

Movement and outdoor spaces as quality indicators in the design of school buildings

BEATE WEYLAND

Free University of Bolzano, Faculty of Education, ITALY

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Abstract

This article takes a special look at the relationship between pedagogy and architecture in the process of constructing school buildings. It often seems that the contribution of the education professional is not important in designing a school. It turns out, however, that a pedagogical reading of the projects can help to improve the proposals or to choose those that are more coherent with the demands of the educating community. How children move around in buildings and what kind of relationships they establish with the outside space have never been determining factors in the design of school buildings. Yet these are important factors that contribute to better working in schools. In this contribution it will be highlighted how the presence of a pedagogical figure in the jury of an international design competition called "Milano in crescita" for a large school complex in the Municipality of Milan, was able to make use, among other things, of the analysis of movements in and between the proposed buildings. The contribution will highlight the steps identified in the definition of the architectural criteria and their pedagogical declination, and will indicate the elements available to the jury for evaluation, with particular attention to the previous participatory process and to the competition announcement. The presence in the commission of a figure with voting power representing the pedagogical component is not taken for granted. In the international context there are no regulations governing figures who can enhance and defend the movement component and the relationships between indoor and outdoor spaces in the evaluation of projects. The winning school's project has skilfully interpreted the wishes of the schools involved and the bold and innovative intentions of the client. For the first time, the movement factor and the relationship between indoor and outdoor spaces were considered as essential design elements both from an architectural and a pedagogic-didactic point of view.

Keywords: movement, space, architecture, pedagogical criteria, wellbeing, school building

Introduction

In recent years, the design of educational spaces is moving in an interdisciplinary direction to include in the design idea not only the technical-economic, urban planning and architectural discourse, but also the quality and typology of the didactic-educational activities, so as to design with greater precision the relational qualities of the environments among themselves and the furnishings in order to a coherent and pedagogically reasoned thought (Weyland, Attia 2015, Woolner 2015).

Currently, the knowledge and approaches developed to involve school communities in the development of a new school idea have evolved a great deal. In particular, a culture of participation aimed at a more active and responsible involvement of users has matured at national and international level (Montagstiftung 2012, Weyland et al. 2019).

The case study we are presenting concerns the design of the new school complex in Via Scialoia, promoted by the Municipality of Milan between 2019 and 2020 through the activation of participatory processes led by the association ABCittà (abcittà.org) and with the organisation of an international architectural design competition called "Milano in crescita" (Growing Milan), in which the jury included the participation of a pedagogical component with voting power. The presence of the pedagogical perspective in the jury allowed the analysis of the architectural qualities of the projects to be flanked by the development of criteria oriented towards respecting the needs matured in the participatory process and enhancing the general pedagogical indications described in the competition announcement.

As expert involved in the competition committee, my responsibility was to bring together the rich know-how gained over the years on the relationship between pedagogy and architecture in a concrete and clear pedagogical-didactical analysis, with precise references, weighted indicators and criteria equivalent to those established in the competition announcement. In this work I noticed how the analysis of the projects from the perspective of the children's walking in the buildings, between the buildings and around the buildings played a decisive role.

All the documentation of the case study, from the outcomes of the participatory process to the documentation of the commission's work can be found at <http://www.scuolascialoia.concorrimi.it/>.

Materials and Methods

Thinking today about the practicality and materiality of schools is becoming a necessity. Not only because the urgency of school building work is pressing and because it entails a huge economic investment, but above all because the most obvious urgency is that of a school that no longer works as it is, no longer has any appeal and no longer corresponds to the everyday lives of children, young people and adults.

Currently, the strength that pedagogy still lacks in order to speak to schools can find some answers in architecture, which is thinking in the round about the construction of its buildings. As an abstract, inaccessible subject, pedagogy in dialogue with architecture bridges the gap between school and life with its concrete answers.

The strategies that qualify the construction of good, or perhaps better, healthy schools on an international level play on the elements of presence, the quality of the spaces dedicated to teachers, as those who run the school; they enhance the school as a system of interconnected spaces and give it character, in harmony with thoughts and teaching. The best-known international examples of school buildings identify them as cultural centers, open to citizenship with shared places such as common spaces and outdoor space. They also pay attention to the movement in and around the buildings, and relate it to nature, implementing sustainability projects to better relate the school to nature and culture.

New perspectives on school buildings that better combine pedagogy and architecture often arise from participatory processes that help to better define, with the voice of children and teachers, the urgencies to be addressed.

The participatory process

Between May and June 2019, the association in charge of ABCittà organised a series of meetings and workshops to gather input and proposals from the school community. The steps were as follows

- 9 May 2019 - institutional table: n.1 representative of the staff of the Assessore all'Istruzione e Educazione, n.2 of the Settore Educazione del Comune di Milano, n.2 of the Ufficio Tecnico di Urbanistica del Comune di Milano, n.1 of the Area Tecnica scuole del Comune di Milano, n.2 of the I.C. di via Scialoia, 5 of the I.C. di via Console Marcello, n.2 facilitators of ABCittà. TOTAL: 15 participants
- 15-22 May 2019 - consultation in classrooms: Scialoia and Pellegrino rossi preschools: two groups of children large section, total 53 participants; Scialoia primary school: 17 classes for a total of 350 children; Scialoia secondary school: 3 classes for a total of 70 children; Colombo secondary school: 3 classes for a total of 70 children. TOTAL: 543 participants
- 30 May 2019 - Local consultation workshop with the Scialoia school: 5 working groups: n.1 headmaster, n. 4 parents and teachers of kindergartens, n. 22 parents, teachers and non-teaching staff of primary school, n.20 children of primary school, n.10 parents and teachers of secondary school, n.4 children of secondary school. For the administration: Councillor for Education and Education, Head of the Education Sector. TOTAL: 63 participants (38 adults, 24 children and young people)
- 3 June 2019 - Local consultation workshop with Colombo school: 2 working groups: n.1 head teacher, n.22 parents, teachers and non-teaching staff from secondary school, n.7 secondary school children. TOTAL: 30 participants (23 adults, 7 young people).

The consultation started with the involvement of the classes, to ensure that all pupils were informed about the project objectives and had the opportunity to make a contribution.

The listening techniques activated in the initial phase of the course were based on a direct relational approach conducted in collaboration with the teachers, and contributed to building the premise of the subsequent work: the collected data gave indications for the preparation of the workshop, and was presented at the beginning of the group work as a moment of "listening" to the voices of the children and young people.

The tools proposed consisted of a first step of getting to know the theme, inviting the children to analyse the spaces they know; a second step of vision, inviting them to imagine themselves in the school of the future. It was left to the teachers to select the delegates (children and adults) to the workshop.

The preparatory phase of consultation in the classes offered an initial range of ideas at the start of the workshops, which were found in the planned spatial typologies (given element) while leaving their characterisation free (desired improvements).

The teaching and non-teaching staff and the parents' associations also presented documents with precise indications, which were taken up in the group work and integrated into the summary tables. The activities allowed the future vision of the school to emerge, subsequently codified in terms of desired project

elements and the choice of shared priorities in a "slogan". All the groups presented the final result in plenary, having the opportunity to recognise and confront each other.

From the group of nursery school teachers and parents there emerges the idea of a *school based on man and nature*, in which every room, not only the open one, is touched and permeated by nature itself. Another tool was focused on the flexibility of spaces, which should not have too many divisions or fixed elements within them, so that they can be used for different functions.

The relationship between inside and outside must also never be clear-cut, neither visually - thanks to windows and transparencies - nor in terms of activities - thanks to a functional continuity between inside and outside guaranteed by the presence of vegetation inside and canopies and tables outside.

The theme of a "*green school*" is also found in the building typology, with the request for special attention to environmental sustainability in the design, in the choice of materials and subsequently in the furnishings. The new school for the primary school adult group must have spaces and equipment that allow communication between different environments and between different functions. In particular, the flexibility and multi-functionality of the classrooms through the provision of walls and mobile furniture/equipment makes it possible to transform them into laboratories if necessary and thus serve several teaching activities. In this way, laboratories would not necessarily be dedicated spaces. Communication also means that there is no division between the buildings of the Comprehensive Institute but that there can be stylistic and architectural continuity, including physical continuity where possible, thanks to *communicating* and covered *paths* or openings between the outdoor spaces of the gardens.

The other major aspect of communication concerns the relationship with the neighbourhood: openness and dialogue with the neighbourhood are key concepts that emerge from the group and should guide the design of the new building. Collective spaces must therefore also be able to be used during non-school hours and become filter spaces between the school and the neighbourhood: the assembly hall, for example, which is currently lacking and which could also serve as a theatre.

The children focus in particular on the equipped spaces with which the new school must be equipped. Starting with the laboratory classrooms, which must be able to host a variety of activities - cultural, scientific or associative - that are currently lacking through a more functional space and furnishings that are better suited to the various initiatives.

For the outdoor area, many people ask for sports fields and equipment for sports disciplines. An important indication with regard to the new building concerns the *relationship between outside and inside*: some children ask to have covered outdoor spaces to be used also in case of rain or to have indoor common spaces to play in winter; in general, they ask for classrooms facing the garden.

From the work of the adults and pupils of the secondary school emerges the idea of a luminous building both in the common parts and in the classrooms; the element of light in fact characterises many of the environments mentioned and described by the workshop participants: from the classrooms to the gymnasium. Along with light comes 'green' in the sense of a garden. The idea of the students is that a bit of green should enter the classrooms, thanks to a design of the *classroom space that allows direct contact with the outside*. But it is also intended as a garden to be lived in, i.e. an open-air classroom, with a vegetable garden and spaces for teaching.

There is also a request for attention in the choice of materials: that they be as natural and warm as possible, such as wood, and that the colours be more natural. In the new school it is generally required that spaces have a socialising function: corridors and halls should facilitate meeting and collective spaces such as the library should also be able to be used in the afternoon as multi-purpose places for study and discussion.

Particular attention is repeatedly requested on the design of the *indoor/outdoor relationship*: with classrooms well connected to the garden in order to directly use the outdoor space for some educational activities that benefit from the natural environment, such as the vegetable garden, in a sort of continuation of the classroom outside.

The indications in the competition brief

It is important to see what remains of these participatory processes when it comes to the design competition. In this case, the elements that emerged were fully taken into account in the draft design competition.

The "Milano in crescita" competition brief is based on the preliminary design document in which the elements to be considered are indicated. The document shows great attention to the development of open, permeable buildings in contact with nature: "The design objectives can be summarised in three macro-themes: the functional quality of the spaces, the technological performance of the building and the redevelopment of the context. The functional quality of the spaces can be traced back to a new pedagogical approach aimed at making the school, first and foremost, a living environment, the place of the educating community, a learning environment open to the variation of teaching models and capable of encountering personal development processes, so that each student feels recognised, supported and valued in his or her uniqueness. The setting up of new environments that can encourage conviviality in relationships, as well as flexibility in the use of spaces, are elements that can convey the new didactics, in line with the most recent indications, also from the MIUR. A

renewed relationship with nature, which is earth, sky and light, is just as important for learning. "(Preliminary planning document, Annex no. 2 page 4 <http://www.scuolascialoia.concorrimi.it>)

The pedagogical indications include the following recommendations: "The design solutions, in short, must take into account the guidelines expressed by the Guidelines for School Construction referred to in the Interministerial Decree of 11 April 2013 and adequately respond to the following aims and objectives already expressed by the Ministry of Education, University and Research in the Call for Proposals for the "Competition of ideas for the creation of #innovative schools" in 2016 creation of innovative educational environments; environmental, energy and economic sustainability, i.e. rapidity of construction, recyclability of components and basic materials, high energy performance, use of renewable sources, ease of maintenance; *presence of usable green spaces; relationship with the natural environment, the landscape and the reference context also in educational function*; opening of the school to the territory because the school must become a place of reference for the community; permeability and flexibility of the spaces; attractiveness of the spaces to combat school dispersion; conception of the building as an educational tool for the development of both technical and sensory skills; presence of spaces for professional collaboration and individual work of teachers; conception and design of spaces with a view to individual well-being" (Preliminary design document, Annex 2 p. 22). 22).

The call for proposals set out a series of evaluation criteria of a purely architectural and functional nature. The writer's effort was to combine the criteria of the call with a series of pedagogical criteria and to translate the requests into educational language. In order to be able to analyse the projects responsibly, it was necessary to identify the pedagogical-didactic elements of the architectural indications indicated. Below is the table drawn up to carry out the evaluation:

Table 1

	Pedagogical criteria		Criteria for the 'Milano in Crescita' call for proposals	
A	Character of the facade and the building Meet and greet: what does the face of the school tell me? Is it appropriate for the type of school it hosts? What do the entrances offer? Reception?		Compositional and architectural quality <ul style="list-style-type: none"> • Building plans • Materials • Building technologies • Duration • Sustainability • Maintenance 25P	1 A CGD
B	Movement <ul style="list-style-type: none"> - from the outside to the inside and vice versa - horizontal connections - vertical connections 		Organisational hierarchy, functionality, flexibility, continuity of outdoor and indoor spaces 20 P	2 A B C E D
C	Continuity of education <ul style="list-style-type: none"> - How architecture brings relationships between schools together 		Construction in batches/phases 15P	3
D	Aggregation spaces <ul style="list-style-type: none"> - Public - Semi-public - Private 		Urban and social integration 15P	4 D E
E	Relationship with nature and the outdoors <ul style="list-style-type: none"> - Outside (courtyard, public garden) - Protected exterior - Private exterior - Green interior 		Quality of guidelines 15P	5
F	Relationship teaching, learning, knowledge <ul style="list-style-type: none"> - Does architecture allow for a triadic or two-dimensional relationship? - Distributed or pyramidal democracy, frontal or networked? 		Quality of furniture in relation to innovation 10P	6 F E D B
G	Sustainability <ul style="list-style-type: none"> - How do you design the possibility of space care? How much autonomy is there in the governance of the building?		Bim - building information management 10P	7

As can be seen from the table, the effort was first of all to synthesise the indications expressed in the Synthesis Document of the Participatory Process and the Preliminary Design Document into criteria of pedagogical quality. Secondly, attention has been paid to the conjugation of pedagogical and design criteria.

The criterion of "compositional and architectural quality" was therefore translated into the sum of the following pedagogical characteristics: A.an analysis of the characteristics of the façade and of the building from the point of view of the users (pupils, teachers and parents); C.a check on the continuity of education (design of connections, including physical ones, between the various school sections); G.the possibility of "taking care" of the building oneself and of having autonomy in its management (if sustainable, therefore); D.verification of the presence of public, semi-public and private gathering spaces.

The criterion "organisational hierarchy, functionality, flexibility, continuity of external and internal spaces" was associated not only with pedagogical criteria A, C, and D, already explained above, but also with criterion B, defined as "movement", with which the intention was to verify movement from the inside to the outside and vice versa by the users, the horizontal connections between the environments and the vertical ones. It is very important to check whether the various areas of the school are easily reached by children and teachers, whether orientation is easy, whether services are well positioned, and all this can be studied on the ground plan by working on movement and walking. Last but not least, criterion E, "Relationship with nature and outdoor spaces", was also fundamental to the evaluation in this area. This involved assessing the design of the public courtyard and garden, the sheltered garden and courtyard and the private, school-only or even dedicated teaching areas. In addition, the greenery inside (in the courtyards) also had an importance in the analysis.

Pedagogical criteria D and E were also combined with the architectural criterion "urban and social integration".

With regard to the criterion of the call for proposals "Quality of furnishings in relation to innovation" it was important to add to criteria B, D and E, already described, also criterion F, defined as "Relation teaching, learning, knowledge". With this criterion we wanted to focus the analysis on an architecture and organisation of the interior furnishings that would clearly explain the possible teaching scenario: by "triadic or two-dimensional relationship" we mean the possibility of establishing not only cooperative relationships between pupils, but also the aim of developing encounters and exchanges with objects and natural materials (thanks to various and even unconventional furnishings and supports).

An important aspect on which pedagogical evaluation focused was the relationship between teaching, learning and knowledge. It is possible to generate environments that offer the feeling of a 'distributed or pyramidal democracy', it means a networked relationship between different environments and between different buildings. Or it is possible to infer a traditional order, more focused on frontality, control and power. It is important to assess whether or not there is an order and hierarchy in the configuration of the building and in the relationship between classrooms, internal and external common spaces. The possible interrelations and exchanges between the environments, the direct and indirect correlations between inside and outside, offer clear indications of the type of movement desired. It is important to know the specific allocations for sport, travel times, adjacencies, and to assess very carefully the quality of outdoor spaces as important places for structured and free movement.

Results

The international design competition "Milano in crescita" had two phases. In the first phase, between 12 and 19 September 2019, the 52 proposals received were evaluated. The criteria presented allowed only 24 projects to be unanimously selected from these. As can be seen from the committee's minutes of 25.9.19, the reasons given for exclusion in the first round mainly concern the criteria assessing the relationship between the buildings and the urban context, the technical-functional requirements, the links between school cycles, the demands for didactic innovation in the functional organisation and distribution of spaces. The theme of movement in spaces and the relationship between indoor and outdoor spaces was decisive for the choice.

In the second round, the committee excludes a further 8 projects. The reasons given were related to architectural solutions that had not been adequately resolved, but it is interesting to note that three exclusion criteria were again clearly based on pedagogical analysis: "the open spaces for relations between the city and the school are not sufficiently articulated; the internal organisation of the teaching spaces does not suggest a deepening of the 1+4 model of educational innovation described in the call for proposals; architectural solutions do not show sufficient articulation for an adaptive development of the internal spaces."

Having selected the ten projects that went through to the second stage, the committee decided to give advices about important recommendations:

1. attention to the correct combination of planivolumetric design and articulated organisation of interior and exterior spaces;
2. strategic positioning of collective functions to facilitate autonomous and interconnected public and school use;
3. in-depth study of the functional schemes for the different school cycles. In the 1+4 didactic model, with 'group space' it is possible to envisage groupings of 3 to 5 classrooms with a common space outside the classroom (not only outdoors) for sub-group, individual, exploration and informal activities.

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4. attention to ensuring fair sizing of indoor and outdoor informal spaces adjacent to teaching areas to provide equal opportunities for use;
 5. attention to the inclusive design of learning spaces;
 6. in-depth study of soil performance in open spaces and microclimatic dimensions at the urban scale;
 7. control of the project in relation to possible topographical configurations of the ground and built volumes (skyline).

While the language used is also clearly architectural in style, there is again a clear focus on the pedagogical dimensions highlighted in the table above. In particular recommendation no. 1 is linked to pedagogical criteria B, D and E; recommendation no. 2 is linked to criteria B, C, D, E; recommendation no. 3 and no. 5 fully develop criterion F; recommendation no. 4 refers to criteria D, E, F.

The attention to movement in and between buildings and the punctual verification of the spaces for motor activities in the different areas dedicated to the 3 school levels was considered as much important as the attention to agile connections with the sports area.

The second evaluation phase took place from 21 to 28 November. The committee decided to analyse the projects on the basis of a series of criteria (see work report II Grando) and among them indicated:

- *in-depth study of the declination of the 1+4 model expressed in the call for proposals, with attention to the creation of spaces for individual and group activities near the classrooms. The term "group space" can also be used to mean a grouping of classrooms in clusters (e.g. three classrooms and a shared space outside the classroom for sub-group, individual, exploratory and informal activities).*
- *careful study of the quality of the routes with verification of the accesses and flows to administrative areas, laboratories, sports- and collective spaces;*
- *enhancement of the internal-external relationship of both collective use spaces and teaching and laboratory areas;*
- *attention to a fair organisation of classrooms in relation to lighting and the use of open spaces for teaching purposes".*

This is an important achievement and one that places great value on the pedagogical dimension and the explicit requests described by users in participatory processes. Of the nine criteria identified, four explicitly refer to pedagogical indicators. One criterion is of mixed quality: "*correct design (size and configuration) of the multi-purpose spaces and details of their effective and flexible use (canteen, auditorium, library)*".

On 29 November 2019 the winning project was announced with an evaluation that summarises the following aspects:

1. excellent connection of the school with the neighbourhood: the proposal is that of a school with a series of transition areas between the teaching area and public landscape, with the creation of small squares and walkways in front of the entrances.
2. The compositional choice falls on sinuous geometric forms that encourage movement and recall the organic nature.
3. The use of vegetation and plants outside and inside the areas pertaining to the various complexes, with garden roofs that become playgrounds with controlled spaces for movement and play.
4. The interconnection of the volumes by covered paths favoured by canopies that define possible work and movement spaces to be organised outside
5. The permeability of the interiors, which converge in a central courtyard offering opportunities for pupils from the various schools to meet and socialize.
6. The theme of the civic centre is resolved and amplified thanks to the connection, guaranteed by a cycle-pedestrian pathway linking buildings such as the auditorium, library and sports gyms which are also open to the community.

We note again a strong focus in the choice of the winning project on the component of movement and the presence of spaces for interaction also with nature in the open air. Not all the projects and especially not those competing for the podium had such a pronounced focus on these aspects, even though they were pointedly highlighted as indicators for evaluation.

The projects in second and third place studied the organisation of the interior spaces very well, giving less importance to the relationship with the outdoors and the movement of students and teachers between spaces.

Discussion and Conclusions

The presentation of this case study is aimed at raising awareness of how important it is to include figures with accredited skills in the field of pedagogy and didactics, movement and inclusion in school design competition commissions. Without the participation of the undersigned in this competition committee, thanks to the request of Laura Galimberti, councillor for education in Milan, who has been attentive to the relationship between pedagogy and architecture for years, the results of "Milano in crescita" could have been very different. This is not to question the undoubted competence of our fellow jurors. It is just a question of highlighting different knowledge and approaches in the analysis of the projects, which in this case were able to complement each other.

It is not taken for granted that the professionals invited to the competition juries include a specific figure representing the school component, despite the fact that it has been involved in participatory processes. It is also not taken for granted that a professional from the pedagogical-educational area is used to analyse the qualities of the buildings to be constructed.

According to some interpretations of Legislative Decree no. 50/2016, as amended by Legislative Decree no. 56/2017, it is provided that the members of the jury must be sufficiently and adequately qualified, as well as experts in the specific sector to which the subject matter of the competition relates and possess proven requirements of morality and professionalism. It is therefore alleged that it is unlawful to appoint a jury which does not include members who are experts in the specific field covered by the contract. It therefore seems to be understood, by the very nature of the competition, that the commissioners with voting rights should be architects or engineers of proven experience and capacity.

In fact, the appointment in an architectural design competition jury of a pedagogue/representative for the school, competent in the reading of plans and able to dialogue with the client and architects, is not only a quality that has distinguished competitions in South Tyrol and that is beginning to be presented on international tables, but also applies to the rest of Italy. Particular mention should be made of the ISCOLA competitions (www.iscola.it), promoted by the region of Sardinia for schools, which was characterised by the explicit request to the schools for a didactic pedagogical project and the planned inclusion in all competition commissions of a figure with certified skills in the field of educational sciences.

A major building plan is being launched for the redevelopment, transformation and new construction of Italy's school buildings. Of the 143,000 school buildings at least 50% will be invested in major interventions in the coming years. It is therefore essential to develop strategies to equip many more professionals working in the field of school and education sciences to develop a highly qualified competence for the specific sector in question. It is necessary to develop an interdisciplinary approach, to know the language of architecture, to develop an ability to carefully read the plans of the projects, in order to deduce the qualities of the context, the possibilities of movement of children and teachers inside and outside the buildings, the relationships between the different spaces, the qualities and implications of the volumes, the architectural relationship with the territory, etc... This is an urgency that cannot be neglected, otherwise we will be working in a disconnected way on a didactic innovation that will not be reflected in the spaces of the school and that will certainly not facilitate the increasingly interconnected activities between indoor and outdoor education.

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