
When looking at a section every classroom is thought as a void delimited on two sides by walls equipped with shelves and closets, whereas outwardly the wall dematerializes and creates a direct connection with the park.
A drywall skin upholsters the superior void of the classrooms and characterizes for the use of different colors and shapes for every section.

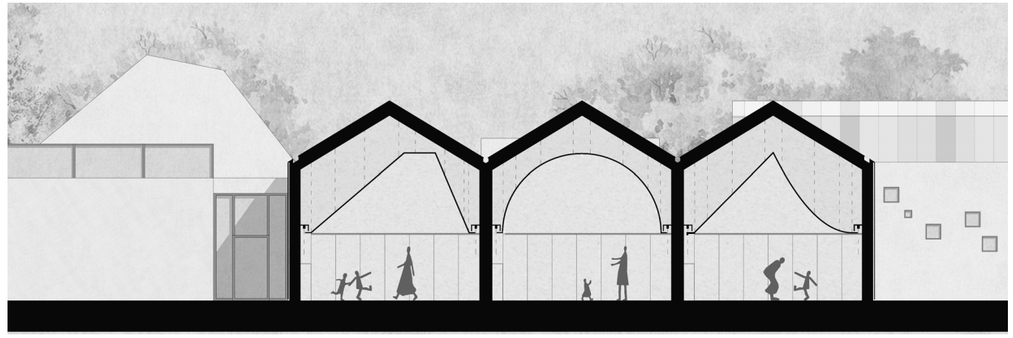
The main feature of the kindergarten is the internal garden that in the plan configures as an amorphous geometric shape, a reminder of a treetop. The design will to break the linearity of spaces is dictated by the desire to offer the child a fluid dynamic spaces that instills in him/her the joy to run and play.
The play room, revolving around the yard, can be directly linked to the classrooms and two labs using sliding walls. This allows more flexibility in the space use and during teaching activities.

Kindergarten circulation

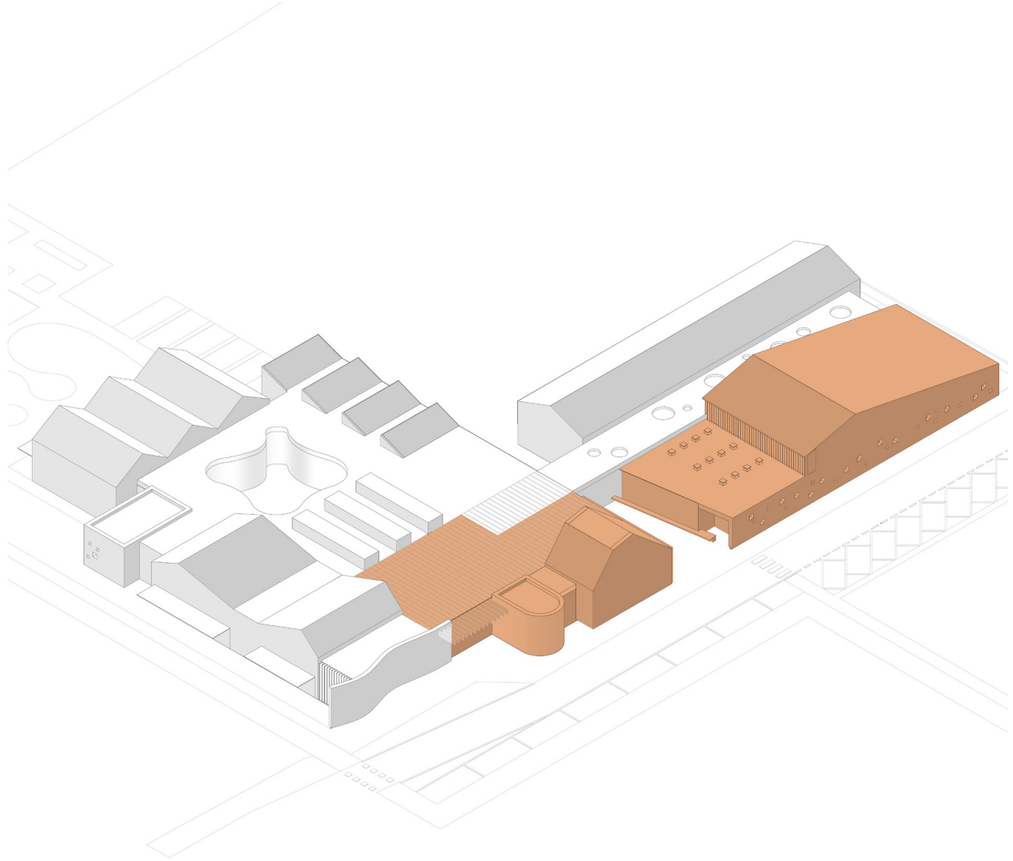


Areas used only by the kindergarten

Excerpt from a section on the classrooms of the kindergarten



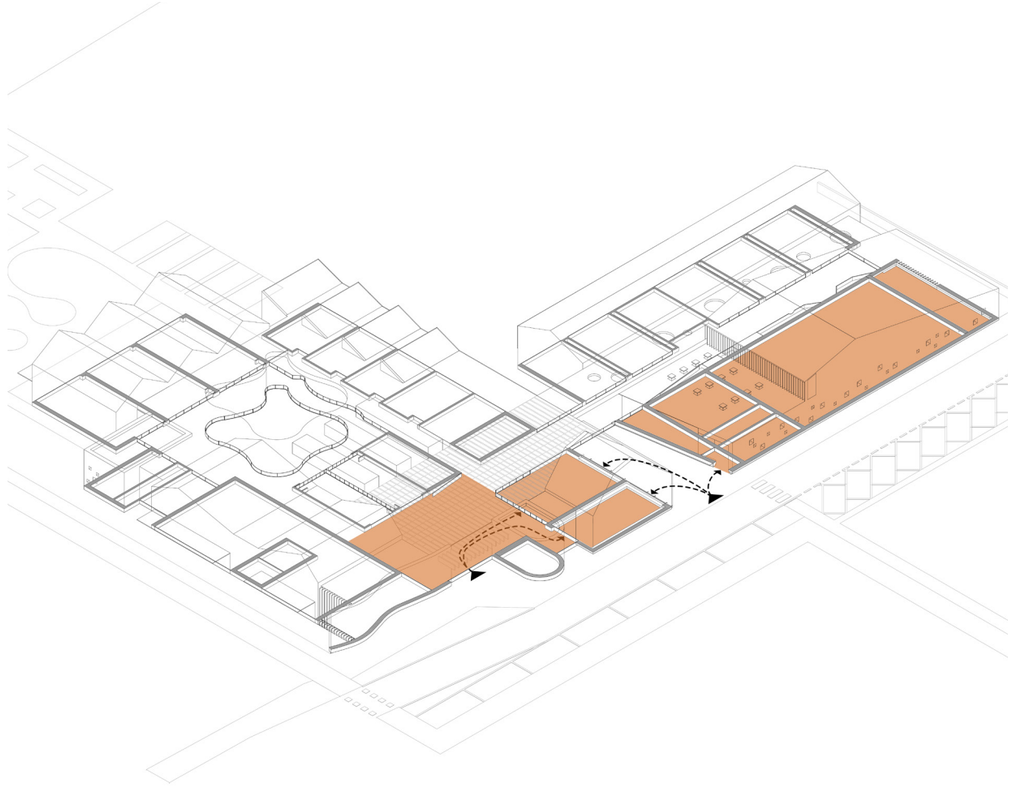
View of one of the classrooms in the kindergarten



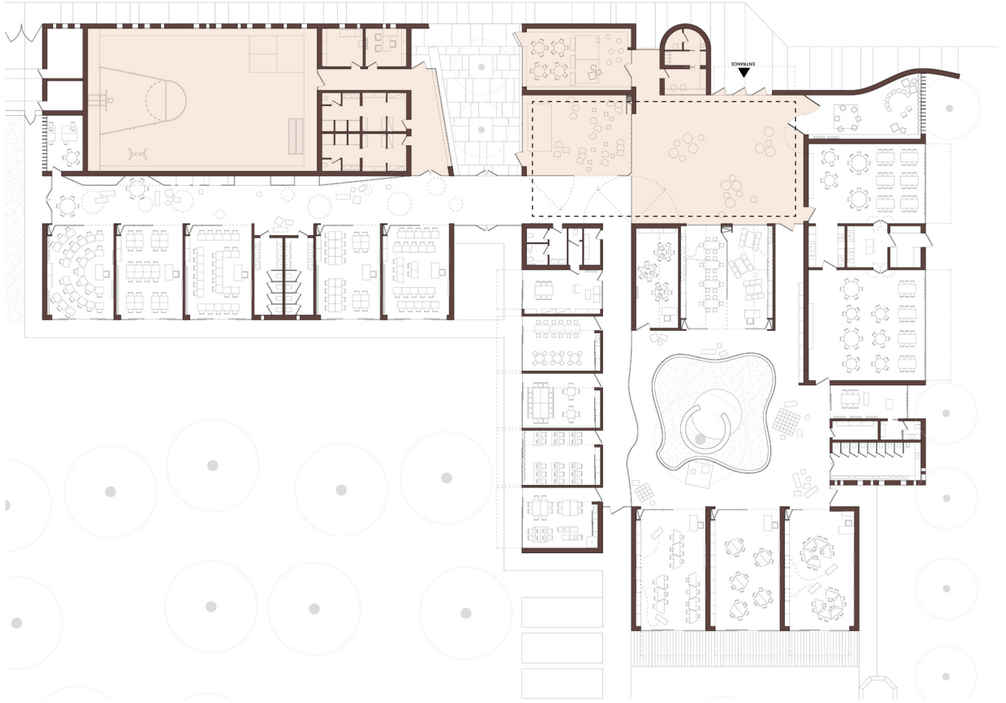
Civic Center

The space dedicated to the citizenry – the Civic Center, is placed around the main access axis. A cut in the volume identifies the entrances for the local community.
On one side, one can enter the gym, on the other side there are a small library and a multipurpose room. The latter is characterized by the use of sliding walls which enable both an expansion movement – in which the Civic Center become a single space with the agorà – or a further fragmentation of the space.
The Civic Center wants to be singled out as the liking element between the city and the school complex. The peculiarity of such structures is the possibility to enjoy the building without disturbing the teaching activities. Through a "do-architecture" approach we have achieved a spatial configuration articulated through changing voids which responds to different needs.

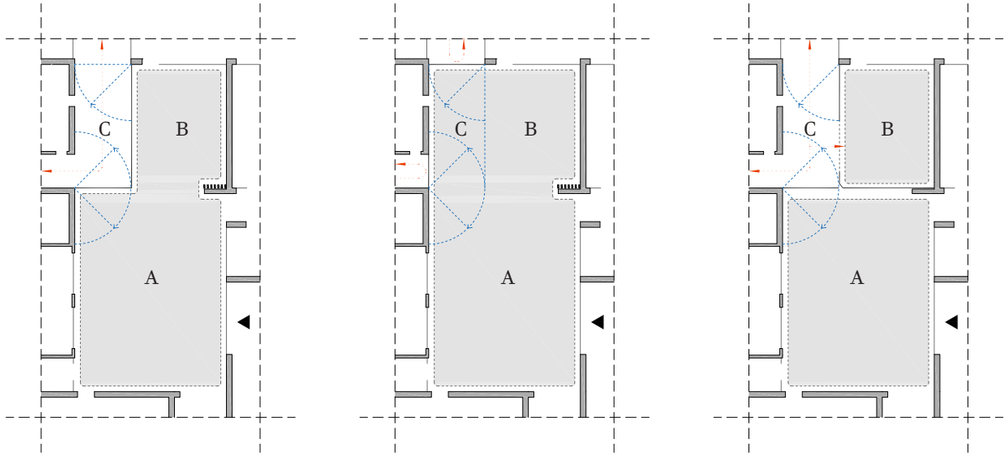
Civic center circulation



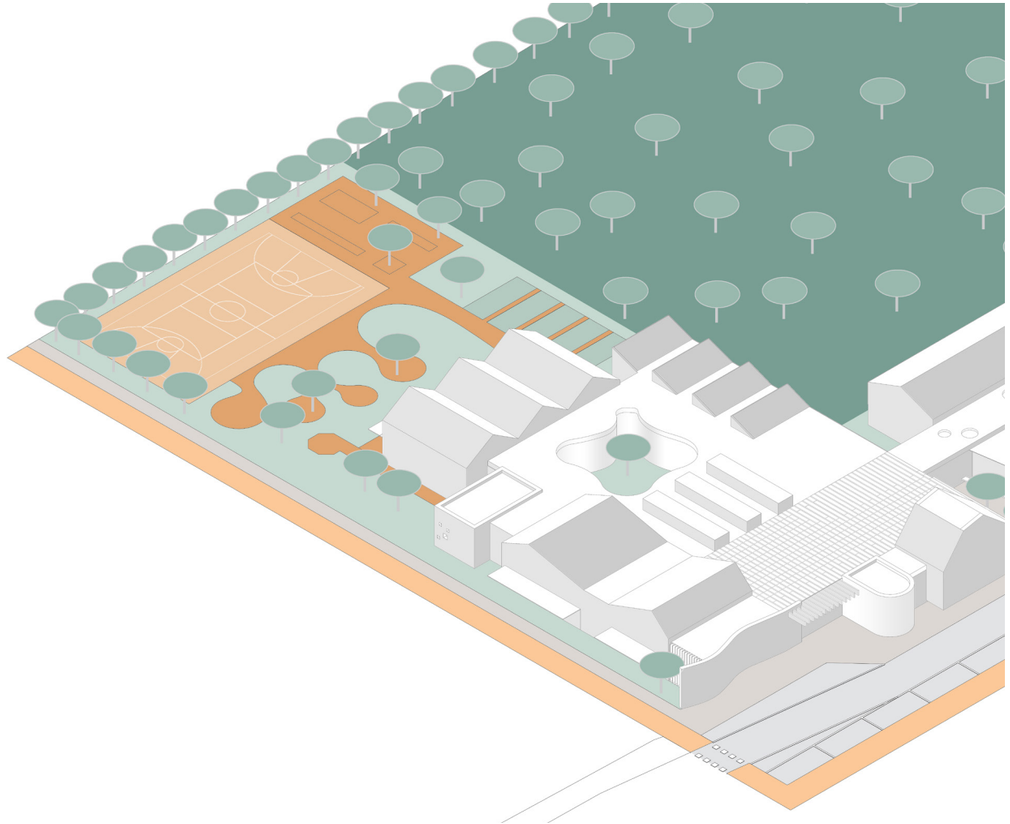
Areas used by the civic center



Possible variations of the space regarding the agorà (A), the multipurpose room (B) and the hall of the primary school (C)



View of the agorà and (on the back) the multipurpose hall



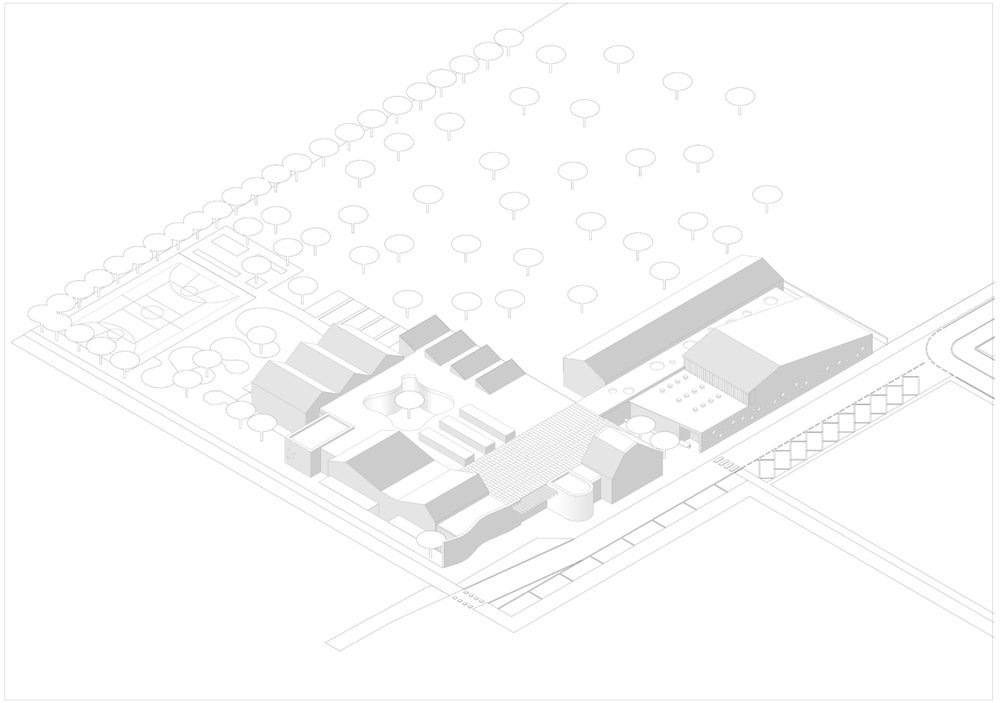
Park

The equipped park has been designed as a natural extension of the internal structure: the classrooms become open-air teaching space and labs are replaced by vegetable gardens where to experiment.
In the space partition, the panels and sliding walls are substituted by the vegetation and the change in soil texture. The state street is filtered through a raw of tree which defines also the border of the school complex and terminates with the olive grove.
A bicycle-pedestrian path links sideways the SS131 to the school access. Inside the park various spaces have been carved out: a recreational pathway, a playing area, a sport facility and teaching areas.

Plan of the equipped park

View of the sport facility and (on the back) the playground

School complex - isometric view



Conclusions

The present analysis allows to understand in depth the design choices which led to the formation of the school building under scrutiny.
The transformation process – from the XIX century to nowadays – of the relationship between pedagogy and educational spaces, allows us to strengthen our awareness of the meaning of “doing architecture”. The work highlights, in fact, how the typology of the school building has undergone massive modifications throughout time; from a rigid, closed and formally recognizable model, we have passed to a flexible outdoor one in which the citizenry can have a say.
This is the case of the new school of Ottava which tries to take the contemporary pedagogy theory as role models and adapt them to the morphology and urban fabric of the plan site. When the architects consider this system the most suitable for realizing the desired space, the tools used to check the design evolve accordingly adapting to the idea developed in unison with architecture.
While the research concerning concrete design results is still at an embryonic state, there is no doubt that the implementation of this method enhanced the control and attention devoted to how the little user lives in the space.

Notes, Figures, Bibliography

Notes

[1] Cf. Pepe D., Rossetti M., Progetti di scuole innovative, 2016, p. 6.
[2] Cf. Krier L., Drawing for Architecture, 2009.
[3] Preface by Education Minister P.I. Baccelli to the 1894 New School Reform, http://cronologia.leonardo.it/storia/tabello/tabe1530.htm, digitato in data 11.04.2017.
[4] Cf. Montessori M., The Human Tendencies and Montessori Education, Association Montessori International, Amsterdam, 1966.
[5] Cf. Sartoris A., Luci sulla scuola moderna, Emo Cavalleri Editore, Como, 1937, p. 10.
[6] Cf. A. Sartoris, Luci sulla scuola moderna, p. 10 and p. 32, and cf. Ing. Terragni A., Arch. Terragni G., Progetto di Asilo per il Rione S. Elia in Terragni e l'Asilo Sant'Elia, "Aiòn", n. 7, 2004, pp. 120-135.
[7] Cf. E. N. Rogers, Architettura Educatrice, 'Domus – La casa dell'uomo', n. 220, giugno 1947.
[8] Cf. "Casabella - Continuità", monography, n. 243, settembre 1960.
[9] As defined by Treccani Vocabolario Online, with "pluriclasse" we intend the following: "Nella scuola elementare, spec. nel passato (oggi il caso è raro), gruppo di più classi che vengono riunite insieme, perché costituite ciascuna da pochissimi alunni, e a cui l'insegnamento viene impartito contemporaneamente da un unico maestro". Cf. http://www.treccani.it/vocabolario/pluriclasse/.
[10] Cf. Rossana Rossanda, "Casabella - Continuità", n. 243.
[11] Cf. P. Druker, From Capitalism to Knowledge Society, in Post-Capitalism Society, HarperBusiness, New York, 1994, p. 19.
[12] Cf. Neef D., The Knowledge Economy, Butterworth-Heinemann, Boston, 1998.
[13] Cf. "El Croquis", Aires Mateus 2011-2016, n. 186, 2016, p. 50.
[14] Cf. www.umbrella.it/web/download.php?valo=e_73, revised 02.05.2017.
[15] Weyland B., Attia S., Progettare scuole tra pedagogia e architettura, Guerini scientifica, Milano, 2015, p. 111.
[16] Cf. G. Canella, Scuola e paesaggio: un'occasione perduta?, "Hinterland", n. 17, marzo 1981.
[17] P. Zumthor, Atmosfere, 2007, p. 24.

[18] Morin E., Seven complex lessons in education for the future, UNESCO Publishing, Paris, 1999, p. 61.
[19] Cf. Bronfenbrenner U., Ecological Models of Human Development, in International Encyclopedia of Education, Vol.3, 2nd ed., 1994, 1643-47, pp. 37-43.
[20] Cf. Indicazioni nazionali per il curriculo della scuola dell'infanzia e del primo ciclo d'istruzione, Ministero dell'Istruzione dell'Università e della Ricerca, 2012.
[21] Cf. Malaguzzi L., In viaggio con i diritti delle bambine e dei bambini, Reggio Children, Reggio Emilia, 1995.
[22] Cf. Indicazioni nazionali per il curriculo della scuola dell'infanzia e del primo ciclo d'istruzione, Ministero dell'Istruzione dell'Università e della Ricerca, 2012, p. 18.
[23] Ibid, p. 26.
[24] Cf. Kuuskorpi M., Kaarina, González N. C., The future of the physical learning environment: school facilities that support the user, OECD, 2011.
[25] The definition of spatiality, connectivity and temporality are all taken from (OECD 2011).
[26] Cf. Blackmore J., Bateman D., O'Mara J., Loughlin J., Centre for research in educational futures and innovation, Faculty of Arts and Education, Deakin University, OECD, 2011.
[27] Cf. Gillies R. M., Ashman A. F., Co-operative Learning. The social and intellectual outcomes of learning in groups, RoutledgeFalmer, New York, 2005.
[28] Cf. Aldrich C., Learning by doing. A Comprehensive Guide to Simulations, Computer Games, and Pedagogy in e-Learning and Other Educational Experiences, Pfeiffer, New York, 2005.
[29] Cf. Haynes J., Children as Philosophers. Learning through enquiry and dialogue in the primary classroom, RoutledgeFalmer, New York, 2003.
[30] Cf. Malaguzzi L., In viaggio con i diritti delle bambine e dei bambini, Reggio Children, Reggio Emilia, 1995.
[31] Cf. Ibid.
[32] Cf. Gadamer H. G., Truth and Method. 2nd ed., Crossroad, New York, 2004.
[33] Eames C., Eames R., Powers of Ten, https://www.youtube.com/watch?v=Ww4gYNrOkkg.
[34] Cf. Malaguzzi L., In viaggio con i diritti delle bambine e dei bambini, Reggio Children, Reggio Emilia, 1995.

[35] Cf. Ibid.
[36] Cf. Bennett F. L., The Management of Construction: A Project Life Cycle Approach, Butterworth-Heinemann, Oxford, 2003.
[37] Weyland B., Attia S., Progettare scuole tra pedagogia e architettura, Guerini scientifica, Milano, 2015, p. 42
[38] The Piano Urbanistico Comunale (PUC) is available at http://www.comune.sassari.it/comune/puc/puc_indice_new_doc.html, revised 14.05.2017.

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1-2 E. G. Asplund, Karl-Johan School, Gothenburg, 1915-24, aerial perspective and plan.

3-4 G. Terragni, Sant'Elia Kindergarten, Como, 1932-37, axonometry, sections and plan.

5 W. Gropius and M. Fry, Histon and Impington Village College, Cambridgeshire, 1936, elevetions, section, plan.

6 A. van Eyck, Primary School, Nagele, 1954-56, plan.

7 H. Hertzberger, Montessori School, Delft, 1960-66, scheme of the school expansion until 1981.

8 J. van der Keuken, Children playing in the Montessori School, Delft, 1975.

9-10-11 Aires Mateus, School in Vila Nova da Barquinha, Portugal, 2007-11, diagrams and exterior views, photos by F. Guerra.

12-13 A. C. Baeza, Benetton Nursery, Treviso, 2006, plan and exterior view, photo by Hisao Suzuki.

14-15 Cez Calderan Zanovello Architetti, Primary School, Vipiteno, 2010, plan and exterior view, photo by Günter Richard Wett.

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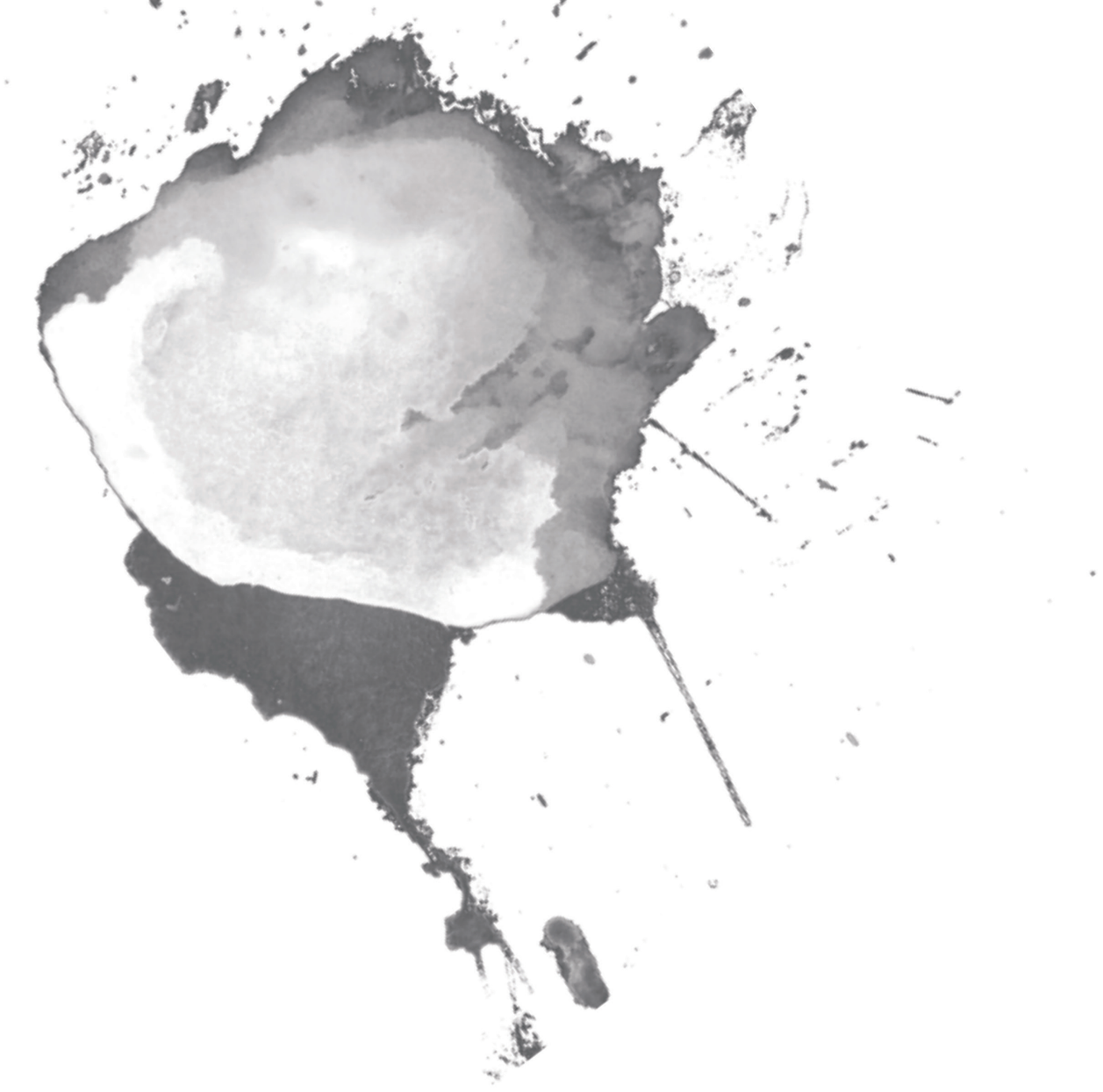


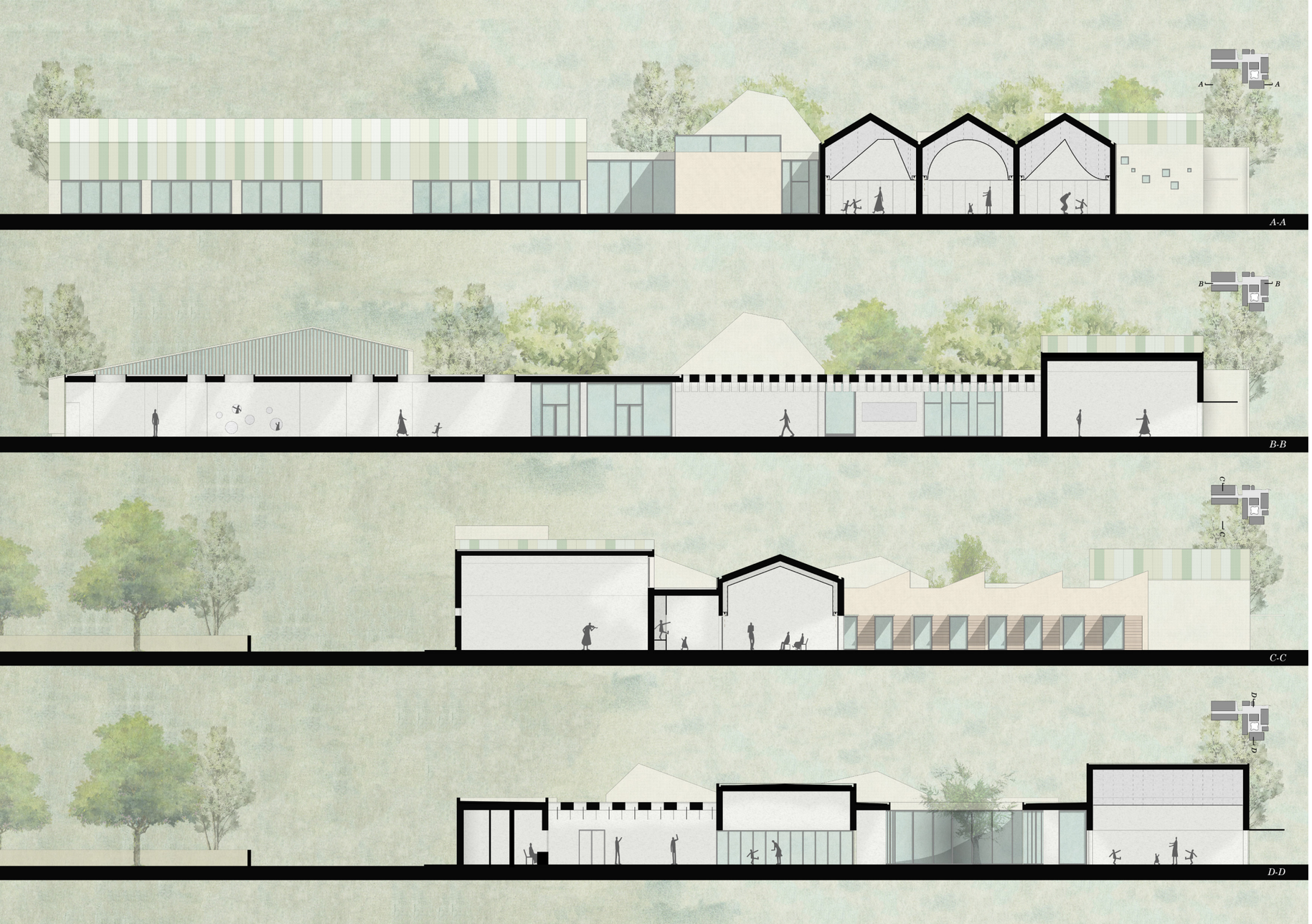
Project Boards

N

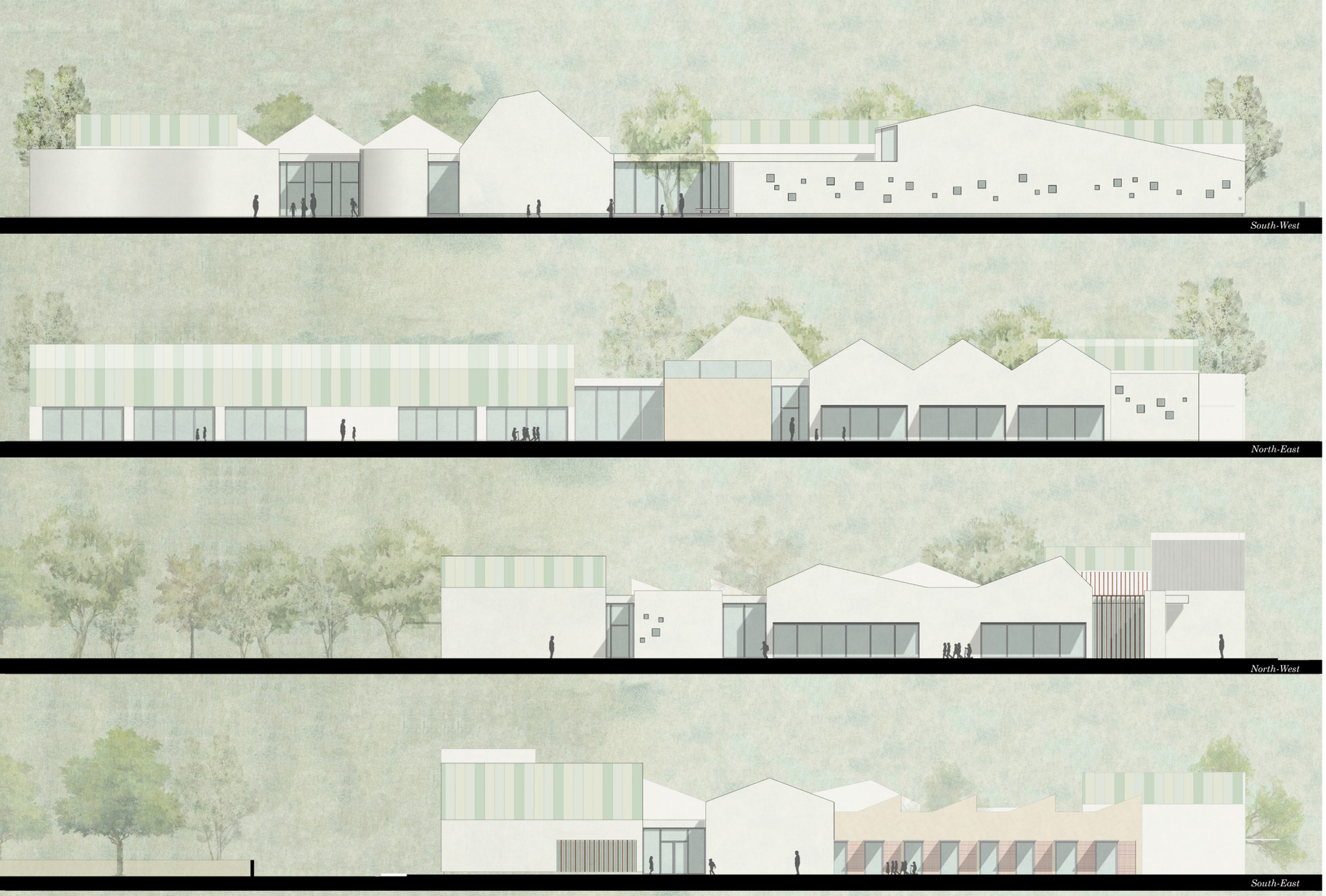
Board 01
Site Plan
scale 1:1000

1 Classroom (kindergarten)
2 Theater lab
3 Language and Science lab
4 IT Lab
5 Playground
6 Children's restroom
7 Teachers' room
8 Teachers' restroom
9 Storage room
10 Courtyard
11 Canteen (kindergarten)
12 Canteen (entrance) and kitchen
13 Canteen (storage)
14 Storage room
15 Canteen (primary school)
16 Music Lab
17 Agorà
18 Staff
19 Storage room
20 Library
21 Multipurpose room
22 Gym hall
23 Office
24 Storage
25 Dressing room (men)
26 Dressing room (women)
27 Gym
28 Entrance (primary school)
29 Restroom (primary school)
30 Teachers' room
31 Science lab
32 Math lab
33 Language L2 and IT lab
34 Art lab
35 Classroom (primary school)
36 Individual study room
37 Teachers' restroom
38 Storage
39 Technical room
40 Electric panels

Board 02
Plan
scale 1:250



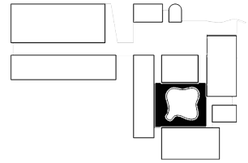
Board 03
Sections
scale 1:250



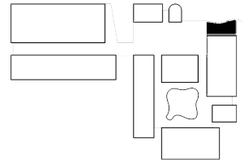
Board 04
Elevations
scale 1:250

Board 05
Design Process
scale 1:200

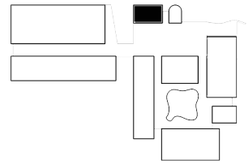
Board 06
Maquette
scale 1:200



Board 07
The Courtyard
Kindergarten



Board 08
The Music Lab
Common Space



Board 09
The Library
Common Space

Board 10
The Olive Grove
School Exterior