



DOI: 10.21005/pif.2023.56.B-05

THE METAPHOR: A LITERARY TOOL LENT TO THE ARCHITECTURAL DESIGN. THEORETICAL REFERENCES, RESEARCH METHOD AND PRACTICAL EXPERIENCE IN TEACHING ACTIVITY

METAFORA: NARZĘDZIE LITERACKIE UŻYCZONE DO PROJEKTU ARCHITEKTONICZNEGO. ODNIESIENIA TEORETYCZNE, METODA BADAWCZA I PRAKTYCZNE DOŚWIADCZENIE W DYDAKTYCE

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ABSTRACT

The design process in Architectural Design Studio's first classes for students is often based on images that are erroneously used as references by copying some formal choices. In the most general sense, this issue is related to a gap between architectural culture and society, as architecture is considered a virtual and consumable object. Those problems could be faced with an old but still effective tool that is the metaphor.

Architecture is mainly known by images, and each image has a visible and an invisible part; the latter concerns the culture that underlies it. The paper assumes the metaphor is a design tool that can be helpful in the initial stages of the design process as it allows anyone to quickly connect images, ideas, and experiences, getting deeper into the invisible part of images. Since the metaphor is mainly a linguistic agent, most of the studies concern the use of the metaphor in the field of theoretical criticism and for reviewing other projects. The paper proposes to integrate this approach by investigating the metaphor to support the transfer of shapes and figures between different architectures. Furthermore, the proposed process foresees a permanent part based on the type of dynamic and more mobile part where metaphorical thinking finds space.

Therefore, two types of use of the metaphor are put forward: the first interprets existing buildings by recognising both linguistic metaphors used by the critics and those crystallized in the architectural form; the second instead stimulates students to use visual metaphors in determining the shape and volume of the project.

Aesthetic, metaphor, imagination, design culture, metaphorology, teaching method.

1. INTRODUCTION

In this introduction, we will explain why the metaphor is still an up-to-date discussion topic, especially in architectural design teaching.

Whenever we come into contact with a work of architecture, we can fully appreciate its physical characteristics: forms, shapes, the interior atmosphere and the relationships between our bodies and the space. This everyday experience takes on a different meaning if it concerns an architect, an artist or another user category.

The viewpoints of architects (or in the most general sense of designers) are frequently particular, and this has provoked several misunderstandings, especially when modern architecture is involved. The famous Peter Blake's book *Form follows fiasco* as well as the many failures of large modernist districts such as the huge building complex "Corviale" in Italy (Rome 1972-1980) designed by Mario Fiorentino or the high-rise Pruitt-Igoe residential complex in the U.S.A. at St. Louis designed by Minoru Yamasaki and demolished in 1972 are only a few examples that symbolize the crisis of a certain way to design modern architecture (Bristol K., 1991). If, on the one hand, these high-rise housings were stigmatized, unsubsidized and used as goatscape (Hud User) on the other hand, the architects impose their standpoint on the inhabitants following a top-down design process. If such districts clearly had substantial social issues, other modernist buildings were torn down as the owners didn't understand their cultural value: in Japan, the Nagagin Capsule Tower designed by Metabolist architect Kisho Kurokawa (1972) was dismantled in 2022. The brutalist complex Robin Hood Garden (1972) by Alison and Peter Smithson (built in the same year as the Pruitt-Igoe demolition) was the victim of bulldozers in 2017-2018 nevertheless was considered an icon of brutalism. Neither an architect like Rem Koolhaas was immune from the destruction of one of his more experimental buildings, that is Netherlands Dance Theater (1987) in Den Haag (Overstreet K., 2016) destroyed in 2015.



Fig. 1. 1970. Pruitt & Igoe residential district Demolition. Source: Hud User



Fig.2: Demolition of the Netherlands Dance Theater 2016. Photo by Kojiri.jp. Source: Dance Theater, 2016

Sometimes the buildings mentioned above failed due to an over-intellectualised design: Peter and Alison Smithson imaged partially utopic situations as the “street in the sky”, assuming that it would have helped pursue Jane Jacobs’ concept of “eyes in the street” improving urbanity with the bottom-up process. The Corviale building in Rome (a considerable slab building 1 km long and 200 meters wide able to house up to 16,000 inhabitants) was supposed to represent a dam to stem the urban sprawl and to condense the whole complexity of the urban context so that the building ought to become a city in the city.

Apart from objective issues related not only to social trouble but even to technical problems, such as raw concrete degradation, what is considered beautiful and liveable in the field of buildings and built environment by ordinary people is radically different from what architects think.

This paper hypothesises that symbolic thinking and, in a particular way, the metaphor could be common ground able to fill such a gap. To pursue such goals, it’s necessary to develop the human

capital of architectural students so that they can contribute to disseminating the designer way of thinking (Lawson B. 2006) in society¹.

The purpose consists of making students more familiar with metaphors intended to support the design process. Indeed, the metaphor is effective for its aptitude in relating reality and very different concepts. Its inventive value is based on the flexibility of human thought that, looking for correspondences between very other phenomena, weaves them, modifying that knowledge that had already been acquired and generating new experiences.

In the field of Architecture, a Metaphor, through operations of substitution, modifies the “distance” between a shape and what it represents, providing architecture with a chance to be “other” from technical-functional needs. In literature, the tropes trigger an inventive process introducing in a proposition, “licences” (Garavelli B., 1988, 144), made up by substituting one or more terms which are appropriate with others having a figurative sense or not necessarily linked to the previous ones by a relationship of similarity.

In the Architectural form creative process, the rhetorical tropes can introduce variations to the typological content of a building or of a settling structure, corresponding to literary “licences”, aiming at the introduction of a difference that, by “crystallising” in the architectural form, modifies its figurative value. Anyway, their action field is tied by interaction with the rules of the architectural plan. But this should not happen through a top-down process, i.e. asking students to answer a questionnaire; on the contrary, it is recommendable a bottom-up process where students, thanks to the input given by lectures, spontaneously apply a metaphoric approach to design. To fulfil such goals, we need to set the fundamental theoretical topic of metaphor applied to architectural design, assuming the concept of building type as the primary design tool. The method we are about to see does not concern only architectural discourse, but the detection of how metaphorical thought has been used to shape architecture.

2. METHOD

In the following paragraph, we are about to face with the method through which the metaphor can enhance the architectural design process, starting from the state of the art about such issue.

The realm of metaphor is language; we are going to demonstrate that a good architectural rhetorical trope, even if it is rooted in literature, should define a (partially) autonomous operational circle.

According to Adrian Forty (Forty A., 2001, pp. 6, 64), architecture can be „like” a language or a language itself. The first proposition is an analogy, and the second is a metaphor. Neither of these hypotheses is totally wrong or correct, but they feed from the vast realm of interconnections and contamination among architectural design, literature and art.

The late 1960s and early 1970s semiotic standpoint, where a total coincidence between architecture and language popular among architects and scholars was posited (Calabrese O., 1977), should be discarded as it would drive to a dead end (Koenig K., 1964). So, we state that architecture and language share some common properties: according to Vitruvio,² they may have a signifier and a signified, and both are articulated in a system of relationships and differences. Besides, architecture lends from the language grammar, syntax, denotation and connotation that are the main tools for ordering and hierarchising architectural composition.

The main field where metaphor owes most of its popularity is the architectural discourse and its capability to address the flexibility of human thought, interweaving many concepts very far from architecture with the design of shapes and forms. Such concepts may even be in contradiction with the topic of architectural design since a good metaphor puts together different or opposite ideas.

¹ In Italy each academic year 67,412 students are enrolled in the Faculties of Architecture, including bachelor and masters. (Iscritti all'università, 2023). According to CNAPP data (the national board of architects) the amount of professional is 250,000 architects without taking into account the engineers.

² Vitruvio wrote that in architecture like all things there is a difference between „quod significatur e quod significant”. Marco Vitruvio Pollione, *De Architectura*, libro I, cap. I.

But the most appealing research line is endeavouring to investigate the physical shape of architecture from a metaphorical standpoint: indeed, the metaphor can convey a hidden meaning from the sphere of imagination to the one of reality, thus connecting the syntactic side intrinsic to architecture and made up of morphological, typological and tectonic rules, to the semantic one in an original way.

To be really effective, the metaphor should be framed by the figure: according to Alan Colquhoun the latter is a „configuration whose meaning is given by culture” (Colquhoun A., 1981, p. 190). Indeed, he assumes architectural figures work in a way similar to rhetorical tropes of classical literature, particularly to metaphor, as both quickly turn ideas into images and vice versa, condensing a multiplicity of information into invariant elements, easily understandable and able to draw forth emotions.

The aim is to look for „something” that architecture (De Fusco R., 1989, p. 34) says. In the most general sense, in architecture, this happens thanks to the correspondence between what is perceptible and what is not, through analogical and symbolic (Franzini E., 2001, p. 34) references. A work of Architecture is metaphoric if it addresses some of the manifold sensorial information to a symbolic meaning that represents something abstract in the mind of the subject or the designer, matching the corporeality of architecture with mental images. The point is „unveiling” (Heidegger M., 1968) something that is concealed by means of figuration. This last identifies differences in shapes and conceptualises them through filters so that certain forms correspond only to some concepts and not others (Guillerme J., 1982, p. 33). The figure thus takes on a meaning conferred by culture thanks to a „functioning” analogous to the rhetorical tropes of classical literature, in a particular way to the metaphor.

This process is bidirectional since it can be carried out both by those who experience architecture and therefore interpret it and by architects turning a thought into the shape of the space. This kind of interpretation is based on the Greek word „mimesis”, which in the neo-Latin languages, means theatrical representation and concerns the relationship between the visible side of artistic forms, in our case of architecture, and their „inner core”, that is an eidetic nucleus in which the meaning of a work of architecture is enclosed. This core corresponds to the invisible part of buildings that needs a metaphoric interpretation to be fully grasped.

Traditional studies treat the metaphor as a linguistic phenomenon. They concern theoretical subjects and argue that architectural theory often arises from a metaphor. Klaus Seligman (Seligman K., 1977) states that „figures of speech and thought culturally validated has affected the different mainstream of modern and contemporary architecture.

A more recent group of studies concentrate on the heuristic and cognitive role of the metaphor in the design process. Hey et al. (Hey J., et al. 2008) investigated the way in which metaphors and analogies widen the horizon of design, making it creative. Starting from the widespread use of metaphors in discourse about the design process in engineering, they analysed popular textbooks in order to find out what kind of metaphors have been used and how they have affected design strategies. A notable researches was performed by Hernan Casakin (Casakin H., 2019). Apart from having developed studies about metaphor as a tool to enhance the solving-problem issue in design, he carried out an empirical study aimed to

- (i) identifying metaphorical expressions generated during the design sessions;
- (ii) categorizing metaphors according to diverse experiential domains.
- (iii) classifying figurative expressions into image and conceptual metaphors, and analyzing how they relate to the experiential domains (Casakin H., 2019, p. 4).

Casakin claimed to have developed an innovative perspective for metaphor in architectural design, blending discursive and cognitive features so that it can be addressed not only to design but also to teach how to design.

Rosario Caballero’s research about metaphor (Caballero R. R., 2011) was informed by its role in providing architecture with a powerful figurative lexicon about space and matter. The aim was, on one hand, to understand whether and how the metaphor is a key factor in architectural design

teaching; on the other hand, to examine critically the use of figurative language in building review due to the easiness through which the metaphor bridge over conceptual and visual knowledge (Caballero Rodriguez R., 2003). Besides, she mentioned the utility of metaphor in architectural teaching to undergraduate students in order to make their jargon more effective and help them visualize abstract concepts faster.

Another work that may be considered seminal is *Metaphor in Architecture and Urbanism*, edited by Andri Gerber and Brent Patterson (Gerber A., Patterson B., 2013). The book deals with „metaphorology”, a concept originally minted by Hans Blumenberg in 1960. The starting point is the productive potential of the metaphor as an engine able to shift meanings to unlike domains and concepts, skipping whatever logical mechanisms in making metaphors. A further source is Jacques Derrida, who claimed the difficulty of finding out a correct literal meaning (Derrida J., 1974) and argued an inventive role for the metaphor. The two philosophers convey a key concept for understanding metaphors in architecture: the interaction between the „unstable disciplinary nature of architecture and urbanism” (Gerber A., Patterson B., 2013, p. 24) and the essence of the metaphors; this connection deals with the quick processing of correspondences between very different subjects weaving them. Gerber’s approach has been inspired by Peter Eisenmann’s theoretical studies, according to which the architect should broaden his traditional tools beyond drawing, including writing to define concepts and communicate ideas. So not surprisingly, he tends to blend the word and speech domains with the one of architecture, exploiting the metaphor as „vehicle” to cross the boundaries between the building shape and the subtended concepts.

3. RESULT

The metaphor is a powerful tool able to enhance the design process in the early stages as it involves “unconventional and creative thinking” (Casakin H., 2019, p. 2). The most effective way to design is thinking by imagination and not by images, meaning blending the invisible side of images with the invisible one and taking advantage of the fluidity of such symbolic connection.

The relationship between the invisible and visible in the image domain has been investigated by phenomenologist philosopher Elio Franzini (Franzini E., 2001). He argued that images are data to be described while the imagination is a process which interprets such data. The common ground between images and imagination is given by the representation and memory, which sift the different aspects of sensing, conveying them to a logical order grounded on the memory and the experience. So, the shift from images and imagination does not happen randomly but is addressed and screened by assessment criteria driven by previous knowledge.

Imagination, or representation, involves two moments: the reception of images and perceivable experience (that is not passive but is addressed by the glimpse of the subject) and its active conceptual processing. The first operation pertains to the world of sensation (aesthetics), the second to the sphere of thought (logic): thus, representation, even if it has to encompass sensation, and aisthesis, finds its truth and its universality mainly in the logos domain, in its translation into categorical and conceptual terms (Franzini E., 2013).

For what concerns architectural design, „logos” means not only the discourse – this is the main limit of Derrida and Eisenman as architecture never gets out from the abstract world of theoretical thought - but even the concrete sphere of architecture, which involves the types, tectonic, relationship with a physical context, the society and of the course the issues concerned with the practical building of a work of architecture.

The consistency between architectural design and metaphor lies in its cognitive potential that stems from the weave among theoretical discourse, images and ideas that conveys into the design. We argue that this approach has been made possible by the “Blending Theory” or “Conceptual Blending” proposed by Fauconnier (Fauconnier G., Turner M., 1996) and Turner (Turner M., 1996). It is considered an improvement of Lakoff and Johnson conceptual metaphor theory (Lakoff G., Johnson M., 1980) that had set fundamental notions as “source of domain”, “target domain”, “invariance”, “mapping”. The blending theory modifies the “basic unit of cognitive organization” (Grady J.,

Oakley T., Coulson S., 1982) of the metaphorical framework, turning the arrangement into two domains in four mental spaces. They are “a particular scenario” structured by the aforementioned domains. In the field of architecture, the four-space model of the Blending Theory would work as follow:

- Input space 1 which contains the source of the metaphor;
- input space 2 with the target of the metaphor;
- “generic” space where the concept shared by both inputs finds a place ;
- blending space where the issues coming from the inputs are modified and transformed into something new.

If we consider the famous Le Corbusier’s metaphor of the ocean liner, input space 1 is the typical housing building type (*unite d’habitation de grandeur conforme*) input space 2 the steam ship, the generic space corresponds to the shared properties like the distance from the city, the independence of building from the street pattern, and the concept of collective housing is submitted to a machine logic where everything is normalized as the “exact breathing machine” where the air is never cold or hot as it is produced and humidified at 18C°” (Le Corbusier, 1991). The blending space is the *Unité d’habitation* which is neither a ship nor a conventional building, but a different space where some of the previous properties blend together: for example, the living roof is similar to the deck of a ship, the considerable thickness of the building makes its proportions similar to those of the steamer, the large pilotis allude to the idea of suspension from the ground and above all the experience of the city consists in a view from afar.

The test method consists in outlining the metaphoric meaning in a group of modern and contemporary exemplary buildings analyzing the interactions among architectural discourse and the shape of the building.

The goal is to understand what degree of awareness the designer demonstrated in the use of the metaphor and how it influenced the project.

The background hypothesis consisted in taking the concept of type, a well-known tool widespread and popular in research and design in the Italian and Spanish schools of architecture (Martí Aris C., 2021), as a supporting beam that makes the metaphor stand up.

The type is an elementary structure that interacts with certain transformations, like juxtaposition, combination, superimposition, inversion, and variation, thanks to the intent of the architect or by other factors (client wishes, regulations, economic constraints and other contingencies). In modern and contemporary architecture, the parts of a building (loadbearing structures, walls, envelope, roof, layout, spatial arrangement) are relatively autonomous so that inventive and creative issues, like metaphors, can be inserted into the interstices among such parts, modifying them. Besides, the type circumscribes an invariable part of the architecture i.e. the arrangement of space, which by difference highlights the metaphorical meaning. This last usually is opposed to the type as a metaphor concerns concepts or ideas very different from the one of architecture.

The type and the metaphor superimpose different fields of knowledge: the first manages elementary formal structures in consonance with tangible transformation, while the second operates in the domain of literary imagination in which imaginative desires, theory, art, pictures, and images convey in order to make things that are new or amazing.

The first study case is Giuseppe Terragni and Pietro Lingeri’s *Danteum* (1938-1943). It is a project of an unrealized building initially designed for an area between Massenzio’s Basilica and Imperial Fora in Rome, which would have been a hybrid between a museum and a library, completely devoted to Dante’s *Divina Commedia*. Although Terragni had never spoken of rhetorical tropes, the iconographic program was openly founded on metaphors as the architect decided to infer the design program entirely on *Divine Comedy* narrative, and this would not have been possible without metaphors. Their frame was the images evoked by the *Dantesque* poem, while the focus was represented by the morphology of *Danteum* interiors. The entrance to the building, was almost concealed in the façade, hidden by an external non-bearing wall and placed in a narrow corridor. This space, according to Thomas Schumacher (Schumacher T. L., 2004) is a metaphor, not only of the

verse „*dritta via [...] smarrita*” („the straight way that had been lost” D.C. I,3), but also for the slightly clumsy manner through which Dante get into the hell - “*non so ben ridir com’i v’intra*”, I,10 (I don’t know how I entered)- linked with the Christian idea of the need for a long and tortuous pilgrimage to reach the destination.

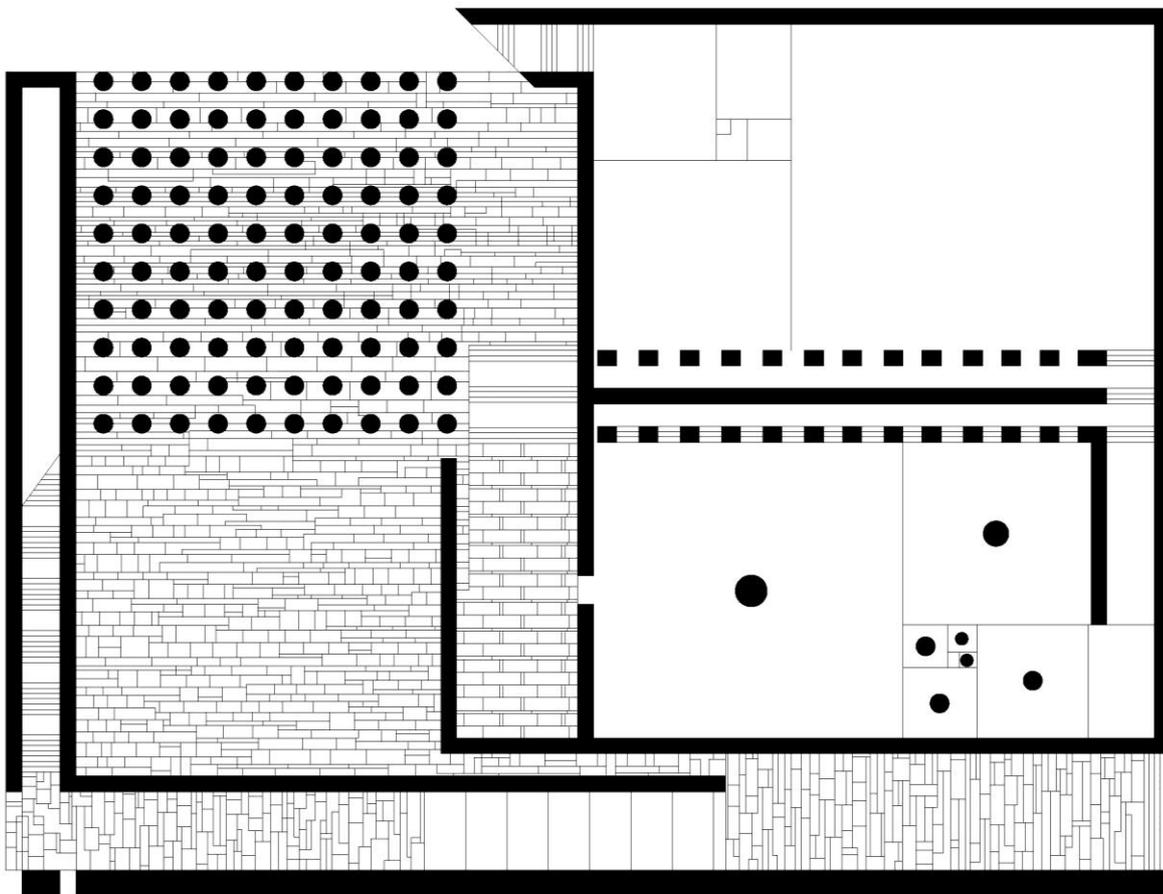


Fig. 4: G. Terragni: Danteum level 0. Source: Redraw by the author

The superimposition of squares, that characterize the floor plan layout, is a metaphoric representation of the overlapping of sounds between the second verse of a triplet and the first and third of the following one, according to the pattern A-B-A B-C-B.

The first place along the visiting path is the hundred columns' room: the space is a substitutive metaphor of the preamble of the Divine Comedy: the columns, arranged in a cartesian order, represent, in a nearly literary manner, the image of the “*selva oscura*” (dark forest).

In the rooms dedicated to Hell, Purgatory and Heaven, the secondary subject of the metaphor concerns another imaginary topic. Seven steps below the courtyard, the room of the Hell is split into seven squares measured out according to the golden ratio and arranged so that they make a spiral: this order can be repeated endlessly, addressing the arrangement of the squares towards the idea of eternal damnation. The damned soul will never be able to escape their conviction, and this image is given back by the placement of the column in the centre of the square. This last was an

insurmountable border that showed the lost soul that, finding himself in a place which is unmistakably determined, loses any chance to modify his condition. Purgatory was organised in a similar way, but the sequence of seven squares had an opposite orientation, and it's facing the room of Paradise. The room of Paradise is the last step of a way that crosses the opposition between light and darkness: the visitor, completely excluded from the outside, progressively gets closer to the light. Thirty-three glass columns support a transparent roof partially open towards the sky; the walls are partitioned according to the same grid scheme of the roof. The space within Danteum shapes a gradual passage from darkness to light, the metaphor of that "luminous progression" (Ciucci G., 2003) imagined by Dante as a structural theme for the *Divine Comedy*.

Since the beginning of his career in the middle of the 1970s, Rem Koolhaas, introduced a design method informed by an innovative and unusual approach where visual arts, screenplay writings techniques, suggestions taken from contemporary art, especially surrealism, and structuralism were blended together mainly by means of metaphors. Most of the theoretical projects designed till the beginning of the 1980s, when he turned OMA in a professional office, were grounded on metaphors. He gave two definitions:

Metaphor: It's gradually dawning that a brainshaped building or some notion of the ego doesn't, on its own, make a mental asylum proposal more satisfying.

Metaphors: metaphors are transformation of an actual event into a figurative expression, evoking images by substituting an abstract notion of something more descriptive and illustrative. It usually is an implicit comparison between two entities which are not alike but can be compared in an imaginative way. The comparison is mostly done through a creative leap that ties different objects together (Oma, Koolhaas R., Mau B., 1995, p. 926).

According to Koolhaas, the design process springs in a mental space before achieving a formal solution; anyway, architectural design is storytelling full of symbols and self-biographic suggestions. The architect is a writer as well as a designer, and we are not too far from Peter Eisenmann: the difference is that the latter gives more prominence to the words, while Koolhaas pilots the architectural shape by means of concepts. Although much of OMA's work is metaphorical, in this paper, we focus on three houses as they contain enough elements to understand how the metaphor is the driving force that makes the manipulation of architectural matter consistent with the architect's narrative.

In Villa Dall'Ava (Paris 1985-1991), as would happen for other similar projects like Villa Geerling (Holten 1992) and Villa Floirac (Bordeaux, 1994-1998) Koolhaas and his team shaped the architecture following the metaphors turning in such a way the constructive program into a script. The house is arranged in two boxes slipped in opposite directions and superimposed on a base whose main elements are a concrete solid wall and a glass façade. The boxes are for the rooms, while the middle part, long and narrow, holds up a swimming pool.

If we consider the single part of the building, namely the complex loadbearing structure based on mass and balances, the unconventional building materials, the large amount of transparent or translucent surfaces, the raw concrete wall or the pool, they are symbols that recall some well-known topics of Rem Koolhaas theoretical thought: the pool clearly represents the Floating Swimming Pool³ while the wall is a symbol of the Berlin Wall. But if we take into account the whole building, it is a metaphor for Koolhaas' narration about architecture, art, and society as it was expressed in *Delirious New York*. The metaphor blends together different domains: the house as a living machine and, consequently, the modernist architecture, Koolhaas's way of representing is ironic criticism of modern architecture by means of images (the metaphorized) and the shape of architecture (that is, the metaphorizing) (Gargiani R., 2013, p. 81).

³ The floating swimming pool is one of the most famous metaphors of Koolhaas. It is an image taken from the *Story of the Pool* (1977) illustrated by Madelon Vriesendorp and published in *Architectural Design* n. 5 (1977). This icon conveys the "idealized" project New Welfare Island, in which Koolhaas planned to transform a broad sector of Manhattan in an urban workshop. (Oma, Koolhaas, Mau, 1905)



Fig. 3: Rem Koolhaas, Villa dall'Ava. Maquette by Vera De Prizio, source: Koolhaas R., (2014)

In Terragni's *Danteum* and Rem Koolhaas's villas, the design was molded by the willingness of the designer to address his personal interpretation of the architecture through a metaphor in order to match unfamiliar subjects, like the *Divine Comedy* or the outstanding theoretical concepts of Koolhaas. But in most of the works of architecture, the designer has never thought to insert metaphorical meaning.

It is quite evident that the architects who intentionally set the project on one or more metaphors are not many, and when they do that, they are animated by a strong theoretical imprint: the metaphors blend the conceptual and image (Caballero R. R., 2003, p. 150) sphere as well, and they are concentrated in the early stages of the project easily intertwining with the definition of the form.

Instead, we have a completely different approach when the constructive aspect of architecture prevails and constructive thought matches the theoretical foundation of the project.

Some Italian architects, such as Giorgio Grassi and Antonio Monestiroli, have theorized the self-representative value of architecture in the context of a side of the School of Milan⁴ where the form is not considered an idea but a thing with full objectivity (Malcovati, 2011).

Architecture must therefore be simple, clear and honest, for which its essential form is the form of construction. The famous Adolf Loos mound is frequently quoted in Italian architectural literature (Biraghi M., 2021, p. 16). Is this a metaphor? Certainly not if we consider it just as a functional construction, yes if we convey the meaning of the memory of who has been buried there. It's necessary to focus on the shape not on the mound as the shape "represents its own identity and purpose" (Monestiroli A., 2005, p. 36). The building is architecture if it manages to represent itself in a clear and precise way. Does architecture represent something that is not other than itself? No, because architecture represents itself and is the metaphor for its own constructive act.

If we consider, for instance, the load-bearing system of a building, there are obviously significant formal differences depending on the materials determined by the physical and mechanical properties of the materials, which, in turn, affect the figurative quality of the architecture. A steel pillar is shaped in order to support the instability of the equilibrium for which it has the same rays of inertia in the two directions so that the sections have equal stiffness. The decision to use H-sections or cruciforms is very different figuratively. In the first case, a directional spatiality is expressed and in the second, a central one. The arrangement and spacing of the pillars, in turn, evoke other properties usually referred to as the essentiality of the constructive form, as happens, for example, in the case of the buildings by Mies Van Der Rohe. The cruciform section since Barcelona Pavillon to Neue Berlin Nationalgalerie convey both a technical form and a figurative meaning pursued through a metaphor which represents "a strong sense of stability" (Monestiroli, 2005, p. 100) and a balance of force similar to columns of ancient architecture.

The metaphor concerns the contamination between a necessary and objective technical solution and a formal one to which meanings are attributed: the technical form is the aesthetic form (perceivable and assessable with criteria oriented towards the concept of beauty). These are metaphors we live by) Lakoff and Johnson, in particular of an ontological type, since "involve the projection of entity or substance status on something that does not have that status inherently".

Another example is represented by those buildings where the structural system changes its shape due to construction needs.

In the INA building by Franco Albini in Parma (1950) the rhythmic tapering of the pilasters towards the sky represents a decrease in the burden that loads the support system. They are part of a double expressive system: the verticality of pillars and perforations denotes transparency and lightness accentuated by the progressive thinning of the structure; the horizontality of the string-course and the courses of brick filling underline opacity and consistency of masonry walls.

In these cases, the metaphorised does not pertain to something beyond architecture, but a constructive technique. The relationship between visible and invisible regards the relationship between architectural form and constructive need, where architecture is a "metaphor of itself".

4. DISCUSSION

The effectiveness of the metaphor in architectural design has been tested in a group of projects⁵ developed in Architectural Design Studio Master classes. The tests were arranged in a bottom-up way after a lecture about the subject of metaphor in architecture. The students were free to follow a metaphorical approach to design or not and the "focus", or a vehicle (metaphorising), that was

⁴ The School of Milan is a group of scholars and architects originally grouped around the charismatic figure of Ernesto Nathan Rogers and the magazine *Casabella* after WW2. In the end of the 1960s the school split in different tendencies driven by Rogers's assistants (Monestiroli A., 2010).

⁵ Throughout the tests, the metaphorical tools as a support for the creative step of design was with tools were taken in ten students project during academic years 2015-2016 and 2017-2018 at the master class of Architectural Design Studio, Faculty of Architecture Urban Planning and Construction Engineering of Politecnico di Milano. Here two of the best are presented.

supposed to activate a shift of meaning from the primary subject to the secondary one was defined through a dialogue between students and professors. The students show interest in organic metaphors.

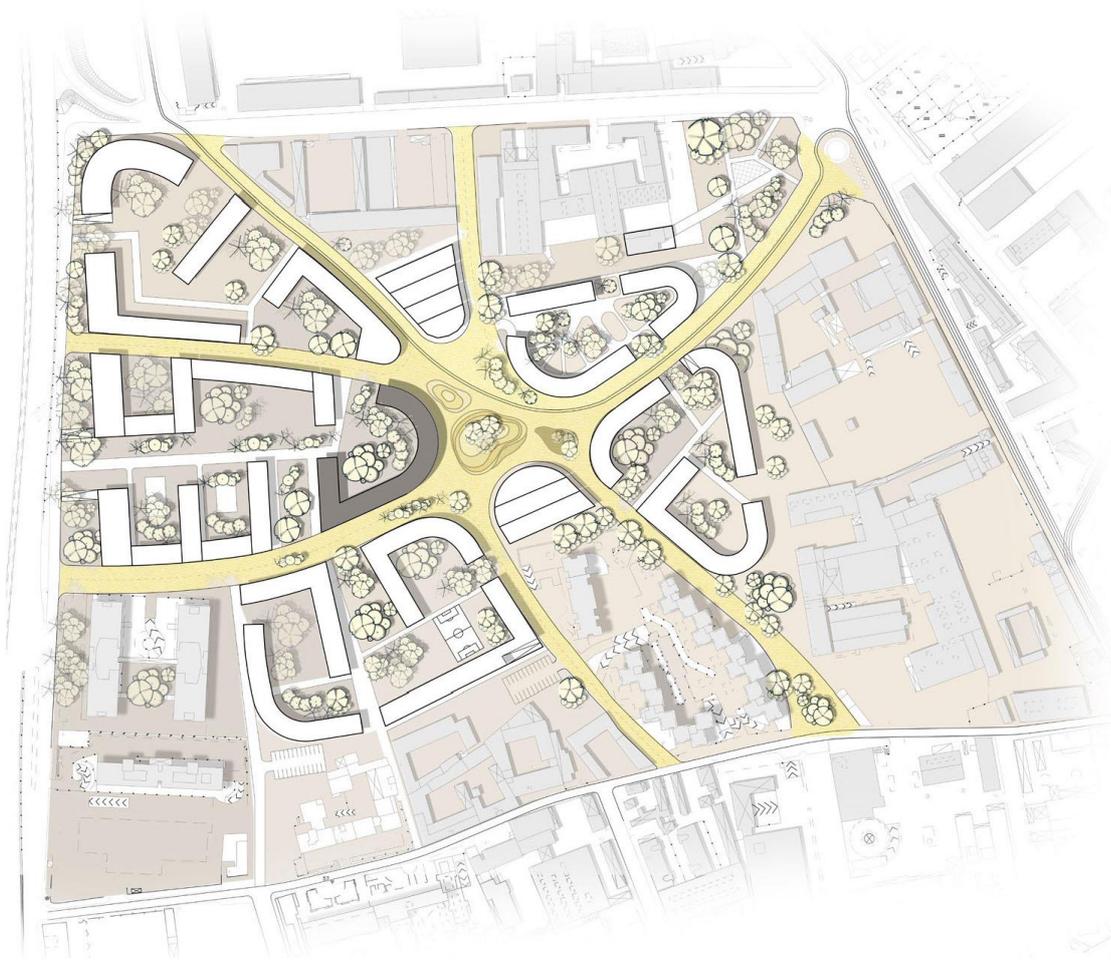


Fig. 5. Architectural Design Studio A.A. 2015-16, Politecnico di Milano, prof. M. Lucchini, L. Basabe. Project by N. Nenadovic, G. Porro, E. Riva. Source: Author's archive.

The first group of students was asked to design a housing complex in a vast abandoned area of the north periphery of Milan. They take the metaphor of the “octopus” to arrange the open space, so the test was addressed to the urban scale. The project established certain relations to the surroundings of the area, street and urban spaces, blending the new buildings with the inner courtyards in the points of connection. The mobility scheme proposes a restricted and regulated car flow, combined with a tram line, intersecting the area, and mainly, a comfortable pedestrian movement with a rich green system.

The buildings committed to raising the idea of continuity of flowing space following the pattern of the “octopus”. (Fig. 5)

The second project coped with the building scale; the topic was designing a block of flats as part of an urban regeneration project in a brownfield area of Milan (Fig. 6).

The students struggled to find a characterising idea and wanted to create a mixed-use building with a residence and some facilities for the inhabitants; then, they find out new energy for the project by thinking of a snake that metaphorically wrapped and crossed the building. They developed the idea of transforming the snake into a concept that practically turned into a path that crosses the building in several storeys, making a system of shared rooms and spaces for a public library for both citizens and inhabitants.

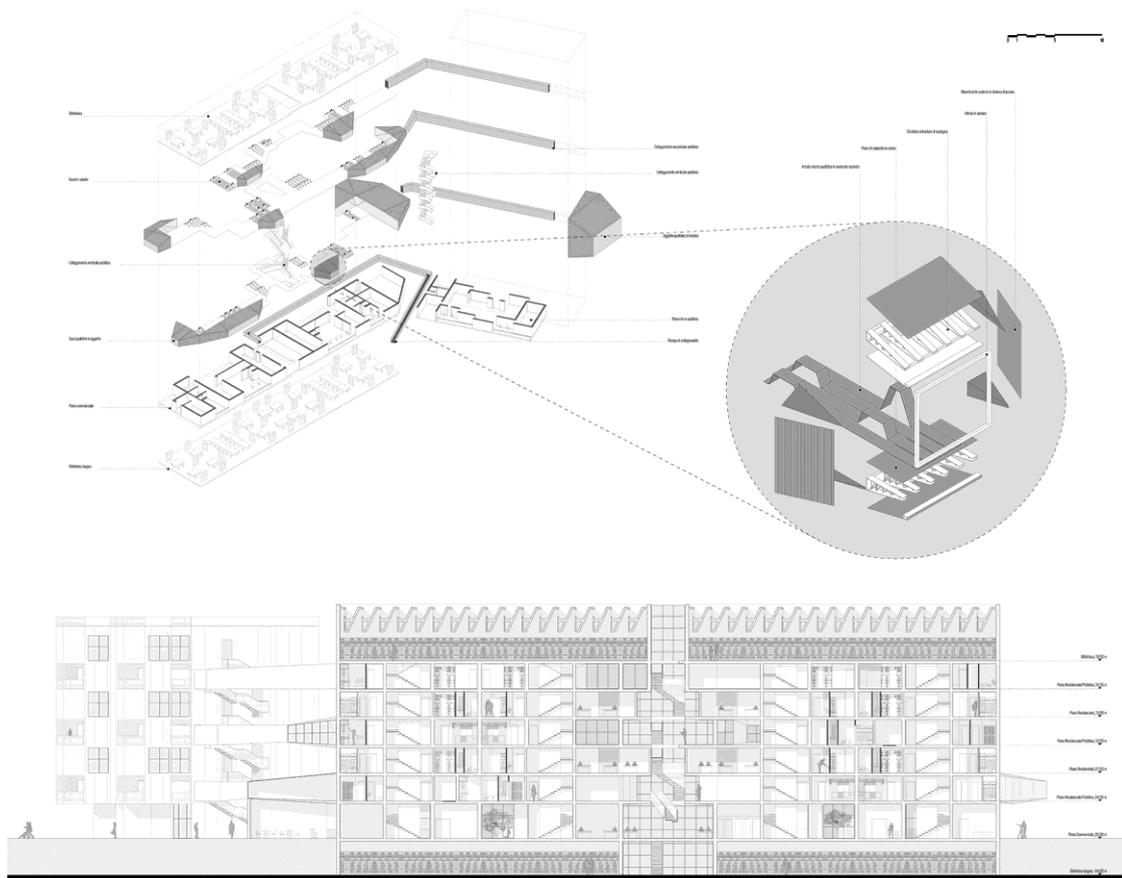


Fig. 6. Architectural Design Studio A.A. 2016-11, Politecnico di Milano, prof. M. Lucchini. Project by D. Grossi, M. Camaggio. Source: Author's archive.

The metaphor is a literary tool lent to the architectural design. Its strength is due to the ancient ability, known to the rhetoricians of antiquity, to quickly connect very different ideas with the aim of persuading an audience. It can be very useful in the initial stages of architectural design, where the project is not yet stabilized and is therefore more subject to change. Due to its nature, the metaphor finds room in project criticism, especially in architectural Design Studios where the dialogic tool is remarkable. However, it does not only concern verbal phonic language but also the perception of images and haptic experiences. Consequently, to improve design performance, it must be applied above all to design images, as has been demonstrated in the examples described in the paper. The symbolic value certainly has the non-innovative but no less effective ability to move the design thinking making the designers passionate about what they are doing. So we can return to

the initial premises of the article: the metaphor as a critical tool can help to pursue even those who are not experts in architecture but still have to deal with the validity of a design hypothesis. After all, the metaphor remains a rhetorical figure.

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