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1831_9. CONCLUSION

UNIVERSITY IS CITY. THE INFRASTRUCTURE OF EDUCATION AND RESEARCH AS AN ENGINE OF URBAN REGENERATION

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ABSTRACT

The aim of the work is to reaffirm the strategic correspondence between the university settlements and the city, in a logic of absolute complementarity. The University has always been the institution dedicated to education in its highest and most noble form: likewise, the relationship between universities and the urban context has characterized the debate on the management and development policies of the city. The first universities arose far from the cities according to a concept that saw advanced training and research as distinct from the progress and life of the urban context. The isolation of the university settlement from the vital center of a constantly growing city, while on the one hand guaranteed, with its physical autonomy, a more marked dedication to study and research, on the other decentralized the flows of students and staff university, in an attempt to limit integration with the urban context. Today the city and the university have profoundly changed: the progressive physical development of the anthropized contexts has gradually reached and definitively incorporated the most ancient university buildings originally built outside the urban boundaries. The city, in the new current phase of economic development, increasingly needs the University as the driving force for innovation and the revival of the economic-entrepreneurial fabric through culture. The universities, from structures specifically dedicated to the teaching and training of young people, have witnessed the constant growth of research and experimentation activities, by means

of development models that find their effectiveness the closer the relationship with the system is. companies, institutions, other universities. The university institution represents one of the most important strategic nodes of the territory, through which the city can open and expand its borders to tend towards a global knowledge market. This paper intends to provide a contribution on the role of fundamental activator of relations that the University has had, provides and will be able to guarantee in the construction of the future city.

KEYWORDS

University; city; urban regeneration; architecture; future.

1. THE UNIVERSITY BETWEEN MEANINGS AND CONTEXT

The significance of the University and the places connected to it interprets, in the history of civilisations, a fundamental element of intellectual manifestation and representation, capable of conveying the importance that culture and education have acquired in defining the identity of peoples. History tells us that there was no era during which entire communities did not root their own growth in the transmission of knowledge and expertise, in the search for an identity of their own. Indeed, the university has always had a reputation as the institution dedicated to education and learning in its most lofty and elevated form: likewise, the

relationship between a university and its urban context has often informed the debate on the city's management and development policies. The first universities in Italy were founded far from the cities, with a belief in a concept that involved advanced education and research as distinct functions, separable from the progress and life of the urban context. Whilst on the one hand, the isolation of the university campus from the vital centre of a city undergoing constant growth guaranteed, due to its physical autonomy, a greater degree of dedication to both study and research, on the other, it decentralised the flow of university students and staff in its attempt to limit the interactions and possible short circuits with the city-based setting and everyday life.

Nowadays, the city and the university have changed a great deal: the progressive physical development of the anthropised contexts has gradually reached and definitively incorporated even the oldest university sites, originally built outside the city limits.

The urban reality, in its new, current stage of economic development, has a growing need of the University as a driving force for innovation and the relaunch of the economic and entrepreneurial fabric: a push, an energy that are generated by the strength of culture. The Universities, as structures dedicated specifically to teaching and training young people, have witnessed the constant growth of research and experimentation activities, by way of development models whose effectiveness lies in their relationship with the system of companies, institutions, and other universities.

The role of the Universities within the city can be traced back to that of a crucially important urban actor, a nerve centre capable of generating and developing both urban and social regeneration and renewal strategies. Particularly, the university exhibits an osmotic dependence upon the city and the services that it can offer: the modern-day tendency

for academic structures to open up to an ever-widening and international user base is reliant upon the full range of infrastructural, environmental, commercial, social, service and leisure facilities which the city is best equipped to provide.

The university institution represents, on this front, one of the most important strategic hubs for its local area, by way of which the city can open up and widen its boundaries to cater to a global knowledge market: it is the place formally dedicated to the production and circulation of knowledge and cultural and technical information; it is the catalyst of human capital; it is an active participant in technology transfer policies; it is a point of connection with the global research, innovation and development networks.

The University is an integral and fundamental part of the city, just as the city is a constituent part of the fabrics that take the form of university campuses: two realities which merge together and mutually integrate without a distinction of value between one and the other.

The relationship between the university sphere and the definition of the spaces dedicated to it - within the anthropised contexts - represents the barometer for the cultural expression and soul of a community. Spaces that are structured using the soul of the place as a starting point, interpreters of the memorial values of the communities they are a part of, capable of identifying these contexts as eloquent areas which are evocative of the anthropological experience: representations of material and identity culture which leave a symbolic footprint on the territory that they make their home.

The university can now, in its own right, be associated with the deeper concept of university infrastructure thanks to its ability to position itself as the interactive hub of an area, of which it becomes the driving force and dynamic expression. In this sense, the term "infrastructure", traditionally associated with the concept of the university, should be

considered - in its material meaning - as an element which links urban functions with one another and its being an element capable of acting as a mouthpiece for the relationships established between them.

University infrastructures, through their spaces, represent one of the most effective social, functional and morphological adhesives of the many and complex relationships that are established in the urban organism, representing a dynamic system that is constantly evolving. As such, university infrastructure cannot be said to have a meaning which refers to an exclusive typology of buildings, but instead wholly to the role that these architectures have taken on in the evolutionary and structuring dynamics of the contemporary city, within which knowledge, information and education represent the qualitative hallmark of attractiveness of the physical and social fabric of a situation.

To consider buildings and architectures for education and research to be on a par with infrastructural networks in the traditional sense means positioning them within the complex articulation of the contemporary space which is the stage for our most noble activities. Indeed, this terminological scenario recalls the dynamic concept of "integrating" (or integrated), which, from the Latin, means to complete, to add something in order to make a system whole and functional.

When we pair the word infrastructure with the word university, from the semantic and operational point of view, we are attempting to define a new approach capable of including an overall rethinking of the role of educational facilities in society, the city, and the local area. In other words, it means integrating and connecting spaces and places which do not dialogue with one another, defining new settlement systems, rearranging scattered fragments of cities, creating new levels of experience.

University architecture identifies a model, a city system, which is also highly recognisable

due to its high architectural quality: an overall vision in which design and process, form and function, construction and familiarity of places meld into a single structure marked by hierarchies and, consequently, by actions of organisation of the local area. These spaces are also intended to be occupied by a specific type of user/inhabitant, one who makes an effort to learn and to modify their behavioural approach in part according to the environment in which they spend their time: educational spaces as a stimulating opportunity for experimentation and integration between the articulated functional, morphological and technological components that has characterised the production of architecture and its urbanity in recent years.

It must be considered that the university, more than other functions, when engaging with a user base of a constantly fixed age range, changes with the changing requirements of the student population, bringing with it the feelings and concerns of a cultural renewal that involves instruments, forms and, therefore, also spaces. Architectures which simultaneously incorporate consolidated spatialities together with forms which evolve according to the educational models which stimulate and support them.

In recent architectural history, in line with the developments of university complexes and campuses within urban centres, the main tangible features draw their energy from the desire to constitute parts of the city that are integrated and in continuity with the places they belong to, becoming significant points of reference.

Research on these spaces blends their status as places with an international user base together with more local themes in relation to the productive sphere and the place they belong to, expressing their potential to "be part of the system" through large-scale networks and relationships in search of new centralities. The requirement for flexibility, connected to the rapid changeability of the

logics which accompany the presence of a multicultural and international population, opens a view to the optimisation of the use of structures characterised by an increased size and, as such, potentially capable of addressing multiple needs, possibly planned, though also with the ability to accommodate one-off requirements which are often unplanned, including and especially of a public nature.

The architecture of the university and its nature as an urban place par excellence represents, for the discipline of urban planning and architecture, a real opportunity to engage with complex issues which are part of the tradition of the evolution of the city, with the aim of reclaiming the meaning of architecture and bringing it back to the centre of collective needs for transformation, shielding the architect from the danger of playing the role of "cultural organiser" rather than that of an intellectual dedicated to developing methods and tools within their discipline.

2. MILAN AS A WORKSHOP WHERE "THE UNIVERSITY IS THE CITY"

The paradigm of Milan authoritatively highlights these dynamics: the universities have gradually become one of the main figures within the strategies for the regeneration and innovation of the city, the central areas, the outskirts and the territorial sectors which have gone unaddressed for decades.

The city of higher education has slowly taken the place of the industrial city, replacing it - including physically - in its historical sites: the Politecnico in the large abandoned industrial areas of Bovisa, the Università Bicocca on the sites once occupied by Pirelli, the IULM in Barona, and many more besides. In this scenario, the Universities have become major players in the urban transformation process.

To an even greater extent than in the past, teaching and research institutions have now established themselves as key urban protagonists: a condition which is able to stimulate processes for development and territorial, economic and social growth, capable of having an effect and taking actions of urban transformation in strategic locations by structuring new production and research centralities. Such phenomena are still undergoing change, not crystallising into a stable and concluded balance but rather remaining in constant evolution within an extremely dynamic framework which is receptive to new stimuli deriving from the onset of changing conditions of an economic, social, productive or relational nature.

As far as the recent history of the Politecnico di Milano is concerned, think of how its structures have evolved in the area known as Bovisa: from the second half of the 1990s onwards, the large factories which were abandoned at the time and the defunct warehouses used for the purposes of industrial production underwent a profound transformation aimed at a specific functional reutilisation of the buildings which gave them a new identity connected to higher education, culture and research. An operation of urban renewal, thought up and promoted by a cutting-edge university which was able to perceive the district's full potential, generating and triggering policies of social, economic and productive change for an entire portion of the city, promoting new synergies and relationships within the territory capable of reaching and involving the entire metropolitan area.

Referring specifically to the promotion of regeneration, enhancement and redesign that the Politecnico di Milano is currently implementing within its two campuses in Milan, it should be noted how this underpins its reasons for transformation with two profoundly different evolutionary histories and spirits.



Figure 1. Masterplan for Campus Leonardo, Politecnico di Milano (VIVI.POLIMI, 2018)

The facility located in the Città Studi area, known as Campus Leonardo, is the historical Campus of the Politecnico di Milano, built in the early decades of last century and organised, distributively and morphologically speaking, after the model of hospital architecture with pavilions, from which it drew its inspiration. A strong setup with its own expressive quality, now fully integrated into the fabric of the city which, over the decades, has grown out of its origins as open countryside by way of additions that have enveloped and accommodated the university's spaces, raising them to the status of locations that are barycentric to the entire system of Città Studi.

With the development of the degree programmes and the increase in enrolments that followed World War II, the original nucleus expanded through the construction of new buildings in the surrounding areas,

including the premises of the Architecture Faculty (established in 1934), whose current configuration is the result of a series of building operations: the original nucleus opened at the start of the 1950s under the presidency of Piero Portaluppi and work continued under the Plan for the Expansion of the Politecnico di Milano (1958-59), which involved, amongst others, Gio Ponti. Later on came the addition of a further extension, headed up by Vittoriano Viganò (1982-86).

The logic of birth, evolution and settlement of the Campuses in the area known as Bovisa - namely Campus La Masa and Campus Durando - was quite the opposite. Bisected by the railway line that connects Milan with the north of Lombardy, the two campuses insisted on abandoned areas that the Politecnico, as of the 1980s, has managed to restore by settling there.

At the end of the 1980s, with the start of the process that saw the university's extension into the wider area (with branches in Como, Lecco, Cremona, Mantua and Piacenza set up over the course of a decade) and the establishment of the Politecnico Rete, work began on the construction of buildings for teaching and research in the Bovisa area, a neighbourhood to the north of the city which was once one of the most important hubs in Milan's industrial history. The via Durando campus, intended for the Faculty of Civil Architecture and Design, was opened in 1994 and involved the restoration, alongside new building projects, of some historical buildings of industrial archaeology. A few years later, the La Masa area saw the start of a long process of converting the many warehouses in the area into facilities suitable for the laboratory and teaching activities involved in certain Engineering courses.

Starting in 2017, the Politecnico announced an investment policy with a view to bringing its buildings up to the international quality standards now necessary in order to be able to compete with the finest universities across Europe and beyond. In particular, 2020 will see the inauguration of the new Architecture Campus in the Leonardo area: a revitalisation project aimed at fixing up the existing structures belonging to a portion of the Campus which evolved mainly between the 1940s and the 1950s, along with making enhancements to the teaching buildings, with particular reference to model-making and innovative teaching.

The "Bonardi project", as it has been dubbed, focuses on creating the necessary infrastructure and connections for the most important architectural elements of the School of Architecture through a new system of green, public spaces as a replacement for



Figure 2. Masterplan for Campus La Masa, Politecnico di Milano (VIVI.POLIMI, 2019)

the areas previously used as car parks, as well as constructing some new buildings and renovating other existing ones, including the Trifoglio and Nave buildings which are part of the scheme of works which took place in the 1950s under the auspices of Gio Ponti.

All the works are merely branches of a larger redevelopment plan, made possible by an idea from and with the collaboration of Renzo Piano, and drawn up by Ottavio di Blasi & Partners, which tends to favour open space as the primary connective element of the entire system.

There are currently 15 active construction sites across the two Campuses, all related to works which will see the Politecnico equipped with new world-class structures for the purposes of research, teaching, sport, social inclusion and relationships of those within the University.

In the same vein, a complex and multidirectional strategic project entitled VIVI.POLIMI has been launched, involving the rectorate, teaching staff, research fellows and architects in the design of the Campuses of the future, with particular attention to the quality of the users' social lives, relationships and study in their everyday actions. A quality that involves confined spaces, open spaces, gardens, avenues, squares, meeting places

and study places in a spatial continuum between full and empty spaces, different categories of user base, the positives and negatives of the urban fabric.

As such, it is a strategic project aimed at updating the quality of the spaces dedicated to work, research and teaching in the Politecnico di Milano with an international outlook that is increasingly open to a dialogue between the university and the city. Improving the quality of the spaces on the various Campuses means increasing the quality of life for the neighbourhood that has been home to the Politecnico for over 100 years. After years of one-off building works, the project aims to give a unified design to the Campuses, their history and their future.

3. VIVI.POLIMI PROJECTS

3.1. The "Agorà degli studenti"

One of the first construction jobs planned by the VIVIPOLIMI project - the creation of a space equipped especially for students (dubbed the 'Agorà degli studenti') on the first floor of the School of Architecture on the Campus Leonardo in Milan - involved the redevelopment and enhancement of the

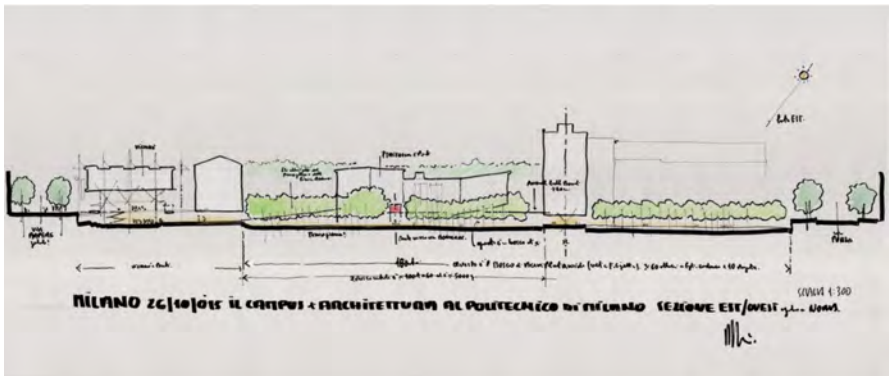


Figure 3. Idea for the new Campus of Architecture (Renzo Piano, 2015)

interior spaces of the building, obtained by moving some of the secretarial offices to another location, thus creating a space for students capable of meeting the requirements for places to meet and study, which are currently in short supply in relation to the high number of students who attend the School, which is at the very top of global international rankings.

Two elements strongly characterised the intervention guiding the design choices, starting from those on the largest scale and working down to those regarding materials and detail: the historical and cultural importance of the architectural building and its positioning, which is barycentric and strategic with respect to its surrounding buildings.

The area being repurposed is located within a complex of buildings designed by architects/ masters who are universally acknowledged by critics and architectural history to be of considerable cultural importance. Built between 1953 and 1961 based on a design by Giordano Forti, Gio Ponti and Piero Portaluppi, the building was conceived as a “teaching building” within which a sort of sample collection of modern construction was installed, featuring all the existing types of structures, materials, finishes, doors, windows, furnishings and installations for students to get to grips with in a hands-on learning environment.

Only two wings of the initial design actually came to fruition, resulting in an L-shaped building and leaving the courtyard and via Ampère façade unfinished. The building was then later completed by a body, designed by Vittoriano Viganò and constructed between 1970 and 1983, which has since come to represent the School’s truly iconic building.

The design of the new “Agorà degli studenti”, whose execution was marked by the timings linked to the delivery of the lessons conducted within the classrooms which overlooked the construction area, involved demolition of the partitions that separated the Secretary offices, to create a large open space housing over 120 new wired study stations for working alone or in a group around a table, also using computerised tools. The demolition of the secretarial offices, with the consequent removal of the false ceilings, brought the original floorplan of the building to light, characterised by a single slanted roof with the upper extremity coinciding with the window-covered opening towards the inner court.

The extreme uniqueness of the building and specific conditions surrounding it guided the selection of building materials, finishes and furnishings, all custom designed for this project: from the doors closing the apertures towards the classrooms, created to ensure adequate noise insulation during lectures, with handles geometrically reminiscent of

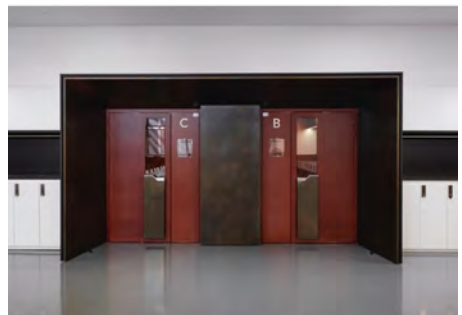


Figure 4. *Agorà degli studenti* (VIVI.POLIMI, 2019)

the shaped profile of a handle designed by Ponti for this same building, to the finishes on the ribbed base of the walls, similar to the parapet finish on the entrance staircase.

A new "student plaza" was immediately baptised "Agorà", symbolising the new meeting place for individual or collective studies, working around a table or on three-dimensional models, equipped with new storage areas for personal items, as well as for exhibiting three-dimensional models or graphic projects. The Presidency of the AUIC School was transferred to this new space, re-establishing a historic precedent.

3.2. Giardino di Leonardo

As for the open spaces, in line with the strategy of the works as a whole, the priority was to commence the redevelopment of the spaces behind the historic building of the Rectorate: a new space, the "Giardino di Leonardo", bordering the historic and recently-renovated Piazza Leonardo da Vinci, now occupies the existing area through an effective pairing of contemporary flavour with early 20th century style.

The project focuses on restoring and enhancing the campus' historical heritage, creating formal order and enhancing architectural and environmental quality, specifically as regards the central natural green area adjacent to the Rectory and its tree-lined avenues.

In the original design of the Campus Leonardo, the "Giardino di Leonardo" was the heart of the Campus itself, overlooked by the main buildings in accordance with a symmetrical settlement code.

The primary objective is to guarantee the best use and maximum pedestrian viability in the space, making it easier to use by eliminating approximately 130 car parking spaces, which over time have invaded the area: in the scope of sustainability and regeneration, the project is designed to structure the open spaces on

the campus to respond to how the space is actually used daily by the people who inhabit it.

The starting point for the design stemmed from the overall conditions of the open spaces on the Campus, which had significantly deteriorated over the decades. Intense use, new functional and technological needs, and the opening of the auto park altered both the spaces and paving materials. The elimination of the trafficable passage inside of the open spaces in the Campus, a source of noise, pollution and hazard, the true transformational element in the context, was the incipient idea driving the project.

The sustainability of the project was then interpreted by prioritising continuous natural green areas, expanding their size and rendering them useable both informally and in several detached equipped islands. These spaces are equipped with wired break tables and seats, with Santafiora stone bases and corten steel support frames. The two islands to the northeast and south of the Rectory are fitted with roofing for use during the sunniest seasons and rain; the equipped area in the garden without any roofing, is dedicated to use during the milder seasons. The project includes renovation of the tree-lined avenues in Luserna stone, creating a more harmonious environment in the historical context in respect to the previous cement pavement, in order to reach a complete pedestrian use, improving accessibility for cyclists, and marking out specific areas for bicycle parking. In terms of trees, the landscape remains largely unchanged, except for the replacement of the trees that had been compromised: the planting of new shrubbery with colourful blooms providing a diversified display over the course of the seasons, with the aim of enhancing the "Giardino di Leonardo" as a green space, is the extent of the garden's new endowment of plant life.



Figure 5. Giardino di Leonardo (VIVI.POLIMI, 2019)

3.3. Continuity: the internal-external non-limit

The underpinning idea of the project is to standardise, in terms of form and materials, the many and varied “Gates” dotted around the perimeter of the Campuses, both in Milan and in the university’s centres across the region and beyond. Crossing the threshold of a university Campus is not just a physical step, but also a symbolic action. An architectural element made of concrete and corten steel marks the main entrance to the Campus La Masa, welcoming and greeting those who tread its ground day after day. A passageway with an iconic, institutional and monumental value: the Politecnico logo, carved into the material, is symbolic of the University’s presence in Milan and the Bovisa neighbourhood.

3.4. Lights at Polimi

The recognisability of the Politecnico and its history is also sustained through the enhancement and restoration of its iconic buildings: the renovation and new lighting projects which involved the buildings of the

Rectorate, on the historic Campus Leonardo, were conceived in this vein, generating a domino effect of a progressive willingness to also restore the neighbouring ex-factory buildings.

3.5. Collina degli studenti

At the Campus La Masa, the absence of significant plant life and the poorly-identified connection space gave rise to the design of a renaturalised area, achieved through the insertion of a green hill, home to a building capable of holding over a hundred study workstations, on the mezzanine floor, and a faculty space dedicated to the social lives of the teaching staff. Located in a seldom-used area, this “Collina degli studenti” will give an injection of life into an anonymous space by transforming it into the beating heart of the entire Campus: In conclusion: the University represents a city of education and culture to which all advanced civilizations should strive in order to create a generation capable of facing the important challenges of the future.

The projects listed here have been developed within the structures of the Politecnico di Milano and with the help of the figures related to it: contributions to their preparation of various kinds have been provided by professors, PhDs, research fellows and professionals, assisted by technicians from the Technical Construction Area of the Politecnico itself. In particular, contributions to the aforementioned projects in different roles and for different lengths of time have come from: Prof. Emilio Faroldi, Vice Rector and coordinator of the VIVIPOLIMI project; Prof. Stefano Capolongo, Prof. Francesco Infussi, Prof. Lorenzo Jurina, Prof. Camillo Magni, Prof. Laura Elisabetta Malighetti, Prof. Tomaso Monestiroli, Prof. Eugenio Morello, Prof. Filippo Orsini, Prof. Alessandro Perego, Prof. Gianfranco Petrot, Prof. Tiziana Poli, Prof. Maurizio Rossi, Prof. Michele Ugolini, Prof. Ilaria Valente, Prof. Maria Pilar Vettori; Eng. Arch. Andrea A. Bassoli, Eng. Fulvio Bernabei, Arch. Matteo Cervini, Ind. Eng. Alessandro Corti, Arch. Andrea Cremonesi, Arch. Andrea Gianni, Arch. Giuseppe Mondini, Arch. Giacomo Penco, Dr. Virgilio Piatti, Eng. Edoardo Poletti, Arch. Paolo Raffaglio, Eng. Bruno Sala, Arch. Alessia Sarno, Eng. Gianluigi Sevini, Arch. Manuela Strada, Eng. Michele Terreni.



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