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Front Pages

Athens Journal of Architecture

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Seven Steps to Organic Modernism: Alvar Aalto's Civic Centre in Seinäjoki Seen through the Lenses of Bruno Zevi

By Ari Hynynen[*]

Some scholars point out that modern architecture has been comprised of two parallel currents from its very beginning: rational and organic. Although many interpretations of modernism highlight industrial standardisation and mass production, Bruno Zevi suggested that the basic ideas of functionalism already included the principles of organic architecture. Here organic does not refer to nature's forms but to human life. In the 1970s, Zevi published his theory of seven invariants of modern architecture, which received mixed reviews. This study aims to update these invariants for being viable in our time by comparing them to Zevi's former writings dealing with organic architecture and the role of space in architecture. The invariants will be tested and elaborated in empirical analysis of Aalto's Civic Centre in Seinäjoki, Finland.

Background

The status of architecture as an independent scientific discipline depends on its ability to stand on its own theoretical basis. So far, the methodological field is very fragmented. Like many other architectural theoreticians, Bruno Zevi (1918-2000) did his bit by writing his most renowned book, "The Modern Language of Architecture" in the beginning of 1970s.[1] The seven invariants introduced in the book have partial convergence with the basic theses of functionalism, which makes the invariants seem somewhat anachronistic in the 1970s. However, that decade was the dawn of postmodern architecture which, for Zevi, meant a painful return of bygone classicism; there was nothing "post" for him indeed. His generation has experienced the rise of fascist, Nazist, and communist regimes with their enthusiasm for rigid classicist symmetry, monumentalism, and eclectic use of historical architectonic motifs.[2] The postmodernist movement was also the reason Zevi resigned rom a highly esteemed professorship at the University of Rome.[3]

In his book, Zevi's main aim was to develop an explicit theory for differentiating modern architecture from numerous style variations of classicist architecture. According to him, modern architecture should have a language of its own in the same manner as classicist architecture had a lexicon, grammar, and syntax. It is important to notice the word order in the title of Zevi's book "The Modern Language of Architecture…" instead of "The Language of Modern Architecture…".

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1. B. Zevi, *The Modern Language of Architecture* (Seattle: University of Washington Press, 1978). The English version is a translation compiled of two books originally written in Italian: "Il linguaggio moderna dell'architettura" (1973), and "Architettura e storiografia" (1974).

2. A. O. Dean, *Bruno Zevi on Modern Architecture* (New York: Rizzoli, 1983), 17-34.

3. Ibid, 113-118.

This means that Zevi's purpose was also to create a generic framework for understanding architecture over historical periods, seen from the vantage point of our present time. According to Zevi, history will be alive by being interpreted this way.[4] However, his approach is slightly problematic, as he bases his argumentation so strongly to specific time-bound motifs and technological innovations from certain period, like cantilevers or shell structures.

Zevi's theory has been widely criticised from diverse standpoints. For example, Conrad Jameson[5] considers Zevi's aim to create a new grammar for modern architecture very ambitious, although Zevi didn't succeed in justifying the relevance of his invariants. Jameson takes "asymmetry", the second invariant, as an example, and tries in vain, based on Zevi's argumentation, to understand what it is that makes it "modern". Undoubtedly Zevi's argumentation is provocative, partly based on psychoanalytic theories. But finally, it is his sharp style that raises resistance, and gives impression that his main aim is to offend classicist and postmodernist architecture. Andrea Sauchelli[6] criticises Zevi on his principles to prioritise space as the primary factor of architecture. However, Sauchelli reads Zevi from the vantage point of art historical methodology, whereas Zevi's aim is to develop architecture as an independent scientific discipline. These two approaches could meet better if Sauchelli had studied Zevi's two seminal books, "Towards an Organic Architecture"[7] and "The Modern Language of Architecture,"[8] alongside "Architecture as Space."[9] These three texts together would have provided a wider picture of Zevi's ideas on the social substance of architectonic space.

Johanna Gullberg[10] criticises Zevi's thinking on its inclination to define beforehand the evolving architecture. According to Gullberg, this is especially harmful, as Zevi has meant his invariants to be used in architectural education. The main reason for this kind of criticism lies in Zevi's habit to formulate his principles very concretely, avoiding abstractions, metaphoric expressions, and academic jargon. Manfredo Tafuri[11] claims that Zevi's effort is doomed to fail, since language as concrete and descriptive as this, equates to design. According to Tafuri, purely textual criticism that examines its subject outside from the meta-level would succeed better.

The criticisms described above are well known and commenting on them is not the aim of this article. On the other hand, they are well justified, as they point out how Zevi undermines his own message by mixing his personal and political

4. D. Ricchi, *From Storia to History (and Back): Fiction, Literature, and Historiography in Postwar Italian Architecture* (Princeton, USA: Princeton University, 2016), 20-40, 54-67; Dean, *Bruno Zevi on Modern Architecture*, 1983), 35-49.

5. C. Jameson, "Review of The Modern Language of Architecture by Bruno Zevi," *Journal of the Society of Architectural Historians* 40, no. 1 (1981): 80-82.

6. A. Sauchelli, "On Architecture as a Spatial Art," *The Nordic Journal of Aesthetics* 43 (2012): 53-64.

7. Zevi, *Towards an Organic Architecture* (London: Faber & Faber, 1950).

8. Zevi, The Modern Language of Architecture, 1978).

9. Zevi, Architecture as Space. How to Look at Architecture (New York: Horizon Press, 1974).

10. J. Gullberg, "Voids and Bodies: August Schmarsow, Bruno Zevi and Space as a Historiographical Theme," *Journal of Art Historiography* 14 (2016): 1-20.

11. M. Tafuri, *Theories and History of Architecture* (London: Granada Publishing Limited, 1980), 106-107, 201-202.

ideas into his theories. Yet, Zevi's provocative and polemical writing style should not prevent to utilise his basic ideas that could be extracted from his books. The aim of this article is to re-interpret Zevi's invariants into more practical and timeless forms, and simultaneously to analyse Alvar Aalto's Civic Centre in Seinäjoki, Finland, which is an under-scrutinised Aalto object from the standpoint of architectural theory.

To be precise, this study aims to update the seven invariants introduced in the book for being viable in our time by reflecting them to Zevi's former writings dealing with organic architecture. "Towards an Organic Architecture"[12] was Zevi's first remarkable publication on architectural theory. Without understanding the importance of this book, his seven invariants might remain partly cryptic. The invariants are: 1) Listing as Design Methodology, 2) Asymmetry and Dissonance, 3) Anti-perspective Three-dimensionality, 4) The Syntax of Four-dimensional Decomposition, 5) Cantilever, Shell, and Membrane Structures, 6) Space in Time, and 7) Reintegration of Building, City, and Landscape. On closer study "The Modern Language of Architecture" is deeply based on the principles found in Zevi's interpretation of organic architecture. To capture a good overall picture of his theoretical reasoning, these two books should be examined in parallel.

Methodology

In this study, the testbed for these invariants is Alvar Aalto's Civic Centre (1958-1987) (Figure 1) in Seinäjoki, Finland, complemented with the newer Apila library (2012) designed by architect Asmo Jaaksi. Aalto's church was completed 1960, town hall 1962, library 1965, parish centre 1966, office building 1968, theatre 1987, after Aalto's death, and the Apila library 2012.

Aalto's Civic Centre has been a subject of architectural analysis before, albeit quite rarely. Finnish architect Jaakko Penttilä's[13] study draws on Dimitri Porphyrios' eclectic theory,[14] which is one possible way to understand Aalto's approach, as he had a very distinctive repertoire of classic and "Mediterranean" motifs, like agoras and piazzas. However, eclectic methodology does not reach the deeper layers of architecture, the social, functional, and ethical. Penttilä's analysis focuses more on tracking different motifs and form elements, thus applying art historical methodology.

There is one quite frequently used concept found in analyses on Alvar Aalto's works: organic architecture. The choice is relevant, as Aalto himself tended to use the concept eagerly, albeit never defined it precisely. It seems to be a difficult challenge for the Aalto researchers as well, since too often the concept is left quite

12. Zevi, *Towards an Organic Architecture*, 1950. The original book in Italian was published in 1945, "Verso un'architettura organica".

13. J. Penttilä, *Kaupungin kasvot* (Tampere, Finland: School of Architecture, Tampere University of Technology, 2009). Jaakko Penttilä's study is a master's thesis, but it is referenced here due to its high quality; it could easily be a licentiate work in most universities. Unfortunately, the study has been published only in Finnish, titled "Kaupungin kasvot", The face of a city.

14. D. Porphyrios, Sources of Modern Eclecticism. Studies on Alvar Aalto (London: Academy Editions, 1982).

fuzzy with some references to nature's processes and morphology. Bruno Zevi took a different stance, as he highlighted the social aspect of organic, probably adopted from Walter Curt Behrendt's book "Modern Building – Its Nature, Problems, and Forms."[15] Zevi also connects "social" and "spatial", thus providing new conceptual tools to better understand architecture's social dimension through multiple and constantly changing human practices. In other words, for Zevi, the actual material of organic architecture is social space ("Architecture as Space", Zevi 1974.[16]) It is fair to point out here that although Zevi is known in promoting space as a primary principle of architecture, he is not the first architectural theoretic to do that; August Schmarsow introduced the idea as early as the end of 19th century.[17]

Figure 1. *Seinäjoki Civic Centre Seen from the Roof of the Parish Centre. Aalto's Library on the Left, Town Hall on the Right Side. The Theatre and the Office Building on the Background*
Source: Ari Hynynen.

According to Zevi, to support ever-changing lifeforms by architectonic space, the designer ought to abandon all the stagnated conventions that might restrict emerging architecture. Without aiming for a precise definition, Zevi encapsulates the idea of organic architecture as follows: "Architecture is organic when the spatial arrangement of room, house and city is planned for human happiness, material, psychological and spiritual. The organic is based therefore on a social idea and not on a figurative idea. We can only call architecture organic when it aims at being human before it is humanist."[18]

15. W. C. Behrendt, *Modern Building. Its Nature, Problems, and Forms* (London: Martin Hopkinson Limited, 1938).

16. Zevi, *Architecture as Space. How to Look at Architecture*, 1974. The original book in Italian was published in 1957, "Saper vedere l'architettura".

17. Gullberg, "Voids and Bodies: August Schmarsow, Bruno Zevi and Space as a Historiographical Theme," 2016, 1-20.

18. Zevi, *Towards an Organic Architecture* (London: Faber & Faber, 1950), 76.

The last sentence is noteworthy in that it is open to interpretation. If the basis of architecture is some "-ism", then a doctrine already exists that is being followed. Here Zevi refers to the original principles of functionalism, according to which form follows function and changes with changed circumstances. However, it is essential to distinguish when "function" arises from some dogma or when it is based on the reality of life and its practices. To précis Zevi, visual form or aesthetics in themselves do not indicate the organicity of architecture, but rather one must assess the design approach, mentality, and method of the architect.[19] Based on Zevi's own writings and interviews,[20] it is fair to sum up that for him modern architecture, in its ideal form, applies organic principles.

The same kind of organic principle can be found as early as in Johan Wolfgang von Goethe's (1749-1832) natural scientific writings, where the starting point is to develop theoretical formulations based on empirical contemplative investigation, not by trying to explain some phenomena based on existing theories. Central in Goethe's scientific thinking is a phenomenon-centeredness that strives to understand totalities, retaining the study object within the perception of the senses. Transforming the study objects into mathematically measurable entities reduces their qualitative dimension to abstractions that can form entities only within the sphere of quantitative theories, but not within the human world of perception. According to Goethe, this leads to a break in man's relationship with nature.[21] Goethe himself did not use the concept of organic, but it is interesting that both Behrendt[22] and Zevi[23] referred to his scientific or art philosophy.

Goethe's scientific approach is a close relative to later philosophical and methodological systems, like Edmund Husserl's (1859-1938) phenomenology, or grounded theory used in social studies.[24] These theories have been completely left out of the present study, since including them would have led to such areas of philosophy of science that would be beyond its scope. The philosophical relationships between Goethe, Aalto and Zevi have been noticed already in some earlier studies, albeit quite superficially and without proper analysis.[25]

19. Ibid, 71.

20. Dean, Bruno Zevi on Modern Architecture, 1983.

21. H. Bortoft, The Wholeness of Nature. Goethe's Way Toward a Science of Conscious Participation in Nature (Edinburgh: Floris Books, 1996); Bortoft, Taking Appearance Seriously. The Dynamic Way of Seeing in Goethe and European Thought (Edinburgh: Floris Books, 2012).

22. Behrendt, *Modern Building. Its Nature, Problems, and Forms* (London: Martin Hopkinson Limited, 1938), 6, 127.

23. Zevi, Towards an Organic Architecture, 1950, 69.

24. B. G Glaser and A. L. Strauss, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (New Brunswick, London: Aldine de Gruyter, 1967).

25. N. Ray, *Alvar Aalto* (New Haven and London: Yale University Press, 2005), 155; E. - L. Pelkonen, *Alvar Aalto. Architecture, Modernity, and Geopolitics* (New Haven and London: Yale University Press, 2009), 39; A. Hynynen, "A Deep Organic Re-Reading of Alvar Aalto's Design Approach," in *Proceedings of the 6th Annual Architectural Research Symposium in Finland 2014: Designing and Planning the Built Environment for Human Well-Being, October 23rd to 25th in Oulu, Finland: The 6th Annual Symposium of Architectural Research 2014 and The Annual NAAR Symposium 2014, October 23-25, 2014, Oulu, Finland* (pp. 28-39). Publications no. A61. Department of Architecture, University of Oulu.

The conceptual framework described above helps us to appropriate the ideas presented in the book "The Modern Language of Architecture". The book is built around seven invariants that, according to Zevi, are essential for modern architecture. The invariants will be tested and elaborated in empirical analysis of Aalto's Civic Centre and linked conceptually together with a uniting storyline based on Zevi's ideas on organic architecture. In practice, correspondences will be analysed between the seven invariants and the architectural solutions in the Civic Centre. The concrete operations include observations in site, as well as analysing drawings and photographs. The result of these operations will be a conceptual framework that helps us to better understand and use Zevi's "language" in evaluations and criticisms of architecture, and, on the other hand, to also grasp Alvar Aalto's architecture. In addition to these, the aim is to go a step further in developing the theory of organic architecture.

Results

Next, the invariants will be studied individually in their original order:

Listing as Design Methodology

The first invariant, titled "Listing as Design Methodology", does not tell too much about its actual meaning. Yet, it introduces many key concepts as, according to Zevi, it lays the foundation for all the subsequent invariants. In fact, the term has a philosophical character in comparison with the following, much more concrete ones, as it captures a wide array of principles concerning architects' basic attitude and approach towards built environment and its design. Further, in the very core of the invariant there is a built-in demand for modern architecture to be revolutionary. In Zevi's reasoning, all historical eras have produced modern architecture in a sense, that modern is conceived as innovative and reformist, in other words: revolutionary.

According to Zevi, revolution is necessary, since the basic task of architecture is to produce spaces for constantly changing needs of human life, as well as to fulfil diverse emotional needs. On the base of this principle, Zevi's societal program features not only a utilitarian political reform but, instead, its aim is to surpass daily practices and enhance individual happiness as well. The revolutionary aspect has also manifested in Zevi's idea to place architecture – at least partly – in the sphere of art: "…genuinely creative spirits have always started from the scratch."[26]

It is exactly here, where the very core of the first invariant lies. For being able to start from scratch, an architect should unlearn all the professional substance that has been accumulated from past practices. "Listing…" means that an architect should be able to approach all his commissions open-minded without preconceptions and rulebooks, without simply repeating something already learned. Consequently, it is

26. Zevi, The Modern Language of Architecture, 1978, 8.

necessary to act without ready-made models, abstractions, theories, metaphors, dogmas, canons, as well as without a defensive shelter provided by the academic community. As we can notice, modern architects' mission outlined by Zevi is extremely demanding. As a representative of this kind of courage, he refers to Alvar Aalto, who was, in Zevi's mind, an augur of organic architecture in Europe.[27]

Based on this introduction, how is the first invariant manifested in Aalto's Civic Centre in Seinäjoki? A good example of Aalto's way to start from scratch is the parish centre (Figures 2 and 3). In a classic sense, it is not an ordinary building and least of all an ecclesiastical building but, instead, it is more a landscape structure with a functional content. The parish centre surrounds the yard of the Lakeuden Risti church like a big retaining wall that holds the terraced land mass. The building does not manifest any convention typical of a church building, but it forms a zone of freely organised spaces to serve the parish's daily activities, as well as the landscape architecture of the whole building block of the Lakeuden Risti.

Figure 2. *Seinäjoki Parish Centre Seen from the Church Yard*
Source: Ari Hynynen.

27. B. Zevi, *Towards an Organic Architecture*, 1950, 57-64; Zevi, "Kunnianosoitus Alvar Aallolle," in *Alvar Aalto ja Italia* (Rooma: 2RC, 1980).

Figure 3. *Seinäjoki Parish Centre Seen from the Square of the Civic Centre*
Source: Ari Hynynen.

Another elegant example of the invariant of "Listing…" is the new Apila library as a part of the Civic Centre. Alvar Aalto's buildings have such authority that architects tend to respect them when they are forced to design in the nearby surroundings. This reaction can be seen at least in three different modes. The first mode strives to keep a polite distance from Aalto's premises. In Seinäjoki, due to fear of possible bad solutions a certain 'safety buffer' in the urban tissue around the Civic Centre has clearly evolved. However, if there is no other option than to build very close to Aalto, the second mode tries to find design methods to submit to or blend into Aalto's architecture. This is the case as regards to the new parish office building, which is located on the other side of street of the old parish centre (Figure 4). With its deliberate neo-functionalist design with white plastered surfaces, it makes a – perhaps unnecessary – concession to Aalto.

Figure 4. *Aalto's Parish Centre on the Left, and the New Parish Office on the Right Side*
Source: Ari Hynynen.

The third mode is well illustrated in the case of the new Apila library. The design process of it was extremely challenging due to its location in the very near proximity of the old library. The new library comes very close to Aalto's iconic fan-like reading room in the open landscape of the park. Surprisingly, the new building does not take this famous architecture as an ideal model or respect it as an authority. It does not imitate, submit to it, or flatter it by any means. The new Apila library does not align itself into any imaginary lines derived from Aalto's buildings. On the contrary, Apila stands boldly next to the old library, creating a vivid dialog between old and new by its totally different form, materials, and colour schemes (Figure 5). Although the co-existence of seemingly disparate buildings is somewhat tensed, it is fruitful and positive, as the visual difference provides independence and space for both in equal measure. The design solution is courageous; it starts from scratch par excellence. Apart from these, it would be a story of its own to tell how citizens have adopted the new library as a common living room in Seinäjoki.

When taking a closer look at "Listing…" it is quite easy to realise that it introduces the basic principles of Zevi's ideas on organic architecture as presented in his seminal book from 1945.[28] His aim is not to teach an explicit theory of organic architecture but, instead, open various views on what it could be. This kind of approach is suited well to Zevi, who avoids academic hair-splitting and semantic definitions. His statement "We can only call architecture organic when it aims at being human before it is humanist"[29] reflects this attitude. Perhaps Zevi's various standpoints could be encapsulated by stating that organic architecture always starts from the constituents of the sensory world and social reality with an aim to raise them towards their ideal state – not the other way around. Based on this idea, the real functionality of built environment extends beyond plain utilitarian goals towards ideals such as humane dignity.

Figure 5. *Old and New Libraries in Dialogue*
Source: Ari Hynynen.

28. Zevi, Towards an Organic Architecture, 1950.
29. Ibid, 76.

Asymmetry and Dissonance

If the starting point for architectural design is the needs of every-day human practices, there is no place for symmetry in designing spaces, volumes, or facades. Diverse functions located in different parts of the building produce, in a sense, their own spaces around them, if this is allowed. These spaces are very specific, when it comes to their character, dimensions, lighting, materials and so forth. Symmetry, as a design principle, tends to waste space if, for example, secondary spaces have the same room height as the primary living spaces.[30]

Zevi goes beyond these kinds of simple functional aspects. Built environment, alongside daily needs, should also support psychological, emotional, and existential human needs. In this regard, according to Zevi, static symmetry represents aspirations to safe and secure life, a fear for indefinite and relative; in other words, a fear for real life and living things and beings. Tensions, contradictions, and incompleteness belong fundamentally to human existence, so it is only reasonable to let the built environment reflect them.[31] Interestingly, the same theme is highlighted in Alvar Aalto's speeches, when he now and then refers to a "little man" and a "human error" as inherent aspects of human life.[32]

Symmetry has a political dimension as well. Totalitarian power leans on symmetry and expresses itself always through symmetry. It is almost too easy to pick up examples from the history books of architecture. Pure ideal forms and symmetry belong to the world of abstract ideas. They resist change and dynamics, thus blocking the continuous flow of space and time, which are the necessities for ever-changing forms of human life and culture. Zevi illustrates this point by referring to the history of music, and especially to composer Arnold Schönberg, who abandoned the tonal centre when he tried to break free from restricting triad harmony. The result might sound dissonant, but the experience is dependent in cultural and historical contexts. Schönberg's idea was to create dynamics, tensions, and a sense of movement – the same effects as Zevi applied to the sphere of architecture. In this sense, dissonance does not equate to chaos but, instead, it opens a way to get rid of pure aestheticism and the stagnated conventions and rules of classicist architecture and allow modern design to be based on the social logic of the building.[33]

30. Zevi, The Modern Language of Architecture, 1978, 15-17.

31. Ibid, 17.

32. G. Schildt (Ed.) *Näin puhui Alvar Aalto* (Helsinki: Otava, 1997), 280-282.

33. Zevi, *The Modern Language of Architecture* (Seattle: University of Washington Press, 1978), 21-22.

Figure 6. *Town Hall Seen from the Central Square. No Detectable Symmetry and Repetition Whatsoever*
Source: Ari Hynynen.

Aside from elitist political power and aestheticism, there are still other sources for symmetry in architecture. Technological dominance is one of these, as it works through the repetition which is typical for industrial processes. When Aalto's Civic Centre in Seinäjoki was designed, the construction industry was taking its baby steps towards standardisation and prefabrication. Although Aalto was interested in new technology, and he was one of the first architects in Finland who developed standardisation with his humane ideas, he never let technology dictate his design. In Seinäjoki Civic Centre, it is impossible to find symmetry of any kind (Figure 6). For example, the long window lines in the Town Hall or the old Library could easily be repetitive, but Aalto created a rhythmic variation of window-casing for creating a sense of movement or used dense grills to cover the window line for giving it a consistent texture. Moreover, none of the individual buildings in the Civic Centre dominate the building complex. All the buildings deviate from each other by their architecture, thus avoiding repetition and symmetry, and creating dialogical tensions among them.

All this applies to new Apila library as well. In this sense, it could be considered a quite straightforward continuation to Aalto's modernist design in Seinäjoki. As mentioned before, Apila library's architecture is perfectly independent in relation to Aalto's buildings. However, it is just the lack of symmetry and dominating lines of the building complex that allow the new annex to join it as an equal member.

Despite the lack of a clear dominating element in the Civic Centre, there exist hierarchical relations among the buildings. For example, the 55 metres tall belfry of the Lakeuden Risti Church is located on the edge of the building complex. Instead of being a dominating structure, it stands more like a graceful landmark in a plain landscape. Another kind of hierarchy is created by the deep blue ceramic tile cladding in the façade of the Town Hall. The distinctive, solemn colour symbolises the dignity of the democratic decision-making of the Seinäjoki community. In contrast to the Town Hall, the State's Office building represents more mundane design with its rectangular shapes, white colour, and its location in

the background of the complex. On the other hand, it has an important role in the wholeness, as it creates a strong boundary wall for the whole building block.

Although the Civic Centre features various symbolic elements like these, there is no dominance or symmetry of any kind. There are no hidden grids, modular networks, or other kinds of hidden abstract systems that define the order of the building complex. Instead, the order is purely intuitive, and it reveals itself totally to human sensory perception. All the architecture that matters in this building complex can be experienced without intellectual or professional speculation.

Anti-Perspective Three-Dimensionality

The principle of Anti-perspective three-dimensionality is a continuation of the previous invariant, "Asymmetry and Dissonance". If the architect leaves the field free for citizens and users to make their own choices of how to observe and approach buildings, they can formulate their own personal conceptions of architecture. The plasticity of Aalto's Civic Centre does not offer any ready-made vantage points or main facades chosen by the architect. Instead, all directions of approach to the Centre and its individual buildings are equal in their attractiveness and architectonic quality (Figure 7). Although the piazza between the buildings has a clear centralising function, it does not suggest any central focus for the complex.

Figure 7. *The "Backyard" of the Town Hall*
Source: Ari Hynynen.

In classicist architecture, the main facades are prioritised by the architect, a professional who knows better how to look at buildings. Facades are two-dimensional projections of the physical built environment, abstractions that simplify complex real-world situations. The two-dimensional way of representing architecture is a professional method to manage construction projects. However, drawings do not usually allow non-professionals to experience architecture, as they lack the key factor, architectonic space that brings buildings into the sphere of the sensory world.

The architectonic composition of Aalto's Civic Centre does not comply with a rectangular coordinate system. Instead, the lines of the buildings intersect each other freely in varying angles. Due to free composition and form-giving, the sense of three-dimensionality and stereoscopic effect are very strong, though not dramatic. A first-time visitor at the Civic Centre might wonder about the emptiness of the piazza, whereas the pedestrian flow is channelled to the new Apila library just behind the old library and Aalto's theatre building. Before the new library was built, the piazza was almost deserted. The reason for that is the slightly problematic location of the Civic Centre outside the main pedestrian flows of Seinäjoki city centre. Seinäjoki is a middle-sized Finnish city with 65,000 inhabitants, but only a couple of thousands of them are living in the city centre the rest of them inhabiting the rural areas and smaller centres of the city region. Also, the most important commercial services have moved to big shopping centres on the outer fringe of the urban area.

The Syntax of Four-Dimensional Decomposition

The fourth invariant describes the decomposition of the classicist box in quite concrete terms. Here Zevi refers to his favourite masterpieces of modern architecture: Frank Lloyd Wright's Falling Water, Mies van der Rohe's Barcelona Pavillion, and Gerrit Rietveld's Schröder House in Utrecht. The common feature in these three works is how the walls have been designed as separate board-like surfaces, detached from each other, thus avoiding box-like closed inner corners. By letting the walls to slide apart, large openings in facades are allowed, as well as free-flowing inner spaces instead of closed rooms.

Zevi's enchantment with these kinds of board-like design tactics is remarkable strong – insomuch that the more general aspect of the invariant "The Syntax of…" might fade out. According to Manfredo Tafuri,[34] this is exactly the problem with Zevi's reasoning: sometimes he acts more like a designer instead of an architectural theoretician or a critic. However, if we genuinely aim to understand his intentions, it is necessary to go patiently beyond his time-bound fixations and take them more like examples instead of clinging to his literal descriptions. This makes sense also if we want to use the invariants in analysing architectures of different eras, like Zevi has meant to.[35]

For example, regarding the new Apila library, the four-dimensional composition has been realised excellently, although Zevi's invariant has not been applied literally. The inner walls that vary with their shapes, heights, and window openings, encounter each other at varying angles. They do not apply Zevi's board-like tactics, yet they create free and flexible flow of space both inside the building, and through the wall openings between inside and outside as well. By four-dimensionality Zevi refers to the temporal dimension that, in architecture, equals to dynamic flow of space.[36] This comes true when the traditional closed envelope

34. Tafuri, Theories and History of Architecture, 1980, 106-107.
35. Zevi, The Modern Language of Architecture, 1978, 187-214.
36. Ibid, 31.

of a building is opened for daylight and freely flowing social life. According to Zevi, social life in space is explicitly movement.[37]

Figure 8. *The Reading Hall of Aalto's Library*
Source: Ari Hynynen.

When compared to Apila library, the spaces in Aalto's library are more closed, but not in a classicist sense (Figure 8). This applies to all the buildings in Seinäjoki Civic Centre, as well as to other Aalto's works. It is remarkable that Zevi mentions the lack of four-dimensional decomposition as a deficiency in Aalto's architecture and, consequently, does not count him in the very small top team of the modern architects. On the other hand, Zevi respects Aalto as a leading master of organic architecture in Europe, whereas Frank Lloyd Wright holds a comparable status in America. However, it is highly questionable to downgrade Aalto's architecture on the base of the fourth invariant, as his spaces are not box-like closed or static envelopes. On the contrary, the flowing spatial configurations and varying floor levels, combined with carefully thought-out window openings and warm materials create dynamic but intimate interiors so specific to Nordic modernism.

In this regard, Aalto's library in Seinäjoki is an example par excellence. The floor level in the central part of the fan-like main hall has been dropped down some 1,2 metres for creating a peaceful space for intense reading. The space is lit by natural light streaming in through the upper windows, and it is reflected from the curvilinear, white-painted concrete wall. There are no enclosing box-like walls with closed corners, nor classic windows on those walls. On the contrary, the window opening comprises the entire upper part of the wall. In the outside of the building, the wall-like character of the opening is highlighted by a unifying brise-soleil assembled over the whole window line.

37. Ibid, 47-53.

Cantilever, Shell and Membrane Structures

Zevi's aim was to express the invariants in as concrete phrasing as possible. Obviously, he strived to avoid academic jargon and, instead, addressed his message to a much wider audience. The chosen strategy partially succeeds, as his illustrative language clearly helps non-professionals to dive deeper into the principles of modernist architecture – apart from the invariant titles – but, on the other hand, it leads to problems among academic readers. And problems can't be avoided if we focus literally and strictly on the level of construction technology or iconic architectonic imagery of some specific period. As stated before, the necessary key to follow Zevi's reasoning is to go beyond his time-bound, fanatic and sometimes politically coloured parlance.

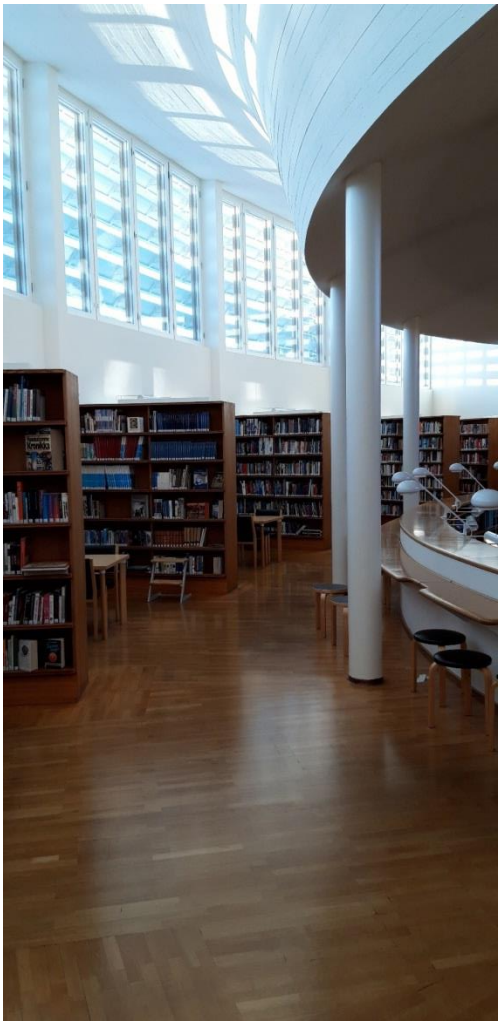

Figure 9. *The Recent Renovation of the Library Respects Aalto's Ambition to Merge Technology as an Integral Part of Architecture*
Source: Ari Hynynen.

Consequently, the invariant "Cantilever, Shell, and Membrane Structures" can be understood as an illustration of how modern civil engineering enables

modernist decomposition in architecture. However, construction technology and design tools are developing fast if we think, for example, of Zaha Hadid's wildest works seen from the perspective of, say, the 1970s. Although Zevi named his invariant according to the technologies of the modernist heyday, he simultaneously prophesied that computer technology will regenerate the language of architecture. Evidently his basic idea was that by using the latest technology, architecture might become modern in the deepest sense of the concept. If we further continue Zevi's reasoning, there are other new technologies that could inspire new architecture as well. For example, innovative large-scale timber architecture, or circulated and dismountable buildings already exist as manifestations of emerging technologies of bio and circular economy.[38]

Alvar Aalto was very moderate in deploying the latest technology. There are no radical constructions, nor dramatic spatial effects created by technology-driven structures in his buildings. Yet, Aalto was not against technology. On the contrary, he was a forerunner in Finland in developing standardised housing and technologies for manufacturing modern furniture by using plywood. His aim was to harness technology to serve his own and unique form language that was, in turn, meant to support and strengthen the human essence of the users of his buildings. From the standpoint of technology, Aalto's Civic Centre in Seinäjoki represents a very modest and subtle sample of solutions. All the technology is integrated in the overall architecture, although the church and the council chamber would have been favourable spaces for accentuating structures. This quality is gracefully respected in the recent renovation of Aalto's library, where the new installations for air-condition were conducted and hidden inside the bases of the bookshelves (Figure 9).

Space in Time

According to Zevi's core theory, the very essence of modern architecture is its social content. Consequently, spatial configurations of buildings and built environment should adhere to their social content. Social content might be a somewhat vague concept, but for Zevi it simply equates to human life in architectonic space. Life is not static, but it consists of continuous movement through the built space. Seen from the user's point of view, space and time intertwine into one holistic experience of everyday life. The task for architectonic space is to support this dynamic life by letting the space flow freely and reflect the movement. Thus, the component of time of this holistic continuum concretises in movement.

The task of the four previous invariants is to enable the free flow of space. This gives birth to social space by breaking down the classicist box that is composed by complying with aesthetic and abstract rules instead of preferring organic human life. If the first two invariants ("Asymmetry and Dissonance", "Anti-perspective Three-dimensionality") prepare the ground for the birth of social space, the next two ("The Syntax of Four-dimensional Decomposition",

38. See Ellen MacArthur Foundation, *Cities in the Circular Economy: An Initial Exploration* (Ellen MacArthur Foundation, 2017a); Ellen MacArthur Foundation, *Urban Biocycles* (Ellen MacArthur Foundation, 2017b).

"Cantilever, Shell, and Membrane Structures") provide more concrete design and construction tools to finally operationalise the decomposition. Zevi emphasised that the invariants should be applied exactly in the specific order he introduced them in his book.[39] Considering the importance of the order, Space in time represents, finally, the birth of social space.

If we take this notion of order literally, each invariant is a precondition for successfully applying the following invariants to create true modern architecture. As we remember, Zevi criticised Alvar Aalto for lacking the four-dimensional decomposition. Logically, this shortage should result in Aalto's buildings as static spaces that do not support and reflect vital everyday movement. It is true that the envelopes of his buildings are not so porous as, for example, in Mies van der Rohe's Barcelona pavilion but, again, Aalto had a syntax of his own. Against the ideas of universal modernism, Aalto's architecture was contextual, as it was adapted to topography, landscape and, most importantly, to climate conditions. In the harsh Nordic weather conditions buildings are, in the first place, shelters that should coexist and survive with nature. In these constraints, Aalto's spaces flow freely and three-dimensionally, reflecting the functions and characters of the spatial program. Once again, the Seinäjoki library is a prime example of this.

Re-Integration of Building, City, and Landscape

The title of the seventh invariant indicates various meanings for integration. First, as referred to in the previous paragraph, the separate parts of an individual building should be integrated as a connected whole. This is not necessarily a matter of pure form-giving, but it relates to the programmatic level of a building as well. By integration, diverse functions could be combined to achieve a hybrid building, to use a trendy term. Moreover, by following Zevi's reasoning on modernist time-space continuum, the functions might vary along the time axis as well. In practice, the daytime use of a building, or a part of a building, could differ from the functions in evenings. If built environment possess this kind of flexibility, it can better support continuously evolving human practices, movement, and communal needs.

Second, when moving towards the urban scale, we can analyse re-integration through the later stages of Aalto's building complex. During the time the Civic Centre was built, it had to be located outside the existing urban structure due to land-ownership reasons. Alvar Aalto presented only some indicative sketches of how the Civic Centre should be integrated into the developing urban fabric of Seinäjoki. At present, the process of integration is still incomplete, as the only realised examples are the Apila library and the new parish office building. However, there are new plans in the pipeline, so the upcoming tactics remain to be seen. The integrative tactics applied in the Apila library complies with modernist ideals, but it is fair to point out that the chosen line is quite demanding. Genuine, mutual dialogue requires that the architectonic qualities are on a par with both buildings.

39. Zevi, The Modern Language of Architecture, 1978, 71-76.

Third, Zevi questions the whole idea of a single, detached building. According to his reasoning, a building is usually a part of some urban, social, and technical system, or it belongs to nature's system. In this regard, Zevi uses the concept of *urbatecture*[40] to underline the systemic nature of the human built world. The concept is a close relative to one of the 1990s catchwords, *landscape urbanism.*[41] According to it, it is no more reasonable to plan built areas, technical infrastructure, and unbuilt areas separately, as they form an increasingly intertwined system. Alvar Aalto's approach in Seinäjoki Parish centre represented a more conventional method of landscape architecture, where the building was embedded into an artificial embankment. This creates an impression of strong rootedness of the building. By the time of construction in the beginning of 1960s, the site was open field. It did not help to anchor the new building to the landscape, so Aalto chose a special tactic to handle the morphologies of the terrain and the building in an integral way.

Finally, Seinäjoki Civic Centre offers a good example to study Aalto's synchronic and diachronic tactics for integration. These two tactics can be related to time-space continuum in a way that the synchronic tactic aims at organic wholeness through spatial or morphological means, whereas the diachronic tactic connects architectonic design with some historical patterns. It can be assumed that Aalto used diachronic tactics to make his buildings and milieus more familiar and make them recognisable to a wider audience.[42] The Mediterranean and classicist motifs, like piazzas, colonnades, and white plaster do their job in this regard, but they also indicate, in Aalto's reasoning, the cultural background behind modernist architecture. Dimitri Porphyrios pays so much attention to Aalto's diachronic tactics, that he considered it worthwhile to build a theory of Aalto's eclecticism.[43] Certainly, this is an acceptable way to explain Aalto's architecture, but it does not capture its relation to the deeper undercurrents of the modern movement.

Discussion

Finally, the seven invariants can be divided into three main groups under new, slightly more abstract design principles: 1) Organic strategy, 2) Tactics for spatial dynamics and decomposition, and 3) Back to wholeness. By doing so, they can be detached from the modernist dogmas and literal meanings that Zevi, somewhat paradoxically, lapsed into. For example, the principle "Organic strategy" represents Zevi's first and the most important invariant, "Listing as Design Methodology". In this regard, organic means a design strategy, or attitude, that puts aside all the dogmas, abstractions, theories, and ideal models of architecture. The aim is to elevate the reality towards ideal, not the other way around.

40. Ibid, 76.

41. C. Waldheim, "Landscape as Urbanism," in *The Landscape Urbanism Reader* (ed.) C. Waldheim (New York: Princeton Architectural Press, 2006), 35-53.

42. Cf. S. Giedion, *Space, Time and Architecture. The Growth of a New Tradition.* 5th Revised and Enlarged Edition (Cambridge, Massachusetts: Harvard University Press, 2008/1941), 2-28.

43. Porphyrios, Sources of Modern Eclecticism. Studies on Alvar Aalto, 1982.

If "Listing…" poses a wide, general strategy for modern architecture, the next five invariants represent more practical tactics for implementing the overall strategy. Above all, the following list of tactics should be understood as a toolbox to help architects dissolve the dogmas and cultural stagnation that tend to paralyse creativity and free flow of space. Today's practicing architects might wonder how familiar and axiomatic these tactics appear and, as a matter of fact, they come very close to the basic doctrine of architectural education of the 1970s, when Zevi's book "The Modern Language…" was first published. Zevi's purpose was to write a book for practicing architects, students, and lay people interested in architecture.[44] It was probably for this reason he wanted his architectural language to be as concrete as possible. However, due to this concreteness, it is necessary to go behind the phenotypes of the invariants and strive to understand their deeper meanings – especially as Zevi has meant his language to be used in analysing architecture of different eras, not only modern works.[45]

In the second principle, "Tactics for spatial dynamics and decomposition", the concept of spatial dynamics is a combination of the invariants "Asymmetry and Dissonance", "Anti-perspective Three-dimensionality", and "Space in Time". Here the spatial dynamics can be understood as a certain design tactic of spatial composition and spatial configuration that makes the architectonic space flow and take forms freely, following daily practices of human life. Aalto's and Jaaksi's libraries are both real masterpieces in this respect. The latter part of the second principle, decomposition, is more concrete and it is based on construction technology, and it depicts two invariants, "The Syntax of Four-dimensional Decomposition", and "Cantilever, Shell, and Membrane Structures". In Zevi's examples these two tactics are connected to concrete structural elements like walls and cantilevers. If the aim of "The Syntax…" is to slide the walls for eliminating closed corners and hole-like windows, its companion "Cantilever…" provides means to explode the entire classicist box by using the latest construction technology. However, despite their concreteness, the spatial dynamics and decomposition should be understood more like heuristic tools for architects to keep the space-shaping elements in flux during the design process. This kind of strategy prefers the social content of space instead of conventional design and building methods as determinants of spatial quality.

The classicist "box" should not be taken literally, but to be understood as a compilation of architectonic dogmas based on earlier technologies, design principles and societal paradigms. New design and construction technologies help to dissolve the dogma, but still the mere decomposition takes us only halfway, as functionality and intelligibility of built environment requires the integration of different physical[46] scales of design. The third principle, "Back to wholeness", highlights the important role of architecture as the art of wholeness. This role

44. Dean, Bruno Zevi on Modern Architecture, 1983, 51.

45. Zevi, *The Modern Language of Architecture* (Seattle: University of Washington Press, 1978), 187-214.

46. And temporal as well, cf. Giedion, Space, Time and Architecture. The Growth of a New Tradition, 2008/1941, 2-28.

stems from the very practical and existential human needs for sensing, using, and dwelling in the built environment. From the organic standpoint, architectural design enables space that is more lived than thought, more wholistic than analysed and, thus, reduced into separate parts. Zevi has strived to point out the importance of the decomposition to create true modern architecture. However, it is as important to re-integrate the decomposed parts for finishing the design process and achieving organic wholeness. In architectural education it is a well-known doctrine to proceed from analytical working stages to synthesis, where the diverse components will be combined as a connected whole. For approaching the synthesis intuitively, Alvar Aalto used to leave his drawing board for a while and immerse himself in painting with oil colours. Through re-integration, architecture belongs genuinely to the sphere of art, as well as to the world of logical calculations.

Conclusions

All Zevi's principles are based on the idea of organic architecture that he developed through his whole career. According to him, the organic ethos was built in the fundamental ideas of modern architecture, but it gradually deteriorated as modern architecture declined into a functionalist dogma and a style. Zevi was talking about classicist box, but he made a remark that modern box is not impossible either. In addition to cultural conventions also technology and industrial production might duplicate easy and familiar sameness through their approved production platforms. Yet, by following Zevi's reasoning, if the modern architect finally ends up designing a truly modern box, it will have been through decomposition and re-integration.

Surprisingly, there can be found a box among Alvar Aalto's works as well. Zevi considered the well-known office building of Enso-Gutzeit in Helsinki a regrettable flaw in Aalto's otherwise brilliant career. However, there might be a chance that Zevi, in his uncompromising thinking, did not notice the possibility of decomposition and re-integration the building had gone through in the design phase. When analysing, in turn, the Seinäjoki Civic Centre, there is no doubt if its architecture is modern in the sense Zevi refers to. The Civic Centre is a rewarding object of study, as the other dimensions of organicity, apart from Zevi's, could be counted out. That is to say that Aalto used, in some of his works, a strategy that leaned strongly on landscape's morphology, giving grounds for calling it organic architecture. In Seinäjoki, the landscape and the construction site did not provide substantial morphological starting points, if not restrictions either, for form-giving.

In Zevi's reasoning, the essential dimension of modern architecture is its social and spatial organicity. Like this article strives to point out, the organicity of architecture is based primarily on the architect's overall approach and methods. The organic strategy is manifested in built environment by numerous ways, providing, at its best, well-being and happiness for its users and dwellers. From this standpoint, it is insignificant whether we categorise a building functionalist, modernist or organic. But if our aim is to find socially and culturally more sustainable ways to build the human habitat, we need to better understand our built

environments for being able to choose alternative design strategies. Bruno Zevi's and Alvar Aalto's life works provide useful tools to revise our customary ways of making architecture.

Finally, for Zevi, modern architecture is revolutionary architecture. Its main task is to provide spatial support for constantly evolving societal reform. Although social life is at the core of true modern architecture, this kind of thought-model inevitably creates a split between "architecture" and mundane "building production". In this sense, Zevi's theory is explicitly a critical theory, as it puts pressure on achieving architectonic quality. In his book "The Modern Language…", he makes experiments in testing his invariants in the cases of classicist architecture as well. According to him, the best architecture in all eras has always been revolutionary, in other words: modern. Zevi's aim was to make the invariants applicable to analyse architecture over historical periods. For making this task easier, the level of abstraction should be lifted a bit higher – like introduced in this article. This notion also paves the way to further studies, where the cases will be selected from different eras.

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Digital and Physical Margins: Pre-Visions for New Interactions in the City in Progress

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COVID-19 era forced society, cities and shared spaces at the edges of society, progressively shattering their own memory. The most common and crowded places have become almost exclusively virtual, hastening a process of digitalization and technological growth aimed by the Sustainable Development Goals (SDGs) of the 2030 UN 'Agenda', but which is still immature and superficial because, in many cases, it is forced by an emergency rather than by a consciously planned evolution. Moreover, the temporary emptying of metropolitan areas and the denial of social relations at all levels - personal, work, psycho-cultural and recreational - has progressively, but not indelibly, determined a sort of schizophrenia of the 'signifiers' as well as the 'meanings' of the urban fabric, of the memory of the spaces' use, as well as of public buildings or private houses. The current boundary between analog and digital, that will hopefully be transformed into one harmonious integration and interaction, is the field on which the paper intends to focus its attention trying to define a balance (trans- and post-pandemic) between the re-appropriation of the collective living and the preservation of advantages widely demonstrated by the support that digital technologies can offer.

Introduction, Scientific Debate and Disciplinary Approach

In urban planning such as in architecture, the 'margin' is traditionally understood as a border— a clear and precise delimitation separating one territory from another, or defines a specific area. The term, translated and reinterpreted in relation to anthropized areas, identifies, in the modern imagination, those degraded metropolitan areas without a strong identity which often corresponds to the suburbs, to the dormitory districts, to the historic centers transformed into ghettos, to the public spaces poorly experienced and with no identity, or to disused industrial complexes. The meaning therefore acquires a negative and vaguely derogatory meaning because it is related to 'unsolved' or 'critical' places of contemporary living.

The digitization process is the protagonist of the 21st century and the thrust deriving from the pandemic event in progress has introduced new interpretations of the concept of 'margin'. It moves away from the physicality of the compromised areas just described in order to relate anthropized habitats at large to the virtual one proposed by the WWW (World Wide Web), IoT (Internet of Things) or ICT (Information Communication Technology) according to a logic of "digitally

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integrated urban space"[1] anticipated in various experiments, but still very far from reaching a maturity or a widespread awareness.

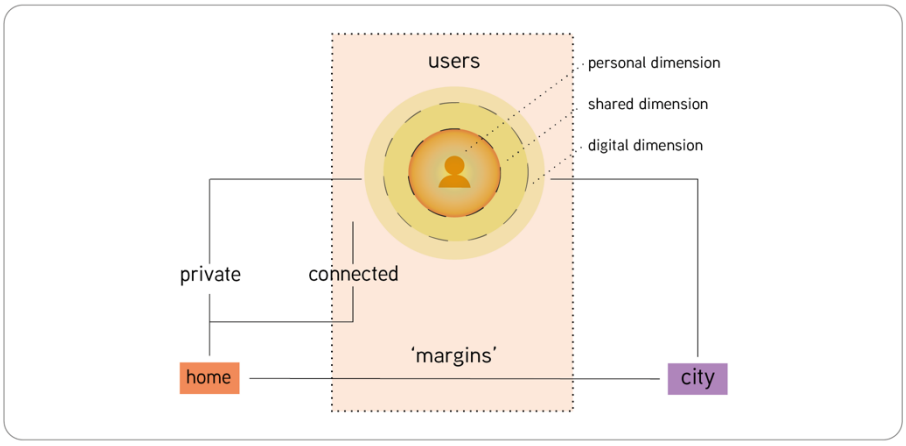

Figure 1. *Home, City and Users: The 'Margin' Idea*
Source: Morozzo, Delprino 2021.

In this sense, the margin (Figure 1), no longer understood as a physical and tangible border, becomes that undefined place; in the worst case scenario it separates, while in the best case it connects the analogue to the digital. It is a place that, due to the digital forcing suffered in the COVID-19 era by sectors such as culture, work and training, risks acquiring the same negative values as those unsolved urban fabrics.

In an increasingly liquid society and dimension of daily life, it is therefore advisable to act immediately by reasoning on the one hand on the experience still in place and on the other hand on the positive role that the margin can acquire if we attribute to it new potential, helping to define it as the space of relationship and integration between two parallel realities that can mutually benefit from its strong formal and functional identification.

The pandemic has placed society in front of a reality (Figure 2) where the collective buildings for education, culture and work have been recently voided in favor of an 'underworld' where the predominant technology is that which establishes exclusion or inclusion. In this scenario these 'spaces', meaning both physical locations and as virtual platforms, open up to new interpretations and tools able to discern the pandemic event.

1. M. Castells, *La nascita della società in rete* (Milano: Università Bocconi Editore, 2014); C. Ratti and M. Mazzarello, "Leveraging the Use of Digital Technologies to Activate Public Areas and Foster Creativity," in M. I. Ferreira (Ed.) *How Smart is your City?: Technological Innovation, Ethics and Inclusiveness* (Berlin: Springer, 2021).

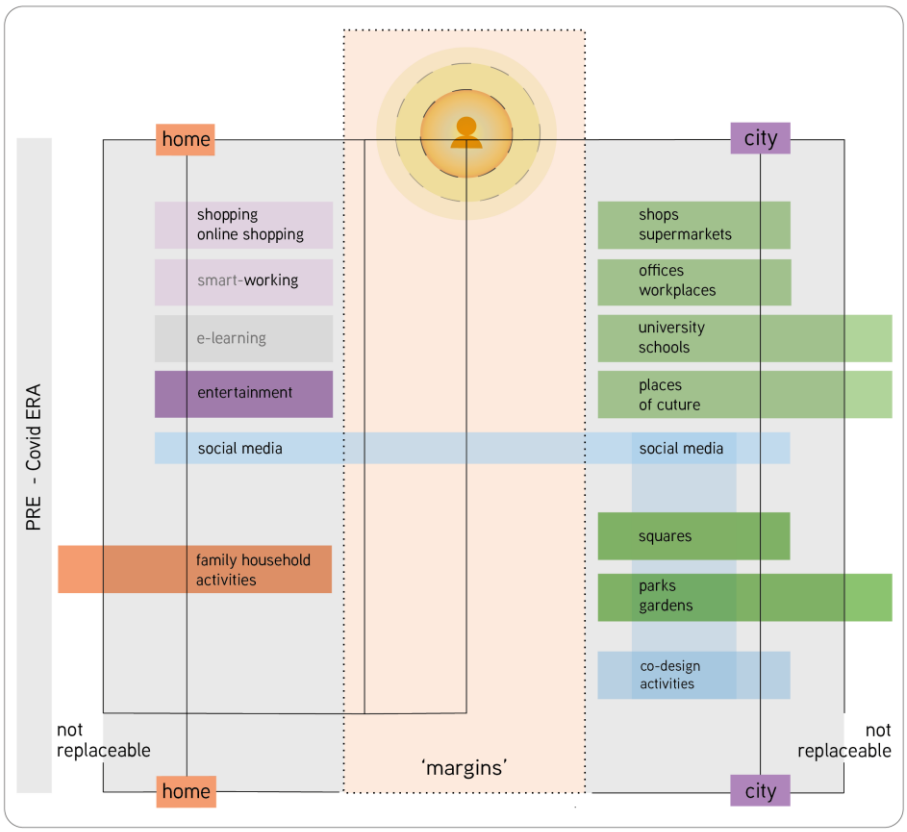

Figure 2. *Home, City, Users and 'Margin' During PRE-Covid ERA*
Source: Morozzo, Delprino 2021.

During the pandemic users have been modifying their behaviour and habits according to the new workspaces, which are either physical but limited or virtual. People stuck at home included the virtual platforms where they work and communicate with colleagues with private residences.

The margin has been shifted to disappear, alongside the border defining the physical and the virtual. Homes have been dematerialized and absorbed, losing their vital primary function.

Tools have emerged and been designed to help blunt promiscuity, but they are currently not enough to achieve the goal of giving virtual workplaces an identity in a way that preserves that of the private home. The possibility to switch off one's own video camera, for instance, may give more privacy; but it is only palliative and does not fully compensate.

At the same time, public or private buildings of collective living, temporarily abandoned, have gradually lost their function and identity.

In this context it's essential to define a clearer margin so that houses could recover their scope and privacy. Video calls appear like portals to go through the margin, doors letting in more people than normal.

In the course of this paper, it is considered the state-of-the-art of digitization of interactions within the workplace, universities and places of education, cultural

and recreation contexts. It proposes a reflection that takes into account the futurability of phygital[2] solutions embracing the goals of the UN SDG 'Agenda', thus considering environments where one has access to a fairly stable internet connection and basic technological tools.

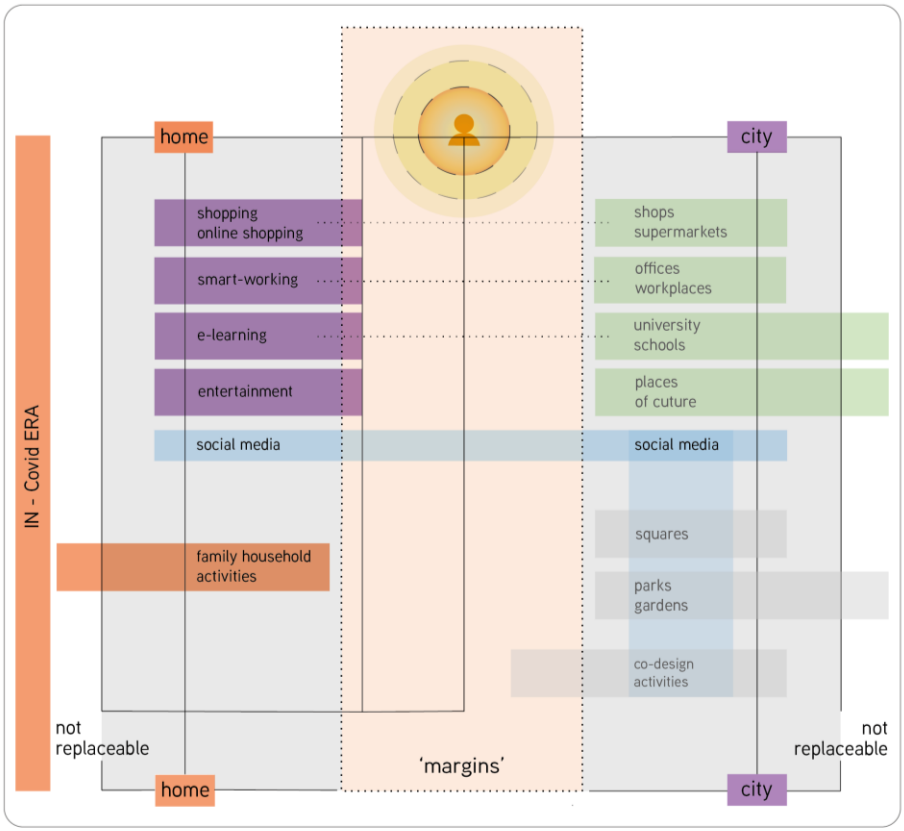

Figure 3. *Home, City, Users and 'Margin' During Covid ERA*
Source: Morozzo, Delprino 2021.

During the lockdown, working tasks have been accomplished using the same tools as used for entertainment and socializing with peers. In this way, the homes become 'the Place of Everything' (Figure 3). Virtual rooms should be confined and clearly separated from everyday life. Users are active actors moving on platforms which can play different roles, changing their aspects and functionalities according to that. When they play an institutional role, they should provide official and trackable information. The goal is to redistribute the culture, to track and preserve it, making it institutionalised and accessible, so that houses can reacquire their dignity. In the same way workplaces, educational or cultural buildings can regain their identity by building a strong relationship between physical space and digital media, taking advantage of the latter rather than succumbing to it.

2. With "phygital" it is described the blend of digital and physical experiences. This approach can add value by combining physical and digital experiences by making information accessible in a multimodal way.

Furthermore life during the pandemic event, in its dramatic relevance, has demonstrated the importance of to "leave no one behind" as Antonio Guterres, Secretary-General of the United Nations, said[3] and the need to look at a different UN 'Agenda' SDGs with an interdisciplinary and systemic approach has reinforced[4] in order to achieve a real benefit from existing experience, and to foresee future scenarios and better living environments.

A broad and collaborative vision may drive the difference by supporting the achievement of the SDGs at different levels. Starting with the goals specifically dedicated to work, such as number 8, to education, such as number 4, or to building resilient and technologically advanced infrastructures, such as number 9, even apparently unrelated scenarios can be addressed. If equally distributed and accessible, the goals for digital innovation can lead to an immediate impact and will be able to foster or contribute over time in terms of widespread sustainability also in relation to the other goals. A correct phygital approach can in fact lead to an intelligent use of space, less convergence and pressure towards users in metropolitan centres, a reduction in travel transportations and the reduction of the pollution produced in the environment, etc.

Briefly, a correct interpretation and development of the concept of margin - which is able to look beyond the digital emancipation on its own - fulfills Antonio Guterres' request on several fronts, contributing to a large number of SDGs of the UN 'Agenda' directly or indirectly related to technological or digital innovation itself.

The paper, in a user-centred vision, contextualised the challenges for a better and more sustainable world, addresses the relationship between remote activities and the tools that enable them in the urban context, whether it be work, cultural or educational, starting from some solid points such as: Rifkin's vision or the Ghel's one; the considerations repeatedly expressed by Carlo Ratti as a researcher and architect at the same time and, eventually, the reflections that emerged from the AICA Summit (Italian Association for Computer Science and Automatic Computing), *60 Years of the Future*, in relation to the trends expressed by the world's major digital behemoths.

Rifkin reminds that a strong community is compulsory for a healthy community, as it's the core of social trust.[5] Building a community is very important while digital identities take shape. Each identity should be defined by the terms of the platform itself, alongside the development of all the actors in the system, which works when the roles are assigned and the tasks restricted to the workflow and the workspace.

The community may be built in virtual rooms, but also in physical buildings and open spaces. Optimising the digital tools doesn't mean to abandon all the rest—quite the opposite, stating the advantages of distance working may help creating a new scheme to decide which tasks are better performed remotely and

3. https://news.un.org/en/story/2020/04/1062492. [Accessed 2 April 2021.]

4. L. Bistagnino, *Design Sistemico. Progettare la Sostenibilità Produttiva e Ambientale* (Bra: Slowfood, 2009).

5. J. Rifkin, *L'era dell'accesso. La Rivoluzione della New Economy* (Milan: Mondadori, 2001).

which ones need physical meetings. In this way the workload can be distributed properly.

Cities evolve according to these new needs and tools, still keeping trace of their identities and memory. Cities need to be organised according to specific digital and human needs. Mazzarello and Ratti[6] distinguish between tangible elements, which may be a barrier or physical layers to be used in the environment, and intangible features, which are the ways for people to interact with and within the city itself (Figure 4).

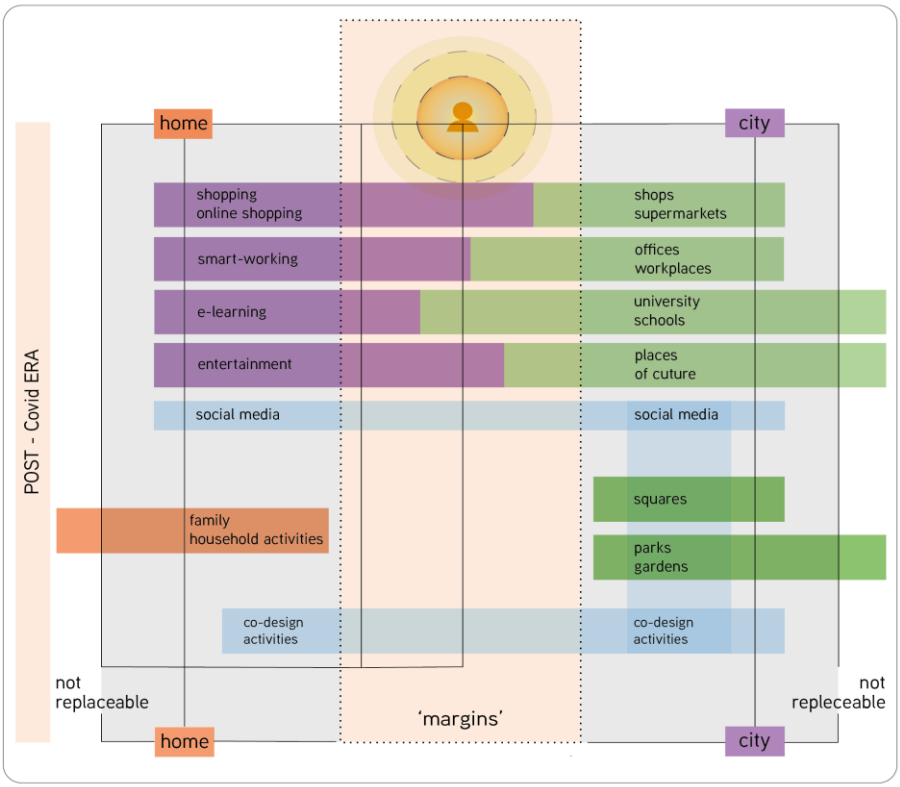

Figure 4. *Home, City, Users and 'Margin' During POST-Covid ERA*
Source: Morozzo, Delprino 2021.

A hyperconnected urban fabric should clearly design and define both kinds of interactions, to combine phygital experience but at the same time to set the margin. Spaces are filled with different kinds of interactions, involving the physical space itself and also with human contacts. But, there's another variable in this equation, which is the digital interactions that are recurrent, linked both with individuals and with space. Gehl[7] sets the quality on an environment according to the balance among necessary, optional and social activities. All of them make people move and interact with each other and concurrently with the space. The latter, the ones involving the actual presence of humans in a shared area, are 'resultant', inasmuch

6. Ratti and Mazzarello, "Leveraging the Use of Digital Technologies to Activate Public Areas and Foster Creativity," 2021, 48-50.

7. J. Gehl, *Life Between Buildings: Using Public Space* (London: Island Press, 2011).

they are the key for all the other activities. Nowadays we can also share virtual spaces for the same reasons: amusement, socialization, learning, work.

Virtual platforms become the extension of the shared area. They should be threatened when paying attention to their purposes and scopes, to set the margin between private and shared, home and public spaces. As homes are private places that people may share with close friends and family, digital platforms can be set as comfort zones. Even so, the platform built to work shouldn't collide with intimate places and merge.

The aim of this work is to envision a sustainable future in which the digital can definitively take on the role of an extension of physical space rather than an alienation of it. Design and psycho-anthropology for design as disciplines capable of connecting knowledge, people and processes are the binoculars through which the present may be observed in order to define a better and human-scaled future.

An approach to scientific debate and research at the Italian Society of Design, in its capacity as a research institution, renews and promotes this approach by dedicating the 2021 annual conference *Design to Connect* to it, in which the "[...] design as a 'relational' and 'connective' discipline, and the project as a tool for building relationships and connections, emerges forcefully. Starting with the metaphorical and virtual meanings of the verb 'to connect', linked today mainly to the digital dimension and networks, it is also necessary to address the profound meaning in the concrete interrelationships between people and their environment, between people and technologies, between people and each other. This is a commitment in which design, through its imaginative, experimental and planning sensibility, can challenge itself, renewing methodological approaches, orientation and intervention tools, both in the construction of new visions, and in the social and cultural spaces reorganisation, ways of daily life, production and consumption."

Method and Debate Focus

At this point the 'margin' may be defined as an opportunity for a city in progress, oriented towards a future in which the hybridization between phygital places and services may determine sustainable relapses in terms of time, resources and inclusion (Figure 5). In this scenario, this paper, through a design-driven approach focused on society needs, is aimed to: re-read critically and with a positive sense the meaning of 'margin' as a field of development, also integration of digital-based technology and reassertion of the urban identity; foresee resilient dynamics for (digital) antifragile systems with aesthetical/inclusive characters, as well as system/services, necessary to make them efficient and representative of those physical places which they flank and support.

The essay addresses the issue with a scientific approach based on the founding pillars of Design Thinking and Human Centered Design. Each reflection is the result of a careful observation phase of the phenomenon investigated with an empathetic attitude aimed at understanding—from the user's point of view rather than the observer—the dynamics, advantages and disadvantages of digital life during the pandemic. Observation that aims to establish a constructive comparison

between past habits, linked with the physical and tangible experience of the workplace, university classrooms and cultural buildings and the current condition that has relegated the same activities in a virtual world, temporarily nullifying the physicality that has distinguished them over time and determining new perspectives also in relation to issues of inclusion.

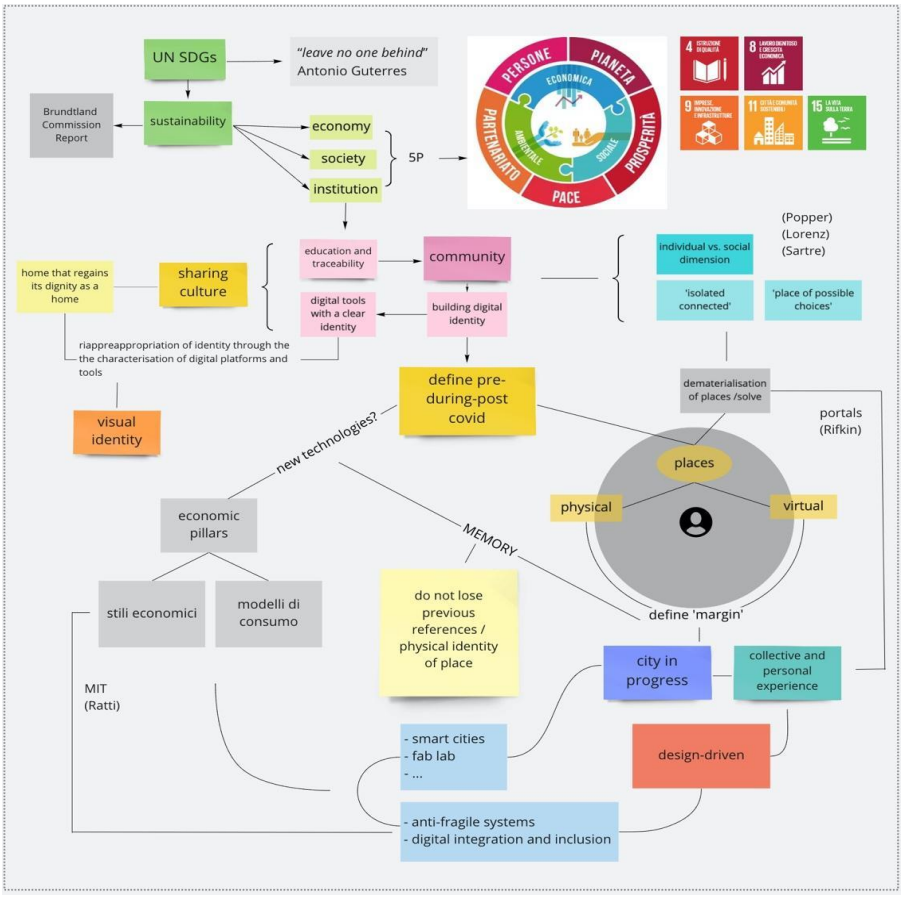

Figure 5. *Brainstorming with Interactive Digital Tools to Define the Scenario*
Source: Morozzo, Delprino 2021.

From this perspective, digital is also a tool for collecting data and exploring user needs. Data-centred goes alongside the human-centred, in a balance whereby people's needs are placed at the core and are improved through the use of data and the integration of new or renewed digital tools, acting as a bridge between the physical world and virtual platforms for work or leisure. This exploratory attitude is enriched in parallel by the intense debate in progress and by the literature involving different knowledge such as architecture, informatics, design and social sciences.

In addition, the direct experience gained in the academic field and the critical reflections born within the scientific community constitute a further element of investigation and reflection in order to propose a sustainable future and a clear identification of the margin. The academic context, in particular, has been observed, experienced and studied from two different points of view: on one hand,

the teacher has been assimilated as a smart worker and as a provider of cultural and training content, on the other hand the student has been seen as a recipient, but also as an actor in the implemented cultural offer. This has led to the definition of scenarios and *personas* capable of representing both the training context and that of the work and culture environments.

In order to do this, 'variables and invariants' of the three different scenarios were identified in order to focus attention on the invariants common to the three areas and on these to define the margin that in the future will moderate the relationship between physical and digital. The invariants are in fact the common denominators of worlds that are occasionally distant, but that are equally overwhelmed by the same critical issues: the zeroing of the use of urban spaces and buildings, finding a work-life balance, restoring dignity to the home, the desire and need to regain possession of the physicality that the pandemic has denied, avoiding stress or burnout from working remotely, the desire to learn from the potential of technology as a useful tool for growth and inclusiveness, the need to review and interpret the digital approach first in terms of economic sustainability and benefit for human well-being.

In a perspective aimed to define the different invariables characterising the investigative scenarios (Figure 5), video conferencing platforms, social media, tools for sharing interactions and collaborative projects and also the different ways of offering cultural contents through the web were analysed and compared in relation to the experience of use. Attention has been paid to the investigation of innovative or unconventional uses of well-known and already widespread and therefore easily accessible tools and applications (Facebook, Instagram...) and new tools still with unexplored potential.

The renewed relationship with one's home and the city has brought new needs in terms of how to interact with already familiar and widespread tools. On the other hand, it has led to the emergence of new platforms as a result of the need to have digital tools designed ad hoc at one's disposal for work and entertainment, but also to broaden the discussion. At a time when personal relationships are limited on a physical level, the need to have new ways of expressing oneself and relating to others has emerged.

Psycho-Anthropology, Margin and Inclusion

Human existence, in its individual and social dimension, both without interruption in their reciprocity, is the expression of an "approximation of the defect to oneself." Basically, none of us can be said to actually be what we would like to be, because there is always a margin that separates us from being what we want to become. In other words, and according to the perspective of the evolutionary epistemology of Karl Raimund Popper and Konrad Lorenz,[8] human beings finds themselves existing on this planet in order to learn. More simply, we

8. K. R. Popper and J. Eccles, *L'io e il suo Cervello. Materia, Coscienza e Cultura* (Roma: Armando Editore, 2002); Popper and K. Lorenz, *Il Futuro è Aperto* (Firenze: Bompiani Giunti Editore, 2002).

live to learn. Our whole life is characterized by this existential imperative, at different and personal levels of consciousness. For each of us there is an individual path that we verify during life itself, with the help of a social and cultural system that can facilitate, more or less positively, the identification of the path. This contribution fits precisely in this context, as we want to reflect on the role that technology, in ever and continuous innovative evolution, can play in the management of the margin, understood in its collective and personal experience. A technology that can effectively improve the human 'feeling of community' that in the current globalized era seems to be relegated to the virtual world only. We are more and more 'connectively isolated,' with a concrete difficulty in achieving and sharing in everyday life that is 'real' amongst living beings, always having lived in villages, communities and now in large metropolitan cities made up of neighbourhoods.

The Cartesian model and the conceptuality envisaged by it are in crisis, and we perceive its epochal significance precisely in this pandemic period. Our traditional perspective of things (objects, situations, movements and processes - therefore 'time' and 'space') does not satisfy the curiosity that our species seems to demonstrate towards different and invisible forms of 'energy'. It is true, it is an 'ancient curiosity,' without which we couldn't have organized our evolutionary adaptation and which today seems to break into our daily lives with greater force.

How does this curiosity manifest itself? In a behavior directly resulting from the boredom of existing, dramatically experienced when the human being is on the edge of life itself, outside of that continuity of change, which is the only possible anthropological coherence.

One of the many existential declinations of human *curiositas* is expressed in the perception of time, and the matter has always been a source of philosophical and design investigations. What we define as past, present and future are cognitions of the mind, that is, brain activities coexisting within our vision of the world. These categories are what we need to place human actions, establishing that cause and effect relationship with which we try to find a meaning between what is antecedent and consequent. In this cognitive forcing we establish the shared meaning of the concept of reality. But, after all, we do not know at all what we mean by this term, what reality really is.

"Reality is the place where our choices are made possible," that is the "place of possible choices," as J. P. Sartre[9] would say. This is where the concept of space-time inclusion of differences becomes decisive, so that, with the help of technology, we can establish that existential continuity that every human being seeks throughout their life. It is a consequentiality necessary for the human being to perceive themself in life and in change. Technology, as this historical global pandemic period is demonstrating, really plays a decisive role in this dimension, favoring and fueling the transition from the margin to the center, both from an economic-social and cognitive-value point of view.

We live and think in a global world, made up of virtual perceptions in which human existences are combined, modifying the real, conveying it in the virtual. 'Click' is the new password, the new contact with the world, and in which we

9. J. P. Sartre, *L'essere e il Nulla* (Milano: Il Saggiatore Edizioni, 1965).

express our desires and projects of participation, of inclusion. The virtualization of reality is paradoxically much more concrete than what we believe. It is no longer necessary to refer to a static, immobile substance defined once and for all, because the virtual image introduces the experience of a time that is no longer one-way and irreversible, inhabited by events. In the new online image, in streaming, in chat, time is reversible. The arrow of time is now relegated to the behavior of matter, certainly not to the energetic fruition of a click. One can contact the real in the virtual, going in all the directions that space allows us to invent another.

Psycho-anthropology for design favors, among its various fields of application, the study of what is defined as obvious within a culture. In almost all human social manifestations, geographically and historically determined, there are many things considered to be obvious. Upon further research of those that we consider to be the most obvious, the idea that the human being needs other individuals certainly emerges. It is true, of course. To what extent, however, are we all actually in agreement? Then, are we really sure that this is true? The social and effective organization of culture does not seem to take into account at all, if not for mere and instrumental reasons, this human *conditio sine qua non*, that life itself would not exist. In fact, life on the edge of a city, of any urban place, does not seem to take into account this anthropologically-determined need and within the existential perimeter that the margin realizes, in turn, the result of social exclusion, that human beings experience boredom.

Boredom arises from cognitive stereotypy, that is the belief (strongly rooted in general confirmation of desires of one's omnipotence) that the 'old way is better than the new one,' even if it is no longer able to recognize it. In stereotypy, certainties and convictions live, thanks to which one cannot doubt one's own traditions, while one derides the others. How many beliefs are there that each individual considers absolutely important and from which one believes is not possible to waive? Many; and far more in quantity than what the media society apparently would like us to believe they've changed. Well, one of these is precisely the idea that technology is just a tool without intentions, or rather, that it is the solution to the human discomfort that every marginality experiences in their daily lives. But every human instrumentation expresses an individual and social upstream intention that makes it a vehicle for change, and for this reason it becomes important, if not indispensable, to culturally invest in training, in education, in a design that motivates the development of inclusive attitudes. The tool is not enough to improve the existential conditions of the human species if we do not see in the tool the opportunity to respond to those obvious things that make us consider the margin as something obvious, natural. The concept of margin emerges when one believes they possess a center, and think as far from oneself what they, as a person and an individual, consider to be geographically and culturally separate from one's daily life. We should therefore design training and educational interventions motivating human beings to consider technology as a final instrument of that desire for solidarity that can save us, as a species and as citizens of the world.

Psycho-Anthropology and New Models of Inclusion through Social Media

The increasing dependence on information and communication technologies (ICT) in pandemic life, both in our professional and private lives, requires us to reflect on how we can manage our life in the digital age. For this reason, many researchers from different disciplines are actively involved in exploring conditions on how to stimulate and receive optimal benefit of the new opportunities that are being offered by ICT. It is now becoming relatively evident how, after this pandemic era, technology's role will take on a cultural and social value, more and more linked to individual psychological aspects. Although the pandemic has united us, the digital divide has demonstrated how technology alone does not guarantee social inclusion, if it is not appropriately embedded in a system of much more full cultural and social policies.[10]

The current and global management of information by social media, as well as cultural and social opportunities, highlights the need for an adequate training/ education towards their use. The presence of "hate communication" styles, together with fake news, witnesses a widespread cultural unease, regardless of social class. In fact, the lack of cognitive tools that facilitate the evaluation of information, as well as opportunities for existential improvement in one's daily life, should be 'solved' with precise and continuous planning actions over time.

One of the fundamental neurocognitive factors to foster a real osmosis between the various professional and social categories present in the cultures of the world is not only the "language" (in relation to the ethnic group to which they belong), but the "motivation for active participation". The ontogenetic development (from birth to death) of all human beings includes the presence of "sensitive periods' and 'critical periods".

On the basis of the Evolutionary Epistemology of which we have already discussed above, the behaviors that we will be able to learn, as well as the attitudes we manifest even before acting, change over time, in harmony with the environment and social conditions in which one finds themself to live. In order to cope with this variability, the Central Nervous System (CNS) modifies its neuronal connections based on environmental interactions. Thanks to adaptive adjustments based on the use or on the quality of performance, the nervous system adapts its functional properties to the needs and to the environment of the individual accurately.

Thus, many nervous circuits go through a period during their development in which the ability to adapt in response to the experience is substantially greater than its predecessor when the circuit has reached maturity. This period is commonly

10. N. Garnham, "Information Society as Theory or Ideology: A Critical Perspective in Technology, Education and Employment in the Information Age," *Information, Communication & Society* 3, no. 2 (2000): 139-152; P. Golding, "Forthcoming Features: Information and Communication Technologies and the Sociology of the Future," *Sociology* 34, no. 1 (2000): 165-184; I. Goodwin and S. Spittle, "The European Union and the Information Society: Discourse, Power and Policy," *New Media and Society* 4, no. 2 (2002): 225-249; C. May, *The Information Society: A Skeptical View* (Cambridge: Polity Press, 2002).

referred to as "sensitive period", within which the information derived from experience selects some specific functional properties from a range of possible properties that the circuit could adopt. If appropriate experience during this period is not acquired, many circuits will never reach the ability to process information in a specific way, with the consequence being that perception or the behaviour may be permanently loss-making.

In addition to these periods, during our learning there are also 'critical periods', that is, those temporal situations in which a great increase in neuronal plasticity occurs within our brain. For example, human beings go through important critical periods during the acquisition of language, competence in stereoscopic vision, peer-to-peer social relations during adolescence, entering the world of work, etc. Despite this, for many nervous circuits, experience does not seem to be indispensable for developing some cognitive skills, and the individual can also develop adaptive behaviours. In these cases, we are talking about a sensitive, but not critical, period. This is why every critical period is certainly also sensitive, while every sensitive period is not necessarily critical too.[11]

Based on these considerations, the realization of constant and continuous social contacts that may occur during virtual social interaction, can favour, if properly addressed and conveyed, the overcoming of critical evolutionary periods—periods that, in addition to the temporal dimension common to the age of the individuals who pass through them, still decline in the social and urban environment where the same actors spend their existence. Being adolescents in the urban suburbs, within marginal socio-cultural dynamics, is undoubtedly different than being in the center of a city and in a stimulating and affluent neighborhood.

Social, as is happening with the new app *Clubhouse*, and not only in the United States but throughout the world, therefore play an important role, both from an individual motivational and cultural point of view, fueling the need for contact and interpersonal relationships. We can read about this new social "Clubhouse" as a new type of network based on voice. When you open the app you can see open "rooms" full of people talking so you can hop in and out, exploring different conversations. You enter each room as an audience member, but if you want to talk you just raise your hand, and the speakers can choose to invite you to speak. Or, you can create a room of your own. It's a place to meet with friends and with new people around the world to tell stories, ask questions, debate, learn, and have impromptu conversations on thousands of different topics. The intonation, inflection and emotion conveyed through voice allows you to pick up on nuance and form uniquely human connections with others. You can still challenge each other and have tough conversations, but with voice there is often an ability to build more empathy. There have been rooms with people from all walks of life finding common ground.[12] Furthermore, founders say that, "The world is not a monoculture, and we want *Clubhouse* to reflect that. Ideally the experience is more like a town square, where people with different backgrounds, religions, political affiliations, sexual orientations, genders, ethnicities, and ideas about the

11. L. R. Squire, D. Berg, F. E. Bloom, S. du Lac, A. Ghosh and N. C. Spitzer, *Fondamenti di Neuroscienze* (Milano: Ambrosiana, 2016).

12. Clubhouse Blog: https://www.joinclubhouse.com/check-1-2-3. [Accessed 2 April 2021.]

world come together to share their views, be heard and learn. Some of these communities come together to debate. Some come to relax and joke around. Others hold listening parties and fireside chats. We think many styles should be supported, and we're working on tools to help everyone create their own space, deepen friendships, meet new people and have meaningful discussions in the way that suits them best."[13]

Thanks to this relationship/analogy with the 'square' of any urban fabric, *Clubhouse* creates and stimulates the creation of virtual occasions in which people, of different ages, social backgrounds and cultural backgrounds, can share interests, desires and content. It also promotes an increased 'motivation to stay together', with the possibility to subsequently create meetings in different urban areas.

Pre-Visions for New Identities and Interactions of Public and Private Spaces

From the analysis of the reference scenario and the psycho-anthropological considerations that involve it, it is clear that it seems to be necessary to build a post-pandemic recovery by carefully reflecting on the role of the "margin" and on a phygital approach able to mediate digital technologies and physical experiences, moods and expectations (Figures 6-8).

There is a clear need to reassess the meaning of "contact" and "exchange" in a logic of connection that transcends the physical aspect without denying it, in order to identify in the seven senses (sight, hearing, touch, smell, taste, sense of balance and proprioception) possibilities for additional interactions useful to complete the direct experience. Similarly, those "weak links" that are naturally nurtured through encounters and confrontation -whether random or planned- are the elements from which to start in order to define the use of working, training and cultural spaces with new eyes.

Carlo Ratti, interviewed for *Open* magazine, states that, "[...] the so-called weak links that come from the randomness of our encounters are very important, otherwise we risk closing ourselves in a bubble that polarises our ideas. If we only work online, our network of contacts is impoverished. People we meet by chance, precisely because they are not connected to our network, can expose us to a condition that we had not foreseen. And this increases our creativity and broadens our horizons. That's why it is important to have a physical space."[14] This vision helps to validate a phygital approach and supports the need for a reinterpretation of the role of architecture and infrastructures in general.

Interesting ideas and stimuli aimed to redefine the use and identity of buildings come from a variety of fields all over the world. These include the experiments conducted by the global giant Cisco, the Designtech institution[15] in

13. Clubhouse Blog: https://www.joinclubhouse.com/on-community-moderation. [Accessed 2 April 2021.]

14. S. Danna, *L'architetto Carlo Ratti: «Uffici Condivisi, Lezioni Online e Laboratori: O le Università Cambiano, o Molte Moriranno»* (Open, 22 May 2020).

15. Designtech Hub: https://thedesign.tech/it/.

Milan, the Senseable City Lab[16] at MIT directed by Carlo Ratti and the work, again by architect Ratti, on both the new university campus in Milan[17] and Cornell Tech at Cornell University in Manhattan.[18]

On the project for a new university campus on the former Expo Milano 2015 site, and referring to the Cornell Tech experience, Ratti, again for *Open*, says that the Italian project is based "[...] on an idea of an university based more on encounters than on lectures: a free ground floor that allows lecturers and students to meet," while, "[...] at Cornell Tech -the Cornell University campus on Roosevelt Island in Manhattan- the basic cell of the office is used not only by the lecturer but also by the students themselves. In Italy, and in Europe in general, the idea is still somewhat alien. It is actually very functional: if lecturers and students spend less time on campus, they can share spaces. A dynamic similar to what happens in offices."[19]

Therefore, the city disrupts the margin between public and private, digital and analogical in the idea of continuity between virtual spaces and physical places, which however still continue to be interconnected. Ratti proposes an idea of a city which is not strictly "smart" and therefore passive, but "sensible", evoking a double-meaning involving sensitivity and the senses themselves.[20] It's a vision of a co-city based on data, which are nothing more than expressions of the needs and habits of the individual inhabitants, but also of the infrastructures that can be kept under control. In this context, data are a means of control and expression of common needs. While machines acquire data quickly and in large quantities, thus putting them at our service, human inhabitants of cities can use them as needed, to digitise and optimise interactions.

This vision is aligned with the approach of the 2018-2021 European project, *Sharing, Collaboration, Cooperation* (SCC), initiated by Cooperatives Europes and co-funded by Erasmus +, which, as Di Paolo summarises, "brings together co-working spaces, higher education institutions and innovation communities, with the overall aim of stimulating the development of collaborative spaces for innovation. In particular, it intends to support the co-working spaces transformation into 'collaborative spaces' capable of developing cross-sectoral and trans-national working methodologies thanks to the creation of 'human' communities and the use of advanced digital tools."[21]

The concept shown represents the city as being participatory, inhabited and co-created in its interactions in indoor places as well as in the public and private networks, constituting a single interconnected reality dependent on the users' needs. The latter then become active players in a scenario of co-collaboration

16. Senseable City Lab: https://senseable.mit.edu/.

17. A. Musillo, *Un Nuovo Campus Universitario a Milano Riporterà in Vita l'area EX EXPO?* (Elle Decor, 17 December 2020).

18. Cornel Tech: https://www.tech.cornell.edu/.

19. Danna, *L'architetto Carlo Ratti: «Uffici Condivisi, Lezioni Online e Laboratori: O le Università Cambiano, o Molte Moriranno,»* 2020.

20. C. Ratti, *Carlo Ratti Talk @ iit—Senseable City. (s.d.).* Retrieved from: https://www.youtube.com/watch?v=ELrPQyU1Sjw. [Accessed 28 April 2021.]

21. D. Lampugnani, *Co-Economy. Un'analisi delle Forme Socio-Economiche Emergenti* (Milano: Feltrinelli, 2018).

between themselves and the whole of cities. In line with this tendency, it seems clear that in future workplaces, cultural venues and university classrooms will have to become again the fulcrum for the activation and definition of resilient communities capable--after the physical interaction and the collective recognition—to also invest positively in their respective digital interface.

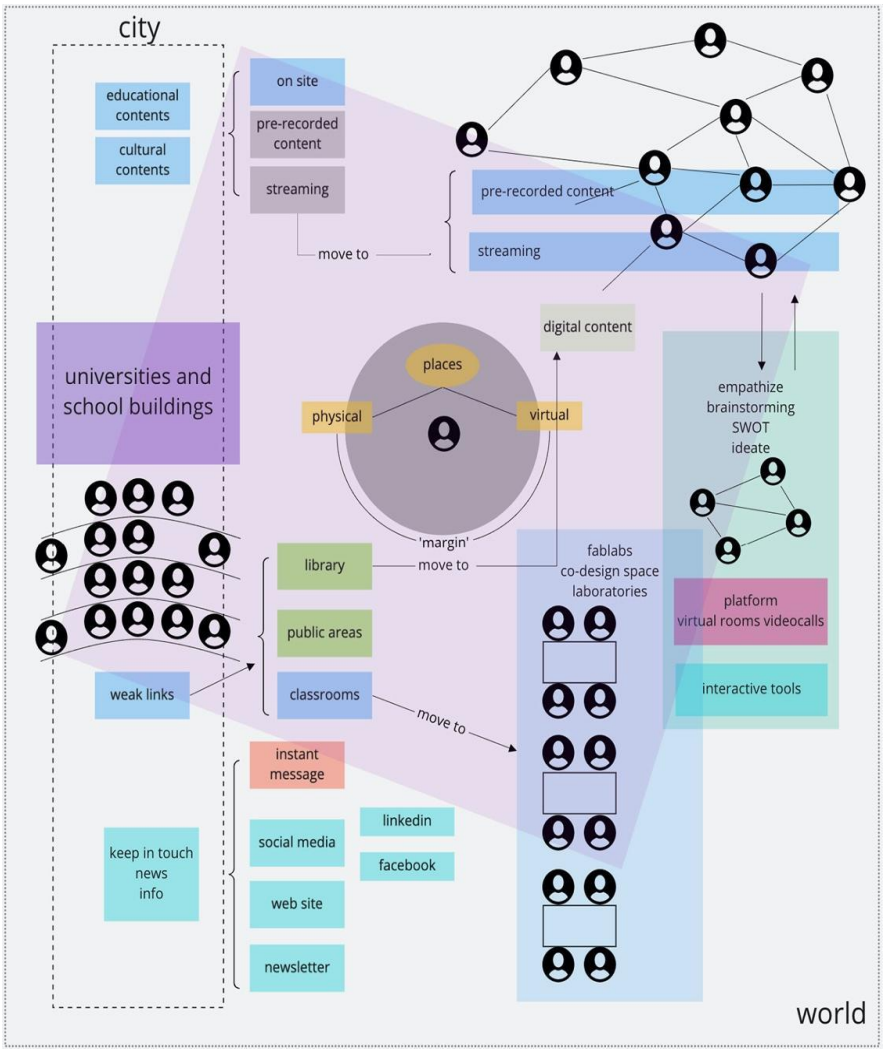

Figure 6. *Education: Interactions-NET in POST-Covid ERA*
Source: Morozzo, Delprino 2021.

So that the process is interactive and ripe, remote activities will need to be clearly identified as an extension and implementation of those in presence, building a strong relationship and a clear identity with university classrooms (Figure 6), the workplace (Figure 7) or the cultural buildings (Figure 8)--such as in museums, theatres, public squares. This will lead to a joint and progressive action on several levels working simultaneously both on the reduction of the digital division to the benefit of an inclusive and sustainable process of technologies at all levels and for all user groups, and on the conversion and reinterpretation of architecture and collective spaces in relation to their use.

The buildings of collective living and working will be steered towards reorganising their use for renewed modes of interaction, reasoning in terms of collaboration and co-creation, useful for fostering those weak links on which group interaction and collective growth are based, rather than on individual or passive activities.

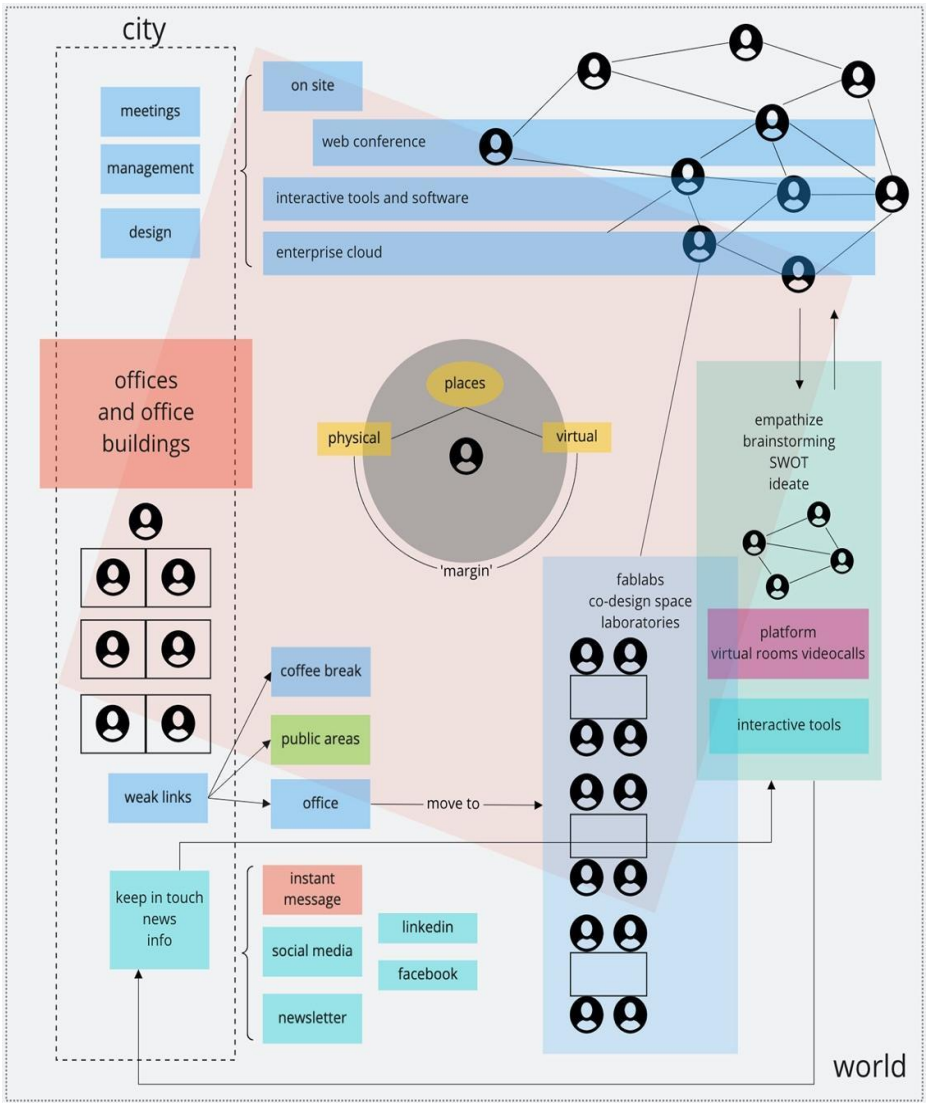

Figure 7. *Work: Interactions-NET in POST-Covid ERA*
Source: Morozzo, Delprino 2021.

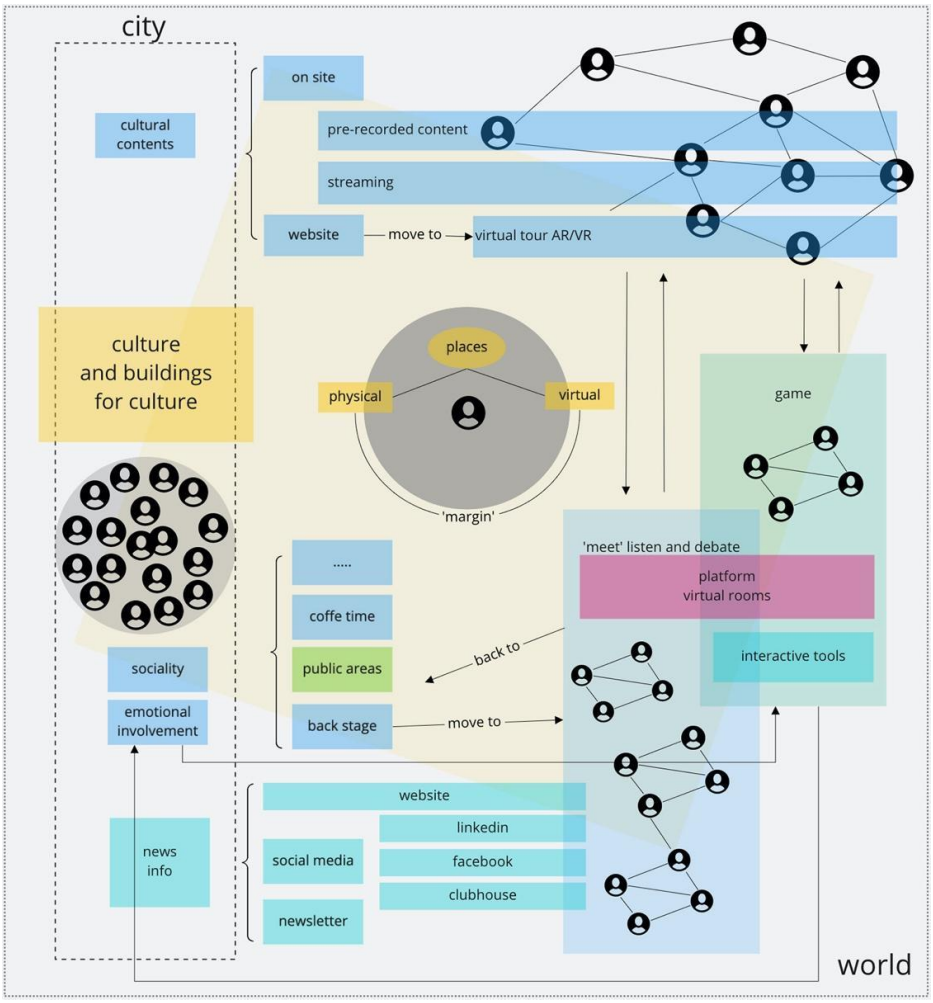

Figure 8. *Culture: interactions-NET in POST-Covid ERA*
Source: Morozzo, Delprino 2021.

In many scenarios the individual workstation, rather than the university classroom crowded with users, but lacking in relationships and exclusively relegated to the role of "distributor" of content, will benefit from existing experiences and will have to be redesigned with a renovated logic. This attitude will also involve a significant emotional aspect, since sharing will progressively replace the concept of possession, and this will have a significant impact on the users' habits and *status quo*.

With reference to the traditional concept of the office, the notion of the hybrid workplace comes into play, i.e., "hybrid offices", with a part of the employees in presence and a part connected remotely. Far from being a simple compromise adopted to temporarily cope with the health emergency, the hybrid workplace represents the present and, even more, the future of the office.[22] The recent methods of interaction have given the opportunity to work, study, connect with

22. Il Sole 24 Ore Economia, *Lo Spazio di Lavoro Ibrido, da Soluzione d'emergenza a Vantaggio Strategico*. Retrieved from: https://www.ilsole24ore.com/art/lo-spazio-lavoro-ibrido-soluzione-d-emergenza-vantaggio-strategico-ADz1mzOB. [Accessed 2 April 2021.]

other users and have brought out new possibilities of inclusion as well as new difficulties.

In the near future, predicting a series of phygital systems and multiple modes of interaction according to the user's needs can allow the latter to break down the barriers that can be both physical and digital. Physical space can cause difficulties as the world of web platforms can if they are not optimized for the needs of various users. The continuity between the real office and the virtual office goes towards the elimination of this dichotomy, identifying an idea of a general phygital office that can be used from home, within a dedicated establishment, or in general, through a platform that allows you to work from a more suitable place for the user. However, this possibility of integrating one's office into the home space should also be optimized thanks to a characterization of the online space and tools. In this way, defining an identity to the virtual space can help ease the interactions and restore value to the domestic environment perceived as such. In addition, the partial working environment integration within the perimeter of the domestic walls will open up new interpretations of interior architecture, stimulating functional distributive organisations to guarantee, even in the family context, the private and public spheres without interference or overlapping.

The American Institute of Architects based its annual survey of interior design[23] trends on the experience of 425 American architectural practices and on the requests received from their clients. Commenting on the data collected, Kermit Baker, chief economist of the organisation and researcher at the Harvard Joint Center for Housing Studies, illustrates how the experience of COVID-19 is already transforming the needs of contemporary living: "According to 68% of those interviewed, there has been an increase in requests for home offices, while 33% have reported a quest for more luminosity through balconies, solariums, porticos or verandas, intermediate spaces between the inside and the outside to be experienced all year long. Other key players in the post-Coronavirus home are 'filter zones' where any contaminated objects such as shoes or coats are isolated. And then, in the post-pandemic home trends, there is an increasing demand for multifunctional rooms, extra rooms to be transformed into studios, classrooms for distance learning, where to cultivate one's hobbies. Briefly, those might be described as spaces of one's own to enjoy while sharing the home with the whole family."[24] And, also with housemates or solely.

As well as changing the concept of home, the phenomenon of smart-working or the lone worker can lead to substantial changes in the entirely contemporary demand to "live in the centre", contributing to a redistribution of population density with positive results in many directions.

The "connected home", designed to accommodate both domestic and working life, is already proving to be an opportunity to alter living habits and

23. http://info.aia.org/AIArchitect/2020/0911/aia-interactive/index.html#!. [Accessed 2 April 2021.]

24. C. Amarillis, *La Pandemia sta Plasmando le Case e 450 Architetti Hanno Capito Come* (Elle Decor, 27 October 2020); AIA Home Design Trend Survey: http://info.aia.org/AIArchitect/2020/0911/aia-interactive/index.html#!. [Accessed 2 April 2021.]

repopulate sparsely populated villages, relieving metropolises of a density that is no longer sustainable.

A recent example is the Smart Village Santa Fiora. In Santa Fiora, a Tuscan village of 2,500 souls in the province of Grosseto, the focus has been put on repopulation, creating the first smart-working village in Italy, where homes are designed to combine family wellbeing and work requirements. Here, tourism overlaps and intertwines with remote working activities to contribute to the overall redevelopment of the village, with discounts on property rentals for those who decide to work remotely from this enchanting location.[25]

Santa Fiora may be the first Italian initiative to move in this direction, but it will certainly not be the only one, and it has its roots in many other unconscious and far-sighted experiences conducted by Italian architects, such as the project for Colletta di Castelbianco, in Liguria, conceived by Giancarlo De Carlo at the end of the 1990s, giving digital technology, as well as architecture, a fundamental role in the recovery and rebirth of the forgotten village. With a sensitivity that distinguishes the master of architecture, De Carlo worked on the concept of the "diffuse hotel"[26] in Colletta di Castelbianco from the early stages. Here, he brings forward twenty years of burning issues into today's debate, considering the chance of living or visiting a small town for short or long periods of time without sacrificing the cultural and information resources that the global village of telecommunications and information technology can make available everywhere as a winning weapon to be used effectively.

The concept of the centre thus seems to become relative to the person rather than to the urban agglomeration in itself, with the possibility of remote activities to be coordinated with those in presence. This makes it easier to move and maintain continuity among the different areas of a territory, and in general, in contacts among the diverse parts of the world, simultaneously with the objectives of technological development and digitalization of a multitude of areas and the possibility of remaining connected in a "digital net" and continuously for the user who lives there even temporarily.

This does not mean, however, that we should lose contact with the memory of places and with the past; on the contrary, the breaking of the margin between the physical and the digital can make us relive that memory and continually experience it. At the same time, they can give shape and application to this memory in the new possibilities of interaction and identity to be given to virtual places. Actually, the Internet is not a passive place, but exists thanks to algorithms which, although they can also work automatically, are created by humans who can use information to give an identity to the spaces we create for ourselves thanks to the possibilities of the web.

If W. Benjamin defines the aura as, "relating to the space-time factor, as well as to the concept of distance, of detachment, of non-approachability to the

25. Centritalianews.it, *Santa Fiora lancia lo Smart Working Village: Incentivi sull'affitto per i Lavoratori che Desiderano Trasferirsi nel Borgo Amiatino* (Centritalianews.it, 29 September 2020).

26. A. Romano, *Giancarlo De Carlo. Lo Spazio, Realtà del Vivere Insieme* (Turin: Testo & Immagine, 2001).

spectator,"[27] then as we relate to the workspace by shortening a distance, we can recover that kind of contact and that value of time and memory. On the contrary, it is even more possible to create a space dedicated to the memory, individuality and expression of a specific group thanks to the customisation of dedicated online platforms.

Co-working, co-design and social media platforms thus have the power to become true vehicles of creativity, preservation and creation of ideas, open and accessible to all thanks to their variety of interactions (digital and non-digital). This may appear as a path and an opportunity of inclusion and characterization of digital spaces in continuity with city hotspots.

Conclusion about a Sustainable Future for the City in Progress

Oki Sato interviewed for *Elle Decor* about the world to come offers us a deep and stimulating reflection:

"We can no longer go back to how we were, but change our way of living in both domestic and urban spaces. From now on, the functions will converge more and more, but differently with respect to the past," Oki Sato warns. "I imagine a capillary city that stretches out in a homogeneous and inclusive way. And then I imagine, within this large surface, that all the functions it needs can be 'moved' and 'assembled' to give shape to a homogeneous vision, which does not exceed verticality." He sees the new everyday life like this: efficient and widespread. "We are trees, with branches stretching to the sky and fruits that sweeten our life: we are about to enter an era without centrality and without hierarchy," concludes Oki. "We will be ivy."[28]

Our "being ivy" leads us back immediately to the incipit of this essay. The ivy, by its infesting nature, marries an inferior collective imagination, while its pervasive and adaptable being impels us to overcome any stereotype in order to reach a positive interpretation that Sato himself summarizes in the two terms "efficient" and "widespread".

If we refer the concept to the pervasiveness of digital technologies and phygital margin as a privileged place for the interaction between the physical and digital spheres, the ivy becomes a *status quo*, a way of being that matures with the city in progress.

An extending city beyond its physical borders, thanks to an inclusive and conscious use of digital, is a city capable of offering training, culture, services and work beyond its buildings by learning to migrate online content and activities without losing its identity. A city where the "anthropological dialogues", that is the sharing of one's individual biographies, take place through a digital acting as a "relational starter", in order to produce that further motivation for the encounter which may develop in presence. In order to be "positively ivy", cities, communities

27. E. Cristallini, "Lo Slittamento dell'aura nell'arte Contemporanea." *Rivista di Estetica* 52 (2013): 27-31.

28. P. Carimati, *Il Mondo che Verrà, Disegnato da Quattro Firme Internazionali del Made in Italy* (Elle Decor, 31 May 2020).

and technological development need to make a generational leap to include some essential postulates in their near future.

The individual and the community need to broaden their "mental perimeter", through a constant and continuous osmotic process between the individual, in his personal experience, and the culture, understood as a set of shared and participated in attitudes within the various human groups. The city and the buildings that characterize or represent it must not only embrace the concept of smart, but envisage a progress in which the margin becomes the second remote identity of services so that the latter can be used anywhere regardless of distance and defining a digital proximity of physical places through which they are provided.

Finally, digital innovation must necessarily pass through the need to establish models to integrate technologies and human-centered in an inclusive and scalable perspective. The development of the infosphere[29] must embrace the idea of designing new tools and interactions with them in order to give the user the opportunity to be active inside the relationship with the city and its inhabitants (in the way of interaction he prefers).

The positive effects will be undeniable and, as anticipated in the introduction to the essay, multiple and on several fronts:

- defining the margin with a phygital approach will help to recognize and maintain the memory of places even in their digital interface;
- distributing and relocating via digital rather than centralizing in physical places will help reduce or plan the access flows to the metropolis, the commuting and its resulting pollution;
- relocating some work activities will favour a reduction of urban overcrowding and will offer opportunities for rebirth in less inhabited areas;
- sharing cultural and educational opportunities also through the Web will widen the possible catchment area with the chance of including even the most fragile or disadvantaged categories.

A first step will allow us to define the world of tomorrow as more accessible and sustainable.[30]

29. The infosphere theorized by Floridi in 2009 is linked to the concept of the fourth industrial revolution. A revolution intended as a revolution of being rather than of technologies and artificial intelligence where the infosphere is the information space of the digital age that involves all areas of life, posing unknown challenges. L. Floridi, *Pensare l'infosfera. La Filosofia Come Design Concettuale* (Milan: Raffaello Cortina Editore, 2020).

30. The essay is the result of a vision common to the authors, however: *Introduction, scientific debate and disciplinary approach*, *Method and debate focus* and *Conclusion about a sustainable future for the city in progress* are attributable to M. C. Morozzo della Rocca; *Psycho-anthropology, margin and inclusion* and *Psycho-anthropology and new models of inclusion through social media* to A. Bertirotti; *Pre-visions for new identities and interactions of public and private spaces* to F. Delprino.

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An Insightful Resemblance between Ancient Egyptian Miniatures and Current Digital Information Models

By Mohamed Said Abdou[*]*, Ebtissam Mohamed Farid*[±] *& Hatem Abdelmoneam Eltawil*[°]

Architects always search for new means of describing and communicating their design ideas, and 3-D models found to be from the most informative means for this purpose. In ancient Egypt, the beliefs of death, resurrection, and eternity shaped the ancient religious structures and their construction. The design and construction processes of ancient Egyptian buildings and artefacts were collaborative between designers and workers who used stones for cult structures and clay for traditional dwellings. These dwellings as well as the daily life activities were represented by 3-D miniatures and buried with the body as those found in Meketre tomb. For example, the model of a slaughtering house described a slaughtering scene with all objects represented proportionally with colors, while the model of a porch and garden embodied an exterior porch and its surrounding landscape elements. In the current era, building information modeling (BIM) describes the creation of 3-D information models in the virtual digital environment. This technology allowed the architects to collaborate in a common data environment (CDE) on the cloud with other design disciplines through a centralized 3-D digital model to make appropriate design decisions. Fondation Louis Vuitton Museum and Shanghai Tower are notable examples that used BIM models to boost their design and construction processes. The 3-D model of the museum combined all design disciplines for real-time collaboration, while the unique shape of the tower utilized parametric modeling and digital simulation for efficient construction.

Introduction

As humans frequently invent new tools and utilize novel technologies, the visual expression of the surroundings evolved throughout history to describe the spatial compositions of the environment in the most informative mean. On one hand, the beliefs of ancient Egyptians for resurrection and eternity paved the way for creating 3-D models that described their daily life activities and the places they used to live in. These models were placed with the buried body to aid him/her in the recognition of the details of the lifestyle in the afterlife by visual expressions that would be very hard to be informative with other means other than colored 3-D models. On the other hand, the current digital design era utilizes the same concept through describing architectural elements by creating digital 3-D information models that provide the full information for each design element to easily describe it to the client and design team and prevent any excessive costs or errors in the

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construction process. Building information modeling (BIM) adopts this concept and enriches each design element with full specifications, costs, performance, visual appearance, construction details, and maintenance options in a common data environment (CDE). The research hypothetically investigates the roots of building information modeling as a radical concept adopted by the ancient Egyptians; and on that basis, states the similarities between the current BIM models and the ancient 3-D miniatures.

Literature

Architects always search for new methods and tools to clearly represent, simulate, and communicate their ideas, such as 2-D drawing and 3-D modeling.[1] The essential function of design tools is to make design ideas perceptible for the design team members and the clients. They influence the design by reducing a complex state of design problem and information into few recognizable elements that can be easily visualized and manipulated.[2]

Digital tools facilitate the perception of design ideas by introducing the illusion of space through animations and renderings,[3] however, many designers complain about trapping their ideas inside the box through using computers. On one hand, the development of information technology (IT) and 3-D digital models proved a radical evolution in the creative design thinking as representational tools of the preconceived design idea which embrace the integration of digital technology and design process.[4]

On the other hand, BIM redefines the way design ideas are developed in the early design process; by bridging creativity with design principles and technological innovations through parametric generative processes and an intelligent database of information-rich objects.[5]

1. J. Anderson, *Basics Architecture 03: Architectural Design (*Switzerland: AVA Publishing SA, 2010), 39.

2. C. Gänshirt, *Tools for Ideas: An Introduction to Architectural Design* (Germany: Birkhäuser Verlag AG, 2007), 60.

3. S. C. Piedmont-Palladino, *Tools of the Imagination: Drawing Tools and Technologies from the Eighteenth Century to the Present* (SA: Princeton Architectural Press, 2007).

4. A. Ali, and C. A. Brebbia. *Digital Architecture and Construction* (UK: WIT Press, 2006), 42.

5. K. Kensek, and D. J. Noble, *Building Information Modeling: BIM in Current and Future Practice* (USA: John Wiley & Sons, 2014), 4.

Aim of the Study

The study aims to explore the potentials of 3-D models in describing the character of spatial architectural compositions. It investigates these potentials through two main objectives:

- Exploring the ancient Egyptian miniatures that embodied the spatial compositions of the daily life of ancient Egyptians.
- Describing the potentials of 3-D information models in the current digital design era that boosts the design and construction processes.

Research Methodology

The study adopts a comparative approach through which it targets exploring the potentials of 3-D models in describing the character of spatial architectural compositions now and then. On that basis, it investigates the roots of ancient Egyptian miniatures represented by the 3-D models found in Meketre tomb in Thebes, Egypt. After that, it describes the digital information 3-D models offered by building information modeling (BIM) technology represented by two notable examples, Fondation Louis Vuitton Museum and Shanghai Tower. The selection of the two examples is derived from the diversity between their forms and functions and the challenges and constraints they encountered. For example, the museum has a unique form that needed comprehensive digital manipulation, while the design of the tower had to respect the impact of the frequent seismic loads. Thus, the concepts of describing the architectural forms precisely and preserving a detailed mockup of the building, originated within the creation of the ancient 3-D models, and implemented within the current digital era of BIM. The study concludes with a comparative investigation about the resemblance between the ancient Egyptian miniatures and the current digital information models as shown in Figure 1.

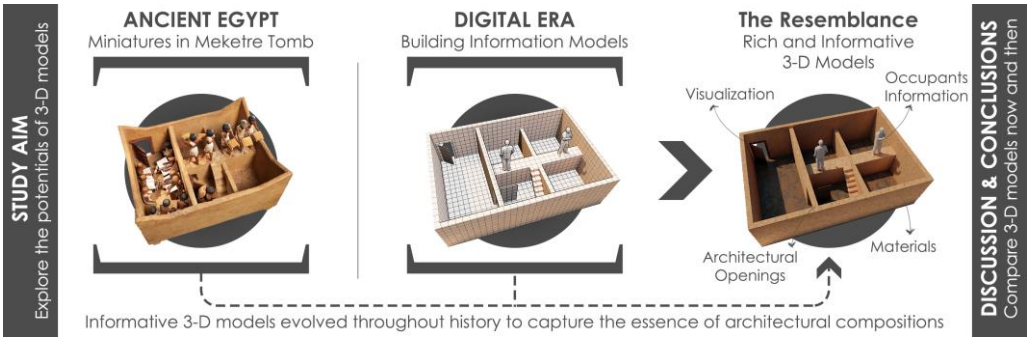

Figure 1. *The Study Workflow*
Source: The researchers.

Ancient Egyptian Architecture – Inherited Beliefs Embedded the Ancient Structures

The architecture of ancient Egypt was shaped by the beliefs of death, resurrection, eternity, cult of the dead, and afterlife; believed by the ancient Egyptians and represented by the burial rituals and the huge monumental religious structures such as the pyramids of Giza. These massive structures built in large scales and with materials far more permanent than that of the private dwellings to survive until the afterlife.[6]

Collaborative Design Environment

Ancient Egyptian buildings and artefacts were created collaboratively by a team of designers and craftsmen. On one hand, the construction process of structures such as temples, irrigation facilities, dams, and water channels needed organized participation of a large number of people to accomplish it.[7] On the other hand, artefacts such as coffins required two or three workers to make the carpentry of the wooden case which had specific dimensions and design considerations, while other workers were responsible for the painting works and the final appearance of the cases[8] as shown in Figure 2.

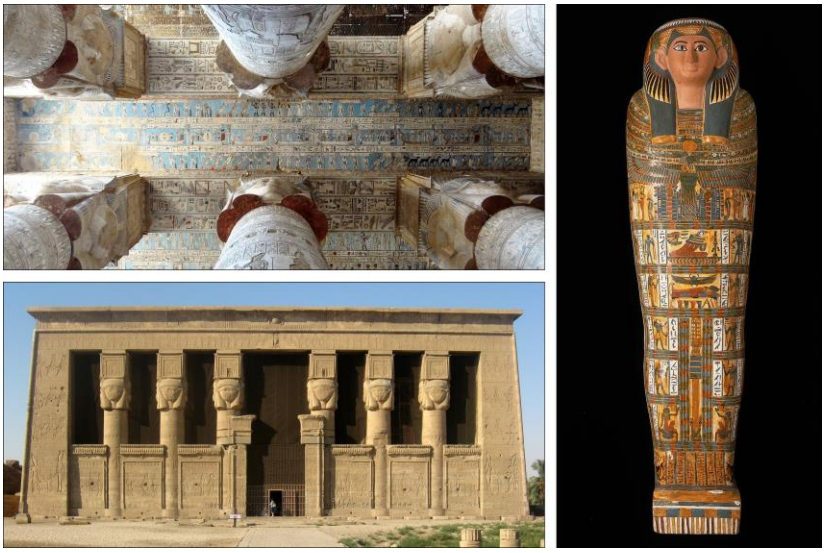

Figure 2. *Hathor Temple, One of the Most Well-Preserved Temples of Ancient Egypt (Left), and Preserved Coffin of the Mummy of Nesmutaatneru (Right)*
Source: Left top picture from (Wikimedia Commons 2014), left bottom picture from (Wikimedia Commons 2008), and right picture from (Museum of Fine Arts Boston n.d.).

The building materials were mainly clay and stone. Non-durable adobe bricks were made of clay that dried in the sun and used for building houses and primitive

6. A. L. Palmer, *Historical Dictionary of Architecture* (UK: Scarecrow Press, 2008), 12.
7. T. Fedulova, *Architecture of Ancient Egypt: Chapter 1 of Brief Guide to the History of Architectural Styles (*Progress Builders, 2014).
8. C. Riggs, *Ancient Egyptian Art and Architecture: A Very Short Introduction.* (UK: Oxford University Press, 2014), 41.

huts for the noblemen. While cult structures such as pyramids were built for the pharos from stones to ensure their durability in the favor of Gods and sustain till the afterlife.[9]

Miniatures Inside Meketre Tomb

Meketre was one of the most successful seniors and royal officials of the early 12th dynasty in the Middle Kingdom of ancient Egypt. His tomb located in Thebes in Egypt was excavated by the American Egyptologist Herbert Eustis Winlock in 1920. The tomb consists of a wide portico carved through the cliffs, a passageway that cuts through the cliffs after the portico, an offering chapel, and the burial chamber. Meketre's tomb contained in its *serdab*, i.e., a narrow chamber inside the tomb, a set of 24 well-preserved wooden 3-D models that embody the daily life activities of the ancient Egyptians as shown in Figure 3. These models were affordable means of describing the daily activities to aid the Ka, i.e., soul, in the afterlife, instead of the huge structures that still exist till now such as the pyramids of Giza that were owned by the upper-class Egyptians.[10] They simulated real things that belonged to the tomb's owner and eternalized the ancient Egyptian daily life.[11] The tomb also included carved and painted scenes on its walls which were integrated with offering texts that described the spirit's needs.[12]

The 3-D models were mainly made from wood, plaster, and linen, and finished with colored paint.[13] They created an insightful description of how the ancient Egyptian structures laid out and functioned.[14] Half of the 3-D models found in the tomb were sent for display to the Egyptian Museum in Cairo, Egypt, while the other half sent to the Metropolitan Museum in New York, United States of America.[15]

The miniature of a slaughtering house shown in Figure 4 described an interior space where ancient Egyptians performed meat processing. The 3-D model showed a scene where two oxen are trussed and being slaughtered by two men in the main hall. The scene also showed other two men holding bowls to catch the blood resulted from the slaughtering, two men preparing kettles, an observer who supervised the slaughtering, and a writer who recorded and documented the meat processing process. In the upper balcony, the details of the hanging pieces of meat were well-represented. All figures have been represented as colored miniatures.

9. Fedulova, *Architecture of Ancient Egypt: Chapter 1 of Brief Guide to the History of Architectural Styles*, 2014.

10. P. Lacovara, *The World of Ancient Egypt: A Daily Life Encyclopedia* (USA: ABC-CLIO, 2017), 211; S. Snape, *Ancient Egyptian Tombs: The Culture of Life and Death* (UK: John Wiley & Sons, 2011), 169.

11. J. Kee, and E. Lugli. *To Scale* (UK: John Wiley & Sons, 2015), 39.

12. Oppenheim, Adela, Dorothea Arnold, Dieter Arnold, and Kei Yamamoto. 2015. *Ancient Egypt Transformed: The Middle Kingdom.* United Kingdom: The Metropolitan Museum of Art.

13. A. Oppenheim, D. Arnold, D. Arnold, and K. Yamamoto, *Ancient Egypt Transformed: The Middle Kingdom.* (UK: The Metropolitan Museum of Art, 2015).

14. Lacovara, *The World of Ancient Egypt: A Daily Life Encyclopedia.* 2017, 211.

15. The Metropolitan Museum of Art, *Model of a Slaughter House* (The Metropolitan Museum of Art, n.d.).

The model measured 76.8 cm in length, 58.5 cm in width, and 58.5 cm in height and was made from wood, paint, and plaster.[16]

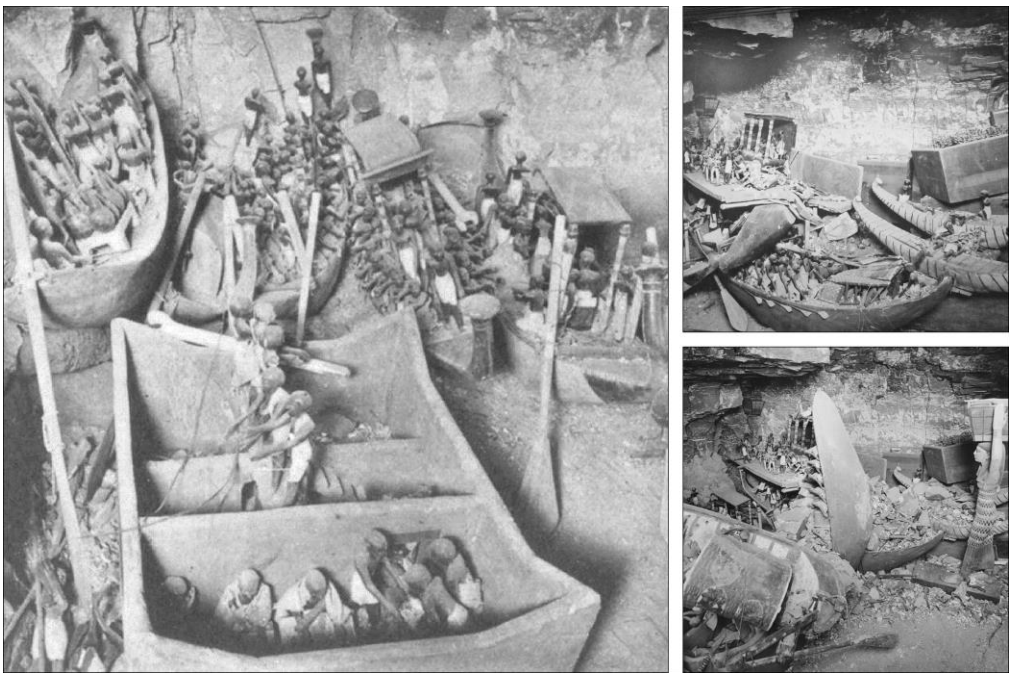

Figure 3. *The Excavation of Meketre Tomb Led to Discovering a Set of 3-D Models that Described the Daily Life Activities of Ancient Egyptians*
Source: Left picture from (Winlock 1920), top right picture from (Lilbitbrit 2014), and top bottom picture from (Lansberry n.d.).

Figure 4. *The Model of a Slaughtering House Described the Process of Meat Processing Through Colored Miniatures of Architectural Elements and Figures*
Source: The Metropolitan Museum of Art n.d.a.

The miniature of a porch and garden shown in Figure 5 described an exterior space of a house porch facing a pond surrounded by trees. The 3-D model showed an architectural composition of a garden where a framed water pond was positioned at the center and surrounded by trees with red fruits. It sculpted a house porch that designed as two rows of beautifully colored ancient Egyptian columns holding the roof. The back of the porch had two doors and a latticed window. The

16. Ibid.

details of columns' sculpting and coloring, as well as the fine placement of fruits on the branches of the trees, added a dramatic sense of space to the model. The model measured 84.4 cm in length, 42.5 cm in width, and 39.5 cm in height and was made from wood, paint, and copper.[17]

Figure 5. *The Model of a Porch and Garden Embodied an Exterior Scene through Colored Miniatures of Architectural and Landscape Elements*
Source: The Metropolitan Museum of Art n.d.b.

Current Digital Design Era – The Paradigm Shift of Building Information Modeling

Building Information Modeling (BIM) as a term has first appeared in print in 1992, however, its concept emerged in the 1970s in an article by Charles M. Eastman, a professor specialized in BIM, entitled "The use of computer instead of drawings in building design."[18] In 2002, the industry analyst Jerry Laiserin mentioned the term to describe virtual design, construction, and facilities management.[19] The emergence of BIM acted as a paradigm shift which evolved the 2-D drawings to 3-D information models that describe each component of the building.[20]

Common Data Environment

The digital workflow of BIM allows multiple design disciplines to work simultaneously on the same project with precise collaboration for each design

17. The Metropolitan Museum of Art, *Model of a Porch and Garden* (The Metropolitan Museum of Art, n.d.).

18. Landscape Institute, *BIM for Landscape* (UK: Routledge, 2016), 15.

19. T.-H. Chuang, B.-C. Lee, and I-C. Wu, "Applying Cloud Computing Technology to BIM Visualization and Manipulation," in *The 28th International Symposium on Automation and Robotics in Construction 2011,* 144-149. Korea.

20. K. M. Gairbheith, "The BIM Design Paradigm., *Architectural Technology Magazine* 111 (2014): 8-11.

element through a centralized virtual 3-D model as shown in Figure 6. The collaboration reduces construction errors and unnecessary costs.[21]

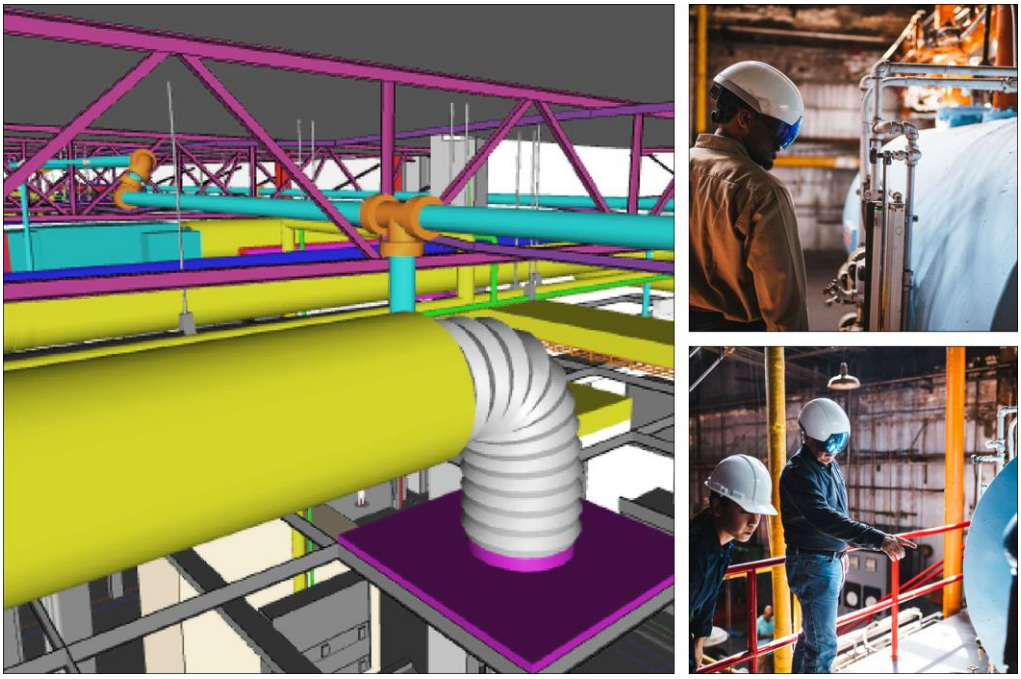

Figure 6. *BIM Models Boost Multidisciplinary Design (Left) and On-Site (Right) Coordination when Used Through Augmented Reality Helmets*
Source: Left picture from (Sanchez n.d.), right pictures from (Mortice 2017).

In the current digital design era, designers and project parties collaborate on a cloud-based common data environment (CDE) where they manage digital information and exchange project data according to predefined protocols.[22] Architects integrate the CDE with BIM to boost the collaboration between design and construction teams in the early design stage, which facilitates and reduces costs and errors of the construction process.[23]

Notable Examples of BIM Models

This part presents two projects shown in Figure 7 in which BIM played a significant role in describing the buildings during the early design process. The first one is Fondation Louis Vuitton Museum located in Paris, France, and designed by Frank Owen Gehry. While the second one is the mixed-use Shanghai Tower, located in Shanghai, China, and designed by Gensler.

21. C, M. Eastman, P. Teicholz, R. Sacks, and K. Liston, *BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors* (USA: John Wiley & Sons, 2008), 17-18.

22. A. X. Sanchez, K. D. Hampson, and S. Vaux. *Delivering Value with BIM: A Whole-of-Life Approach* (USA: Routledge, 2016), 215.

23. R. Sacks, C. M. Eastman, G. Lee, and P. Teicholz. 2018. *BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers* (USA: John Wiley & Sons, 2018), 366.

Figure 7. *Fondation Louis Vuitton Museum Designed by Frank Owen Gehry (Left) and Shanghai Tower Designed by Gensler (Right)*
Source: Left picture from (Vogue n.d.), right picture from (Wikimedia Commons 2015).

Fondation Louis Vuitton is an art museum of contemporary artistic creations.[24] It is located in the historical *Bois de Boulogne* public park in Paris, France. Its complex artistic entity made possible using design and construction technical innovations; through BIM approaches that provided collaboration between different design disciplines by using a centralized information-rich 3-D model.[25] The BIM model provided one source of information for design computation and optimization that were necessary to realize complex geometries and structure elements of the building.[26]

Shanghai Tower is a super high-rise mixed-use skyscraper that rises as the world's second-tallest building. It is located in the heart of Shanghai's financial district in China. The massive size, complex design, and construction challenges of the tower were calling for non-traditional project delivery methods;[27] that paved the way for BIM to be the solution for achieving the project's aspirations by integrating a set of digital processes and tools. The building information model combined precise data of each design element to support the informative processes of parametric design and project collaboration.[28]

24. Fondation Louis Vuitton, *Fondation Louis Vuitton Building in Paris by Frank Gehry* (Fondation Louis Vuitton, 2016).

25. Fondation Louis Vuitton. n.d.

26. A. J. Witt, "Paris Museum Proves that BIM Really Can Be a Team Sport," *Journal of Building Information Modeling* (2012): 13-15.

27. Autodesk, *Rising to New Heights with BIM* (Autodesk, 2014).

28. R. Garber, *BIM Design: Realising the Creative Potential of Building Information Modelling* (UK: John Wiley & Sons, 2014).

The BIM model of Fondation Louis Vuitton Museum developed through a collaborative approach between the client, architects, engineers, and fabricators as shown in Figure 8. The project involved ten firms each in a different country which collaborated in real-time on a centralized 3-D information model on a cloud server. The BIM model incorporated parametric geometries and adaptive engineering intelligence. For example, it encompassed predictive routine maintenance information to support the decision-making process throughout the building's lifecycle, while the mathematical optimizations smartly generated accurate 3-D geometries of the unique facade panels that fabricated using computer-controlled fabrication processes on-site.[29]

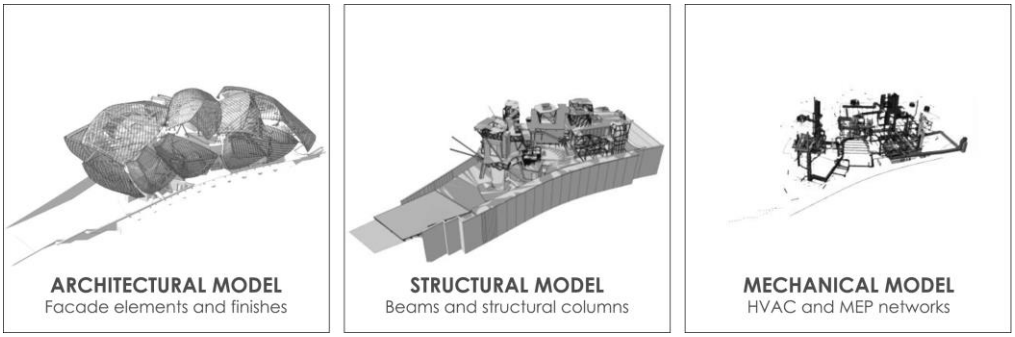

Figure 8. *The Core 3-D BIM Model of Fondation Louis Vuitton Museum Incorporated All the Architectural, Structural, and Mechanical Information*
Source: American Institute of Architects n.d.

The BIM model of Shanghai Tower embodied the designer's idea through early collaboration between the client, architects, engineers, and contractors. The parametric digital model was beneficial for the architects on two levels, the first one was designing the tower using advanced modeling techniques to accurately manipulate its complex geometry as shown in Figure 9, while the second one was the coordination of the complex building systems inside one entity to ensure efficient structural support and mechanical networks.[30] The tower geometry and structural systems responded effectively to the wind forces affecting the tower, thanks to generated variations, digital simulations, and wind tunnel testing that informed the entire design process.[31]

29. American Institute of Architects, *Building Information Evolved: Fondation Louis Vuitton* (USA: American Institute of Architects, n.d.).

30. L. Smith, *BIM: From Concept to Construction: Sustainable Shanghai Tower, Asia's Tallest Skyscraper*, 2012.

31. Garber, *BIM Design: Realising the Creative Potential of Building Information Modelling*, 2014.

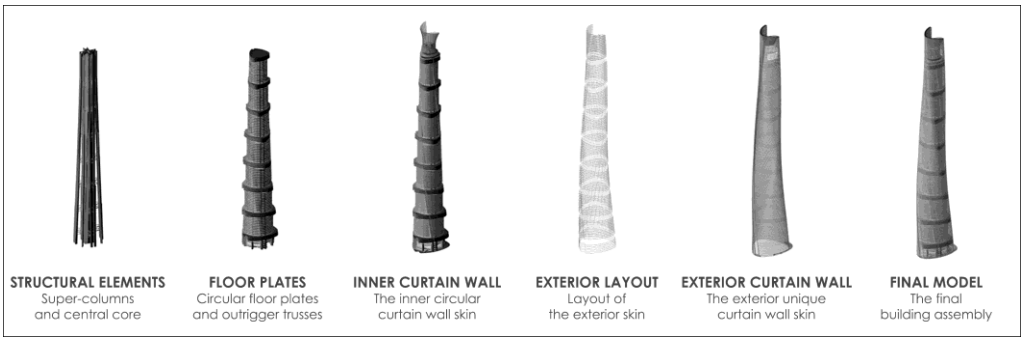

Figure 9. *The 3-D Model of Shanghai Tower Encompassed Informative Models of the Unique Architectural and Structural Elements of the Building*
Source: Pham 2011.

Discussion

Collaborative Environments Now and Then

The architectural design process is a collaborative cycle that integrates reflecting and making approaches among multidisciplinary designers. The establishment of ancient Egyptian buildings and artefacts required this collaboration between architects, workers, and craftsmen to create the elegant masterpieces of that civilization. For example, the massive pyramids of Giza required distinct cooperation between workers to construct the equipment needed for moving, lifting, and stacking the huge and heavy stone blocks for establishing the pyramids. While the ornamental columns of the temples required seamless communication between architects, builders, and painters to construct and finish them. The clear collaboration and communication methods in the current information age are the cornerstone of the effective planning, design, and construction processes of buildings. Using the beneficial technology of cloud computing, the common data environment creates an online entity that integrates and organizes data from multiple sources into one platform to allow coordinated sharing of information. This technology reflects its concepts on the building information modeling paradigm where the BIM model represents a single source of truth for all design elements which may be shared within a worldwide common data environment and produce innovative, cost-effective, and unique designs.

Afterlife vs. Life Cycle

The concept of sustaining the architectural information is embedded within the flow of the design process from ancient times till the current era. The 3-D models found in Meketre tomb targeted this concept as they preserved the sense of space, lifestyle, and daily activities of ancient Egyptians to aid the souls after the resurrection afterlife. The details in the 3-D models transferred the spatial character of the ancient Egyptian buildings that might have been obliterated without their 3-D representations. The value of sustainability is inherited within the

current digital 3-D BIM models through integrating strategic information for design and construction elements that describe their futuristic manipulations. For example, BIM models allow the designers to integrate information related to the maintenance or replacement times of construction elements such as bolts. These bolts are represented within the digital model of the building as 3-D models that comprise specific data which describe them such as their length, diameter, type, material, and durability. The BIM tools then utilize this information to plan the strategic maintenance and replacement routines for these elements throughout the lifecycle of the building; and by that, a clear BIM workflow is adopted between 3-D models, data, and strategic decisions.

Finely Tuned 3-D Models

The 3-D model of a slaughtering house found in Meketre tomb narrated the historical event of meat processing in ancient Egypt through a cognitive 3-D representation of every element inside the space. It comprised the major floor area of the space where structure columns and beams existed, stairs finely modeled, and upper balcony established where secondary structural columns stood. It included the door openings showing the details of their leaves and frames. It also included the pieces of meats, the clothes of the people and their gestures, and the textures of the oxen. The finishing of the model added life to the final scene and enhanced the representation of the function in the space by using colors and adding people and animals. The integrated entity of the 3-D model that showed the organized duty of each person in the scene resembled the adopted collaborative behavior of the ancient Egyptians in their daily life activities. While the 3-D miniature of a porch and garden showed different values of the exterior spaces of ancient Egyptian architecture and landscape elements. Within a wooden cuboid, it comprised the exterior space of a porch where a central pond located, and trees surrounded it. The water, trees, and columns of the porch were finely represented and detailed. For example, each leaf of the tree was modeled precisely, and the fruits were positioned within their dense allocations strategically. While the columns were accurately colored and modeled to create a colorful heavenly scene.

Information-Rich 3-D Models

The 3-D digital models of Fondation Louis Vuitton Museum created a holistic and integrated informative entity that flows real-time data about each design element between the project parties. The advancements of cloud computing facilitated the coordination process between the architectural, structural, and MEP 3-D models to prevent clashes between different components of the building and generate accurate simulations of structural elements and environmental aspects. The complex formations of the building and the comprising of different materials and structural elements and systems required the advanced parametric modeling techniques offered by BIM and computational design to enhance the decision-making and construction processes. The BIM models of Shanghai Tower responded to the challenges of the site and the function of the building. They

created a robust integration between digital and physical simulation that established on the basis of accurate information of the building model. The parametric techniques of BIM modeling allowed the designers to generate several form alternatives to facilitate the flow between modeling, simulation, and decision-making to select the optimum design solution that responds to the challenges of the location such as high-speed winds. The 3-D model comprised informative design and structural elements that embodied the artistic creations of the designers exactly as they imagined.

Conclusions

The study showed the radical role of 3-D models in describing architectural spaces. It compared two robust approaches of using 3-D models in creating spatial compositions in two different eras to emphasize the importance of the third dimension in perceiving spaces and boosting the sense of space. Ancient Egyptian 3-D miniatures were innovative and ahead of their time. They created a significant contribution to the current knowledge of Egyptology as they accurately represented a lot of the ancient Egyptian lifestyle. Current digital information models are rapidly evolving into more advanced modeling techniques and progressive methods of design collaboration. They offer a full perception of design elements and their information and support the decision-making process dramatically.

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Exhibiting Imprisoned Memories: The Construction of Site-specific Narrations in the Jing-Mei White Terror Memorial Park, Taiwan

By Ching-pin Tseng[*]

In Chiang Kai-shek's early governance of Taiwan, many political events occurred which violated human rights. During this 'White Terror' era, military commanders were authorized with powers to restrict the islanders' freedom, as well as prohibit public assemblies. Taiwanese who acted against the martial law would be committing offences of public order, or even offences of treason. The Jing-Mei White Terror Memorial Park was once the place where such political victims were held in custody and imprisoned. Until the lift of martial law, these inhuman events were not revealed to the public, and the two courts, the Ren-Ai Building (仁愛樓, the detention centers), barracks and other public buildings on the site recently have been transformed into parts of the National Human Rights Museum, Taiwan. As many political persecutions occurred and were implemented in the two courts and previous jails of the detention centers, the transformation of the site into a memorial park suggests the site-specificity of memory recollection through exhibiting the built environments, historical archives, and victims' leftovers. This paper intends to discuss the construction of spatial narrations and the means of patching up fragmented memories of these political events, as well as examining the exhibition settings for stimulating visitors' perceptions of the victims' sufferings. Finally, as young generations in Taiwan didn't experience such political oppressions, the paper would ask what sort of immersive channels could be utilized to recall the imprisoned memories and to forge some sufferers' traumatic experiences for visitors.

Introduction

Memory is a recollection of mental images about the past or is a kind of recalling of something imprinted in one's mind. To study the means of exhibiting historical traces and recollecting memories, it is essential to explore what factors can be helpful to stimulate related impressions or stories in the mind and what channels can be utilized to deliver memories to the public. In relation to the recollection of a past event, one might remember impressive venues of the event, related persons, objects, sound impressions, timing, and fragments of scenarios and so on. The aforementioned factors of recollection might trigger each other and further recompose the past narratives temporarily and spatially invoke memories of the event. In other words, for a person who had experienced a historically momentous event, through viewing and perceiving related traces, records, or clues of the event in or around the loci, his/her memories of past sufferings might be recalled. Nonetheless, if the venues of events related to some peoples' traumas

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were enclosed due to political reasons for a long time, it could be asked how other people could comprehend the happenings and realize the truth of these events by visiting relevant exhibitions at the venues. Or, if these traumas were caused by political domination or ideological prejudice, how could historical traces of these events be disclosed? And how could these traumatic experiences be perceived through exhibitions/performances along with the spatial narration of the conserved loci?

After the 2nd World War, the Japanese colonization of Taiwan was transferred to Chiang Kai-shek's governance over the island. Because of the autocratic rule and the corruption of the new governor of Taiwan, a series of political suppressions took place on the island and its people during the early period of Chiang's government. The February 28 Incident is one of the momentous political events in Taiwan's modern history; an uprising against the violence of officers of the State Monopoly Bureau and the mismanagement of the Incident of Chen Yi's officials[1] which sparked off later successive military suppressions and massacres. A severe tension was stirred up between the Nationalist troops and the islanders and thus approximately twenty thousand Taiwanese people were massacred during this Incident.[2] In order to suppress the rebellion of Taiwanese people and Chinese communists, martial law was implemented in the island from 1949 to 1987 and more than ten thousand Taiwanese people were arrested, interrogated, tortured and imprisoned by military authorities.[3] There were many unjustified prosecutions of political cases and events encroaching on human rights happened during this long-term 'White Terror' era.[4] Under martial law, military commanders were authorized to restrict the islanders' freedom of speech and publication, as well as prohibiting people's public assembly and religious activities.[5] Any Taiwanese people who

1. The February 28 Incident started from a Taiwanese widow, who was suspected of selling illegal cigarettes, being struck by agents of the State of Monopoly Bureau on February 27, 1947. The later uprisings were caused by one officer's shooting into a crowd of angry civilians, which resulted in one man dying on February 28, 1947.

2. According to George H. Kerr's investigation and 'the eyewitness accounts brought in by foreigners from every part of the island', the Nationalist troops might have massacred approximately 20,000 Taiwanese civilians. See George H. Kerr, *Formosa Betrayed* (London: Eyre & Spottiswoode, 1992), 310. Besides, according to the 228 Incident Investigation Committee established by Executive Yuan, there were between 18000 to 28000 persons hurt and massacred during this incident. See Department of Cultural Affairs (Ed.), *The Permanent Exhibition of Taipei 228 Memorial Museum* (Taipei: Department of Cultural Affairs, Taipei, 2011), 64.

3. Yan-Xian Chang, "Introduction: White Terror and Transitional Justice," in *Jieyan Shiqi Baise Kongbu Yu Zhuanxing Zhengyi Lunwen Ji* (Eds.) Yan-Xian Chang, and Mei-long Chen (Taipei: Wu Sanlian Taiwan Historical Materials Foundation, 2009), 9.

4. Ibid, 7. According to *Oxford Dictionary*, the historical meaning of White Terror is derived from 'the period of violent repression led by counter-revolutionary forces in 1795, in reaction to the First French Revolution'. Nowadays, it is used to express 'any of various periods of violent repression, especially one led by conservative or reactionary forces against a communist or left-wing regime'. See Lexico, *Oxford Dictionary*, 2019.

5. From the stipulation of Article 8 of the Martial Law, military authorities 'may try by themselves or send to district courts for trial' those who committed such crimes as offense of sedition or treason. See Laws & Regulations Database of The Republic of China, *'Martial Law (1949)', Collected in Central Law* (Laws & Regulations Database of The Republic of China, 2019).

acted against the law committed such crimes as offences of public order, or even offences of treason or sedition.

The Jing-Mei White Terror Memorial Park was employed as a place where such political victims were tried and taken into custody and in prison. Until the lift of martial law, these inhuman events were not revealed to the public, and a lot of related victims and their families redressed grievances and received certain compensations through later official investigations. The military courts and jails set for imposing political accusations have been conserved, and the site has been re-named as Jing-Mei White Terror Memorial Park since March 2018.[6] Prior to the study of the history of built environments on the site, it is important to clarify the cause of traumatic experiences and the background of 'White Terror' political events in Taiwan, so as to explore the means of narrating these imprisoned memories.

Because of the consequence of Taiwan's democratic progress and the islanders' awareness of the importance of human rights, the National Human Rights Museum of Taiwan was established in the Jing-Mei White Terror Memorial Park in 2018 (Figure 1). The Jing-Mei White Terror Memorial Park and the Green Island White Terror Memorial Park are organized by, and are under the jurisdiction of, the National Human Rights Museum. The process of establishing these two parks would on the one hand portray Taiwanese people's collective memories of the 'White Terror' era and related political traumas, on the other might reveal some political parties' collective resistance to the disclosure of such injustice. The conservation and exhibitions of the Jing-Mei White Terror Memorial Park would not only provide channels for young generations to realize the happenings of these political oppressions, but also uncover multiple historical traces for the public to perceive the victims' sufferings and to question political ideologies and prejudiced cognitions of these events that were imprinted by Chiang's Chinese Nationalist (KMT) government.

Accordingly, this paper defines the 'imprisoned memories' firstly as, memories of being imprisoned, and secondly, the confinement of revealing these happenings of being imprisoned. It is thus essential to study the cause of traumatic experiences as well as its relation to related objects and venues of the events through literature review. Moreover, the historical background of the site, the transformation of these negative cultural heritages, as well as the recollection of imprisoned memories through specific loci will also be explored. In the end, the paper will further discuss the potential methods of recomposing such imprisoned memories through analyzing the spatial narration of conserved loci and related spatial regenerations, as well as studying the means of exhibiting and revealing stories and memories of these historical traces and leftovers of the sufferers who were imprisoned then.

6. The site was named as Jing-Mei Human Rights Memorial Park from 2010 to the February of 2018.

Figure 1. *The Title of 'National Human Rights Museum' Is Set on the Existing Main Gate of the Jing-Mei White Terror Memorial Park*
Source: Ching-pin Tseng

Collective Traumas and the Transformation of Negative Cultural Heritages

Historical momentous events, which could include natural disasters, wars (battles) among nations or races, and political massacres and so on, often cause the victims physical and mental suffering. These sufferings would deeply shape related persons' unforgettable or traumatic memories or cause psychological disturbances to the victims, because of the events' unexpectedness and violence.

To study traumatic memories and the representation of traumatic experiences, it is essential to clarify the definition and the cause of a trauma. According to *Oxford Dictionary*, a trauma means 'a deeply distressing or disturbing experience' and an 'emotional shock following a forceful event or a physical injury, which may lead to long-term neurosis'.[7] In relation to the mental process of traumatic experience, Sigmund Freud states that it is 'an experience which within a short period of time presents the mind with an increase of stimulus too powerful to be dealt with or worked off in the normal way, and this must result in permanent

7. Catherine Soanes, and Angus Stevenson (Eds.), *Oxford Dictionary* (Oxford: Oxford University Press, 2006).

disturbances of the manner in which the energy operates.'[8] This permanent disturbance of energy operation in oneself can thus be regarded as psychologically unbalanced stress after experiencing such traumas. With regard to the diagnosis of posttraumatic stress disorder (PTSD), Richard J. McNally further defines the traumatic stressor as on the one side '… only those stressors associated with serious injury or threat to life', and on the other 'we might allow any stressor to count as traumatic if it terrifies the person or produces certain symptoms.'[9]

In terms of political repression or inhuman torture, such stressful events or physical injuries might happen to a group of persons, races, communities, and countries. Collective traumas would continuously affect the whole society and might cause related persons' mental sufferings more than the traumas itself. Especially, collective political oppressions and unjust treatments could have been concealed for a long time due to the cases' inhuman manipulation, and the victims as well as their family members might thus suffer from additional psychological depressions due to social contempt or injustice. Moreover, because the truth of these events could be concealed by the domination of certain political authorities, ruptures among races and peoples might be increasingly generated.

Accordingly, by means of conserving the loci of political persecutions and exhibiting the data of historically momentous events, traumatic experiences can be reinterpreted and be disseminated to the public for positive and educational purpose. To discuss the exhibition of imprisoned memories and collective traumas caused by the political dominations of Chiang K-s's KMT government and related 'White Terror' events, the historical background and the spatial transformation of the site, the detention centers, and the two courts and so on, will be discussed in the following sections.

The Historical Background of the Jing-Mei White Terror Memorial Park

Under the control of Chiang's military government, most Taiwanese people could not express their ideas about public affairs or even read any book related to democracy or communistic thoughts. There were thus many cases related to political offenders or dissidents towards KMT's ideology in the early part of the Martial Law period. The great need for military law personnel led the Ministry of National Defense to establish a military law school on the site from 1957 to 1967; student dormitories and Chiang K-s Hall have been preserved since the military law school was moved out in 1967[10] (Figure 2). From 1967 to 1980, the First Court, the Military Court and the new detention centers of both the Judge Advocate Office and the Department of Military Law were constructed on the site for the purpose of sentencing most major white terror cases and holding military

8. Sigmund Freud, *Introductory Lectures on Psychoanalysis* (London: Penguin Group, 1991), 315.

9. Richard J. McNally, *Remembering Trauma* (Cambridge and London: The Belknap Press of Harvard University Press, 2005), 79.

10. The above historic information is referenced from Wei-chou Wang, *The Final Report for the Investigation Research of the Historical Buildings of Jing-Mei Human Rights Cultural Park and the Building of Auto Repair Brigade* (New Taipei City: The Preparatory Office of the National Human Rights Museum, 2011), 73-85.

prisoners, political prisoners and felons etc. During this period, these detention centers (仁愛樓, the Ren-Ai Building) were named as '新店二十張景美軍事看守所' (Jing-Mei Military Detention Centers in Xindian, Xindian Ershi Zhang Jing-Mei Junshi Kanshousuo).[11] In 1975, Chiang K-s died, and his rule of the island transferred to one of his sons, Chiang Ching-kuo, three years later. In Chiang C-k's early governance of Taiwan, the dominant politics continued for some years. In 1984, a special prison house was built for the detention of His-ling Wang, director of the intelligence bureau of the Ministry of National Defense, who was sentenced to lifelong imprisonment after the assassination of dissident journalist-writer Chiang Nan (江南).[12] The above case also reveals Chiang C-k's subsequent political domination over the island and its people. From 1980 to 1991, a front gate, a reception room and sentry posts were built near the Hsiulang Bridge; the two courts and the detention centers have been preserved since then. Through tracing the historical background of the Memorial Park, the horror and darkness in Taiwanese society from post-war to the end of the 20th century can be revealed.

Figure 2. *The Conserved Chiang K-s Hall Is Still in Use*
Source: Ching-pin Tseng.

11. Ibid, 108-110.
12. Ibid, 112-120.

In 2001, having known that the Ministry of National Defense planned to reconstruct the site, Vice President Hsiu-lien Lu, a former sufferer of the Formosa Magazine Incident, proposed the idea of preserving the detention centers and other public buildings in her visit to the site. Although there were some opposing voices regarding her proposal, these 'Jing-Mei Military Detention Centers in Xindian' were later registered as historical buildings of Taipei County in 2007.[13] Since the Council of Cultural Affairs took charge of the park, the site and most of the buildings on it have been preserved and conserved till now.

The Spatial Transformation from Jing-Mei Military Detention Centers to the White Terror Memorial Park

From the background of the site and the social value of existent historical buildings on it, the preservation and conservation of these tangible cultural heritages suggest a future vision for transforming collective traumas into positive understandings of the history, and a potential for visitors to empathize with the sufferers. Based on the principle of preserving original historical traces and the spatial context of the site, most of the buildings are conserved according to their previous conditions and transformed into exhibition rooms (Figure 3). In addition, for establishing Jing-mei White Terror Memorial Park and for preparing National Human Rights Museum, some new constructions and memorial spaces were constructed on the site or were set together with non-registered heritages.

In association with White Dove Square and a pond, a new imagery construction highlighting the entrance of the park was constructed by using 'high walls' as symbolic elements to express the concept of 'imprisonment'.[14] A series of concrete high walls are set across the building of the previous Higher-grade Military Court Prosecution Bureau to represent the dissidents' 'conflict with the military authorities'[15], as well as suggesting physical and psychological sufferings of being compressed and tortured. A strong will for challenging the authority is thus demonstrated by these penetrating concrete walls which present narrow and compressed spaces with dramatic brightness projecting from the top and the end of the imagery construction (Figures 4 and 5).

In terms of the regeneration and exhibition of the two courts and the detention centers, some simulative spatial scenes and descriptive information of 'White Terror' events were installed in these places to illustrate the history and phenomena of holding political sentences and imprisoned lives of the sufferers. The former student dormitories of the Military Law School were also transformed into exhibition spaces to demonstrate the narratives and history of white terror events (Figure 6). In considering the inhuman history of the political events which occurred in Taiwan, and Taiwanese people's delayed knowledge of those imprisoned memories, the site along with related historical buildings could be regarded as a negative cultural heritage that is 'a conflictual site that becomes the

13. Ibid, 125.

14. Chien Architects and Associates, "The Entrance Imagery of Jing-mei Human Rights Cultural Park," *Taiwan Architecture* 264 (2017): 93.

15. Ibid.

repository of negative memory in the collective imaginary.'[16] By preserving the places of imprisonment and disclosing stories of inhuman events, the site and related built environments may act as channels for recalling negative memories of the sufferers and their families on the one hand, and can serve as site-specific teaching materials for reclaiming human rights and for forging democratic visions for the future on the other.

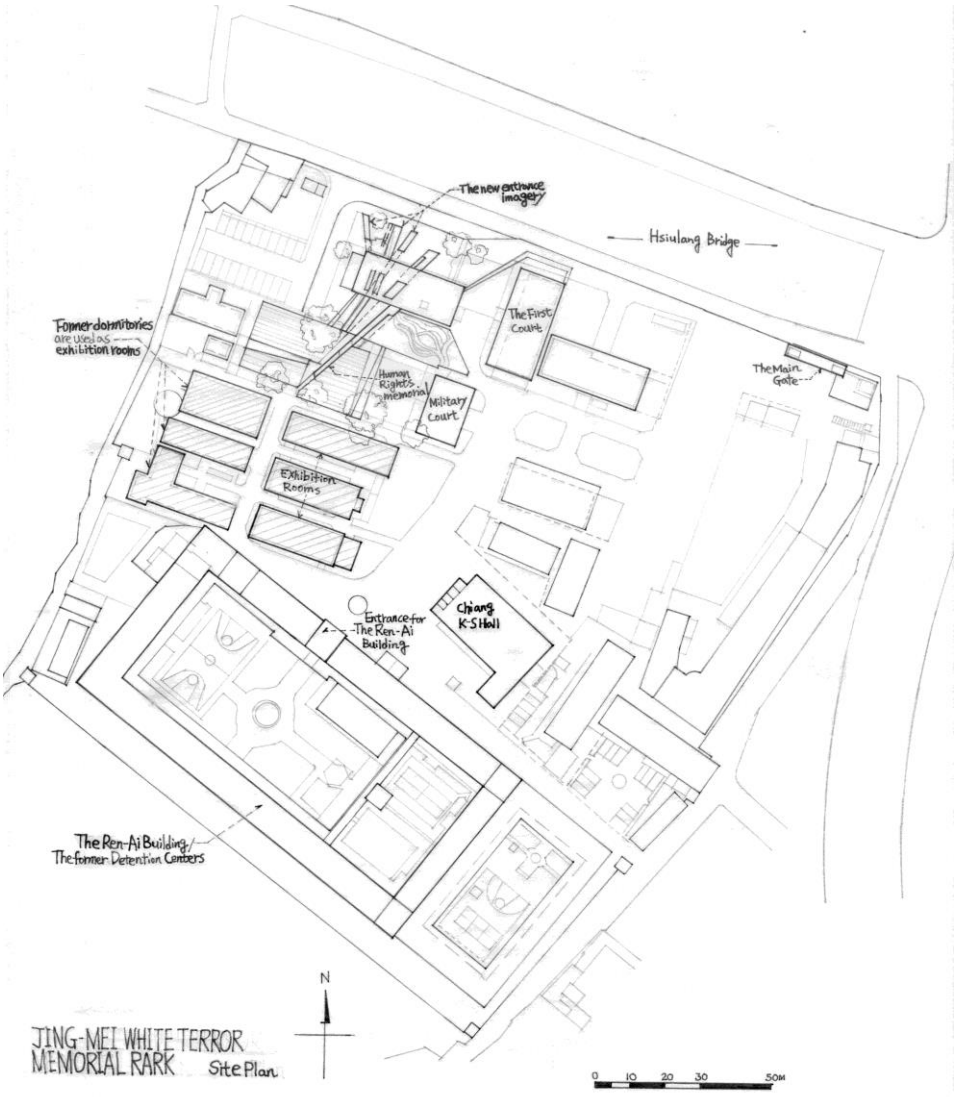

Figure 3. *The Site Plan of Jing-Mei White Terror Memorial Park*
Source: Wei-chou Wang, redrawn by Ching-pin Tseng.

16. Lynn Meskell, "Negative Heritage and Past Mastering in Archaeology," *Anthropological Quarterly* 75, no. 3 (2002): 558.

Figure 4. *The New Entrance Imagery is Connected with the Previous Building of the Higher-Grade Military Court Prosecution Bureau*
Source: Ching-pin Tseng.

Figure 5. *A Human Right Memorial with Engraved Names of 'White Terror' Victims was Built along with the New Entrance Imagery*
Source: Ching-pin Tseng.

Figure 6. *The Former Student Dormitories of the Military Law School have been converted into Exhibition Rooms*
Source: Ching-pin Tseng.

Memories, Specific Places and Spatial Narrations

Memories are closely related to people, things, happenings, and places that the people encountered before. Through these experiences of encountering, layers and layers of mental images can be engraved in people's mind. By means of recollection, the past can be called to mind, as well as being associated with existent traces of the past occurrences. In discussing Aristotle's theory of memory and reminiscence, Frances Yates paraphrases Aristotle's words by saying that:

> Memory, … belongs to the same part of the soul as the imagination; it is a collection of mental pictures from sense impressions but with a time element added, for the mental images of memory are not from perception of things present but of things past.[17]

That is, memory can be regarded as the lasting state of mental pictures that have been collected from sense impressions of things past. With regard to the state of mental impression being long lasting in memory or being effaced quickly, the variation of age and temperament of the person act as determinant factors.[18] Accordingly, the difference between memory and reminiscence (or recollection)

17. Frances A. Yates, *The Art of Memory* (London: Pimlico, 1996), 47.
18. Ibid.

can be discerned. Yates further discusses Aristotle's words and says that '[r]ecollection is the recovery of knowledge or sensation which one had before. It is a deliberate effort to find one's way among the contents of memory, hunting among its contents for what one is trying to recollect.'[19] As Yates states that Aristotle's emphasis on the process of recollection is closely related to the principle of association and is based on the similarity, contiguity or dissimilarity between the contents of memory and sense impressions[20], it would be essential to explore what sources and means might benefit the recollection of sense impressions related to specific places. In other words, in terms of the recollection of past impressions in people's mind, it is important to discuss the spatial factors of places or venues where relevant events occurred.

In terms of the curation of exhibitions that are relevant to historical events, museums can be prevalent venues or institutions for recalling collective memories by means of narrating related information or stories. According to M. Christine Boyer, '[t]he museum offers the viewer a particular spatialization of knowledge - a storage device - that stems from the ancient art of memory.'[21] This particular spatialization of knowledge that the visitor may perceive can be explored through two aspects. One is the curation of an exhibition in accordance with the story line of related events through visual presentation and spatial narration in a museum; the other is the conveyance of the events by associating with the visualization of the events' data and the spatial discourse between the happening of the events and the spatial context of the venue that has been transformed into a museum. The former aspect may merely focus on the visualization and spatialization of the information portrayed in the exhibition. The latter suggests that the historical and spatial context of the events that are closely related to the museum building and the site might have shaped people's imprints of the places, and can be unveiled in association with the spatial narration of the museum and the exhibition of the events. The former type of museums could thus be newly built and might not be located on the specific venue of the event(s)[22]; while the latter would be established within extant building(s) and specifically on the venue where the event(s) occurred.[23] The former may reveal collective memories without necessarily being associated with the spatial and historical relationship between the event's venue and the museum building; whilst the latter is inclined to suggest specific

19. Ibid, 48.

20. Ibid.

21. M. Christine Boyer, *The City of Collective Memory: Its Historical Imagery and Architectural Entertainment* (Cambridge and London: The MIT Press, 1994), 133.

22. For example, United States Holocaust Memorial Museum is a newly built museum and there is no direct connection between the building site and the venue of the Holocaust.

23. For example, the Auschwitz-Birkenau Memorial and Museum in Poland and Eden Camp Modern History Theme Museum on the outskirts of Malton in England were established on the venues where the historical events occurred. The Auschwitz-Birkenau Memorial and Museum is former German Nazi Concentration and Extermination Camp that was established in 1940 and was controlled by Nazi Germany when Poland was under Nazi's occupation during the World War Two. See Memorial and Museum, Auschwitz-Birkenau, *Museum and History*, 2021. Eden Camp Modern History Theme Museum was originally a war camp for accommodating Italian prisoners of war. See Eden Camp Modern History Theme Museum, *About Us and Discover* (Eden Camp Modern History Theme Museum, 2021).

historical and spatial discourses between the existent building(s) and the venue of the event(s), as well as delivering collective memories of the event(s) along with the site and the relics.

In discussing the role of the museum as a memory device, Boyer states that '[b]y the nineteenth century, … its rooms or "topoi" were places to stop and to look around, to visually observe the common and contrasting features … The path through the sequence of rooms narrated the evolutionary development of history and simultaneously walled in the heterogeneity of time.'[24] This means of setting spatial sequences for structuring the historical relations among artworks (exhibits) and to express the history of curated exhibits, or for prompting memories of past events that are exhibited in a museum can also be discovered in some contemporary cases.[25] In terms of the narration of historical events, however, the exhibition set in a museum that has been transformed from an extant venue might be different from the exhibition curated in a newly built museum. Because exhibitions held in a newly constructed museum may demonstrate a process of re-composition of past events and related narratives, the visitor may not recollect perceptional and spatial memories of the events by viewing the exhibits and by following the spatial sequence of the exhibition. Accordingly, to further associate stories of specific events with related places, the paper suggests that the exhibitions could be held in specific sites or at specific places, rather than in newly established museums. That is, the site-specificity of exhibitions can reveal certain spatial characteristics and auras for the visitor to grasp relevant situations or tactile experiences of the happenings.

Regarding the happenings of 'White Terror' events in Taiwan, most of the islanders couldn't receive the information before the relief of martial law. The loci of sentencing and detention also couldn't be disclosed publicly until the human rights of Taiwanese people had been obtained. The Jing-Mei Military Detention Centers are preserved and conserved for the purpose of unfolding the history and stories of 'White Terror' events in the island. In order to deliver the spatial sense of being imprisoned and the situation of being dominated by the authority, most of the Military Detention buildings and the two courts are presented in their original states. The visitor can discover lots of political slogans and signs, leftovers of the victims, and torture instruments etc. in many places of the site and in the confined detention rooms. Traces of political domination and recorded images of the sufferers' lives in the jails may stimulate visitors' imaginations of the victims' traumatic experiences. Hence the site-specific exhibitions of the political happenings together with the spatial narration of the restored settings of the jail rooms may draw young Taiwanese generations into a cognitive and sensory association with the white terror events.

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24. Boyer, *The City of Collective Memory: Its Historical Imagery and Architectural Entertainment*, 1994, 133.

25. For instance, the exhibitions of the newer building of the National Museum of Scotland are curated chronologically to present Scottish history, starting from the lowest level about prehistory to the medieval period, and on the higher levels, histories of later and modern periods are conveyed.

Means of Exhibiting Imprisoned Memories and Spatial Experiences

As the Jing-Mei White Terror Memorial Park is preserved to demonstrate an on-site museum or a memorial park, the site, the Ren-Ai Building, related built environments and the newly constructed memorial, can be regarded as physical referents for patching up the islanders' memories of white terror events and for unveiling the victims' imprisoned sufferings. To recollect the victims' and Taiwanese people's collective memories of the events, various channels and media can be associated with the spatial narration of those incarcerated spaces, and further to exhibit data of specific political happenings as well as uncovering such unbearable situations.

Theme Guided Tours and Site-Specific Exhibitions

Because the happenings of the 'White Terror' events had been enclosed for several decades and the visitor thus could not realize the history of the construction of the cells, barracks and the two courts and so on, three different theme tours for general visitors have been scheduled (Figure 7). Firstly, 'A Brief Introduction of the White Terror' by young officers has been set daily with a route from visiting the exhibitions in the barracks to the Human Rights Memorial to convey the history of 'White Terror' events and stories of the two White Terror Memorial Parks. Secondly, for visitors to perceive the sufferings of political prisoners and their family members, a theme tour in Ren-Ai building is arranged with a route from the entrance to the internal cells, public places and to the factories, by inviting related sufferers or their family members who were involved in the events to share their experiences of living in such situations. Thirdly, for providing visitors with more information about the trials and narratives of significant political cases, a guided tour from the Military Court to the First Court, and to the Special Jail Quarter for Hsi-Ling Wang is set. Especially, the trials of a series of significant 'White Terror' cases, such as the Formosa Magazine Incident, which were held in the First Court, will be introduced along with a set of interactive digital media.

According to the setting of the administrative office of the memorial park, the first guided tour focuses on visiting exhibition rooms by introducing the outline of limited cases within a short period of time. The visitor might not fully grasp the happenings of 'White Terror' events and clearly understand the relationship between the loci and the narratives of these events. In association with the second and the third theme tour, however, visitors might perceive spatial impressions of being imprisoned in such compressed and distorted environments due to these places' spatial characteristics and some immersive situations forged by interactive installations. Moreover, as the purpose of constructing the Jing-Mei White Terror Memorial Park is to exhibit imprisoned traumas of specific political events, for the sufferers and their family members who were involved in these events, the site has preserved their traces of bodily and mental sufferings, as well as building up a close relationship between the sufferers' spatial experiences in the site and their memories of being imprisoned.

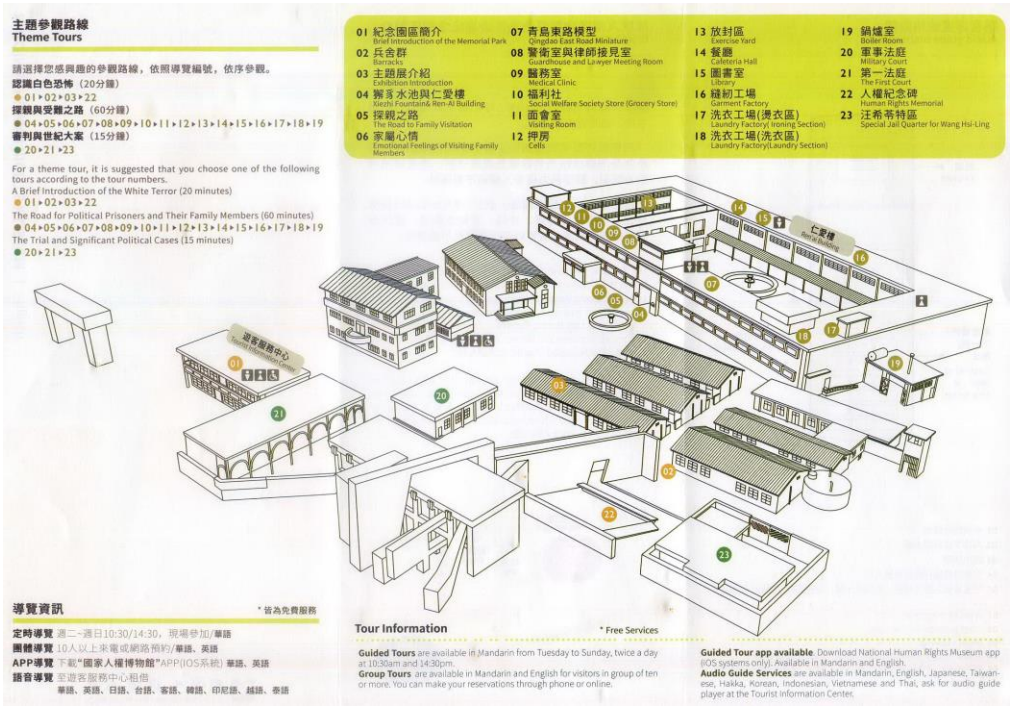

Figure 7. *Tour Information of the Memorial Park*
Source: Jing-Mei White Terror Memorial Park.

In terms of exhibiting imprisoned memories and collective traumas, the paper suggests that the notion of site-specificity would contribute to the re-composition of such experiences through spatial, visual, and verbal narration. According to Nick Kaye, 'site-specificity focuses on the interrelationship among artistic works, events, behaviors and the characteristics of a place.'[26] In the light of Kaye's statement, the paper argues that in terms of the conveyance of the memories of these 'White Terror' events, there is a process of semantic interchange among the events, participants' behaviors, site-specific arts, and the places where they are located. This process of exchange articulates the properties and qualities of the works and defines the value of their existence. The site-specificity can trigger spatial attributes of the locations of artworks, as well as stimulating the beholder's spatial perception of the venues. Accordingly, by associating the site-specificity of these loci with related information and some prisoners' leftovers, related persons' traumatic memories would be recollected, and young Taiwanese generations' ignorance of past political oppressions can be patched up.

In visiting the Ren-Ai Building in the memorial park, it is possible to perceive a sense of being compressed and tortured because of the spatial aura of the constricted cells and the bored setting of public spaces, e.g., the visiting room, the cafeteria hall, and factories and so on. In relation to the curation of relevant exhibitions in the detention centers and in other buildings of the site, there are two issues can be discussed in this section. Firstly, the story lines for setting the

26. Nick Kaye, *Site-Specific Art* (London and New York: Routledge, 2000), 1.

exhibitions in the existent places of the 'White Terror' era might be closely related to the temporal traces of relevant events and the spatial sequences of the happenings. That is, the scenarios of narratives that occurred in the site and in related built environments can be temporally portrayed by the spatial sequence of events, as well as being illustrated together with the spatial characteristics of the places where the sufferers were situated during their imprisonments. Moreover, the exhibition of the history of 'White Terror' events and the spatial narration of constructing the site and its built environments could be correspondent to the narratives of Taiwanese people's courses in struggling for human rights.

Secondly, in relation to the guided tours set for the visitor, a brief background of these historical events, the information of constructing the site and its built environments, as well as the narrative relationship between the happenings and the memorial park could be outlined; however, to visitors and young Taiwanese generations who did not encounter the happenings of the events, the narration of relevant stories and occurrences by noninteractive visual and spatial exhibitions might be insufficient and inactive. Moreover, from the above discussions about the setting of theme tours in the memorial park, any singular guided tour would be difficult for visitors to fully perceive such indescribable sufferings caused during the 'White Terror' era. Hence, the paper argues that there can be an alternative means or narrative media for generating immersive experiences for beholders. This means or narrative channel may also take advantage of the site-specificity to stimulate the audience's perception of the place along with the sensory impression of the events. In addition to the curation of on-site exhibitions of 'White Terror' events, the paper suggests that the holding of site-specific performances at the venue of events can also prompt beholders' empathy with related sufferers of the happenings. Regarding the notion of site-specific performance, Marvin Carlson states that:

> In such productions already written texts are placed in locations outside conventional theatres that are expected appropriate ghostings in the minds of the audience, or, in more extreme cases, new works are created that are directly inspired by the extratheatrical associations of these locations.[27]

Hence, in terms of the significance of strengthening audiences' resonances with the political events by associating theatrical performances with previous spatial settings and auras of related places, an immersive way of representation or revelation of the imprisoned memories could be proposed and further discussed in the following section.

Experiencing the Events through Immersive Theater

To visitors who weren't subjected to the political compressions and persecutions, static and passive channels of exhibitions might not stimulate their perceptions of those inhuman sufferings and cause their empathies with the

27. Marvin Carlson, *The Haunted Stage: The Theatre as Memory Machine* (Ann Arbor: The University of Michigan Press, 2003), 134.

sufferers. In the paper of "Performance and Death: Ronald Reagan", Peggy Phelan proposes that '…performance might provide a model for witnessing a historical real that exists at the very edge of the phantasmatic – events that are both unbearably real and beyond reason's ability to grasp: events that are traumatic'.[28] By participating in a performance that intends to simulate the situation of being incarcerated and persecuted, the spectator may bodily and mentally experience such unimaginable sufferings. It can thus be suggested that a sort of immersive theater or interactive exhibitions need to be established to invoke the visitor's visual and spatial perceptions as well as imaginations of being imprisoned in such confined places.

In terms of exhibiting imprisoned memories through theatrical performances, there are two aspects which can be discussed. The first aspect is about the setting of narrative scenarios and the viewpoint of the audience for historical interpretation. The second one is the spectatorship and responsiveness of audiences who are not familiar with the historical background of the 'White Terror' events. Since the opening of the Jing-Mei White Terror Memorial Park, there have been some theatrical performances presented in/at specific places of the site to demonstrate pertinent political narratives.[29] For example, a site-specific performance entitled *Too Many Dreams in One Night: A Survival Proposal for Returning to an Alien Place* (夜長夢多：異境重返之求生計畫)[30] was shown in 2018, which intended to guide audiences to the historical venues to personally experience political suppression that is similar to what occurred in the 'White Terror' period. This performance associates with installations, virtual reality, and immersive theatrical settings for visitors to confront bodily torture and imprisonment through successive scenarios of being interrogated and shackled in jail rooms. In other words, it is inclined to forge simulative experiences for participants to ponder over the relationship between the individual and the collective regarding persecutors' violence over the sufferers, as well as perceiving the long-term terrors caused by Chiang K-s and his heirs' political dominations.

Prior to the performance, audiences were guided into Ren-Ai building and behaved by following the order of a soldier who was played by a performer. After walking through several dark corridors, audiences were directed into a cell and later were separately guided to varied spaces (Figure 8). Furthermore, due to being bodily imprisoned and restrained without freedom, the participant thus acted as a criminal and was instructed to wear an eye mask, and could only follow orders from the earphone that they were asked to wear.[31] In the next scenario, the

28. Peggy Phelan, "Performance and Death: Ronald Reagan." *Cultural Values* 3, no. 1 (1999): 118.

29. For instance, *I Promised I Wouldn't Cry* (說好不要哭) and *From Frost to Qingming* (降霜到清明) were respectively performed in the site during the Human Rights Day 2019 and 2020. Retrieved from: https://www.nhrm.gov.tw/w/nhrmEN/events. [Accessed 13 January 2022.]

30. Dark Eyes Performance Lab, *Too Many Dreams in One Night: A Survival Proposal for Returning to an Alien Place*, immersive theatre x VR x installations, set and performed at The Jing-Mei White Terror Memorial Park on Nov. 29, Dec. 2, 6 and 9, 2018 (Dark Eyes Performance Lab, 2018).

31. Ibid.

audience heard and watched some cases of unjust stories which happened in Taiwan during the 'White Terror' period, as well as grasping simulative situations of relevant happenings through VR setting.[32] Moreover, the beholder acted as if being sentenced for committing a certain crime after being called out, interrogated and tortured in a cell[33] (Figure 9). Some audiences might not psychologically identify with these simulative scenarios of interrogation, however, as well as immersing in this sort of situation due to the difference between the theatrical settings and actual lives that the audiences have experienced.[34]

Figure 8. *Too Many Dreams in One Night, Audiences Were Guided by Performers*
Source: 陳藝堂 (Chen, Yi-tang)/ Dark Eyes Performance Lab

32. Ibid.
33. Zheng-han Wu, "Zhenshi de Zhaohuan yu Jixian." *Performing Arts Review* 315 (2019): 84.
34. According to Wu's personal experience of participating in the show, he tried to accept the reality of the set scenarios by responding to the interrogation with true answers. Thus, punishments of being handcuffed and throttled were caused because that response had aroused the anger of the interrogator. Ibid.

Figure 9. *Too Many Dreams in One Night, an Audience was interrogated in a Cell*
Source: National Human Rights Museum

Contrary to the above scenes, a following scenario was set in a court room, where a persecutor, who took part in previous persecutions, was standing in front of the audience. Ironically, participants could have a chance to make a judgement whether the person could be forgiven or should be put to death. From this setting, it is possible to discover the transformation of the audience's role from a sufferer to a decision maker (or a persecutor), as well as questioning the standpoint of related authority and the result it had caused.35 In the end of the show, when the audience had been guided to the courtyard of the Ren-Ai Building, some dancers were subsequently strolling and performing like walking corpses from all directions to the center of the courtyard. With various characters and performers converging in the center, the ending of this show demonstrated that all scenes and situations that had been presented were non-realistic.[36] (Figure 10). Apart from the contrast between the simulative situations and the ending performance, the paper would state that this so-called immersive theater or participant performance could forge participants' physical experiences of being tortured, as well as stimulating their psychological empathy with the sufferers. Because a lot of visitors did not have experiences of living in the 'White Terror' circumstances, however, some imitative dialogues and interactions between set characters and audiences might imply a sort of contempt for pertinent sufferers and victims because of the inconceivability of these collective political sufferings.

35. Ibid, 85.

36. Ibid. Also see Dark Eyes Performance Lab, *Too Many Dreams in One Night: A Survival Proposal for Returning to an Alien Place*, 2018.

Figure 10. *The Ending Show of Too Many Dreams in One Night*
Source: National Human Rights Museum.

Conclusion:
Recomposing Collective Memories through Spatial-Temporal Narrations

From the above discussions, it can be discovered that there are multiple means for exhibiting imprisoned memories, and it can be stated that static and passive ways of exhibition may not deliver immersive and sensational experiences to audiences. By setting perceptional, immersive, and participant performances at historical venues or loci where 'White Terror' events happened, tactile and psychological perceptions may trigger audiences' empathy with the sufferer's experiences. Concealed historical traces could thus be exposed, and through this collective memories might be gradually patched up.

Regarding the storylines for narrating the sufferers' experiences or for recalling memories of being imprisoned, it would be essential to compose these narratives by both synchronic and diachronic ways, so as to establish a spatial-temporal structure of spatial narration. In other words, a linear way of narrating the history of the park and the diachronic development of 'White Terror' events through the on-site exhibitions could be associated with the synchronic narration of some sufferers' lives in the jail by means of immersive theater. Furthermore, the notion of site-specificity may contribute to the visual and spatial representation of the happenings, as well as the recalling of imprisoned memories of the sufferers.

The employment of immersive theaters as means to recollect audiences' memories of specific events or places has become a trend in Taiwan.[37] For example, a site-specific immersive theater *A Walk through Utopia* that was produced by Kaohsiung Museum of History and shown in the house of Qi-hua Ke (柯旗化), a sufferer in the 'White Terror' period, presents sufferings and memories of Ke and his family members in the period.[38] By means of the direct participation of audiences in the unfolding of theatrical scenarios, spectators can perceive the sufferer's situation and sense the spatial auras from the site-specificity of related venues. In terms of means or channels for reshaping experiences of sufferings in past political events, as well as for recollecting memories of related happenings and places, the paper concludes that the spatial narration of the site and its curated exhibitions would be comprehensive and perceivable if the audience could interactively participate in the exhibitions together with theatrical settings. Moreover, in association with the site-specificity of restored detention centers, interactive exhibitions and immersive participation in the theatrical performances, the visitor's empathy with the related sufferings and sense of being imprisoned can be stimulated.

At the end, with regards to the guided tours in persons, the paper suggests that differences of political ideology might be unavoidable in relation to the narration of these political incidents, because varied narrators could propose their biases and interpretation of the 'White Terror' events. By providing multiple channels of spatial and visual representation of the political events for the visitor, and to disclose multiple experiences of identifying the subjectivity of the island, the purpose of re-establishing the islanders' human rights could be successful and positive.

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37. There were also some immersive theaters shown in specific historical heritages in Taiwan to narrate stories of these places and provide the audience with chances to experience these theatrical scenarios.

38. The Ke Qi-Hua House, *A Walk through Utopia* (The Ke Qi-Hua House, 2016). Ke's house cannot be regarded as a negative cultural heritage, and the scale of the site is smaller than the Jing-Mei White Terror Memorial Park.

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Autism and Architecture: The Importance of a Gradual Spatial Transition

By Alessandro Gaiani[*], Duccio Fantoni[±] & Salome Katamadze[°]

The research in the following paper is developed in collaboration with the no-profit organization "Università per i Disturbi dello Spettro Autistico" (UDSA), active on the issue of the role of surrounding environment in the educational process of neuro-atypical young adults. Even though, wide range of population is diagnosed with Autism Spectrum Disorder (ASD), the literature primarily refers to childhood period of neuro-atypical individuals. The study explores how Architecture could help young adults with ASD to become more independent and discover their capabilities reducing environmental obstacles. The Autism Spectrum presents a wide range of cases and hues that does not permit the use of general guidelines for the design process, on the contrary, it requires taking into consideration the variety of attitude toward the surrounding environment. Therefore, the paper interrogates the methodological framework of Architecture to tackle the complexity of the design challenge with a trans-disciplinary approach; a variety of figures, outside architecture discipline, were involved in the research. An adaptive method has been used, based more on Greek idea of metis, the ability to take advantage of circumstances rather than using the Platonic notion of "eidos", which referred to a determined pattern, to face the multifaceted aspects of the phenomenon.[1] The study resulted in an Architectural project for The University of Autism Spectrum Disorder, in which the strategy of Gradient defines the spaces based on their intensity, activity and frequency. By considering weaknesses and insufficiency that has emerged during the research period, this paper proposes a lucid theory of the design process integrated with contradictory aspects of the spectrum.

Introduction

Even if, the studies on Autism Spectrum Disorder consistently describe the mechanisms and causes of neurodevelopment abnormalities, they still contain a limited source of information on the Architecture's relevance to the issue and its importance in the everyday life of individuals diagnosed with it.

According to the Centers for Disease Control and Prevention (CDC), in 2014 over 1% of the American population was diagnosed with Autism Spectrum Disorder (1 in 68 children). However, in Europe statistical database is rather scarce, but based on the Department of Health, Social Care of UK it is estimated that more than half a million people in England have autism. This is equivalent to more than 1% of the population. Moreover, as stated by the Autism Spectrum Disorders in the European

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1. Refer to: Alessandro Cravera, *Allenarsi alla Complessità* (Milan: Egea, 2021), 51.

Union (ASDEU) due to limited research on adults, many persons with ASD are not even diagnosed until adulthood, whatsoever environment is not responding to their needs. Through this analysis, it is understood that spatial studies and their performance on neuro-atypical individuals go far beyond minority group necessities.

Even though United Nations adopted the standard rules on the equalization of opportunities for persons with disabilities on 20 December of 1993 (resolution 48/96 Annex),[2] which represents the moral and political commitment of Governments to take action towards impartiality of educational or career advancement, it still does not speak about individuals with Autism Spectrum Disorder. In fact, according to the survey published by the Office of National Statistics (ONS) at the National Autistic Society of UK on 19 February of 2021, Only 22% of autistic adults are in any kind of employment, which is lower than any previous survey conducted by the association.

According to this analysis, the process of developing abilities and specific talents in the neuro-atypical individuals not only in childhood age is directly connected to their growth towards an independent future. The Architectural research faces design challenges in those processes and aims to identify its role in different stages.

The University's educational project is based on the American college model, for the young individuals after high school and before their orientation in the specific field of specialization. Along with the design research, the proposal in parallel reflects the didactic structure and its adaptive solutions. Explicitly, the organization concentrates on the preparation and integrating of individuals with ASD within society, by strengthening personal talents or abilities after compulsory education. For this reason, the study aims in the following pages to underline the influence and the contribution of Architecture in the improvement and apprehension of Autism Spectrum Disorder.

Due to the opposite poles of the spectrum as hypersensitivity or lack of sensitivity, unidirectional design guideline cannot be applied but rather deepened crucial Architectural criteria. Neither, it can be generalized within inclusive school design accommodations, simplifying Spectrum within special educational needs. In fact, the research project intends to provide a spatial strategy, coherent and adaptive towards given current statistical situation about individuality with ASD in Italy. Moreover, the architectural project refers to the local problematics of the issue.

Literature Review

The literature and informative referential part of the research process has continuously advanced with the contributions of a group of doctors, led by Dr. Marta Stanzani and other representatives from the world of education, public administration and parents, gathered in the non-profit organization UDSA. As

2. UN Global Program on Disability, *Standard Rules on the Equalization of Opportunities for Persons with Disabilities - Target Areas for Equal Participation: Accessibility* (United Nations General Assembly Resolution 48/96, Annex, 1993).

already mentioned, the architectural part follows the educational program carefully developed by the group members, leaving the space for interpretation and contribution from the design process.

At the same time, after overviewing external sources, it has been understood that existing scientific literature regarding Architecture in relation to individuals with ASD (especially when it comes to an adult age individual's environment) rarely considers the wide range of Autism Spectrum; in fact, the majority of the studies regards the relationship between Architecture and the general idea of Autism, with scarce attention towards the hues of cases, which could be very different one from the other.

Nevertheless, some of the theatrical references remain crucial for a deep understanding of the Spectrum and analysis of its most common, until now known effects. Architect Magda Mostafa is one of the names that cannot be left out while speaking about ASD. Apart from the ASPECTSS as a first index of the design guidelines applicable worldwide, like a project development tool, she has published numerous articles about methodology and study cases in the framework of architectural factors or spatial characteristics, such as acoustics, visual (colours and patterns), visual (lighting), texture, olfactory and spatial sequencing of functions.

Likewise, it worth mentioning professor Joan Scott Love with researches done in the framework of a studio teaching experiment[3] of Leeds Beckett University, Faculty of Architecture, where the first phase of the research is to analyze the theoretical part of the topic, followed by a comparative method of already existing buildings adapted or designed from the beginning for the neuro-atypical individuals. However, the design laboratory research takes references from the ASPECTSS mentioned previously.

As a summary of theoretical and practical information, a fundamental reference has been the article by Francisco Segado Vázquez and Alejandra Segado Torres - Autism and Architecture published in the scientific community IntechOpen. On the historical background, the article outlines contrasting sides of the Spectrum and tries to define the importance of the Architecture in finding spatial results, however, the research stops on the analytic point of view without offering a specific solution.

On the background of scientific articles, research or informative platforms such as Spectrum, ASDEU, National Autistic Society and Autism Europe has been considered crucial for finding common ground and deepening statistics or educational conditions for individuals with ASD in various countries. What is more, those associations remain key resources for understanding daily opportunities and future perspectives for neuro-atypical individuals in real-time. The news, which is constantly updating, gave the paper the possibility to evolve the project, following up to date information.

However, to understand better what it means to live with ASD in an environment that does not adapt to your needs, external literature has also been a great support. A book that has been published in 2007 with the title "The reason I

3. J. Love, "Sensory Spaces: Sensory Learning – An Experimental Approach to Educating Designers to Design Autism Schools," *Archnet-IJAR, International Journal of Architectural Research* 12, no. 3 (2018): 152-169.

jump: The inner Voice of a Thirteen-Year-Old Boy with Autism",[4] written by a young boy Naoki Higashida, has been a fresh view to the ASD awareness.

Such brilliant literature, written by individuals with Autism, become not only a chance of comprehension of the state of mind, difficulties or just various sensibilities, but also a testimony of amazing ability and talent hidden within the people with ASD.

Theoretical Framework and Methods

In order to arrive at a certain methodology, forwardly used and explained in the paper, it is important to understand which theoretical definition of ASD has been taken into consideration. Indeed, up to date, numerous hypothesis has been made towards the disorder, nevertheless, the research chooses the sensory definition of autism, generalized by the researchers such as Rimland, Delacato and Anderson.[5] The definition results reference as well in Magda Mostafa's various articles while searching for the design concept and Architecture role for the autistic users: "In such theories, autistic behavior is credited to a form of sensory malfunction when assimilating stimulatory information from the surrounding physical environment."[6]

Mostly the output of similar study topics are guidelines and prescriptive notes. Those results highlight the intention to connect peculiar behaviours with spatial conditions. This methodological approach could be extremely effective with other disorders, but it is insufficient to establish a general rule in the case of the wide range of ASD. It is for this reason that it is important to understand that nor research neither project methodology can give an audience to the typical perception as the spatial understanding. Indeed, awareness of contrasting attitudes regarding surroundings plays a key role in the method's definition.

This complexity requires the use of a new attitude to deal with the subject, derived partially from the new developments of the physical, chemical, biological, social sciences. In this field, the reality is based on a complex system, in which it is necessary to conceive the subject, no longer as a juxtaposition or a sum of parts, but through a new paradigm: an inclusive system of links, diversity, transversality and adaptation. Thus, the specific element of a theory is no longer the reduction from complexity to simplicity, but that of translating complexity into a theory or rather into a "differential sequence of theoretical approximations".[7]

4. N. Higashida, *The Reason I Jump: The Inner Voice of a Thirteen-Year-Old Boy with Autism* (Great Britain: Hodder & Stoughton, 2013).

5. B. Rimland, *Infantile Autism: The Syndrome and its Implications for a Neural Theory of Behavior* (New York, USA: Appleton Century, Crofts, 1964); C. H. Delacato, *The Ultimate Stranger - The Autistic Child, Academic Therapy Publications* (California, USA: Novato, 1974); J. M. Anderson, *Sensory Motor Issues in Autism, Therapy Skill Builders* (Texas, USA: The Psychological Corporation, 1998).

6. M. Mostafa, "An Architecture for Autism: Concepts of Design Interventions for the Autistic User," *Archnet-IJAR, International Journal of Architectural Research* 2, no. 1 (2008): 189-211.

7. M. Ceruti, and F. Bellusci, *Abitare la Complessità* (Milan-Udine: Mimesis, 2020), 51.

The impossibility to define a univocal solution for a safe environment leads to elaborate an open method to be applied in the design process. The variety of alterations in the perception of the ASD suggests the definition of a system of different possibilities in a clear order, rather than a precise set of strict rules. In this sense, the attention for the quality in the sequence of spaces has a universal validity in designing. The abandon of effect-cause relation between information reflects a general attitude in which the possible relations in a variety of situations are fundamental (see Figure 1).

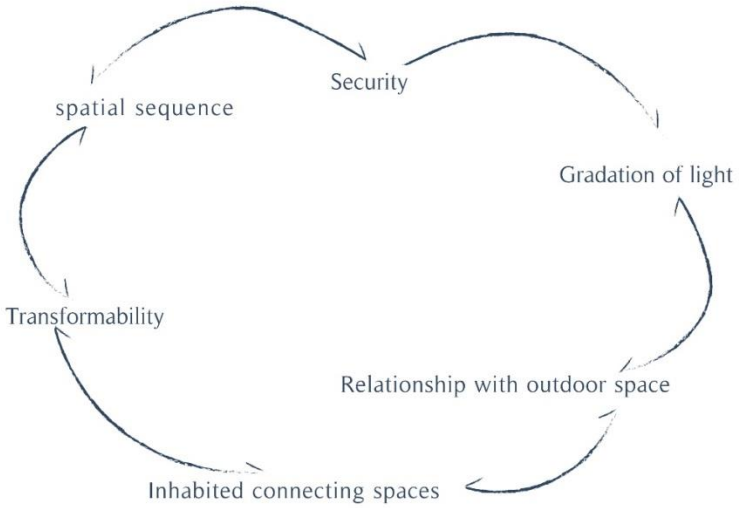

Figure 1. *Key Element Concept*
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

On the background of this complexity, the research is based on the involvement of experts from other sectors, who no longer just become participants, but also co-authors/producers in the design process through a trans-disciplinary approach to recompose a coherent dialogue between different fields of knowledge. In the study, Architecture, Medicine and Sociology could not run in parallel, on the contrary, they should intertwine in continuous reciprocity of intersections. The impossibility to marginalize complexity in different autonomous elements is leading towards recollecting solutions from the different fields and applying them in the practice altogether. Such a multidirectional interweaving authorizes a transition from memory to contemporaneity, from the object to the act, from a condition of marginality and exclusion to one of inclusion, feeding that incredible interweaving that is the architectural project. This attitude implies a continuous adaptation and mediation of the project to the contingent conditions in continuous mutation.

In order to respond fully to the ever-changing metabolic manifestations of young adults with ASD and to define the quality of such an educational facility, the project has required a change in the approach to the method. The method moves from a Cartesian scientific paradigm, which proceeds by simplification1 in which the elements are broken down, reduced and ordered, commonly used for architecture, to a complex one, more appropriate to the subject matter.

The approach is not the one used in the analyzed scientific literatures, based on the scientific system, as it is considered no longer appropriate for discovering the multi intelligibility linked to buildings for the education of these individuals. However, autism, by its nature, presents in enlarged forms and, therefore, the Cartesian disjunctive logic, which separates and decontextualizes, it results insufficient.

Furthermore, the survey of the scientific literature reveals that most of the projects tend to focus on the younger generation and their learning processes up to school age, abandoning the training of individuals with ASD in the post-school age.

The chosen method and its result focus precisely on the design of a building for the after-school education of young people with ASD.

The multitude of ways in which autism manifests itself leads to use a method that seeks to "weave", to put together, parts connected by variable relationships, and that uses adaptive tools capable of relating to the diversity and complexity of the cases.

Referring to Von Foerster's exposition, the chosen method involves action, translated into interaction with experts and parents who deal with the problem by conducting interviews and then making use of direct experiences. This first approach allows to formulate an assessment of the situation's potential; afterwards moving on to learning, translating the data through a simple but adaptive strategy; to conclude with an adaptation that is expressed in the proposal of different configurations that has being changed by interacting and relating with the figures previously mentioned.[8]

The action phase is concluded by jointly determining an element that, even in the different manifestations of the disorder, certainly has an impact: the perception of objects, spaces and people with particular attention to light.

During this phase, some question has raised: how can a compound element such as light be separated, and faced only in terms of psychology, environmental performance, pedagogy and physiology? To overcome this impasse, Architecture offers the opportunity to gather all the points of view in a fragmented, yet holistic, theory of the project, in which disciplines define the terms of a relationship between different aspects and Architectural elements.

Therefore, the focus is on all those spatial relationships that play with light and perception in general: the connection between inside and outside, the degree of inclusiveness and the smooth transition between shared and individual areas.

The ongoing researches about Autism and Space focus on specific aspects of perception.

8. Refer to: Cravera, *Allenarsi alla Complessità*, 2021, 51.

It then becomes essential to define a consideration of necessity that is implicitly identified in the relationship between theoretical thought and design in architecture.

It is worth mentioning as an exception in the modernism the position of Alvar Aalto, especially after the conference "Rationalism and Man" held at the Swedish Craft society in Stockholm in 1935. The Finnish Architect ascertains the impossibility to deal with human perception of space within the paradigm of a narrow scientific and diagrammatic approach. Those limits were evident in the control of lightings factors, fundamental issues in projects as Viipuri Library and Paimio Sanatorium. The problem of light, natural or artificial, is a starting point for considerations about the complexity of the aspects that compose the space. In fact, this attitude interests a wide range of elements, from the acoustic relevance of the ceiling to the touch of the doorknob, beyond the idea of standard and scientific prescription.

Aalto introduced the discipline of Psychology into the Architectural discourse, in combination with a careful understanding of the role of tradition, for a more human orientated approach. Although the necessity of a wider perspective on the relational importance of the project is not defined in a clear transdisciplinary framework, Aalto proposed an attempt to overcome the impasse of mere cause effect methodology in the debate on human perception of space. It mostly becomes evident during and after the project of a Sanatorium and a Library. The presence of different users in specific conditions required solutions that could not be determined by the rationalist-typological repertoire. The criterion of rational simplification was largely insufficient to comprehend all the level of complexity that involved education and health. This paradigm shift is an essential hue to elaborate a new approach in the case of Autism Spectrum Disorder.

The range of possible behaviours of ASD persons in respect of any condition is so wide that a precise strategy has been elaborated to overcome this impasse. Therefore, the idea of designing spaces with different perceptions and relationships is at the basis of the project and has been expressed through the strategy of Gradient (see Figure 2) that articulates the architectural space gradually based on the intensity of relationship with the others, in terms of potency, activity and frequency.

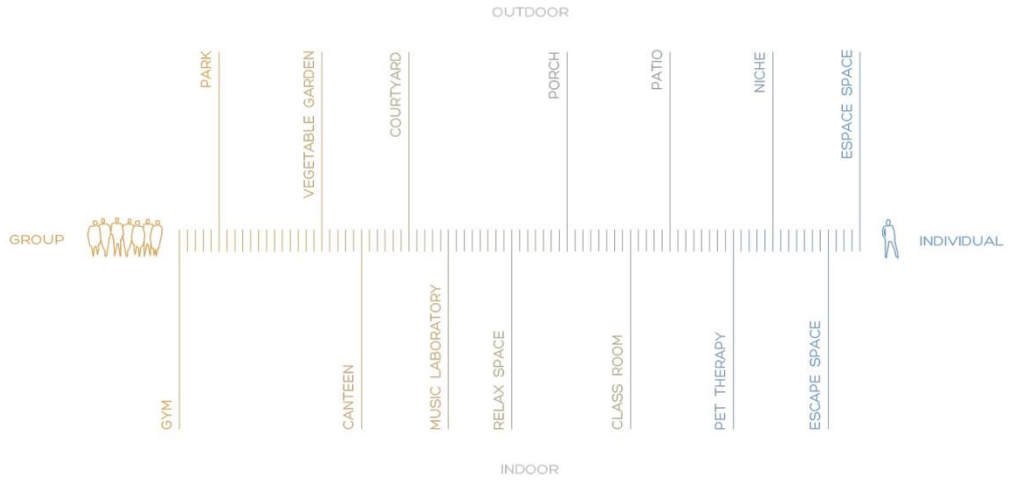

Figure 2. *Gradient Strategy Diagram to Illustrate the Transition from Individual to Group Spaces, in Outdoor and Indoor Conditions*
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

The presence of a variety of conditions stimulates every individual to find his/her own environment. At the same time, the sequence of spaces with different sensorial conditions avoids the risk of "the golden cage", the situation in which the comfort is so high that any variation becomes a trauma. Therefore, the safe and balanced environment is not an a-priori, but it relates to the specificity of the persons to stimulate the aptitude to adapt to uncontrolled situations.

In this sense, Architecture is the most influential factor: beyond prescriptive guidelines, the willful arrangements of situations in a coherent frame are the decisive starting point; the importance of transition prevails over the definition of generic spatial solutions to offer a variety of conditions with different intensity of stimuli.

The parameters of intensity are related to the most significant source of discomfort for ASD persons in relation to all the senses. Crowding is a crucial factor: the chance to meet other persons, especially strangers, is a high-intensity factor. Furthermore, the presence of disturbances is related to the proximity to dynamic situations (like a corridor or a playground). The mediation of the conditions is more important rather the removal of the sources. Architectural solutions guide the ASD persons to the most suitable place for his/her peculiar inclination (see Figure 3).

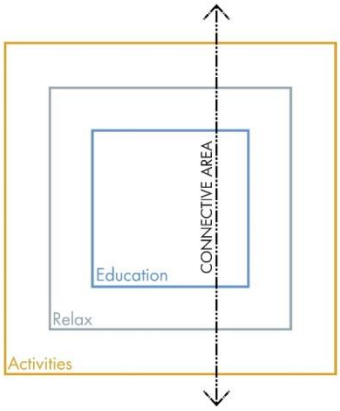

Figure 3. *The Strategy of Rethinking Relation between given Activities and Connective Area*
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

These interferences relate to the exchange between users, as living beings, and architecture, as a still object, in a degree of ductility of space "An architectural space must appear, but it must also have the capacity to disappear quickly. The issue of appearance, which is more important than the issue of disappearance, does not have to do with temporary structures, but rather with a gradient of deformability in the interaction between living and non-living bodies."[9]

The proposed method reflects in a continuous exchange between knowledge belonging to the world of medicine and education and that of architecture.

This transdisciplinary relational intertwining, has defined an instrumentation in accordance[10] with the expressive identity of each group.

The learning project for neuro-atypical persons requires a reinterpretation through the use of new tools suited to complexity, which, like catalytic agents, trigger reactions. These Tools, in their constitutive identity, contribute to change and to reformulate the co-production of conditions of reciprocity with people, in which architecture takes on an evolutionary dimension. In this regard, it has been an interesting reference the famous essay by S. Freud Analysis Terminable and Interminable, 1937, in which the author suggests different activities "It almost looks as if analysis were the third of those impossible professions in which one

9. O. Carpenzano, *Qualcosa sull'architettura. Figure e Pensieri nella Composizione* (Macerata: Quodlibet, 2018).

10. J.-H. Martin (Ed.), *Partages d'exotisme* (Lion: Rèunion des Musèes Nationaux, 2000), 124.

can be sure beforehand of achieving unsatisfying results. The other two, which have been known much longer, are education and government."[11]

The analogy among impossible, therefore interminable, professions reflects the instability of the process related, although differently, to individual behaviors. For these reasons, the activities appear appropriate to define a range of actions that could shape the space: government refers to the act of indicating a general order in which variations, dictated by behavior that cannot be determined, could coherently combine. Education represents the backbone of the project and it expresses the possibility to lead the individual to express specific potentialities. The analysis, out of the framework of Freudian theory, reflects the mission of better understanding behaviors to help to improve life quality, not just for a specific individual, but for a wider range of cases.

The result is a new and changed form, not only the outcome of a creative act but the adaptive result of a multi-relational processual interweaving that originated and shaped it.

Results

The project of a University for ASD persons (UDSA in the Italian acronymous) aims to support a sustainable integration within the society. In fact, the differences in perception are not necessarily limits to an autonomous life. The mission of the UDSA is to support the talents in the neuro-atypical persons and to support them in future adult life. The suggested research design methodology seeks as a result an Architectural proposal.

In order to understand the Gradient strategy, it is important to follow in the narration step by step the same sequence that was translated from the theoretical ideas to the Architectural project. In fact, for further deepening of the proposed design, the research prefers to describe the project through three main sectors, starting from the low stimulus arriving at the highest one: The west block of the building that resembles an autonomous academic system capable of functioning without any additional extensions, the middle block, which represents the pivotal point of the University, as it consists of an Atrium with double high, farther followed by refectory and access to the offices on the second floor, and last but not least, the east block a culmination of the building – the gym which symbolizes activity, exchange and the most crowded area.

Each sector contains different elements, that at several points intersect with each other, however tending to maintain the main characteristics of the "Gradient" strategy through the whole building (see Figure 4).

11. S. Freud, *Analysis Terminable and Interminable* (London: Hogarth, 1937), 248.

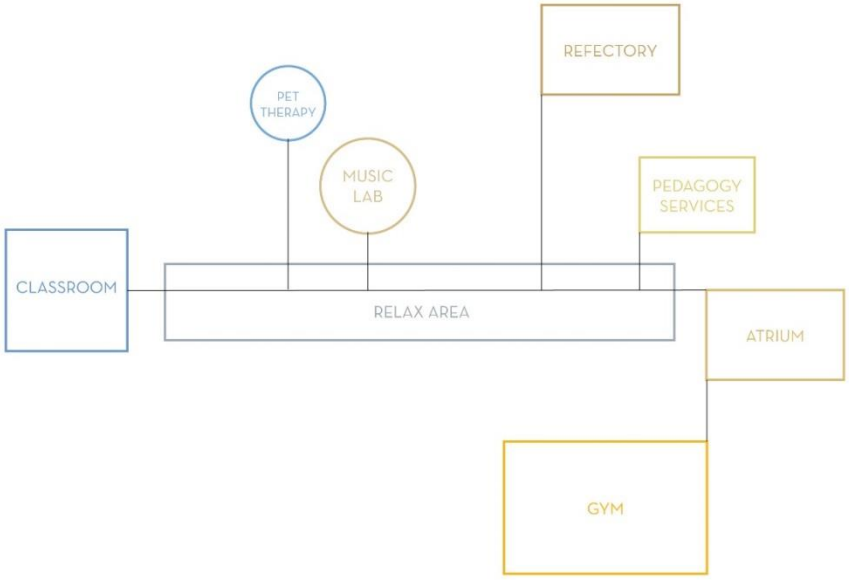

Figure 4. *The Gradient Strategy Following the Whole Building Program*
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

The West Block

As already mentioned, the west block of the building serves mainly for didactic purpose. It is being estimated that each year university would host approximately 40/35 students, while the studies would last for consecutive 3 years, in consequence, the building should host from 100 to 110 students in total. Therefore, there were designed 6 classrooms with additional, variable and flexible spaces.

The Courtyard

The main figure of the West Block is the central internal courtyard, which defines and guarantees a circular, continuous flow inside the building. Nonetheless, the outdoor spaces have their own definition of the 'Gradient 'strategy, they still remain in tight relation with the indoor environment and mostly follow the sequence of the activity. Indeed, the courtyard represents the heart of the educational spatial system, where students from different classes can meet, socialize and have a direct connection with the external environment, while maintaining the aspect of safety and measurability of the area (see Figure 5). The rhythmical design pattern (being repetitive in the use of some elements, but within a certain distance introducing a change or a new element) helps to create recognizable features of the garden, where each person can find mutual or individual space without being excluded based on their particular perception or sensibilities.

Figure 5. *Perspective of the Inner Courtyard, in the Didactic Area of the University*
Note: The connective spaces and the pet therapy laboratory are directly connected with the outdoor area.
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

It remains important to underline, that the design attitude has never divided the strategical approach from the architectural idea. In fact, the variability of the courtyard's inner space results from the structural pitch, that at the same time generated individual spots in case of the necessity. As recommended from the educational program, the garden has a connection to the pet therapy area, which represents another variation of the outdoor facility where the students have a possibility of interaction with different domestic animals.

Connection

In the several research and guideline papers, one of the most problematic part in spatial terms are the passageways, corridors or distributive areas inside the building. Monotonous, repetitive and indistinguishable hallways often cause disorientation and, what is most effortful, a shocking effect of drastic change from one type of environment to another. As a matter of fact, this was one of the aspects, which the design process aims to resolve, still maintaining the central system of the garden.

The natural light to be direct but seamless all over the route. Transparent elements between these two spaces guarantee an equal exchange of the perception, avoiding alienating feelings for inner or outdoor spaces. The connective area is following

the same rhythmical approach already mentioned above, but this time the diversity of the space is caused not only by the singular structural elements but also by the shifting volumetric position of the classrooms. Moreover, along the way, the passage is equipped with small niches or particular playful furniture to give to students the opportunity for a moment alone or just an observation point of view from where one calmly adapts to the environment (see Figure 6).

Figure 6. *Connective Spaces*
Note: The connective spaces permit many activities. Their generosity allows both social interactions and peaceful isolation, in regard to the psychophysical condition of the students.
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

Classrooms

As already specified, in the university, there are 6 classrooms explicitly dedicated to the didactic program, which should host not more than 20 students per lecture. However, based on the didactic program, classroom organization does not follow the traditional method but try to adapt to the sensibilities of the students. For example, each person can attend the lecture in a form she/he would prefer, sitting or standing, as the maximum time of each lesson would be only 30 minutes (this time quantity is considered adequate for fully maintaining one's attention and concentration).

In the design proposal, apart from offering easily transformative and adaptive spaces for the classrooms, it was crucial to elaborate a certain module, which would contain relation with the supplement areas, such as relax rooms and small outdoor spaces. Indeed, the project offers a combination of the program where two

classrooms share one garden, for didactic activities and direct contact with the natural environment even inside the classrooms, and one relaxing room, equipped and dedicated to calming moments or even socializing possibilities (see Figure 7).

Such a quantity of spaces allows to avoid crowded and overstimulated atmospheres during the learning process. It must be mentioned that within the classrooms there were designed also an individual area, to take a short pause from the ongoing lecture, and an individual bathroom.

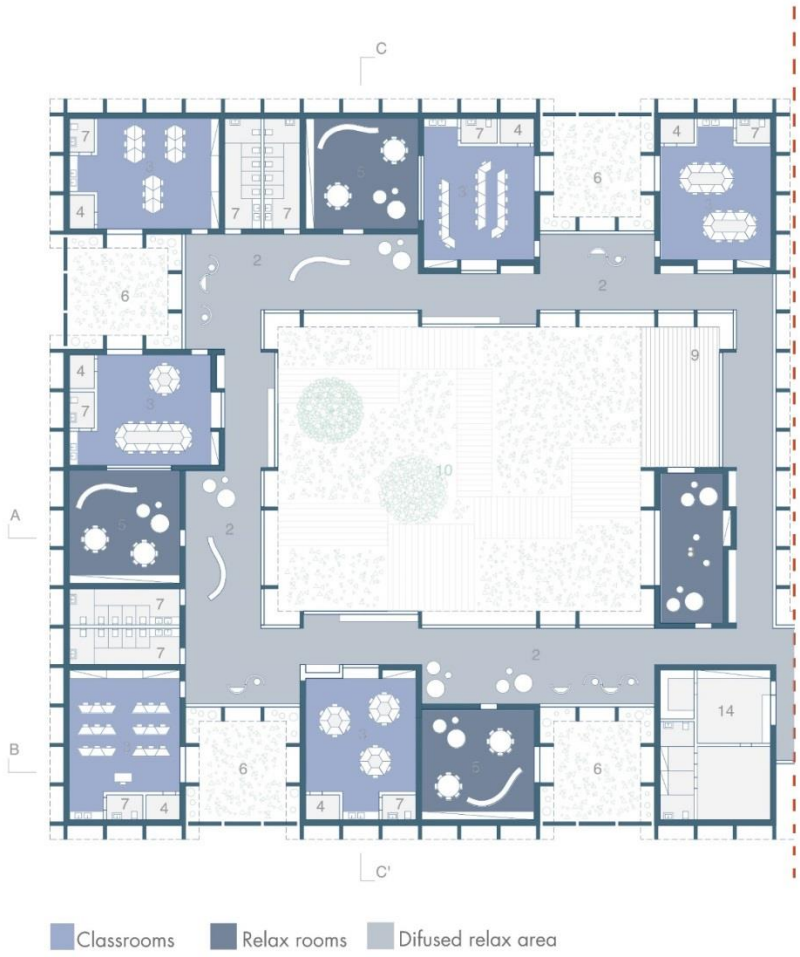

Figure 7. *Schematical Plan of Classrooms, Relax Rooms and Diffused Relax Area in the West Block of the Building*
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

Beside the program and relational aspects between different areas, one of the fundamental design elements remained the light and acoustic performances. These two components is a primary problem that creates barriers in the perception or concentration for the individuals with ASD. Therefore, there were introduced vertical glass elements, starting from above of the eye level, which would guarantee to filter

not only the direct light but also the information and distraction from the street view.

The Middle Block

The middle block of the university represents the open and welcoming space of the building, its setback position compared to the rest of the southern façade, internal structure and playful blue panel variation helps to differentiate from the rest of the volume and indicate the main entrance (see Figure 8). To avoid a drastic change from outdoor to indoor space, another courtyard is present, as an architectural void and filter. The proximity between the entrance area and inner garden allows a soft transition from the outside world to a new environment.

Figure 8. *Perspective of the South Elevation*
Note: The facade expresses the repetition of the structure and the gradual raising of the curved roof.
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

Connections

Through the design process, the atrium has gained different variation of uses, based on the architectural decisions of leaving the space as free as possible, maintaining certain emptiness that in the case of necessity could accommodate any kind of event or need. In the everyday life rhythm, it represents the main connecting area inside the intervention, some kind of a buffer zone between the academic and leisure part of the volume.

Moreover, the atrium takes advantage of the height generated by the curved roof (external point starting from the classrooms, of 5 meters and arriving approximately at 15 meters on the other side of the gym) to provide an ample perception of the space (see Figure 9). Apart from being a connective area between the classrooms, canteen, offices and the gym, occasionally in wintertime it becomes a small indoor theatre facility, while in the summer it can incorporate the outdoor part of the garden for the participants and become a stage itself.

Refectory and Offices

The refectory, which is facing the inner courtyard for more natural light and privacy, is not only a place to get a meal but represents one of the spaces of socialization, exchange and even participation, through an engagement of the students in the cooking process. Due to the high number of students, the area of the canteen is quite spacious. However, confusion, noises and spontaneous activities are typical for these environments. Therefore, it has been very important to find an architectural solution to avoid a chaotic atmosphere.

Figure 9. *Longitudinal Section of the Intervention*
Note: The project combines outdoor spaces of different size and atmosphere.
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

The project offers a smaller sector division of the voluminous refectory through different height partition panels, which guarantee noise absorption allowing individuals with ASD to have an opportunity of concentration and effortless interaction with the ambient and between each other.

The university for individuals with Autism Spectrum Disorder is not only a place of education but as well deepening research of the disorder towards improvement and progress.

The students while attending university can also contribute, make changes and offer new ideas for a better understanding of their needs. The project included as well part of the offices and archives where these studies and observation could develop by the students, teachers and psychologists of the school.

As before, the design proposal organizes research spaces on the second floor, above the refectory, taking advantage of the transparent glass façade facing in the inner garden for natural daylight and visual connection with the rest of the building.

The East Block

The east block of the volume is where the curve of the roof arrives at the highest point and resembles the most active space through the university. As the studies show, physical activity takes a great part in the improvement and stabilization of the disorder, while often individuals with ASD suffer from motor and coordination difficulties.

The project contains a professional basketball stadium equipped with separate changing rooms for students, services and stands for possible open events. Besides the stadium, the gym offers a smaller activity area with various exercising equipment on the mezzanine floor. Because of the sophisticated level of the university's activity part, it even can be used by the city during the closing hours of the school. Like in the other sides of the building, the gym gets soft daylight from the upper openings which make spaces even more adequate for individuals with ASD.

In the project, any spaces could be portrayed based on perceptive qualities. The common spaces, such as the gym, the canteen and the entrance, represent environments with high intensity of stimuli (see Figure 10). On the contrary small niches or the benches in the recesses, represent a decompression spot for the need of pause from the information.

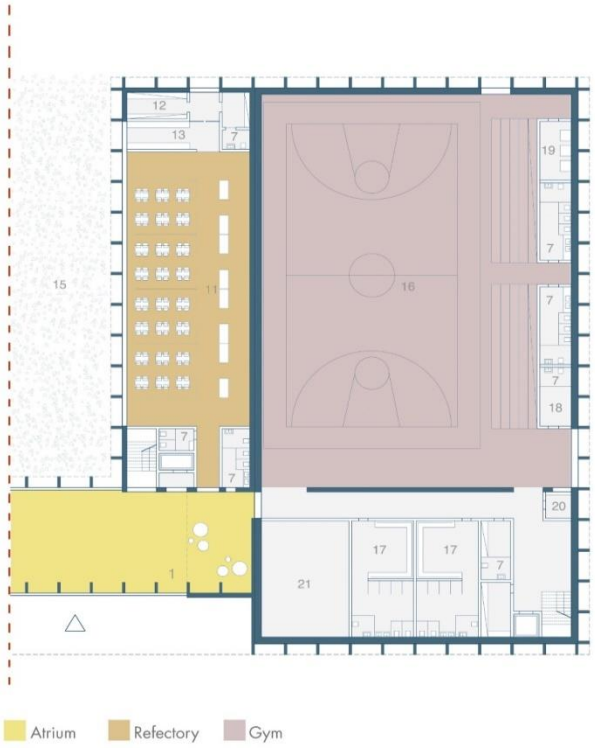

Figure 10. *The Middle and East Block Plan with High Stimulus Program*
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

Therefore, the program itself is articulated on a sequence of spaces with a gradient stimuli intensity, scattered of safe havens in case of necessity. Within the same logic, the control of the sun rays permits to distinguish different rooms not just in term of lighting comfort, atmosphere and brightness, but also to mediate the contact with the outside. The windows higher than the human eye define introverted

spaces, with fewer external details; on the contrary, the windows on the small patios encourage to interact with the outside environment, in a safe condition.

In parallel, the same division of the intervention is possible with outdoor places: the grade of connection with the outside world, the extension and size, the presence of covering and the number of entrances/exits (see Figure 11).

Figure 11. *Overall View of the Project Plan*
Note: The three sectors are visible in the layout: the didactic area, the public central space, the gym.
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

The division in three blocks or sectors responds to a gradient sequence of stimuli intensity and permits a delicate transition to the building. Every sector presents a different logic: the gym is a compact element, the central core is a porous and transparent connection, the didactic area is an introverted volume that encloses a courtyard garden. The continuity of the curved roof allows understanding the project as a unity, especially to orientate the students (see Figure 12).

Figure 12. *Perspective from the North Side*
Note: The intervention guarantees a high level of privacy and it uses the surrounding areas as an open field for free activities.
Source: Duccio Fantoni, Salome Katamadze, Alessandro Gaiani, 2020.

Conclusion

In conclusion, the delicate premises revealed the opportunity to generate a new aptitude in the relationship between Architecture and individuals.

The limits and directions of previous studies have nurtured the curiosity to experiment with a new methodological approach, which is not intended to be definitive, but a point of departure for further developments, ready to be improved and integrated with updating information and future development of the issue.

It needs to be remarked the fact that the necessity to adapt to specific conditions of Autism led to a method, that could be valid for architectural projects in different contexts. The design strategy reflects the importance to express the numerous relations in a specific architectural intervention. In this sense, the role of the project is not more to impose a state of things, rather to allows interactions to take place in the space. This shift is condensed in the proposal for University for Autism Spectrum Disorder in Architectural and educational terms. The Gradient strategy combines several necessities in a precise, yet open, configuration. This form of complex reciprocities requires the Architecture to maintain its quality in a continuous state of adaptation. In fact, the goal of the project is to guarantee such a variety of situations to allow any neuro-atypical adult to achieve a desirable state of concentration. In this process, the idea of homogeneity is questioned in the

balance between the individuals and the group. Therefore, the physical space represents a sensitive place of negotiation.

The criterion of the Gradient suggests a connection of permanent conditions, proper of architectural presence, and transitory activities. This relation expresses the preeminence of qualitative aspects over standard requirements not only for neuro-atypical users but also in neuro-typical ones.

The proposal suggests an Architecture aptitude that includes differences and nuances, instead of omitting them.

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