ARCHITECTURE AS A DIALOGUE BETWEEN BODY-BRAIN-SPACE

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Abstract:

The link between the man and architecture take us to research about how we perceive the space, how we embody the space using Juha Leiviskä's works as cases of study. We are analyzing some of his projects based on Maurice Merleau-Ponty theories about phenomenology of perception, neural and corporal reactions and responses based on neuroscience developed by Antonio Damásio and Juhani Pallasmaa arguments about a phenomenological conception of architecture; for this, we are using several methodologies such as observation *in situ*, historical analysis of architecture and context.

There were establish several important architectonical concepts for the perception of the space, from the body to the brain. Our body is a biological and cultural organism that is constantly changing, based on the environment that is developing in. When we talk about our body perception in architecture we talk about human scale, movement, *promenade architectural*, but another concept is time; we measure the time trough architecture and our own bodies, as Juhani Pallasma says:

"*We are incapable of living in chaos, but we can't live outside of the passage of time and duration. Both dimensions need to articulate and give specific meanings. Time must be reduced in scale to human dimensions and concretized as a continues duration.*" (2016, p. 9).

Our brain and body are mutually correlated; they represent two aspects of the same thing, as Merleau-Ponty defends. We started from visual and auditory

perception to understand how we experience the space, but architecture is a bodily experience, more than a visual sense or other of 5 Aristotle's senses which are not enough to grasp all architectural experience. From these aspects and based on Juhani Pallasmaa writings we are developing this analysis of the Cultural Center of Bethlehem in Palestine as a case of study to understand how we experience this building, in a multicultural context, not only as a recovery of a church with a religious and historical meaning but as a social center. Because we believe that architecture is a stimulus generator for certain uses but also is a receptor of these uses by the inhabitants, as Juha Leiviskä argues, "*The aim of [architecture] is to create from human dimensions space to be experienced by people.*" (1999, p. 9).

Keywords: Nordic architecture; phenomenology; neuroarchitecture; space syntax; J.Pallasmaa; J. Leiviskä.

Introduction:

Architecture is a symbiosis between our body, our brain and our geographic and cultural places that gives us our previous experiences and memories, from this point we build our perception of spaces and inhabit them. The quality of a space affects our body and brain, our being as Merleau-Ponty says, unchaining multiple perceptions and behaviors. What are the most important architectural dimensions that impact on our perception and experience of the space and affect our human development and behavior? This is the main question of this research. As architects our focus is on the analysis of the space, but since we build for people we need to consider their experience as part of architecture analysis, looking to architecture, not only as an external object but also as a full immerse experience. According to Peter Zumthor in his book *Atmospheres* we perceive the space in first place through our emotional sensitivity, it is spontaneous, we have an immediate impression of the space through our mind and body, we feel the material and haptic qualities, we hear the sound, we see the lights, and we feel the temperature and the smell.

Architecture in its real manifestation (construction) and cultural (meaning) determines the physical use of the users and neural reaction that affect their behaviors, is the meeting point of human relationships that offers stimulus and meanings. There is a reciprocal and mutual relationship between our brain changes and our built environment and therefore it is important to understand how we perceived our environment, as Eberhrad argues:

"*While the brain controls our behavior and genes control the blueprint for the design and structure of the brain, the environment can modulate the function of genes, and ultimately, the structure of the brain. Changes in the environments change the brain, and therefore they change our behavior. In planning the environments in which we live, architectural design changes our brain and behavior.*" (Gage cited in Eberhard, 2015, p.135)

Here we can see this Top-Dawn diagram, with bidirectional influences from the environment, behavior, neural activity and genetic activity. As human beings, what does differentiate us from other species? We are recursive beings, what is this of recursion? It is to have a conscious of perception, to understand and perceive that we are conscious beings that our brain and body perceive. This is important because we are capable of perceive and react to the environment, in its natural, cultural and sociological environment. As the neuroscientists Antonio Damásio says

about this relationship:

"*If body and brain interact with each other intensely, the organism they form interacts with its surroundings no less so. Their relations are mediated by organism's movement and its sensory devices. The environment [architectonic space] makes its mark on the organism in a variety of ways.*" (1994, p.90)

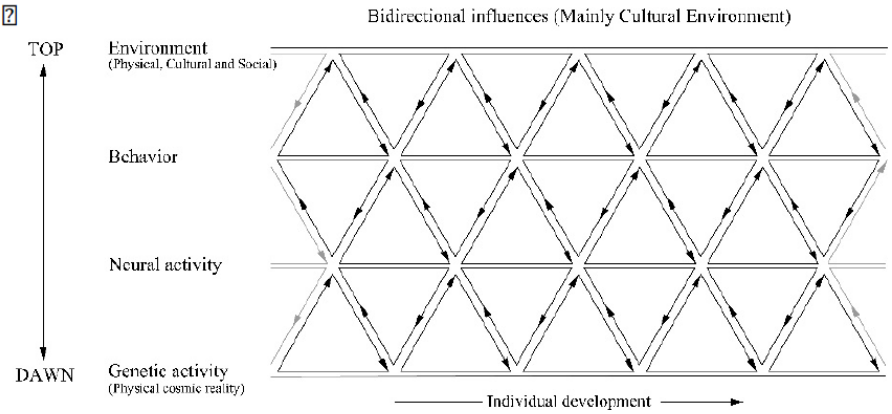


Figure 1 - Topogenetic Interactions (Josep Muntañola, date)

Body, brain and spatiality are intertwined in the architectural experience; the link established with architecture is always based on direct, real, body and mental experience, where actions and movements of the body allow us to understand spatiality and time, emphasizing perception from the corporal experience. The human being, developed to the extent that its architecture served the comfort and health of its inhabitants, considering the human being as sensitive being to the built environment, regardless the attention paid to architecture. Its effects are perceived by our body and brain, it is affected and conditioning our behaviors, hence the importance of studying the impact of our buildings on us and how we perceive our surroundings to the architecture field. From this phenomenological conception of architecture that acts as a cultural model of interaction between body, brain and space, using Bakthin's concept of *Chronotope* we present the analysis of the Bethlehem Cultural Center, in Palestine. Projected by Juha Leiviskä, one of the most important Nordic architects alive of the XX century, this work represents an opportunity to understand how modern architecture is capable of producing sensory effects on its users, changing their mental, physical and social behavior in a context as Bethlehem.

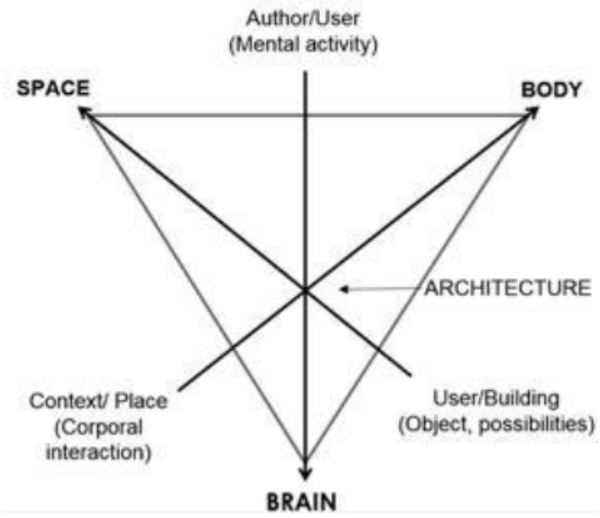


Figure 2 – Chronotope using Bakthin's concept

Body-Brain:

Our body is a biological and cultural organism that is constantly changing, based on the environment that is developing in; it is essential for architecture to understand the correlation between our body, brain and space. Unlike the Cartesian dualism of the body and mind suggested, this research will enforce a strong relationship between our senses/perception and emotional/physiological responses. Brain and body are mutually correlated; they represent two aspects of the same thing. To understand how our experience of space is correlated with emotional feelings and behavior we need to understand that our brain and mind are connected with our body, we act through our body and our body belongs to space and time, as Merleau-Ponty said.

During the history of arts and architecture this conscious of the body has always been present since Vitruvius, Da Vinci, Theo Van Doesburg, Siza and Steven Holl, etc. All these artists consistently had the human scale present in their works, we use the dimensions and scale of the human body as a measurement unit for architecture, and the metric system is based off on the human body proportions. We perceive the world not only through the measurement of dimensions and scale but also through all our human senses, this is how we get to know the space we are in. Our human body is the receptor of the external physical stimuli and transmits this stimulus directly to our brain and consequently our body reacts physically to the built environment and space. Body and brain have multiple possibilities of reaction on a space that can be translated in real uses.

Architecture is a bodily experience, more than a visual sense or other of 5 Aristotle's senses, which are not enough to catch all architecture experience, Pallasmaa refers the 12 senses of Rudollf Stener as necessary to complete a corporal experience. As Asplund says about art, it is also valid in architecture, the most important sense in architectural experience is not the vision but our existential sense (using Merleau-Ponty concept), he believed that the sensory

organs pass on inputs to the epiphysis in the brain and from there to the immaterial spirit. As we can notice on this figure, our mind is nested with our body, as the environment (architectonic environment) is an extension of our body, there is reciprocal relationships between the body, brain, and the space materialized on our memories, imagination and possible uses of architecture.

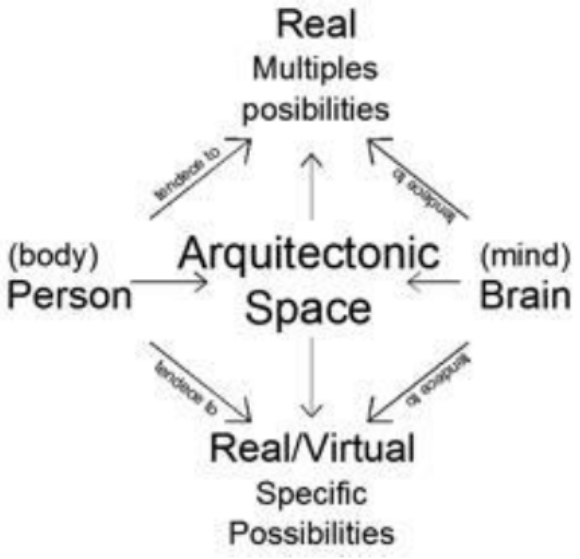


Figure 3 - Interelationship between body-brain - space

This idea that the brain is not isolate from our body, that brain and body are interconnected to process all the information from our environment, is important to understand the representation of our body on our mind and to understand our reference for our interpretations of the external world. This dialectical relationship and interpretation of the physical and mental space leads us to Merleau-Ponty's notion of "*the chiasmatic bind*" linked to the crossing between the physical space and mental space as continuity, keeping with the notion of "*the flesh of the world*", that architecture and our bodies are the world's continuity. As Damásio explains, the human brain and the rest of the body constitute a non-dissociable organism, the organism interacts with the environment as an ensemble: the interaction is neither of the body alone nor of the brain alone. The brain is the internal receptor of the stimuli that our body received, acquires information about our environment (light, sound, texture, smell, etc.) through the filters of its sensory system, organizes this information and use this information to produce behaviors.

Space:

The space is the third element of this relationship, the central point of architecture, as Bruno Zevi says architecture is *"the art of space"*. We can talk about different spaces, pragmatic, perceptive, existential, cognitive, abstract, expressive, aesthetic, but here we will analyze from the architectonic, as a materialization of the different spaces. Our conscious of the space is based in operative schemes, that

are culturally determined and include qualitative qualities resulting from the need for an affective orientation towards the environment, as Norberg-Schulz argue.

The perception of space is a complex process, in which many variables are involved and realizing the importance of the relationship between body, brain and space on the perception of the space allow us to establish a few phenomenological dimensions of architecture for the analysis of the Bethlehem Cultural Center considering the impact on its users. We believe four phenomenological dimensions as **light**; **materiality**; **sound** and **time** can give us the *Atmosphere* of a space as Peter Zumthor called, or "*spirit of place*" as Norberg-Schulz calls in *Genius loci*, or using Pallasmaa conception of "*essenc*es" or atmosphere:

"*Atmosphere is the overarching perceptual, sensory, and emotive impression of a space, setting, or social situation. It provides the unifying coherence and character for a room, space, place, and landscape, or a social encounter. It is 'the common dominator', 'the coloring' or 'the feel' of the experiential situation. Atmosphere is a metal 'thing', an experiential property or characteristic that is suspended between the object and the subject*." (Pallasmaa, 2011, p.21)

The architectural perception is a total act we cannot differentiate one sense from another because as Merleau-Ponty point out our perception is not a sum of visual, tactile and auditive givens, we perceive in a total way, with an haptic experience considering the light, temperature, textures, the sonority of a space at the same time, considering our memories, previous experiences and giving us an impression of the space and a consequently some reactions, uses and behaviors.

The analysis of this project started with the geographic, cultural and political context with also the phenomenological analysis. This cultural center arises in a context of conflict between Palestine and Israel, in Bethlehem a city that was constantly occupied, where the memory remains beyond physical, visible and material infrastructures. The cultural center start working next to the Lutheran Church in an old infrastructure, from 1854/57 and the construction was completed between 1886-1893. It was in the ruins of this church, which in 1995 was installed a cultural center, and in 1998 J.Leiviskä started working on the construction of a this project for the year 2000. It is important note that at this time in 2002 there was one of the largest occupations in Palestine, the construction of the separation wall between Israel and Palestine and the city of Bethlehem was isolated and closed to the outside. In 2002 the church was recovered and was build the Cultural center in the emptiness of the church, keeping alive the memory of the courtyard where the cultural center started working. Leiviskä's construction maintains the memory of that emptiness and the topography of the place, the new building connects the irregularity of the city, with its small scale with the vertical reference frame of the Christmas Lutheran Church trough terraces.

As we mention before the analysis of this project was done *in situ*, with ethnographic studies with the users, analysis of the project and space syntax analysis, combining with the study of 4 phenomenological dimensions to characterize the atmosphere of this building and assimilate them as important aspects of the building when the users inhabit it.



Figure 4 - Bethlehem in the beginning of XX century (Juha Leiviskä Archive)



Figure 5 - Bethlehem Hills, 1950 (Juha Leiviskä Archive)

Since part of this project include a requalification of the previous infrastructures, we divide the project in three different parts for the analysis and better understanding of the architecture in a cultural and historical context. The one is the pre-existing are (Figure 6), where J. Leiviskä in his intervention maintains the previous image avoiding a protagonist of his architecture and framing in Bethlehem streets. His language prevails to the interior of the building creating a different atmosphere in dialogue with different temporal layers that coexist in the same building. The second on is a transition area (Figure 7), between the old infrastructures and the new completely built by J. Leiviskä. To speak about transition is to speak about past and present, a dialogue between spaces, light, material, memories, etc. And the third area is the multipurpose space and spaces of permanent staying where predominates Leiviskä´s architectural language.

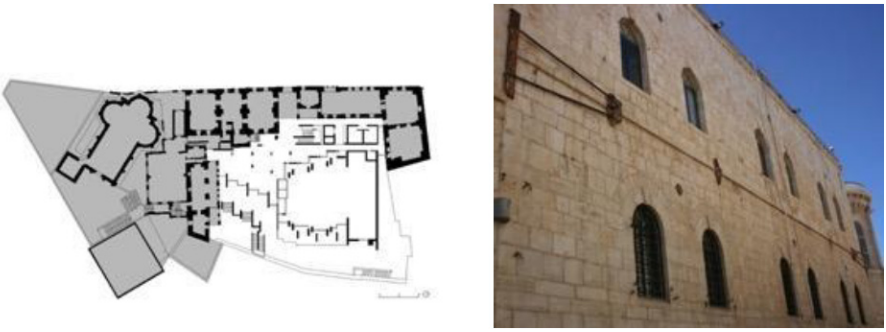


Figure 6 - Pre-existing plan and picture of the old facade



Figure 7 - Transition plan and picture of the hallway

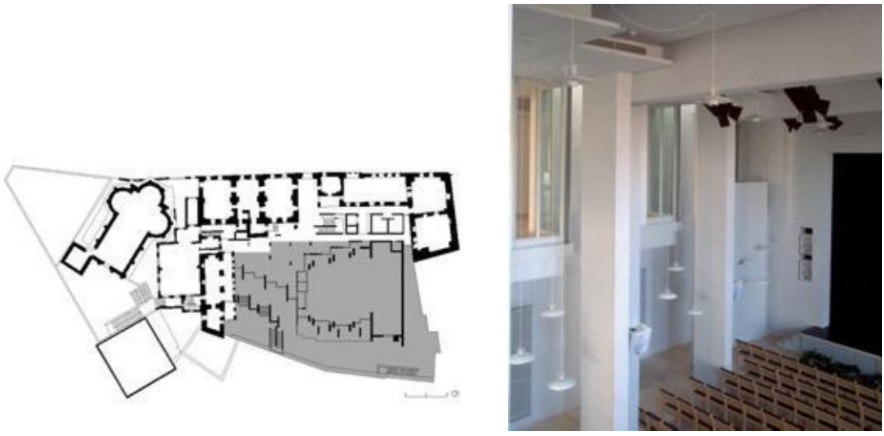


Figure 8 - Floor plan and picture of the multipurpose hall

The duality of light:

Light is one of the phenomenological dimensions of space, when we talk about light we always talk about several dualities as light-shadow; natural-artificial; night-day; material-immaterial; diffuse-sharp. Light is an architectonic material, it is a primordial element for the perception of space, as Le Corbusier points out, "*Architecture is the wise, correct and magnificent play of volumes under light, our eyes are made to see forms in light. […]"* (1998, p.16).

The architectural space exists through light, can be perceived by the eye and by the senses revealing it phenomenological character, but J. Leiviskä use the natural light more than a way to reflect architecture as Simo Paavilainen says Leiviskä is the architect of light and sound, "*Light is one of the principal building blocks of Juha Leiviskä's architecture. He handles light to create space that is immaterial and ethereal*" (Paavilien, 2004, p.15) In J. Leiviskä buildings it is hard to distinguish materiality and immateriality, light becomes another material of architecture, in this building we get to see the surfaces through the light reflections on the walls, light flood in the intersections of walls and roofs (Figure 9, 10 and 11).

In this interweaving of planes, walls, ceilings and windows we can see the influences of De Stjil, Neoplasticism, Van Doerburg and Rietveld in his attempt to reach geometric harmony, with the light always present as a material, achieving an immateriality and shimmering quality of light. As Malcolm Quantrill mentions Leiviskä humanized De Stjil, introducing the dimension of light, materializing abstraction, and getting to this Aristotelian concept of *Topos***,** where the boundary of one object or space can contain the same or not and the boundary is constantly changing, how we can see on the images bellow. As users we can feel the temperature of the light, we can touch with our bodies and we can see it, natural light marks these spaces and is marked by the time, creates spatial sequences, divides space and gives it continuity. Leiviskä also use light to draw spaces, these comes from another influence on the light treatment of the late Baroque of southern Germany.



Figure 9 - Myrmaki Church (J.Leiviskä archive)



Figure 10 - Männistö Church (J.Leiviska archive)



Figure 11 - Cultural Center of Bethlehem (by the author, 2018)

Leiviskä, a Finnish architect used to work in Finland, where the light as a special dimension, 'the Nordic light', where for 6 months predominates the night and the lack of natural light and for other 6 month predominate the daylight, with a cold and homogeneous atmosphere. In Palestine, with the solar incidence Leivsiskä change

the way he treats this phenomenological dimension of the light, he manipulates to control and filter it.

Since part of this project was a reconstruction, we can see different ways to control the light, on the pre-existing areas where Leiviskä recover the stonewalls, is evident how this one protects the interior space from the intensity exterior light. On the other hand, Leiviskä opens his building to the outside with large windows, and interstitial opening on the roofs, which are controlled by the configuration of the structure of the building itself with terraces, and pergolas on different levels (Figure 13). This relationship between the static characteristic of the architectural object and the solar movement and all implicit transformations (Figure 12), the dynamic perception of light introduces a level of complexity into architecture what makes it impossible to reduce architecture to geometry.



Figure 12 - Section with solar incidence (By the author,2018)



Figure 13 – Pergolas at terrace (By the author, 2018)

Light is one of the most important elements of Leiviskä's architecture, he works the natural light rays entering from several sides, light is introduced in slices between clearly articulated and separate planes, through vertical and rectangular windows combining the cold tonality of natural light with a layer of artificial yellow lights suspended by the roof with some rhythms, as we can see on the images below (Figure 14, 15 and 16) and as the architect himself said:

"Daylight and artificial light should be completely different in their nature, even though both light sources are in use at the same time. […] My basic principle is that daylight and artificial light are two different and independent things which complement each other." (J.Leiviska in Marja Ritta, 1999, p.12)

Leiviskä for each space creates its specific lighting, which gives a unique atmosphere to each area; the aim of the lamp design is to create an ambience for the space. The position of these PH-type light fittings seems placed random around the space, fall from the roof by cords. The rebound of the light in different layers of the lamp which have their own color, and which project the light already nuanced, served to transform the overall character of space depending on the time of the day and ambient quality of natural light, as the architectural critic Kenneth Frampton said.



Figure 14 – Artificial light (By the author, 2018)



Figure 15 – Ph-type light fittings (By the author, 2018)



Figure 16 – Ph-type light fittings at Myrmäkki Church (J. Leiviskä)

The sound of space:

The sonority is part of our first impression of the space; we can hear sounds reflected by architecture. As the touch, the sonority is an important sense for spatial perception; Alvar Aalto already mentioned it in his lecture *Racionalism and Man*. Consider the sound and acoustic a phenomenological property of the space, something you cannot reproduce in a magazine, you need to inhabit with the body and mind with a real and a phenomenological experience. Like music, architecture

is an immersive experience, as Steven Holl points out, "*Sound is absorbed and perceived by the entire body"* (Steven Holl, 1998, p.87), as we are inside of a building we are in the same way surrounded in music, which explain why we feel so vulnerable to sound.

The sound of a space allows us to perceive the form and the materials in which it is made, even without visual contact, simply listening we can understand the spatial configuration of a space. Many times, we are not aware of what we are hearing help us to create a perception of a space, the sound is a way to our body measure with our senses the size and scale of space, allow us to measure distances and place. Even if is something unconscious, if we close our eyes we can detect where comes sonority and reveals the importance of hearing in spatial perception, from a point of view of a multisensory experience, creating our perception, *"[…]an atmospheric sound which is 'between' the object and my bod*y" (Merleau-Ponty, 1995, p. 264).

To perceive that we can hear architecture even if it does not produce any sound is fundamental to draw spaces such as churches, concert halls, where acoustic is fundamental. How we design a space will affect the acoustic perception, the importance of the material and texture. As architects we can create different spaces with different acoustic effects, as change the absorption of a space or shorten reverberation time, and these options will have an impact on our bodily and mental experience.

Juha Leiviskä is also a musician, he played piano since he was 12 years old, and he show us his acoustic knowledge in his architectural projects. When he draws all this plans, high walls, different high ceilings he wants to build a specific acoustic for the space, thinking about the acoustic experience of the users, projecting a mental experience. We can see these ceilings as a musical composition (Figure 18), a mental rhythm that can be perceived by the users. Leiviskä with these ceilings and movable walls can draw different acoustic for different uses. In *in situ* analysis, talking with the event's organizers we realize the importance of this acoustic for the organization of the space depending on the event. If they want a sacral concert with high tones, they will organize the space for the singer be in the entrance of the space to project their voice, in the case of a different concert with low tones, the singers can be under the low ceilings and project their voice to the space with high ceilings. The purpose of the room with different functionalities ask for a dynamic solution, and J. Leiviskä with his acoustic knowledge. In this project we can see that our experience of sound is a relational pattern, the configuration of this space, the election of wood as a predominant material in the interiors allow a full of different frequencies to be hear on the experience of this space. J. Leiviskä in this project had the capacity to project different rhythms, underlying social, cultural and environment pattern and when we inhabit these spaces we as conscious beings, have the capacity to synchronize with surrounding rhythms, as Edward T. Hall arguments, perceiving different acoustics.



Figure 17 - Multipurpose hall (By the author, 2018)



Figure 18 – Ceiling of the Multipurpose hall (By the author, 2018)

Approach to the haptic experience through the materiality:

On the interaction between the human body and architecture, the sensory senses are the main instruments that allow the haptic experience, which means sense of touch. The haptic system is made by several senses and perceptions depending on the active exploration of the environment by the human body. Juhani Pallasma is one of the main supporters of a tactile architecture, which is enhanced by the haptic experience, defending that the authenticity and poetic of an architectural experience are based on the tectonic language. Tactile sensitivity allows a taste of plasticity, materiality, temperature and intimacy. Also, Steven Holl points out the importance of the materiality for the haptic system: "*The haptic realm of architecture is defined by the sense of touch. When the materiality of the details forming an architectural space become evident, the haptic realm is opened up. Sensory experience is intensified; psychological dimensions are engaged.*" (1998, p.91)

Alvar Aalto already insisted on the importance of the senses such as hearing

and touch in the spatial experience, he evokes experiences related to material and touch, as light caresses reflective surfaces and bounces on textured surfaces, enhancing architectural tectonics, in his lecture from 1935.

The materials have their own language, which is transmitted to the user through experience, evoking their memories and a haptic experience. In this project of the Cultural Center of Bethlehem (Figure 21), Juha Leiviskä maintain the materiality of the area, using local sandstone, as an answer to the geographic context (Figure 19 and 20), keeping alive the memory of the place, which was once erased by the conflict in Bethlehem. In this project was a constant dialogue between Finland and Palestine, between J. Leiviskä and Palestine engineers as Maha Khamis, who developed in this project different techniques of construction of the usual ones in Palestine. Leiviskä as a Finnish architect used to work with tiles and wood adapt his language to Palestine context, creating a different atmosphere to be experienced by the users in a total immerse experience.



Figure 19 - Bethlehem walls (By the autor,2018)



Figure 20 - Bethlehem walls (By the autor,2018)



Figure 21 - Terrace of the Cultural Center (By the autor,2018)

It is important to know the technical characteristics, as well as the aesthetics of each material in the project phase to adapt it to the space, the character of each material, not only the appearance of its surface but also the shape, color, hardness, its ability to conduct heat, those that get too cold or too hot and other perceptual qualities are extremely important for perception and architectural experience. In

this project Leiviskä use wood as most of his projects, a typical and root in Finland providing a new haptic experience with the wood texture to the Palestine users, but with a dialogue with the Palestine culture using their own techniques and mixing with sandstone on the exterior and on the interior floors.

With the use of sandstone, Leiviskä explore various properties creating different textures and using sizes of stone 40-70-50-30-40, inspired on Nativity Church (Bethlehem), creates different patterns. With different textures on the stone floors Leiviskä emphasize the importance of a simple texture on the comfort and on the spatial experience, creating different rhythms of walking and with different textures, and materiality near the window warns for spatial changes.

The appreciation of touch has also contributed to make the architecture aware of its own "body", of its materiality, textures, especially in the "skin" of buildings, in facades conceived as porous, as sensitive surfaces that register the difference between interior (Figure 22) and exterior (Figure 23) as we can see in this Cultural Center, where the light touch us with the texture of the pergolas. The exterior materiality and the interior pre-existing walls contrasting with white concrete walls and wood with big vertical windows with zenithal light and some pergolas as shadow systems that creates a Nordic atmosphere with a homogeny light with Palestine character on the intensity of contrast between light-shadow, only perceived walking through this space, touching and inhabiting this building with and haptic experience.



Figure 22 – Interior of the concert wall (J.Leiviskä archive)



Figure 23 – Terraces (J.Leiviskä archive)

This approach to the haptic system through the materiality requires a bodily and mental experience when inhabiting this space evoking cultural memories from Palestine and Finland. The tectonic experience is important not only in the perception of the architectural phenomenon, through a bodily experience but also in the retention of memory, we act, think and memorize through our body. Sometimes the memory of a space is not made by the visual and aesthetic appearance, or by a geometric but we remember the warmth of the body, the roughness of a wall and it is that characteristic and element that maintains a space in our memory, as suggested by Gaston Bachelard in *Imaginación Material.* Leiviskä through this project try to apply to our memories, imagination through the materiality evoking Finnish and local materials and techniques, with a phenomenological approach where the touch and the haptic experience matter, where the phenomenon is unique, real and non-transmissible.

Time and space represented in the project:

In this relationship between body-brain and space, time is a constant of architecture as in arts, "*The main ingredient of art is time, […] as an archaeology of collective and biological memory"*. (Pallasmaa , 2016, p. 67). In our material world of architecture, time is one of the variables involved on the perception of space, we need time to perceive and inhabit a space, we cannot isolate time from a place and we can not image a space without associate with a specific time, is a relational concept, does not have an independent existence. Time can only be understood in terms of other concepts as time, motion or event and is why this concept is so important for the perception of space. When we are inhabiting an architectural project, we can appeal to architect memories, user memories combining past, present and future projecting our experiences, in a combination of times. To J.

Leiviskä time is an important characteristic for his architecture, as he explains:

"To me, architecture and music are the arts which are closest to each other. They are the same thing spoken in different tongues. The aim in both is to create from human dimensions space to be experienced by people (…) In both of these arts the dimension of time is a key characteristic" (Leivsikä, 1999, p.8)

We acquire a perception of space through our body and mind, and we need time to perceive, which can be translated into **movements**, we experience architecture by the phenomena of the body moving through the space. Le Corbusier developed this idea of space and time through the corporal movement, what he calls Promenade architectural itinerary arguing that this must be covered to understand a building. As Mallgrave says: "*The space surrounding the body, as Merleau-Ponty noted, is similarly not a neutral geometric field, […] We measure it with our bodies by the steps that we take and the movements of our eyes as we seize it up."* (2018, p.68)

The movement is very important on the architectural experience and is why Leiviskä emphasize this movement through spatial sequences, transition spaces, intermediate spaces. *Raumdurchringung* concept influenced by Aulis Blomstedt and also specific projects as Aalto Library in Vyborg or Ressuction Chapel of Erik Bryggman. In all his projects we can find these transitional spaces as an important part of the project, as an organize space, a point of contact with the exterior, etc. At the Cultural Center of Bethlehem this transition space establishes the connection between different times of the history, putting in dialogue past and present, connecting the pre-existing walls and the new project with different materials and light. This hallway unifies different times through the time that requires to be crossed, connect heights and level passages of the old and new building and allow us to see the different spaces from it, a point of connection between times and uses.

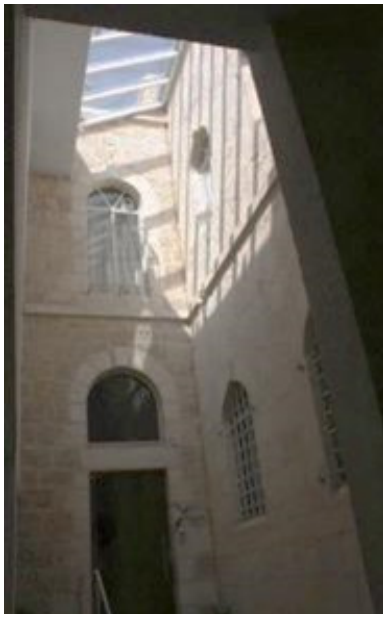


Figure 24 - Transition Space, Cultural Center (By the autor,2018)

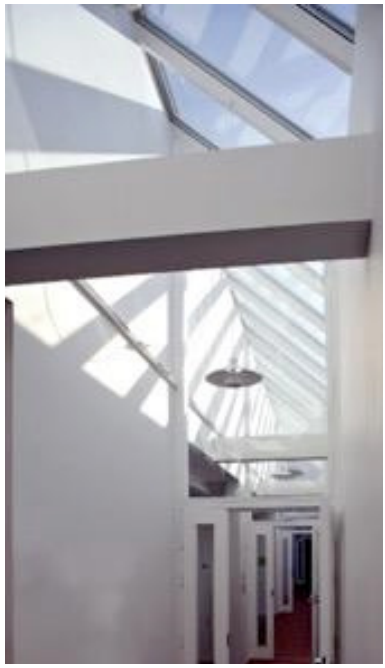


Figure 25 – Pakkila Church, Finland (By the author,2017)

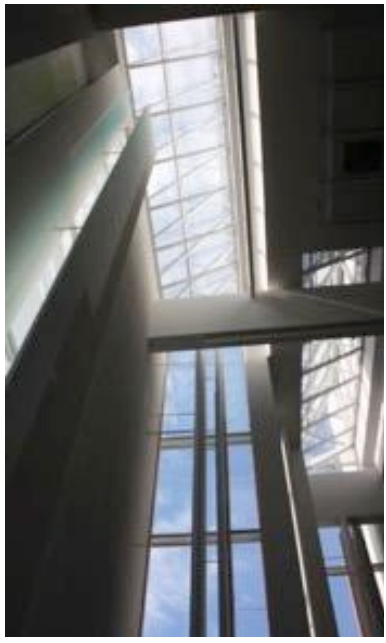


Figure 26 – Männisto Church Finland (By the author,2017)

Leiviskä as a musician use his experience as a pianist to connect different spaces, projecting the movement flowing from one space to the next, as himself says:

"Architecture, being a question of spatial processes and of the organization of spaces in relation to each other, is experienced best specifically by moving through the spaces, by living in them. Similarly, music consists of living within the spaces formed by notes. All these interactions, small and large, light and shade, soft and loud, intimate and monumental, belong just as much in music as in architecture." (Leiviskä, 1999, p.8)

All his projects have a spatial sequence on the organization, requiring movements and time to understand, and for that we need a body and mind, all these spaces are design in a harmonic way, this spatial sequence represent also a temporal continuity.

Conclusions:

As a conclusion we recover the idea of George Lakoff and Mark Johnson that *"The mind is inherently embodied"* (1999, p.3), our experience of the world is always a fusion between our constructed reality and ourselves, and we are conscious of this through the interaction with the environment, architecture.

Based on the analysis, interviews, critiques and observations we believed Juha Leiviskä generate the required atmosphere according to the context. Juha Leiviskä education allows him to understand time and space on a physical, artistic, historical and cultural scale and his architecture achieves to link body, mind and space in an phenomenological approach to architecture. The treatment and manipulation of this elements, like light, sound, material, texture, temperature, etc. affects directly the body being stimulated in all its senses. Thus, time, space, stimuli and meanings make the Atmosphere of this building.

This project represented an opportunity to recover cultural uses that had been lost during the conflict (such as cinema), the infrastructure represent a change for the community, not only a physical change, which allow the access to this space to develop activities in different ways to the previous one established, but also allowed a change of thought of being able to have access to culture, seen as a luxury in the middle of a situation with other deficiencies that might seem basic. From the physical and cultural perception, the sense of appropriation, of belonging is quite evident through an embodiment by the inhabitants allowing the mimesis and the aesthetic perception of this building connecting different histories, times and identities. There is an appropriation of the building by the inhabitant of Bethlehem because there is an identification of the users with the building, they recognize themselves and are able to reaffirm their identity in this space.

Several descriptions by the users of this cultural center show that this building reactivated forgotten times, memories and activities through the atmosphere created by Juha Leiviskä. The cultural center embraces the visitor physically and emotionally enhancing the transactions between body, imagination and environment. And this phenomenological cultural approach to space suggest another mode of though in architecture.

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IDEAL TYPES OF RELATIONS BETWEEN LITERARY NARRATIVE AND ARCHITECTURAL SPACE: THREE EPISTEMOLOGICAL MODELS

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Abstract

The relations between literature and architecture are so complex that, from an epistemological and methodological perspective, a great variety of approaches can be adopted in order to study them. And, actually, the rather chaotic bibliography that already exists on the mapping of those relations is a reflection of this complexity, crystallized variously within the fields of architectural theory, urban theory, semiotics, and literary theory. Firstly, sometimes authors from the discipline of architectural theory use expressions such as "architecture as a language", or "architecture as a (literary) text" or "the city as text", to create a kind of loose "analogy" between the two disciplinary fields. On the other hand, from the viewpoint of textual poetics or narratology, we can find similar, vague metaphors such as "narrative as a space", "narrative spaces", "the space of language", the "architecture of the text", or even "textual space". There seems to be another, second, family of approaches, that tends to establish a parallelism or a quasi-structural correspondence between space and narrativity, architecture and narrative, or building and narrativity, that goes beyond mere metaphors. The cases of Philippe Hamon's studies on the French realist novel or of Paul Ricoeur's famous article on "architecture and narrativity" immediately come to mind.

In this paper I will argue that there is another, third, epistemological possibility of relating literature and architecture that is deeper, more significant, and may prove rather fruitful if we would wish to extract design or creative principles from such a comparative procedure. I would like to call such an approach a *functional-structural correlation* that focuses on the roles and the conceptual content of the elements used to construct the above relation. The aim of the paper is to outline this possibility by organizing and typifying the bibliographical field under three distinct epistemological models usually at work when investigating the relation between literature and architecture, or between narrativity and space. Those models are conceived of as *ideal types*, in Max Weber's sense. In the exposition, I will specifically analyse the spatial literary theories of Gérard Genette, Elrud Ibsch,

Gabriel Zoran, and others, and test their epistemological validity, searching for a correlative theory of narrativity within the discipline of architecture.

Key-words: Architecture, Literature, Space, Narrativity, Ideal Types, Epistemological Models

Introduction: Aim of the Paper and Method Adopted

My aim in the present paper is to schematize some existing scholarly work on the relation between architecture and literature. This relation has attracted some minor attention during the last decade or so. Few theorists of architecture believe that the investigation of the intersection between literary narratives and architectural space will bring about a paradigm shift and a wholistic, structural change of perspective in the conceptualization of space (Terzoglou 2018: pp. 124–129). It is expected that such a change will face the issue of the growing instrumentalization and technocratic formalization of the architectural discipline, by challenging the prevalent aesthetic paradigm of buildings as unique objects. The commercialization of architectural production inaugurated by the so-called "stararchitects" has turned space into a commodity by propagating spectacular images within a shallow marketing game. By irritating the viewer's retina with the frenzied consumption of images, architecture is entrapped by the industry of spectacle, thus losing much of its conceptual content and its experiential meaning. A turn towards narrativity is expected to reveal the deeper humanistic core of architectural and social values that lie at the heart of the collective character of public space, against scientific reductions, algorithmic and parametric formalisms, and instrumental reasoning. Through the concept of "narrativity", architectural creation will be seen *as a writing in space, a writing of space*. Moving away from spectacular imagery propagandized by ocularcentrism and digital media, narrative can restore the central role of actions, bodily practices, and everyday habits for the articulation of a historically rich and rewarding spatial experience which possesses sentimental empathy. The stakes are high and extremely relevant, not only for contemporary architectural design and praxis but also for architectural education.

I will therefore try to organize some of the best approaches to the question of the complex relations between architectural space and literary narrative, by proposing that those relations can be codified under *three distinct epistemological models*. These models capture the complex relation between two disciplinary fields: architecture/space and "literary language", in the widest sense of the terms. In each epistemological model that I will briefly sketch, I want to reveal the *type of relation* envisaged between the two disciplines, and the range and *qualitative character of the uses* that each one makes of the other. Therefore, I believe that the appropriate methodological framework is that developed by Max Weber in his theory of "ideal types".

He writes,

"The ideal typical concept . . . offers guidance to the construction of hypotheses. . . . An ideal type is formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those one-sidedly emphasized viewpoints into a unified analytical construct

(*Gedankenbild*). In its conceptual purity, this mental construct cannot be found empirically anywhere in reality. It is a utopia." (Weber 1972: p. 90).

Before going into the examination of the proposed three ideal types, let me summarize the background and prehistory of this problematic.

Genealogy and Prehistory of the Relations between Space and Narrative/ Language

Postmodern theory played a major role in revisiting the problem of the relation between architecture and language, long after the early discussions and musings about the "architecture parlante" of the 18th century. Charles Jencks, George Baird, and Geoffrey Broadbent were some of the protagonists of those debates during the late 1960s and early 1970s. This era was exactly the heyday of semiology or semiotics. What Jencks and others tried to do is simply copy and transfer some models from linguistic and semiotic theory into architectural discourse. Jencks's argument in favour of a triple articulation (form–function–technic) of architecture, in direct relation to the famous semiological triangle developed by Ogden and Richards, is such an attempt (Jencks and Baird, 1969: pp. 13–17). And despite Gillo Dorfles's hesitation on the epistemological validity of such transfers, due to the complexity and "stereognostic" texture of architectural codes and their irreducibility to those of common spoken languages, people like Broadbent and even Christian Norberg-Schulz went on. They wanted to investigate how meaning was created by architecture, how signifiers were related to signifieds, how material buildings created "symbol-milieus" (according to Norberg-Schulz's catchy phrase) (Jencks and Baird, 1969, pp. 40–48, 51–56, 223–226), and they wanted to know whether architecture is a language or speech, following Saussure's famous dualism (Terzoglou 2018, pp. 121–123). The quest for meaningful form was a kind of heroic dimension of postmodernism, despite the fact that the protagonists themselves were supposed to nurture suspicion towards "grand narratives".

This fervour attracted the attention of famous semioticians such as Umberto Eco, who started addressing the specific problems of a semiotics of architecture. Eco significantly added a flavour of scientificity to the whole debate. In his article on the architectural column, he claimed architecture's double function, the signified one being types of possible functions, but, most importantly, introduced the problem of the specificity of architecture as a discipline. The fact that when addressing spatial contexts we have a mixture of synchronic and diachronic "languages", an array of hybrid morphological and historical features that persist in time, makes the semiotic analysis of architecture not an easy task (Eco 1972, pp. 98, 113–115). My point of view, developed in a recent article, is that facing architecture, if we aspire to adequately analyse it from a semiotic perspective, we have to adopt an interdisciplinary methodological stance, merging literary theory, modal narratology, architectural theory, urban theory, and semiology, at the least (Terzoglou 2018: pp. 123–124). Juri Lotman's idea of a "semiotic continuum" could be useful for such an endeavour. Moreover, Lotman introduces the concept of "the space of the semiosphere" (2005, pp. 206–208), which is diachronic, related to cultural memory, and therefore more relevant to architecture, which addresses, basically, social values, cultural hierarchies, existential distinctions, and collective memory, through the articulation of space within a temporal continuum or framework. Note

the fact that Lotman uses the concept of "space" explicitly, somehow legitimatizing the bridges between semiotics and architecture.

Since then, the concept of "space" has frequently been seen in scholarly work within the discipline of semiotics. In a parallel evolution, architectural theorists adopted much of the terminology from the discipline of narrative theory. The result was the frequent and now almost banal use of expressions such as "architecture is a language", "space is a text", "the city is a text", or, respectively, "narrative is a space", "the space of language", "the architecture of the text", "textual" or "narrative space", and so on. The mutual influence between the discipline of architecture and narrative or semiotic theory can be attested in Leonid Tchertov's investigation of "spatial codes" for the creation of a "semiotopology of architectonic texts" (2010, pp. 73–84). He writes, for instance, "A syntactically connected and semantically unified part of space, which is semiotized due to a spatial code, can be treated in this case as a spatial text" (Tchertov 2010, p. 75). Phrases such as the above are by now common ground for both disciplines. My question is whether that is enough. The great variety of approaches now available, from both fields, has created a rather chaotic and fragmentary bibliography, articulated around very different perspectives and points of view. My argument is that this fuzzy and vague picture does not help the dialogue between the disciplines, since both architects and narratologists, or semioticians, tend to use ready-made crystallised phrases, usually empty of real and operative meaning. To achieve real progress in this dialogue, for mutual benefit, there is an urgent need for an epistemological order or matrix that can be introduced in the discussion to map this complexity. This is my aim in this paper, through a preliminary sketch of this disciplinary matrix.

Ideal Type One: Empiricist Epistemological Models

I shall firstly provide a dense or thick description of the outline of the first ideal type of relation between architectural space and literary narrative and then provide some instances or examples of cases where this type can be ascertained. In this first type, the relation between the two disciplines seems to be external, reminding one of a collation. This collation is based on loose, vague generalizations, using expressions and mechanisms like "as" or "as if" to create abstract spatial or textual metaphors. Those metaphors act as figures of speech creating external juxtapositions between the two disciplines, a kind of parataxis or loose "analogies". I would like to call this approach, from an epistemological perspective, a form of *naive empiricism or naturalism*. Typical phrases that are adopted in this framework are: "architecture *as* a language, the city *as* a text, *as if* it was a kind of literary creation", or, from the point of view of narrative discourse analysis, "narrative, text or language *as* a space, *as if* it was spatial". Some examples:

A.J. Greimas, in his important article on a "topological semiotics" writes, "*Le langage spatial apparaît . . . comme un langage par lequel une société se signifie à elle-même*" (1979, p. 14). [Spatial language appears as a language through which a society signifies itself]. It is a typical instance of a loose metaphor. He goes on: *"la ville pourra être considérée comme un texte"* (Greimas 1979, p. 24) [the city could be considered as a text]. Greimas's "ville-texte" collates two distinct entities in a loose metaphor, without investigating the consequences of it for the deeper meaning and articulation of urbanism or textuality. The same loose methodology

is adopted by David Spurr, while studying "space in literature", in an effort to contrast it with Cartesian, rational spatiality. The argument is not helped by giving labels such as "universal", "dynamic", and "textual" to space as a category found in romantic and modern literature, or using phrases such as "limit-space" (Spurr 2005, pp. 21–29). These expressions remain purely descriptive, superfluous, and general, while the concept of space itself receives no precise definition. The same holds for the important discussion between Alain Robbe Grillet and Alberto Pérez-Gómez on the relations among literature, film, and architecture. The random use of the terms "theoretical spaces", "paradoxical spaces", and "oneiric spaces" creates an epistemological shifting ground of loose metaphors, inadequate conceptualizations, and lack of methodological clarity (Robbe Grillet/Pérez-Gómez 1996, pp. 246, 250, 258). I do not believe Roland Barthes is doing something immensely different in his text *Semiology and Urbanism*, where the metaphor of the city as a writing, as a discourse, as a language, is pushed to the extremes of paratactical juxtapositions between different disciplines. He writes, for example: "the city is a writing; the man who moves about in the city, i.e. the city's user. . . is a sort of reader" (Barthes 1993, p. 417). The city, claims Barthes, is also a poem. It is, then, everything resembling a kind of loose metaphor of "language": writing, discourse, an urban text, a poem. Those assumptions sound marvellous, but what can we gain from that as designers of urban space? I guess not too much.

The proliferation of spatial metaphors is a recurrent theme of scholarship that claims to be interdisciplinary. For example, Renaud Bret-Vitoz's study on the relation between theatrical writing and its scenic representations during the 18th century suffers from most of the above ambiguities. He uses terms such as "imaginary space", "literary space", and "dramatic space" (all the descriptive elements of spatiality contained within the text, to be represented, or not, on the material place of the scene) as distinct "forms of a poetic spatiality" or of a "fictitious space" (Bret-Vitoz 2008, pp. 2–21, 109–113). This chaos of various genres of "spaces" populating the text, by which the author claims to show the importance of this category for the constitution of 18th-century theatrical discourse and performance, fails to do so because there are no clear conceptual definitions of the various dimensions of it. Everything floats in a vague metaphorical cloud. Ideal type one, due to its empirical mode, is unable to shed light on the organizational role of space in the narrative. That is exactly what Simon Varey fails to do in his ambitious book *Space and the Eighteenth-Century English Novel*, where narrative is considered as a "form of spatial design" and spatial concepts in novels by Defoe, Richardson, and Fielding are scrutinised because those writers share "a habit of spatial thinking" (Varey 1990, p.4). Excellent working hypothesis, but with meagre results, since Varey talks about loose architectural and spatial metaphors in literature, abusing the term "space" and cataloguing architectural theorists of the 18th century who have no relevance with the writers discussed above. The whole study looks like a juxtaposition and an assemblage of platitudinous opinions on the political and social dimension of space as an instrument of control and hierarchy in a class society (Varey, 1990, pp. 4, 23, 161, 191, 202–203, 206–208). Isn't that something we already knew before reading Varey's book? The specific role of literature in mapping those relations of power, however, remains underdeveloped in Varey's book, which lacks the sophisticated conceptual apparatus to perform such a demanding task.

Probably the best case study that reveals the strengths and limits of the first ideal type of the possible relations between the discipline of architecture and literature is Michel de Certeau's famous *L'Invention du Quotidien*. One is struck in this book by the dominant presence of the metaphor of "writing" or "text", which seems to be applied almost in every human practice. Reading "makes the text habitable", society has become a text, narrated histories create a "space of fiction" (de Certeau 1990, pp. Xxxv, xlix, 120). The man who marches on the street writes an "urban text" (compare Barthes) without being able to read it, and we find wonderfully articulated phrases creating an analogical metaphor between spatial practices and language. For example, de Certeau writes, "*L'acte de marcher est au système urbain ce que l'énonciation (le* speech act*) est à la langue. . . .*" (1990, p. 148) [The act of walking is to the urban system what the enunciation (the speech act) is to language]. Actually, the walk, according to de Certeau, is like a "space of enunciation" or creates such a space, which is rhetorical. We can discern again this mechanism of the "as if" mode, operating in the first epistemological model discussed here. This practice creates a poetic geography which is superimposed on material geography (1990, pp. 149–158). Narrative structures become, like magic, spatial syntaxes, and, through the persistent use of the figure of metaphor by de Certeau, we are led to believe that spatial actions have a narrative side and, conversely, narrative acts found topological spaces (1990, pp. 170–189). Michel de Certeau's fascinating ability to create resonances between space and narrative does not surpass the empiricist threshold of the first ideal type: his dualism between space and place is confused, and his emphasis on the conceptual distinction between system and action, stability and movement, is rudimentary for a deeper analysis of the issues at hand.

Even Joseph Frank's immensely influential study on *The Idea of Spatial Form* falls prey to such dualisms between the plastic (spatial) arts and literature as an art of time, bequeathed by the huge shadow of Lessing. Frank argues that in modern literature we sense a predominance of spatial form over time sequences. Those writers, as he claims, "ideally intend the reader to apprehend their work spatially, in a moment of time, rather than as a sequence" (Frank 1991, p. 10). But what kind of space is that? It is a space produced by juxtaposition and simultaneity of certain linguistic elements on the surface of the poem. This "spatialization of form" is actually a metaphorical use of the term "space". As Jeffrey R. Smitten has showed, the consecutiveness of language is actually undermined in modern poetry by the suppression of causal and temporal connectives, creating a disruption of the narrative linearity by simultaneous actions, discontinuous events, and dense mosaics (Smitten 1981, pp. 17–20). He writes, "What the concept of spatial form does is to call attention to the departures from pure temporality, from pure causal/temporal sequence" (1981, p. 20). My argument is that Frank's use of the concept of space is a minimal, weak, and thin idea of it, not a robust category, having a loose and vague relation to architectural discourse as a design problem. Therefore, it fits well into the first epistemological model of naive naturalism or empiricism.

As a general remark, I agree with Gèrard Genette. He claims that spatial metaphors *do not speak about space*. They speak about other things *using spatial terms*. The presence of space is implicit in the source of the message. Space acts as a signifier. This is exactly the case with the first ideal type of relations among

literature, language, and architecture. Epistemologically speaking, in those cases, space is only a figure of speech, a form of discourse (Genette 1966, pp. 102–103). Needless to say, because space has an overwhelming presence within language, there is always this tendency to establish metaphorical affinities between linguistic categories and spatial extension (Genette 1966, pp. 106–107). But that is only one possibility, and rather superfluous, as I will try to prove in what follows.

Ideal Type Two: Critical Epistemological Models

There seems to be a different family of approaches, a second ideal type that articulates the relation between space and narrativity, architecture and narrativity, or building and language. This second type tends to establish a parallelism beyond mere, vague metaphors: a kind of quasi-structural correspondence between the two disciplines, architecture and linguistics, or architectural theory and literary theory. I claim that this second type of relations is based on an external comparison between two fields of inquiry, based, however, on abstract concepts. This comparison is no longer a collation but a sort of abstract but strict analogy or correspondence, making use of expressions based on "like", "such . . . as", or "between" to institute a parallelism or homology among distinct disciplinary frameworks. I would like to call such approaches, from an epistemological perspective, *critical or representational conceptualisms*. "Critical" because they transcend mere empiricist epistemologies using only vague metaphors, "representational" because they tend to assume a kind of one-to-one correspondence between the elements comprising each discipline, and, "conceptualism" in order to account for the fact that this family of models actually makes use of concepts in the articulation of the comparison between the disciplinary matrices at hand. Therefore, if I could compare the second ideal type with the first, the differences are striking, but, however, there is one, common element in both of them: the relation between the two parts of the comparison, architecture and language, or space and narrativity, is always assumed to be *external*. That is, it is presupposed that those disciplines are already ready-made entities, so to speak, and then they come into contact or dialogue. To give some examples of this second ideal type, I will briefly analyse the major works and articles by Gérard Genette, Philippe Hamon, and Paul Ricoeur.

Genette, in his 1966 article on the relation between space and language, already notes that "*il y a toujours de l'espace dans le langage. . . . Tout notre langage est tissé d'espace* " (Genette 1966, p. 107) [there is always space within language. . . . All our language's tissue is spatial]. Since language spatializes itself (1966, p. 108), we would expect why poets such as Hölderlin, Baudelaire, Proust, Claudel, and Char are obviously fascinated by place and space, claims Genette (1969: p. 44). Therefore, in his other seminal text from *Figures II*, on "*Literature and Space*", published in 1969, Genette tries to unravel the complex relation between the two concepts. The interesting feature of this article is that it somehow avoids the pitfalls of the general and vague metaphors pervading the 1966 article, inaugurating a methodology resembling ideal type two. Genette asks the crucial question of whether "space" is only one "subject" of literature among others, therefore just an *object of representation* for the temporal mode of existence of literary narrative (Genette 1969: pp. 43–44). If that were the case, then space would be something passive and external, and literature would only speak *about* space, in a kind of empiricist

fashion. Genette argues that is not the case. He asks a second question: is there an active spatiality that signifies, a *literary spatiality* specific to the discipline of literary narrative? (1969: p.44). His answer is yes. Therefore, Genette here implicitly claims that there is a deeper correspondence *between* space and literature. The lineaments of the second ideal type of relation come to the fore. His answer is a very careful and elaborate distinction among *four modes or levels of spatiality*: 1. *Primary or elementary spatiality* of language itself, which is related to the Saussurian idea of "langue" as a system of differential relations. 2. The *spatiality of writing* or *secondary spatiality of the text*, conceived as a kind of expression, manifestation, or symbol of the first. This second mode of appearance of spatiality in literature has to do with the atemporal simultaneity of the total work or book (compare Frank's idea of spatial form). 3. *Stylistic spatiality*, which is related to the use of figures as effects of meaning. This kind of spatiality produces a "semantic space" between literal and figural signification, which is directly related with the concept of "style": *how* things are said, the connotations produced, and the related density of meaning that a literary author can ignite. 4. Finally, the *spatiality of literature as a whole*, an immense atemporal production, whose simultaneous spatial symbol is the library (Genette, 1969, pp. 45–48). In Genette's analysis, it becomes clear that we have moved away from loose spatial metaphors into a conceptual examination of literary spatiality corresponding to architecture's spatiality. As Genette argues, architecture is exactly the type of spatial discipline which does not *speak about space* but makes space itself speak, namely, *space speaks through architecture* (1969, p. 44). Therefore, by a kind of epistemological correspondence, he seeks the same law or conceptual order within the literary field. The concepts he makes use of to map the different levels of literary spatiality, namely, system and difference, simultaneity, style, and atemporality, are obviously more advanced than the loose metaphors used in epistemological models of the first ideal type. Genette's methodology has a heightened critical aura surrounding it and surpasses the usual naiveté accompanying similar studies.

Probably one of the most elaborate studies on the relation between architecture and literature is Philippe Hamon's seminal book of textual poetics called *Expositions. Literature and Architecture in Nineteenth-Century France*. He focuses on the ways in which architecture becomes a privileged model grammar or meta-language for the construction of 19th-century French literary narratives (Hamon 1992, pp. xi, 24–25). Hamon views architecture as a shifter of narrativity, a mathematical and metaphorical operator that enables the visual domain of reality to be transcribed, so to speak, into a textual domain: that of literary (re)presentation (Terzoglou 2018, p. 124). My argument is that Hamon's examination basically falls under the second ideal type. But not completely. It also bears visible traces of the first and third ideal types, as I will show in the next section, making it a rather complex and confused endeavour, from an epistemological point of view. Hamon claims that architecture is a framing device, enabling writers of fiction to construct a "lexical space" imbued with intelligibility, structure, and meaning (Hamon 1992, pp. 19–23). Therefore, the relation between the two disciplines, namely architecture and literary narrative, appears to be already structured through a kind of mutual and complex correspondence. It is as if Hamon projects into architectural space the topoi of rhetoric and the sequences of narrative, or vice versa (1992, p. xii). For example,

for him, architecture offers a "habitable story", a "concretization of narratives", and architects produce stories of places and places that are stories (Hamon 1992, pp. 29, 31).

Hamon is explicit about the working hypothesis behind the book, stating that he works as if "the artifice of literature (an articulated semiotic ensemble that produces meaning) possessed a structural complicity or deep preestablished homology with that very thing whose existence in reality is already artificial: namely the building (an articulated semiotic ensemble that produces space)" (Hamon 1992, p. 6). This is *exactly* the description of the second epistemological model sketched above. Hamon's "conjunctions" between architecture and literature or "connections" between textuality and architecture (1992, pp. 12–13) delineate the strict parallelism that the second ideal type wishes to establish. Hamon argues that both disciplines "join in a complicity of artificiality*"* (Hamon 1992, p. 26) that could even reveal, I argue, *types of roles* that architecture can perform within a literary text. Apart from providing a vague and general metaphor for literary activity or furnishing a framework and a background for the development of narrative plots, architecture can become an object with varying degrees of performativity. Hamon claims that architecture and space can become hermeneutical, discriminating or hierarchical objects of description, thus regulating conceptual distinctions such as the dialectic between the inside and the outside, proximity and distance, container and contained. These performative roles correspond to divergent types of realism (Hamon, 1992, pp.26–29). This type of analysis already anticipates the third ideal type of investigation.

And what about "literary space" or *literary spatiality*, to adopt Genette's expression? Since Hamon belongs to the same epistemological model as Genette, he is expected to have developed a theory of literary space based on the institution of a parallelism or homology among the disciplinary frameworks of architecture and poetics of literary narrativity. And that is exactly the case. Hamon believes that literary space is an *effect* and a result of a production of meaning at work on five different hierarchical levels or planes, contrary to Genette, who listed four of them: 1. the *topological* plane (abstract logical poles, rhythms); 2. the *topographical* plane (collective places and rituals, dwellings and habitats); 3. the *topical plane* (rhetoric figures, topoi); 4. the *typographical* plane (materiality of the page, volume, calligrammic sequentialities of signifiers); 5. the *typological* plane (intertextuality, genres, distances of enunciation, syntax of the rewriting, palimpsests) (Hamon 1992, pp. 34–35). There is an obvious affinity between Hamon's and Genette's lists, and many common properties too. I argue that architects would be particularly interested in Hamon's *topographical level of literary spatiality*, since it is the plane of the signified collective actants and architectural themes, and also of movements, rituals, and proxemics. Therefore it reveals the qualitative interaction between social space and the behaviourof actors, everyday life, and its spatial stage, dwelling, and systems of values (Hamon, 1992, pp. 4–5, 26–28, 32–34, 40). Hamon, through literature, shows architecture as a semaphoric bearer of meaning already codified to induce certain social roles by its occupants (1992, pp. 44–45). This is a similar argument to Varey's idea that the duality of architecture and space is about social control. The difference, however, is that Varey's argument is based on loose metaphors with minimal conceptual content and a poor internal articulation,

whereas Hamon's homological relation between literature and architecture is very well crafted, using rather sophisticated conceptual apparatuses with useful suggestions and interesting observations. Therefore, ideal type two can really teach something to architects for their design thinking, whereas ideal type one cannot, besides creating a general atmosphere of "narrative" metaphors. Let us hear Hamon expounding again on his epistemology: "architecture is to space what narrative is to time: a semiotic means of configuration . . . which allows us to give shape to the amorphous and to impose discontinuity, plot, and direction on the randomness of the real" (Hamon, 1992, p. 35).

A similar use of expressions based on "like", "such . . . as", " the one is to . . . what the other is to . . .", namely mechanisms creating parallelisms between different disciplines, can be found in Paul Ricoeur's impressive essay *Architecture and Narrativity*. His working hypothesis brings to mind Hamon's pre-established homology between literature and building, leading me to claim that Ricoeur belongs to the second ideal type as well. He writes, "To begin with, I would like to put an analogy in place, or rather something that appears at first sight to be only an analogy: a narrow parallelism between architecture and narrativity, in that architecture would be to space what narrative is to time, namely a 'configurative' process; a parallelism between on the one hand constructing, that is, building in space, and on the other hand recounting, emplotment in time. In the course of this analysis, I will ask myself if one ought not to push this analogy much further, to the point of a genuine intertwining, an entanglement between the architectural configuring of space and the narrative configuring of time" (Ricoeur 2016, p. 31). Therefore, the relation between the two, namely architecture and narrativity, appears to be already structured through a kind of mutual and complex correspondence. It is as if Ricoeur, like Hamon, projects into architectural space the topoi of rhetoric and the sequences of narrative or viceversa, revealing the spatiality of narrative and the temporality of architecture. To achieve the desired intersection, Ricoeur uses the categories linked to threefold mimesis from his work *Temps and Récit*, transposing them to the architectural plane (Terzoglou 2018, p. 127). Prefiguration, configuration, and refiguration capture three logical stages that make the parallelism between architecture and narrativity possible, from the common epistemological attempt and desire to shed light on similar creative processes. Ricoeur forges a correspondence between those three logical moments and dwelling, building, and thoughtful dwelling, respectively (2016: pp. 32–39). That is exactly what I have called "*critical or representational conceptualism*", to describe the second ideal type of relation between literature and space. Ricoeur transcends mere empiricist attitudes and instigates a "representational" conceptual apparatus because he assumes a kind of one-to-one correspondence between the basic concepts comprising each disciplinary process of creation. The implicitly assumed homology or quasi-structural analogy between "narrated time" and "constructed space" allows Ricoeur to develop an impressive array of folded comparisons that are based on concepts such as plot, intelligibility, intertextuality, and memory. Those concepts enable Ricoeur to avoid the superficial metaphorology of the first ideal type and to arrive at interesting suggestions regarding the dialogical relations among dwelling, building, reading, and remembering such as his idea of a "plural reading as a work on memory" (Ricoeur 2016, p. 40). Ricoeur's work proves that the

second ideal type, which follows critical and conceptual epistemologies, is more apt to give architects or literary theorists a coherent and organized body of clarifications and substantial categories that probe deeply into the issues of interdisciplinarity. However, my claim is that there is also a third epistemological and methodological possibility, one that is even more fruitful and significant in terms of design or creative principles ready for use during the process of conception.

Ideal Type Three: Structural–Functional Epistemological Models

The third ideal type of relations between architectural space and literary narrative achieves an internal intersection of the two disciplinary fields, based on concrete concepts. The difference between the third and the second ideal types is that, in the latter, external comparison between the two fields of inquiry is primarily based on abstract concepts, whereas in the former, concepts have a concrete, I would even say a literal, content. The distinct type of relation produced in this case is an overlapping, an imbrication, a superimposition of architecture and narrativity, making use of expressions based on "in", "within", or "inside" to institute an incorporation and interpenetration among distinct disciplinary frameworks. So the questions in this ideal type are reformulated. Instead of asking "what is the relation *between* architecture and narrative?", we tend to focus on questions such as "How does narrativity appear or how is it constituted *within* architecture"? or "What is the role that space or architecture assumes *within* the narrative?". The difference is huge. In the first type of question, the two terms under comparison remain external to one another. In the second case, they create a fusion and a conflation, since we are now searching for the functional roles that each pole plays *within* the other discipline. In other words, narrative is organically incorporated as part of spatial inquiry, and space is encapsulated on the inside of literary narrative or poetic discourse. Therefore, ideal type three offers a major step in transcending both empiricist and critical methodologies and epistemologies, by questioning the inherent narrativity of architecture and the implicit spatiality or architectonic quality of literature.

My claim is that the third ideal type of relation is the most fruitful and rewarding from the point of view of processes of creativity, since it allows an inner gaze to the interior mechanisms of articulation of a certain field of research. This quality of "insidedness" is what differentiates the *functional correlation* or *structural permeation* that this type offers, from simple parallelisms or juxtapositions, over the previous two ideal types. That is why I would like to name this model *structural–functional* and characterize it as an *organizational or constructivist realism*. In this type we are focusing therefore on the *textual functions* of space and the *spatial functions* of literary narratives or texts.The interesting thing about this third type is that, to my knowledge, it is still very poorly developed. The potential for growth of similar research programmes is great, and I expect that they will develop in the decade to come, contributing much to the organic understanding of the processes of architectural and literary conception and creation. However, to be consistent with my previous elaboration, I will briefly describe some attempts that I think capture the methodological trail sketched above.

Philippe Hamon, in his book *Expositions*, strangely enough, provides a methodological mixture of first, second, and third ideal types, as already

mentioned. While he starts from loose, descriptive metaphors such as "the city as a book to wander through" (Hamon 1992, p.4), he then proceeds to parallelisms and conjunctions between architecture and literature, the visible and the legible (1992, pp. 5–12). And while he claims that over the 19th century he observes an imbrication of literature and architecture (1992, p. 7), he then retorts by arguing that he only studies "the metaphor of exposition" through ruins, arcades, phalansteries, and the big city (Hamon 1992, p. 13). Oscillating between an "extended metaphor" (1992, p. 21) and homologies between textuality and space, namely between ideal types one and two, Hamon, in some instances, offers a glimpse of the methodological stance of the third type. For example, he writes, "It is by means of architecture that the text begins to speak of what basically defines it as a structure, as a fiction or as a structured fiction. All architecture in literature thus becomes to a greater or less degree, an incorporated metalanguage" (Hamon, 1992, pp. 24–25). This is exactly the formulation of a structural epistemology as described above. Note the use of the expression "architecture **in** literature". Hamon's investigation of the three functions of the architectural object within narrative structures (hermeneutical, discriminating, or hierarchical) (1992, pp. 26–28) follows precisely the epistemological model of the third ideal type of "inside" relations. Hamon hesitates, vacillates, and wavers constantly. On the one hand, he uses general but strict analogical correspondences, such as in the phrase "Architecture is to space what narrative is to time" (1992, p. 35). On the other hand, he furnishes excellent, but brief, analyses of "literary architectures" based on the four rhetorical figures; he talks about kinds of sites and the role that windows, walls, doors, and passages play in articulating spatial effects, thus revealing what he calls the "modal overdetermination" of the architectural object itself (Hamon 1992, pp. 28–29, 35, 38–45). Hamon calls those spatial devices "technemes" and focuses on the analysis of the window, the stained-glass window, the door, the shop window, the wall, and the mirror in Maupassant, Zola, Balzac, Baudelaire, and Mallarmé (1992, pp. 37–43). Traces of a fruitful imbrication of architecture as a system of systems ("archi"-structure) and literature or lyric poetry are scattered everywhere in the text, showing glimpses of a "textual poetics" without however getting there. There is no internal consistency in Hamon's method. Even the interesting intuitions about the ambiguous role of architecture in lyric texts as a medium of vision and a way to constitute the self and its sites or locations remain fragmentary (Hamon, 1992, pp. 191–197). However, he opened a field of investigation on the roles of architecture within literary poetics. Why not apply the same idea to architecture and search for the roles of narrative within *spatial poetics*? But before getting there, let us briefly refer to some more systematic attempts towards an internal reading of the role of space within literary narrative.

Elrud Ibsch developed an exemplary essay based on the third ideal type. He focuses on the function of spatial description in literary texts. According to him, description is the part of narrative which focuses on relations of spatial contiguity and not on actions (time and succession). Transcending a common prejudice that those parts are just effects of the real with a secondary role, Ibsch claims that descriptions perform multiple roles: explanatory, predictive, organizational. Those "diagrammatic images" that create a suspension and interruption of the story have a regulating function: they create a focal field on the psychological state of the

protagonists of the narration (Ibsch 1982: pp. 97–100). He then proceeds to map the changing role of this device in various types of narratives, from fin-de-siècle novels to the "nouveau roman". Spatial structures prove to be crucial for various reasons: by providing space-creating actions (when action and description merge), by giving a sense of a shifting perceptual perspective and delineating possible or hypothetical spaces, by creating a feeling of introspection, and by arriving at the elimination of the subject, where objects are in motion by themselves (Ibsch 1982: pp. 101–106). We are dealing here with a very rich analysis of the transformations of the function of spatiality within the literary text, which also proves that narratives were gradually spatialized from the 19th to the end of the 20th centuries. The rising dominance of description over narration (Ibsch 1982, p. 102) is of course related to Frank's observations about *spatial form*, but in Ibsch's essay this general category has acquired a specific, structural content. There is informational gain from a constructivist point of view. That is a characteristic of the third ideal type and of the functional, organic methodology that accompanies it.

Gabriel Zoran's detailed essay on a "theory of space in narrative" picks up the thread left by Ibsch and gives it the status of a general model of the "spatial aspects" or the "structuring of space" within the narrative text (Zoran 1984, p. 309). It is a clear case of a third ideal type relation between space and narrativity. Zoran claims that the space or a spatial entity within the narrative text derives its existence from language itself, losing some of its real attributes (Zoran, 1984, pp. 309–314). He sees this linguistic effect articulated around *three coexisting "vertical" levels, structures, or layers* of the reconstruction of the world through the text: the topographical, the chronotopic, and the textual. In the first level, space is a self-existent, static entity, independent of the plot, a kind of map produced through a series of qualitative oppositions (inside/outside, near/far, up/down, centre/periphery) (Zoran 1984, pp. 315–318). The second level is based on Bakhtin's idea of the "chronotopos", and captures the movement and action of the narrative, through an integration of spatial and temporal categories. Here the concepts at play are rest and motion (synchronic relations), and directions, axes, and networks (diachronic relations) of movement. Space is seen as a "field of powers", and movement is incarnated in space (Zoran 1984, pp. 318–319). The third level is imposed by the patterns of organization of the text itself: selectivity, temporal continuum, and point of view play major roles in creating gaps (spots of indeterminacy), linearity (segmentation), and perspectival structure (foreground/background) (Zoran 1984, pp. 319–322). However, Zoran claims that apart from the above three vertical layers, there is also a more indiscernible "horizontal" structure of space articulated around three scopes: spatial units (scenes, places, zones of action, and fields of vision), spatial complexes (abstraction), and total space (the external field of reference) (Zoran 1984, pp. 322–332). Through this exhaustive analysis, a rather intricate internal articulation of spatial structures emerges, comprising their inherent systems and their mode of existing. However, in such formalistic analyses, we lose the sense of the activation of those structures in real novels and actual texts. There is a danger in the third ideal type. It can regress into a structuralist abstraction, a tendency to overdetermine the role of space in literature. And although Zoran's analysis can be true, there is a sense of artificiality to his overall construction which renders it less plausible.

Much more lively and organic is the treatment of Jacques Chouillet, where an "interior" methodology of incorporation and interpenetration among distinct disciplinary frameworks of the third type sketched above is applied on a specific text, *Le Neveu de Rameau* by Diderot, by which the author triesto reveal the textual function of urban space in its narrative articulation and meaning. Chouillet rightly claims that space in literature loses some of its physical reality and its concrete attributes (compare Zoran), and is transformed into a field of action and a coloured dominion of the personalities and characters of the plot. In other words, urban geography, through fiction, becomes a *figured space* which is absolutely necessary for the evolution of action, and its features take on textual functions (Chouillet 1975, pp. 71–72). I developed a similar argument in my essay on "Space, Place and Narrativity" focusing on Italo Calvino, Walter Benjamin, Edmund Husserl, and Edgar Allan Poe (Terzoglou 2018, pp. 124–128). The space of the city, seen through the lenses of Diderot's sensibility, ceases to be neutral: through the narrative, there is an "affective charge" created by attractions and repulsions. Narrative references to real locations, through a series of transformations related to a specific *direction of the gaze* of the narrator or the protagonist, become a nexus of imaginary objects, a space that signifies, a space organized and charged with meaning. Therefore, in Diderot's text, we meet a social mapping of the city districts, where actions and picturesque details give order and signification to an "ideal space" (Chouillet 1975, pp. 72–81). Chouillet's essay is a paradigmatic embodiment of a line of argument based on the third ideal type of relations, a structural–functional investigation of the space *produced by* the characters of the plot.

Conclusions: Towards a Spatial/Architectural Poetics

I have tried to crystallize various approaches of the relation between architectural space and narrative function into three basic ideal types: external juxtapositions, external comparisons, and internal intersections. Moreover, I have attempted to characterize their respective methodologies: naive empiricism or naturalism, critical or representational conceptualism, and organizational or constructivist realism. I have unveiled the expressions used by each method, the underlying assumptions of their style, and some key examples where these ideal types are put to action. My overall argument was that the third ideal type is more fruitful and heuristically rich in providing principles that can be activated during the design process of an architectural space or the writing of a novel. Instead of giving us vague spatial metaphors (first ideal type) where space is only a form of discourse, a signifier for something else, second and, especially, third ideal types give space the role of a signified: we are talking about the *content* of spatial representations directly, space is intended in itself, and we focus on how literary language constitutes spatiality (Genette, 1966, pp. 102–103). However, there is a kind of asymmetry in the development of research programmes of the third type. We have at our disposal scholarly attempts that focus on the *textual functions* of space in literature (and, to a lesser extent, in poetry), but we have almost nothing on the investigation of the *spatial functions* of literary narratives or texts in architecture. To reformulate even more precisely, in architectural theory, instances of the first type of relation abound, examples of the second type are scarce, and attempts of the third type are, to my knowledge, missing. It is as if architects have not yet realized the potential

of narrativity for a revaluation of the creative process of space-making. They seem to push back against the idea of applying narrative techniques on architectural composition. However, narrative is present within architecture as a discipline.

According to Pierre Boudon's scheme, there are three organizing instances of an architectural work: iconography (designs, sketches), edification (buildings, materials), and *fiction* (allegories, myths). Fiction in architecture has to do with foundational allegories and legitimatizing myths which conceive of *imaginary possible worlds*. Boudon argues that architecture as a discipline is *in a state of fiction* before becoming a building (Boudon 2014, pp. 21–26). That is absolutely true. Fiction for architects functions as an operation of anchoring arguments on memory, texts, expressive symbolic forms, ideas, values, and concepts. Every great architect moves into a universe of fiction. Boudon clearly proves this assertion in Le Corbusier's texts, essays, and poems (Boudon 2014: pp. 27–34). Narrativity is thus an internal, integral moment of architectural conception; it exists within the disciplinary matrix of architecture. The question therefore should not be what is the possible relation between architecture and narrativity, as if this relation is going to be established between two external entities. The real question should be what are the means to develop the already established and existing imbrication and interpenetration of space and narrativity in order for it to become operative in architectural design conceptions and lead to the building of significantly richer spatial experiences for the user. "Narrativity" is not another parameter that should be added to the existing methodological tools of the architect; it can potentially transform the architect's whole way of thinking and attitude as a designer.

A semantics of the field of possible worlds is urgently needed within architectural conception. Architects work with "as if" hypotheses, they are mythmakers, they structure the existing void, the non-existent, much like a writer structures fiction to instigate a world where the reader will furnish his or her own answers (Ricoeur 1985, pp. 285–305). I argue that a "phenomenology of the imaginary-imagistic consciousness", as Ricoeur envisages it, would be a decisive step in that direction (Ricoeur 1985, p. 306, n. 1). Let me therefore sum up: Architectural space is born and manifested within an environment of narrativity and fiction. This spiritual atmosphere may have been established by the architect himself or herself (through manifestoes, writings, interviews, books) or by a climate of reception from critics and theorists, or by the comments and the appropriations of the architect's work by the users and dwellers themselves. The task of a future spatial and architectural poetics is to map the exact role played by this fictional atmosphere within the operations of the creative process and to systematize it. And hope towards that direction is given if we adopt the third ideal type as articulated and expounded in the present essay. Needless to say, the implicit acknowledgment of the proposed research is that architecture resembles a writing in space, is a kind of spatial writing, and the architect behaves "like a playwright directing spectators through a dramatic sequence" (Pelletier 2012, p. 62). Therefore, narrative can play an internal role in "communicating architectural intentions", invent new architectural programmes, and involve the "temporal experience" of the dweller in an embodied way (Pelletier 2012, pp. 58, 60, 66). We urgently need a "linguistic" and "narrative" turn in the sciences of space, away from data mapping, smart-cities discourse, and artificial intelligence propaganda. Narrative can be useful for architects in order to allow

them to imaginatively experiment with variations of living sequences of meaningful experiences, with spatial situations unfolding in time. Architecture as a writing of space should not be treated as a static, momentary image. Rather, it should strive to create memorable and durable articulations of bodily and mental events that unfold as a kinesthetic plot in time. Good architecture is like a meaningful speech. As Philippe Hamon writes, "The foundations or atmosphere of a building are first and foremost narrative, textual, and literary, a building merely being a kind of frozen speech" (Hamon 1992, p. 46). Well said, indeed, but by a literary theorist. Do we, architects, want to take him seriously?

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THE CONTEMPORARY LIBRARY AS A THIRD PLACE

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Abstract

According to Oldenburg (1999) daily life should take place in three types of spaces and realms of activities in order to be relaxing and fulfilling. These spaces dictate where and how situations occur. The so called "first place" is the home which serves the domestic realm, the "second place" is the workplace where people are productive and the "third place" is the neutral ground, a sociable space, where individuals may come and go as they please and engage their personalities without the context of purpose, duty or role. Such space is by nature an inclusive space: it focuses on social encounters. According to these criteria, many places can be considered third places. This paper focuses on the role of libraries as a "third place" and how they interact in modern society, proposing a design methodology to spatialize such concept.

Traditionally, libraries have focused on gathering knowledge but in recent times their role has changed: the idea of the library as the city's living room is becoming a vital feature in modern urban society. According to Worpole (2004), these spaces, once focused on providing an atmosphere for studying, have now renewed themselves as locations where one is as likely to meet a friend for coffee or engage in an activity as borrowing a book. The contemporary library must be a multifunctional structure that provides users with information, as well as culture, hence acting as a social space. The author classifies the contemporary library into types, which respond to the specific needs of certain communities.

Based on this understanding the proposed design methodology focuses on two main guidelines: Generating spaces with the potential to encourage communication and adopting an organizational system of both storage and content that can help

transforming the experience of library users. The methodology is tested on an underprivileged community located in a city in the Northeast region of Brazil, where inhabitants lack proper access to public social spaces within its urban fabric.

The first methodological step involves becoming familiar with the needs of a contemporary library (Worpole, 2013 and Jakovlevas-Mateckis, et al., 2004), and which type would be compatible with the targeted community. Next, the approach is to understand spatial prototypes that might encourage communication (Liang, 2016), and how different subjects may be organized in a library (Schelling, 2011). The following step relates to the morphology of the building itself, focusing on the use of a biomorphic form-generating strategy named branched blocks (Agkathidis, 2017), in which separate modular spaces branch from each other to give shape to the building. This action is investigated as a means to providing spaces that can produce more interaction, not only amongst their users but also outside the library. We argue that the subdivided nature of this scheme may have a positive effect on the organization of multiple spaces with different functions, particularly by keeping these visually and physically connected.

Overall, the proposed methodology addresses the modernization and rethinking of spaces known as libraries, understood here as complex spatial structures whose functions go way beyond that of a book depository. By aligning the concepts of "third place", the notion of a library as a communication-encouraging space and its organizational system of storage and content with the form-generating strategy of branched blocks, it is expected that the methodology may be able to lead to the production of spaces which can better respond to the needs of the modern library user and the city inhabitants as a whole.

1.Third Places

In 1989 the urban sociologist Ray Oldenburg writes the book *The Great Good Place: Cafes, Coffee Shops, Bookstores, Bars, Hair Salons, and Other Hangouts at the Heart of a Community* where he analyzes the development in American cities, arguing that these lack informal public gathering places, and, as a result, Americans are denied those means of relieving stress. He argues that a fulfilling life must be led in three realms of experience, which are translated into spaces. The first one, the domestic realm, happens at home (the first place), the productive realm occurs at the workplace (the second place) and the social realm takes place in neutral ground spaces designed for social interaction, which the author calls "third places" (Figure 1). Such spaces are inclusive and deprived of social hierarchy, allowing for conversation and interaction to be the main activities. It is also a place where no one needs to play host and everyone can build relationships and enjoy their time, *"Though a radically different kind of setting from the home, the third place is remarkably similar to a good home in the psychological comfort and support that it extends"* (Oldenburg, 1989, p. 42).



Figure 1. Diagram showing the three types of places according to Oldenburg (1989).

2.Contemporary library needs and types

According to this rational there are many different types of space, which can be called third places: coffee shops, bookstores, and so forth. In this paper we explore the possibility of libraries as third places and their ever-changing roles in society. In order to properly design this type of space, it is necessary to understand the roles surrounding it, both today and throughout history, so that architecture can supply the means for all required programmatic aspects to be fulfilled. The necessity to preserve information and artefacts starts almost at the same time as these very things do, resulting in buildings that offer similar services as the library, functioning as a storing space for documents. Libraries have been present since ancient times, such as in the library of Alexandria (285 BC), known to have hold up to 700 thousand volumes before its decline in 145 AD.

According to Jacob (cited in Freire, 2016) libraries used to serve as "storages for power", be that spiritual, economic, worldly, etc. The reason this power was effective relates to the fact that reading and writing were a privilege granted only to a minority of people- kings, nobles and members of the church-, the higher-ranking sector of the society, leaving the underprivileged larger portion in alienation (Markus, 1993). This segregation of knowledge lasted until Europe's Renaissance when university libraries started gaining more power, marking the beginning of the democratization of knowledge, a very slow process taking place over the centuries which led to today's library, where anyone can access its contents.

In 1994 the International Federation of Library Associations and Institutions (IFLA) alongside the United Nations Educational, Scientific and Cultural Organization (UNESCO) published the Public Library Manifesto, and it rapidly became recognized as an important statement carrying the fundamental principles of the public library service (IFLA publications; 97). Twelve points were listed and labeled as "missions of the public library", relating to information, literacy, education and culture and should be at the core of public library services (Figure 2). Since then libraries have evolved from providing those things to becoming centers of community activities and social interaction (McCabe and Kennedy, 2003).

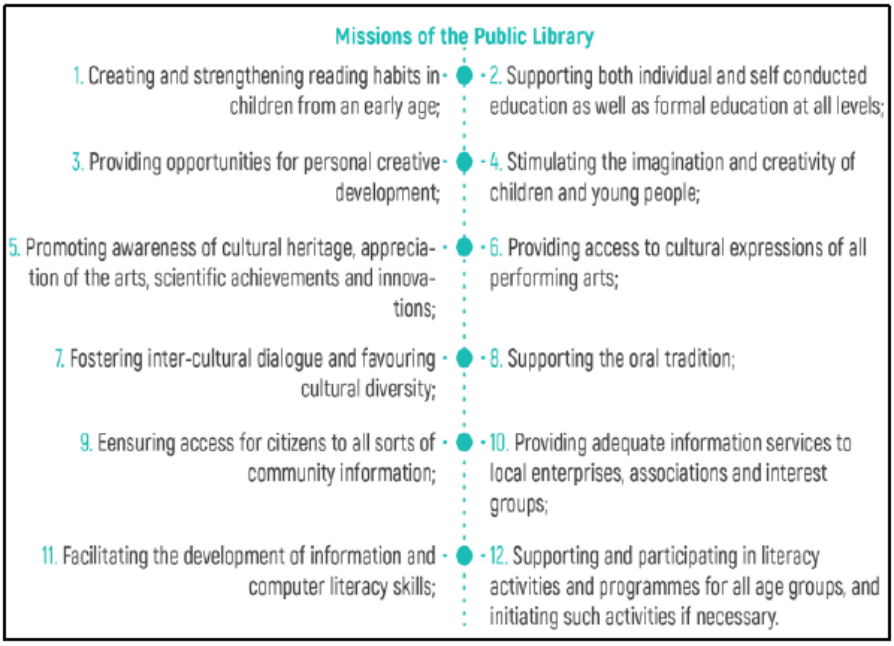


Figure 2. The missions of the public library per IFLA and UNESCO's manifesto.

There are noticeable architectural changes when comparing the characteristics of old and modern days libraries, including the way furniture is organized and which colors are predominant. Perhaps the most significant shift is how spaces now tend to be more flexible, with natural light and more friendly towards social encounters (Figure 3). The technological revolution in the 1980s and 1990s was widely seen as bringing forth the death of the library under the assumption that once people had access to information from their homes they would no longer use this type of space. According to Worpole (2004) this was an exaggeration, as, instead of disappearing, libraries have rejuvenated themselves, turning into places where you are as likely to do your homework, take part in an activity, meet a friend for coffee as borrow a book. Following Oldenburg's (1989) concept, this change is what characterizes the library as a third place

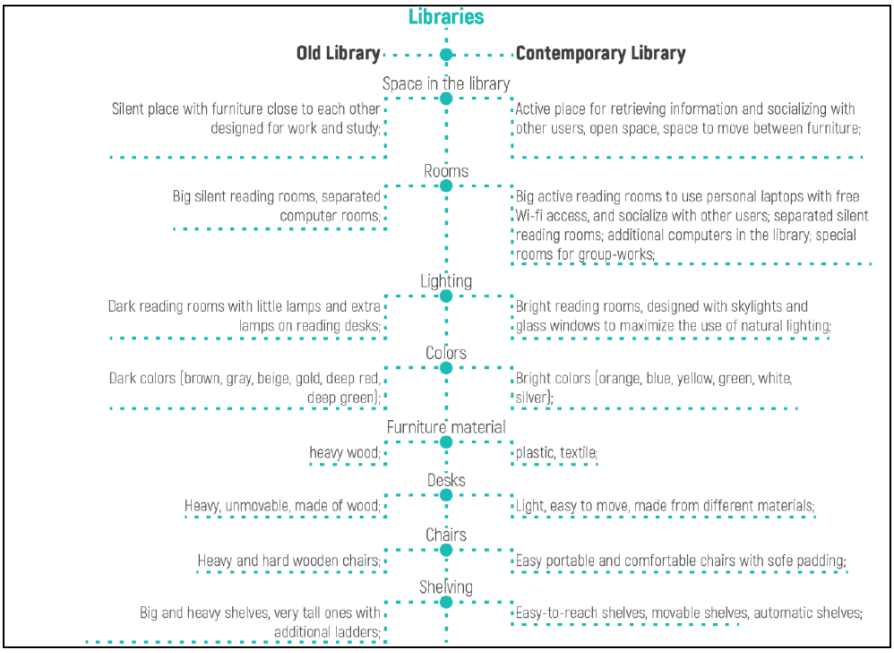


Figure 3. Comparison between the old and the contemporary library based on Liang, W. (2016), edited by the author (2017).

Libraries should provide the users with functions the local community needs most, be that a learning or cultural space, meeting places, etc. It should reflect the particular necessities of its users and lean on four key factors: the people, the programme of services, events and activities, the partners whom the library authority might wish to undertake a joint development, and the place of the library itself. The morphology of the library building usually emphasizes its public nature with grand entrances, stairwells and gardens. Even if the construction is not grand its demonstration of a public space should be maintained. Worpole (2004) adds that even if the construction is not grand its demonstration of a public space should be maintained. The author concludes by speculating on the new types of libraries about to emerge, classifying these into seven typologies according to use, concept, architecture, programme and the place where each of these would fit best, as follows: the new civic landmark, the retail model, the young people's library, the neighbourhood lifelong learning centre, the themed library, the mobile library or pod and the online library (Figure 4).

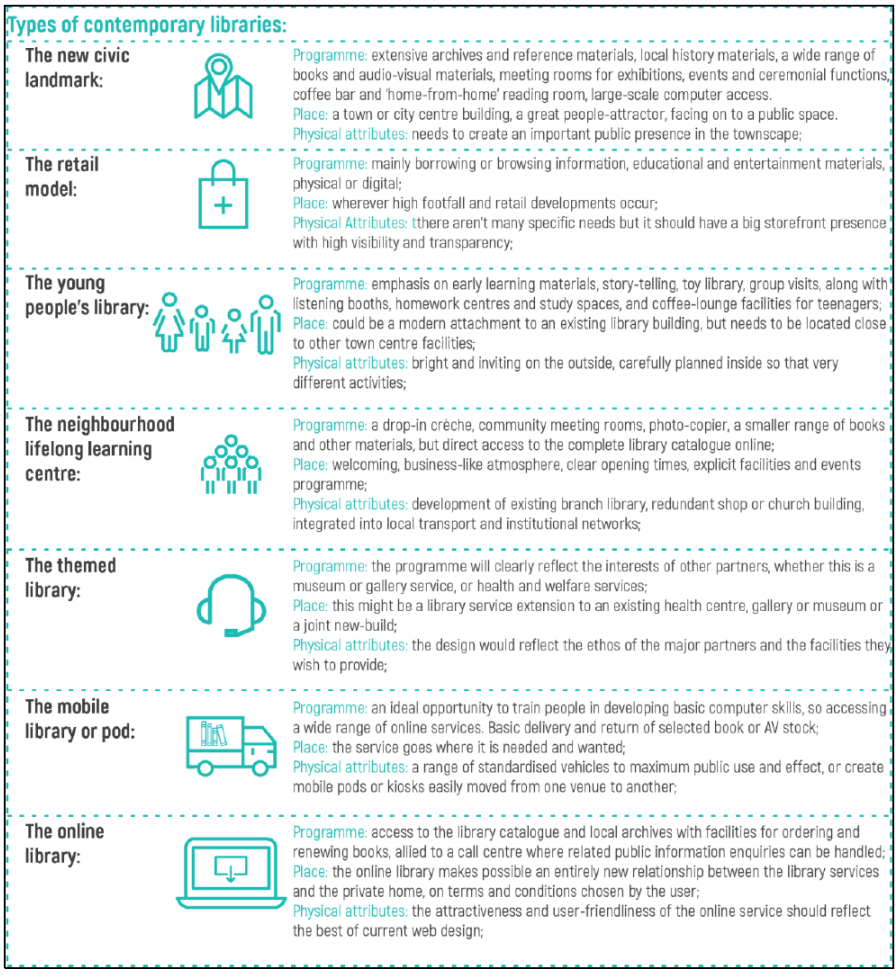


Figure 4. The types of contemporary libraries according to Worpole, K. (2004) edited by the author (2017).

According to Jakovlevas-Mateckis, Kostinaité and Pupelienė (2017) the impact of information and technology is felt in all aspects of life, including the nature of learning and working, as well as, everyday life. Currently society could be characterized by rapid growth in the amount and variety of information. Consequently, transformations on the way libraries are organized must happen in order for them to adapt to the new conditions. The authors analyze aspects regarding architecture and functions of "modern public libraries", suggesting planning solutions for these. The new library must be multi-functional and provide not only access to information but culture, communication and other services. The programme is separated into traditional library and non-traditional services – cultural and social –, and activity spaces. Cultural and social spaces allow libraries to meet informational, cultural, communicational, and other needs of the society. A library also needs to be comfortable, offer easy access and have between 20-35% of its spaces designed for cultural and social activities (Figure 5).

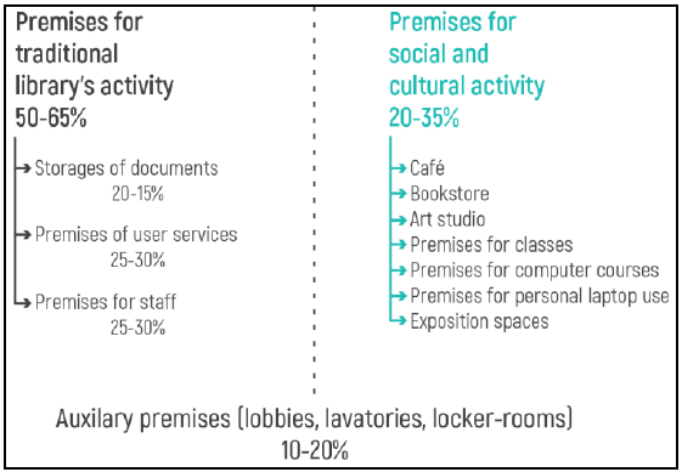


Figure 5. The percentage of space designated for each function according to Jakovlevas-Mateckis et al (2017) edited by the author (2017).

According to Worpole (2013), the twenty-first century library is not just a service station, but, a destination in and of itself, acting as a "living room in the city", a vital feature in modern urban culture. A badly designed project, with low ceilings, artificial lighting, and sequences of metal book stacks is not a space in synch with a library that should respect its costumers and workers. An innovative, welcoming design can attract different people, who might not have considered using this type of space before, architecture can attract people and give support to the cultural values and all things a library can offer. Van Slyck (2007 cited in Griffis, 2013, p.5) writes that learning spaces, such as libraries, have a direct influence on people, dictating which encounters are possible and how memories are created. Thus, form, access and connections between spaces have a significant importance in learning and socializing spaces such as libraries. In his thesis, Liang (2016) organizes prototypes of spaces designed to encourage communication, classifying them into spatial typologies (Figure 6).

Prototypes of space encouraging communication:		Description
Terrace Example: Gund Hall of the Harvard University is designed by Australian architect John Andrews;		System of steps which allow for open spaces with visual contact which promote social interaction;
Atrium Example: Guggenheim Museum, New York, by Frank Lloyd Wright;		Everything spins around an atrium, that way people walking different floors can see each other;
Juxtaposition Example: The Museum of Contemporary Art designed by SANAA;		People are allowed to circulate around exposition spaces which are sealed by glass walls which allow for privacy and connectivity at the same time;
Void Example: Shibaura House, Tokyo, Japan, designed by SANAA;		By cutting out void space in different floors around the building's periphery, spaces in different levels are connected together;
Threshhold Example: Royal Ontario Museum, Canada, by Daniel Libeskind		This threshhold offers a sense of privacy without actually separating the space with walls and doors, which allows for communication;
Split Level Example: House NA, Japan, designed by Sou Fujimoto;		There is an activity in each level. Thus the rooms are created by the levels rather than with walls;
Shaft Example: Sendai Mediatheque, Sendai, by Toyo Ito		Columns that stretch from ground floor to roof functioning as a light shaft and connecting different floors physically and visually;
Rotation Example: ØRESTAD college, Copenhagen, designed by 3XN;		Floors are connected by the circular stairs so that people will have an interaction with the active space when they are moving from lower to upper level;

Figure 6. The spatial typologies that encourage communication by Liang, W. (2016) edited by the author (2018)

"They (the users) may even bring their own laptops, but want the space, the comfort and the associational life offered by the company of fellow citizens, to support them in their personal endeavors. The modern library is now much more than a book depository, formerly accessed by a catalogue, but is a meeting place of books, media, people and ideas (including talks, events, readings and children's activities)." (Worpole, 2013, p.52)

3.Library organizational systems

"Order is what turns a mere collection of books into a library" (Matters, 2011, p.33). The interior organization of a library, consisting of volumes and subject categories, can happen in many different ways depending on the preference of the institution that supports the space and/or the necessity of its users. The traditional way nowadays is the Dewey Decimal System (DDC), which takes into account the subject contained in the volume, each volume receiving a call number and organized accordingly. There are other similar ways, such as the Library of Congress Classification System (LC), which alongside the DDC are most commonly used in the United States, and TAKE into consideration not only the volume's subject but also the author's initials.

Both types of organization need a catalogue, usually made with a system of computers that guide the user to the call number on the desired volume. But is

such an approach even desirable nowadays? Is it possible that a different system could promote interdisciplinary thoughts and research? (Matter, 2011). *"Order is not always fruitful. Innovations (entailing real discovery, not mere retrieval) are often inspired by fuzzy searches and serendipity."* (Michel, 2011, p.37). According to Michel (2011) there are many ways to make the search in a library more interesting and less mechanic as, for example, using the using the users' own knowledge as a base for organization. Another way would be to create a system in which the users can add key words to a search software and these words show volumes, which contain the desired subjects. Libraries in which its stacks and volumes are exposed tend to interest reader more effectively, which may come in the form of serendipitous discoveries like a user searching for a specific title finding other interesting volumes that can be pertinent to their work (Schelling, 2011).

"Traditional book structures and classification systems shape the way we think. We're rarely aware of it, but to a great extent linearity and hierarchy determine how we see the world. (…) And while it can be infinitely useful to think in terms of categories and hierarchies, and casual chains, it can also warp our view and prevent us from picking up on other important qualities." (Astrom, Wemüller and Zimmer, 2011, p. 93)

4.Circulation within libraries

Observing floor plans of some libraries, we detected patterns of circulation, book stack organization and reading spaces, which usually connect the different areas of the building. Most libraries are subdivided per storage layout, interfering heavily on the user's experience, not only regarding comfort and aesthetics but also, the easy access to knowledge. According to Edwards (2009) this layout creates patterns, which he analyzes in existing libraries (Figure 7). Extending the author's analyses and looking beyond the layout of stacks, and into the morphology of the building itself and the circulation spaces, we created types of circulation. In general libraries tend to carry three shapes, the first, a rectangular shape, is a unified slender space; the second consists of an atrium and, the third, of other merging spaces. Within these shapes, we can observe the way the user moves, leading to clues on which layout would be the most fitting for the stacks. Linking this analysis to Liang's (2016) types of spaces that encourage communication, we observed which types were more appropriate for the different library layouts (Figure 8).

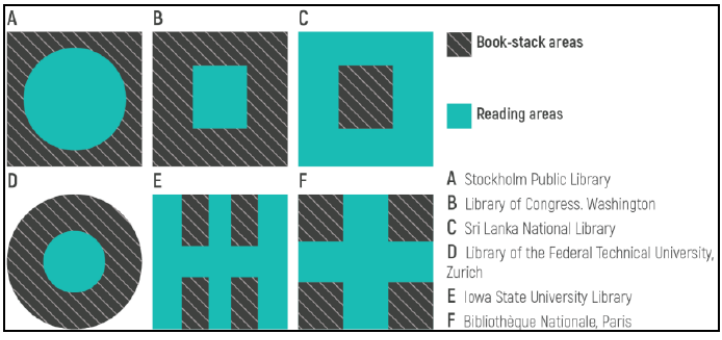


Figure 7. Examples of library types according to Edwards (2009) edited by the author (2018).

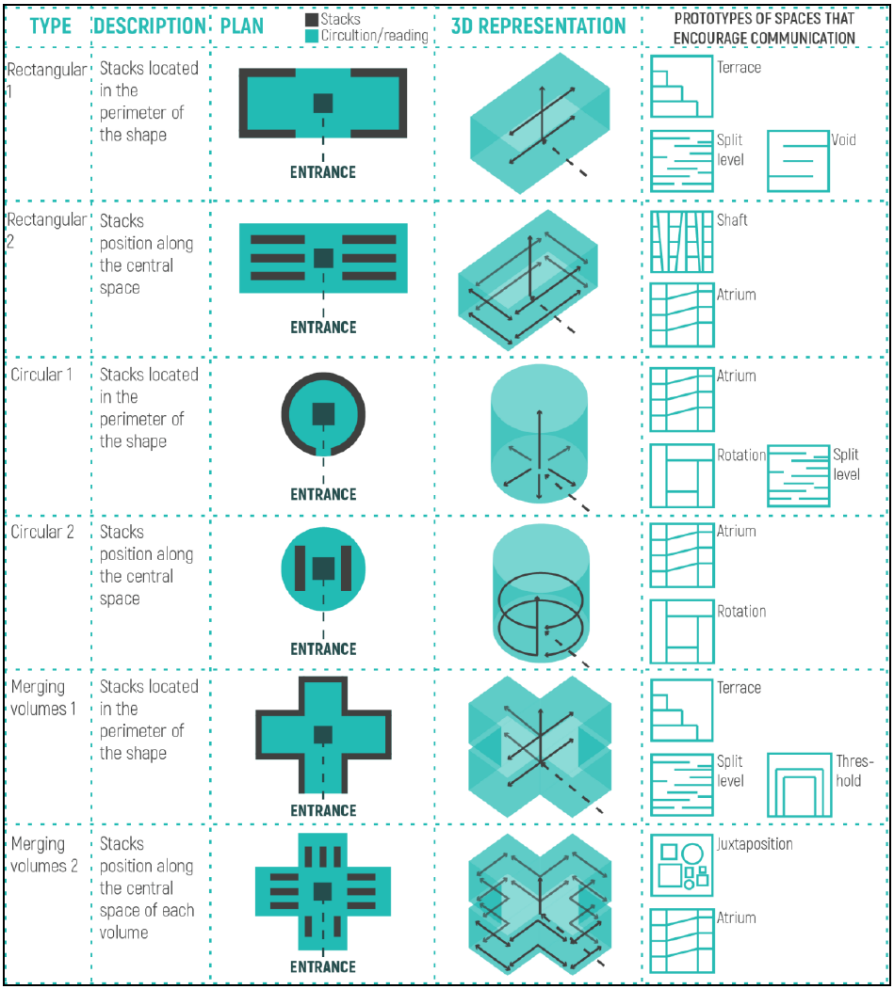


Figure 8. Associating Liang's (2016) spaces that encourage communication with building morphology, stacks location and circulation in libraries, by author (2018).

5.Location for testing

The location chosen to test the concepts described so far is a plot situated in an underprivileged community, on the Capibaribe River waterfront, the main body of water in the city of Recife, in the Northeast region of Brazil.The site choice occurred due to its proximity to nature and mangrove vegetation adjacent to the river, and, more importantly, the fact that it the community surrounding it has very little access to public libraries. According to IFLA the influence radius of a library is 1.5km. In regards to our site, the only library within said radius is located across from the river, which makes it difficult for dwellers from the community to access it on a regular basis.

Once the location was set, we analyzed several aspects, such as existing building heights, land use, and spaces that seemed to be valuable for the social interaction of the community such as the Santana Park, the square located in the middle of the

rows of houses, which has fallen into disuse and is abandoned now a days. During site visits we also met with to one of the community centre's leader, who mentioned the residents' desire for a library, pointing out that one of them had gathered donated furniture and books and a Rioteca – an anagram of the words river and library in Portuguese – which functions as the community's library and third place. Based on maps most buildings are one or two-story, and often used as housing. Besides its proximity to nature, the plot was formerly a square, a previous attempt to provide the community with a third place that did not work, nowadays being occupied with informal housing and used for garbage disposal. As a consequence, we needed to relocate some of these precarious and unsafe housing units to a nearby plot, improving the potential for an active third place at the location (Figure 9).

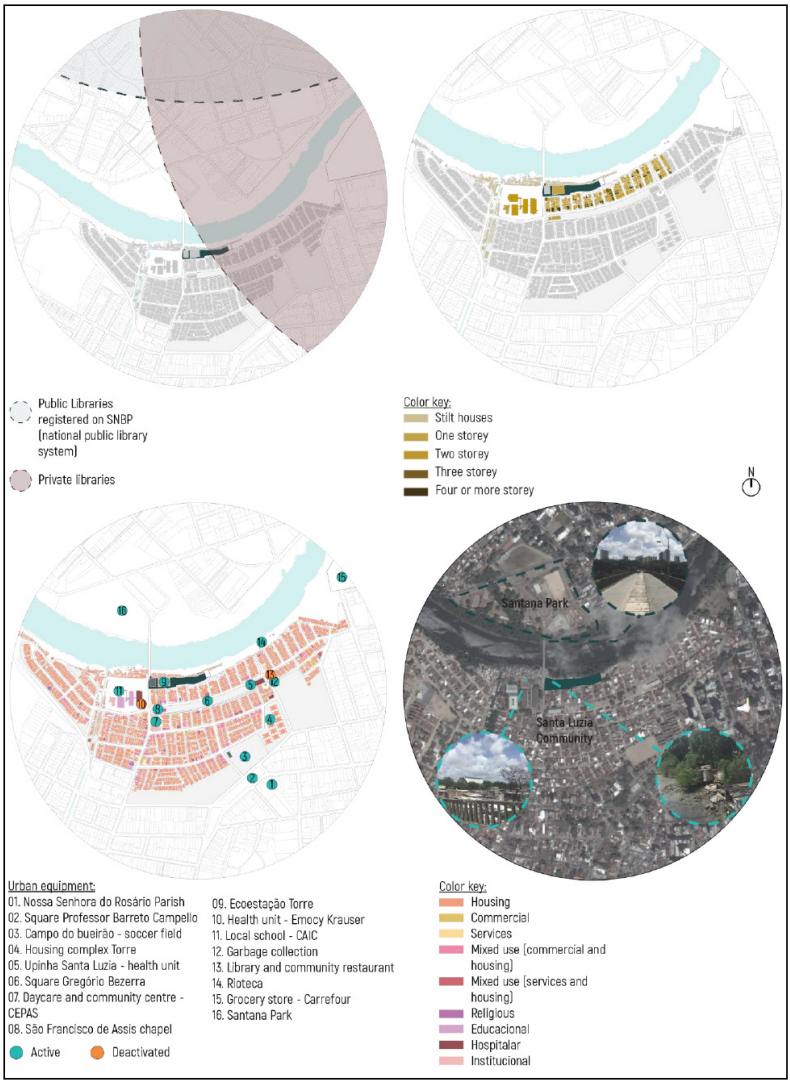


Figure 9. Maps and analysis of the site, the author (2019).

6.Experimenting with design

Based on site characteristics and contemporary library concepts, the proposed design combines various types proposed by Worpole (2004): New civic landmark, the neighbourhood lifelong learning center, and the themed library. As a new civic landmark, besides contemplating spaces dedicated to the typical media in libraries, it should serve as a vehicle to attract city dwellers towards the community by providing open green squares, café and meeting rooms. As for the learning center portion of the project, enclosed spaces allocated for community use are desirable, such as meeting rooms, ateliers and collective vegetable gardens.

Regarding the themed library, it is important to note that, even though the proposal is not linked to any specific sponsors or public agencies, the site is very close to the main public school serving the surrounding community, located by the city's main river, where there is an abundance of mangrove vegetation. These two natural elements- that both the local community and the city as a whole have turned their backs to nowadays – reinforce the need for a design proposal that promotes awareness concerning the rich surrounding environment. With that in mind, the selected subjects for the library volumes encompass the following: Human studies, general education, children's literature, environment, agriculture, energy, and technology/computing (Figure 10).

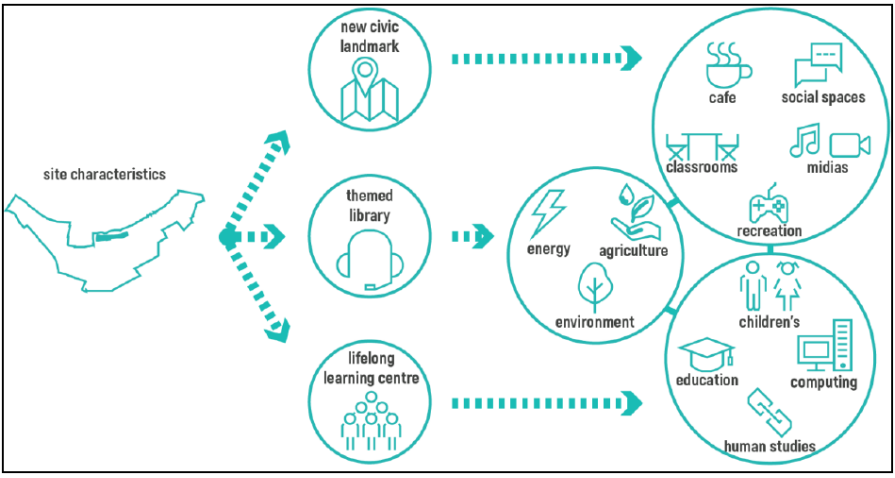


Figure 10. Which library types (Worpole, 2004) fit the site, the author (2018).

Considering the site's proximity to nature and the need to promote engagement with it, biomorphic concepts are adopted as a way to generate the building form, so that it would interfere as little as possible with the feel and physical presence of nature at the location, following a systemic approach. In design, biomimicry implies in having buildings that mimic strategies from nature in order to solve function, aesthetics and sustainability issues (Agkathidis, 2017). The author proposes a series of strategies to support biomorphic form generating, incorporating the processes of morphogenesis and metamorphosis, the first being the biologic process through which an organism creates its form, and the later its adaptation and evolution.

In order to initiate the form generating process we observed that the site was

marked by a fragmentation caused by the large amount of small buildings sitting close to one another, as well as the ever-changing heights of the existing trees and building masses. Based on these two aspects, Agkathidis' strategies of "branched blocks" and "hills and valleys" were utilized in the proposal. The first one, consisting of volumes branching out of each other, was employed towards the building itself, relating to the roots of the mangrove vegetation. The second strategy was associated to the undulation identified at the site, and was applied in the waffle-structured roof that covers the various building blocks that contain the program, generating shaded areas housing social spaces.

The ground floor of the site is freed by the use of piloti, laid out with spaces dedicated to relaxation, reading, playing, etc., which allows for access and view into the mangrove vegetation and the adjacent river to be uninterrupted, except for library entries and a centrally located area for social gatherings.

As for the floor plan, due to the simple geometry with no edges and the ability to deal with the existing building mass in a more neutral manner, we adopted circular-shaped spaces, which utilize 15% less construction materials than rectangular shapes. Circular shapes also provide better air circulation and natural lighting, and, due to their non-squared façades, they perform better when it comes to solar insulation and wind loads. (Paraxo, 2014). Six different diameters were applied to the circles, consisting of cells laid out according to the branching principle: Whereas larger circles were placed at the central portion of the site, smaller ones were added towards the periphery of the plot.

The seven library subjects followed the guidelines of similar or correlating subjects being closer to and connecting one another (Figure 11). The way subjects are spread throughout the space, together with the use of open shelves, allow the user to explore new volumes within each area of knowledge, providing a dynamic experience, as suggested by Schelling (2011).

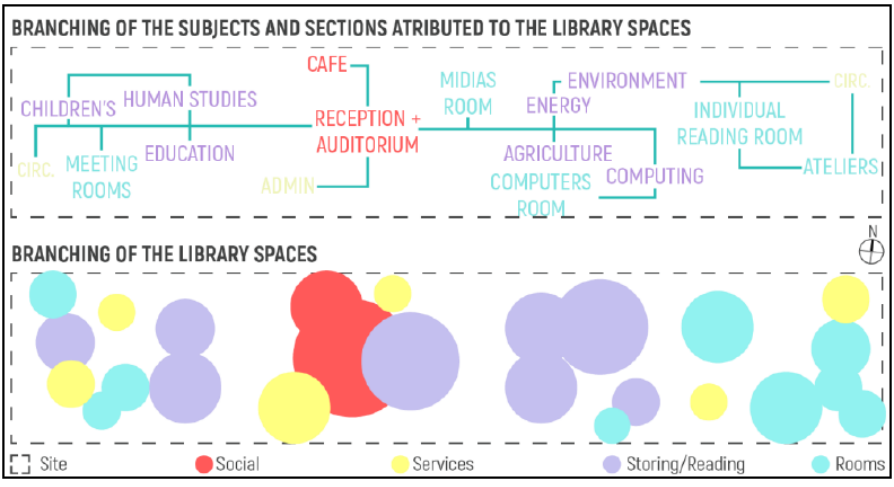


Figure 11. Proposed site plan according to function/subjects, and adopted branching strategy, the author (2018).

Other complementary functions, such as the auditorium and café are located

in the central portion of the site. At West, we have the children's section and those specifically directed to the community, which are close to the existing school and the main direct access to the neighbourhood. The ateliers are positioned on the opposite side, close to the proposed vegetable gardens and to an existing sports field. The rooms housing technology/computing subjects intersect with the space for computers, promoting interaction between the two. This also happens to the spaces dedicated to meeting and events, which are close to the human studies and education sections.

Considering the linear and fragmented nature of the building a traditional library system such as the DDC, which has only one entry and one exit point, would not be practical for the user. With that in mind the proposed system uses Radio-frequency Identification (RFID), which operates automatically, and, according to Saback (2009) can contain different equipment to better satisfy the needs of a library, including portals (at the entrances), portable manual readers and self-service terminals. These terminals would be located one at each access point to the library floor plan, so that the user would not have to walk across the entire library to check a book out.

For the layout organization per se, we used the previously mentioned concepts of juxtaposition, terrace and threshold by Liang (2016). The cellular and fragmented nature of the design, alongside the glass panels protected by wooden *brise soleil*, naturally imprints a juxtaposed feel to the building. The strategies of terraces and thresholds are used on specific rooms depending on functions, as in the reading rooms, where terraces and a threshold separate the space into sections. A few specific spaces, such as the children's reading room, are expanded to the outside creating a balcony of sorts that provide physical and visual contact with the exterior.

For variety purposes the circulation types applied in the library were variations mixing the 'Circular 1 and 2' types (Figure 8) which means that the bookshelves and furniture may or may not be on the volume's periphery, but it always follow the circular form. In order to maintain visual contact with the outside, when it is located at the periphery of the space it is not full height, standing at 90cm at their highest (Figures 12, 13, 14 and 15).

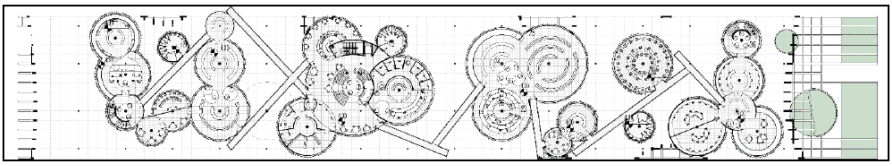


Figure 12. 1st floor plan, the author (2018)

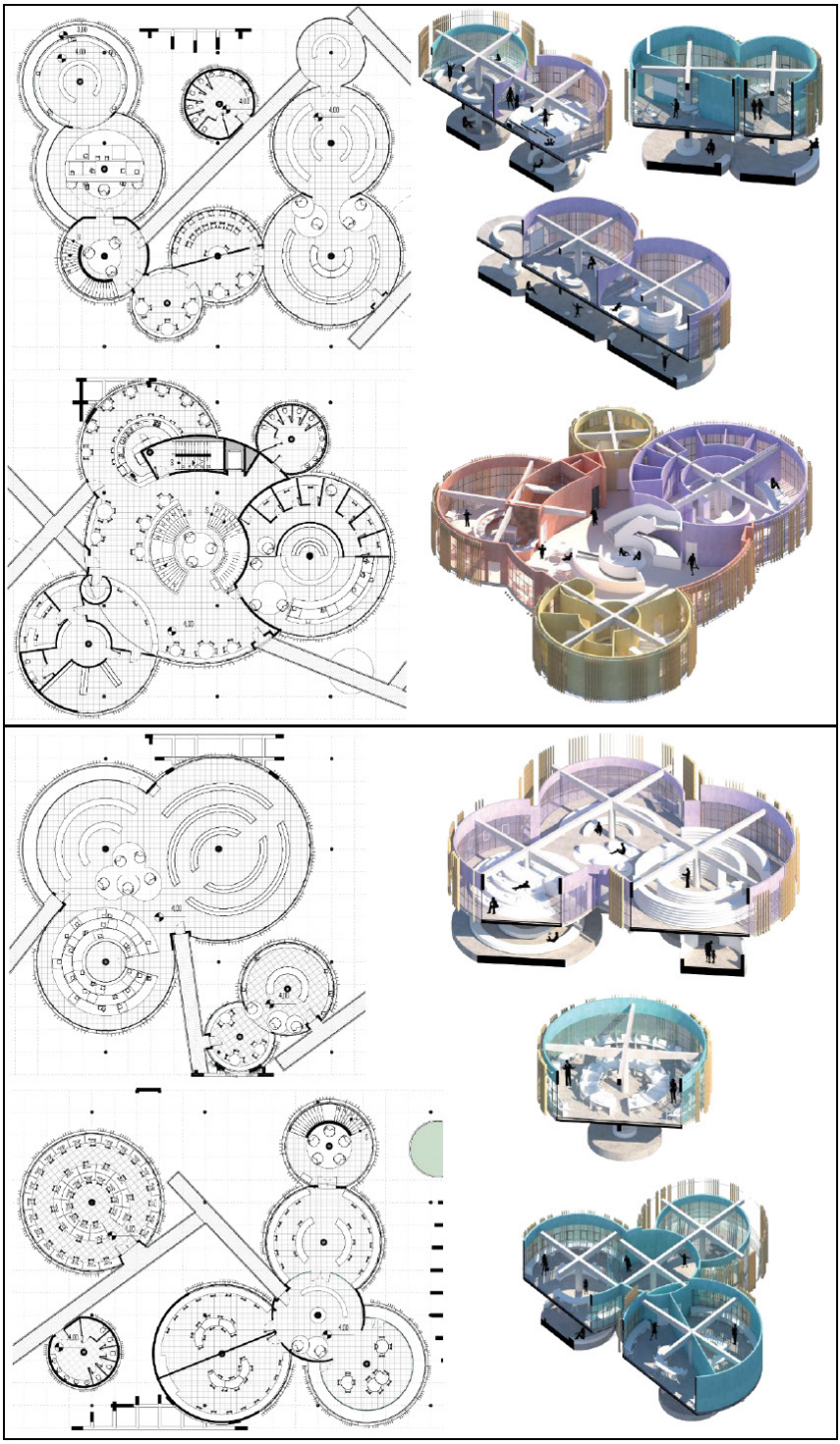


Figure 13. Zooms of the 1st floor plan with 3D images showing the spaces and their layouts, the author (2019).



Figure 15. 3D images of the proposed library showing the possibilities of this third place, the author (2018).

7.Conclusion

Spaces considered as third places, according to Oldenburg (1989), relate to their ability to connect people and promote interaction, as should be the case in a contemporary library. By incorporating higher level of outside-inside interaction, presenting informal reading spaces, and displaying light color tones and more natural light, a library would better deal with society's new demands for comfortable socializing spaces. In order to fulfill these needs one of the actions to be taken is promoting more interaction between the building and the surrounding environment. In the proposal presented here we have conceived a cellular system where volumes were placed according to the biomorphic strategy of branched blocks, in which spaces relate to each other pending on the subjects contained in each sector and how these interact, potentially leading to a more dynamic experience for the library user.

These circular volumes are enclosed in glass panels and light wooden *brise soleil*, an attempt to generate a higher level of outside-inside interaction without compromising comfort in the interiors, which, otherwise, could cause of overexposure to direct tropical sunlight. Through protected glass façades every space would offer a view towards the river, the luscious mangrove vegetation and the surrounding community. The use of spatial types that encourage communication - threshold, terraces and juxtaposition- in the proposed library aimed to stimulate the users to interact with their peers and the space itself, which, alongside its functions is a desirable characteristic in third places.

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THE RETURN OF THE GESAMTKUNSTWERK – "SET THE TABLE", A PROJECT WITHIN THE TOTALITY OF SPACE, PLACE AND SPECTACLE

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ABSTRACT

This paper intends to draw the attention to the process of working with scale and proportions, and put up the question if there is a difference in doing so between design and architecture. Our thesis is that both design and architecture give meaning to shapes by relating them to various scales. Historically when designers and architects make claims about being capable of *Gesamtkunstwerk*, they talk about being able to design from doorknobs to streetscapes. The same logic underlies the Saarinen Maxim: *"*Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan."

The arrival in any city in the world confronts us with cultural differences expressed particularly in architecture, but also in what and how we eat. Every city has its own *townscape* different from any other, and it is while it is every street, every corner and every alley that creates this townscape, it is also what defines the atmosphere within any specific city. It is to see the highs and the lows and

to understand that the totality of it all creates the circumstances for people to bond, socialize, play, eat and live. The townscape can, in our opinion, be directly compared to what we experience when we eat. When we zoom in, the townscape includes *foodscapes* that define how, where and what we eat, whom we eat with and the term of the meals. The table is, as the cities, set and meticulously planned to create an atmosphere, that defines exactly the ones hosting while embracing every guest entering.

Our paper introduces townscape in the kitchen scale bringing *tablescape* into the dimension and scale of daily life. We let design and architecture lead this transformation, as it is the *Gesamtkunstwerk of the tablescape* that is the focus in the project 'Set the Table'. A research project with the overall goal to improve the quality of life of elderly people receiving catered food, by developing a new and innovative packaging prototype which will enhance, change and transform the way food is brought, prepared and consumed.

In this paper, we will present some of the findings in our project "Set the Table" and discuss how the scale and most important the scape concept affects the meal in the context of public welfare, in specific, increasing life quality for the elderly. How, in our architectural praxis, we can transfer the disciplines between scales, to the design of setting a table and as the townscape creates the atmosphere of the streets, let the tablescape create an atmosphere of the meal, both being Gesamtkunstwerk of the life that is living.

PAPER

'Set the Table'

The delivery van halts to stop outside a small, red house, and the driver sounds the horn as his enthusiastic 'hello' before turning the ignition off. Inside the house, the curtains are carefully drawn from one of the windows, and an elderly woman peeks out, breaking into a smile, when she spots her visitor. The rain is relentless, but the driver is practiced, and quickly opens the backdoor to the vehicle, grabs the crates packed specifically for this house, and carries them up the small footpath leading to the now open door and into the warm and dry hallway of Mrs. Hansen, who has been waiting excitedly for her delivery all morning.

In Denmark, elderly people are encouraged to stay in their own houses and live as independently for as long as possible. To help them do so, a delivered foodservice is an option referred to by individual needs, to be received from catering facilities all over Denmark. In two Municipalities in the southern part of Denmark, such catering facility produce food for up to 2500 people a day – among those also to patients at hospitals and elderly living in retirement homes. For elderly people living independently in the two municipalities, food is delivered once a week, with deliveries ranging from providing three meals a day, to just a few meals to help the elderly throughout the week. The users of the catering facility receive a long range of meal options, from which they can select their menus, and the food is brought to them by a delivery man, who, depending on the individual needs and capabilities of the user, will help bring in the food, unpack it from the crate, and arrange it in their

refrigerator (Fisker et al., 2018).

In the project 'Set the Table', the overall goal is to develop a new way of providing elderly people living independently with a meal experience, that will inspire and thereby improve their desire to eat and ensure them better life. The project seek to design and develop a new packaging prototype, which will allow the food to taste homemade and fresh, offer solutions to a range of practical needs, and through its aesthetic design presentation, invoke an eating experience above the usual; enhancing, changing and transforming the way food is brought, prepared and consumed.

This paper will draw the attention to the process of working with scale and proportions in such a design process, and ask whether there is a difference in doing so between the terms of design and architecture. Our thesis is that both design and architecture give meaning to shapes by relating them to various scales. Historically when designers and architects make claims about being capable of *Gesamtkunstwerk*, they talk about being able to design from doorknobs to streetscapes, i.e. being able to give form to any scale. The same logic underlies the Saarinen Maxim: "*Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan.*" (Jesonen & Jetsonen, 1956, p.11). The concept of Gesamtkunstwerk denotes a fusion of disciplines previously firmly segregated, often illustrated by Wagner's idea of the *music drama;* a union of music, dance and poetry. For Wagner the Gesamtkunstwerk was the "art-work of the future", an interdisciplinary collaboration, "an associate work" (Wagner, 1849, 81).

Furthermore, by introducing the concept of the townscape into the kitchen and dining scale and thereby also bringing tablescape into the dimension and scale of daily life, we let design and architecture lead the transformation, as it is the *Gesamtkunstwerk of the tablescape* that is the focus in the project 'Set the Table'. In this paper, we will present some of the findings in our project 'Set the Table' and discuss how *the scale* and most important *the scape concept* affects the meal in the context of public welfare, in specific, increasing life quality for the elderly. Furthermore we discuss how, in our architectural praxis, we can transfer the disciplines between scales, from the townscape that creates the atmosphere of the streets to the design of setting a table, and how we let the tablescape create an atmosphere of the meal, being the Gesamtkunstwerk of the life.

From Townscapes to Tablescapes - Zooming In

Opening Mrs. Hansen's refrigerator reveals high stacks of black packaging boxes, making it difficult to locate the exact thing she is looking for. Once found, Mrs. Hansen perforates the top layer of the packaging with a fork, and puts it in the microwave with practiced ease. 6 minutes later the loud 'ding' of the oven signals that dinner is imminent, and the packaging is carefully taken out. A glass of water and a fork are the only accompanying elements as the steaming dish is put on the kitchen table directly in the packaging; Mrs. Hansen stopped setting the table after her husband died four years ago.

The arrival in any city in the world confronts us with cultural differences expressed particularly in architecture, but also in what and how we eat. Every city has its own townscape different from any other, and it is while it is every street,

every corner and every alley that creates this townscape, it is also what defines the atmosphere within any specific city. It is to see the highs and the lows and to understand that the totality of it all creates the circumstances for people to bond, socialize, play, eat and live. In our opinion, the townscape can be directly compared, to what we experience of the intimate physical surroundings, when we eat. Built environments in a town can be multi-scalar and exist on both macro-scale and microscale. When we zoom in, this built environment of a townscape includes food landscapes, also known as *foodscapes* that shape our food choice, food consumption and food availability (Sobal & Wansink, 2007). The table is, as the cities, set and meticulously planned to create an atmosphere that defines exactly the ones hosting, while embracing every guest entering (Edwards & Gustafsson, 2008; Gustafsson, 2004).

We want to point out that the built environments are multi-scalar and contents macro- and microscale proportions all influential to how the surroundings act, change and react. These scales can in our opinion be directly referred and further developed to the scape term. The townscapes also have the multi-scalar ability, as it works on several levels, including if we follow this idea; *the kitchenscape*, *the tablescape*, *the platescape* and *the foodscape*. It is the surrounding atmosphere that holds the availability and accessibility, and thereby affect how and what we eat (Sobal & Wansink, 2007).

In the project 'Set the Table' we use the scape-term as a tool to embrace the meal prepared for the elderly and observe, analyse and conclude upon every scale interfering with the elderly having a positive meal-experience (Hedegaard, 2015). We look at micro-level at every household scape that concerns the meal, which enables us to see how the scapes determine the availability, the intake and the meal experience as total.

'Set the Table' focuses on the food and the packaging that holds the food, but more importantly, it includes all the different aspects which influence and constitute a meal. Through the scape-tool we make changes and adjustments that initiates the elderly to be more involved and it is our belief, that these changes can higher their self-esteem, give back some self-determination, make them take part and use these units of their private built environment (Fisker et al., 2018).

In the kitchenscape, we look at the kitchen and the dining area as a room and at its appearance, as this is often where food is either prepared or consumed - or both. At the tablescape, we see the furniture, lightning and other interior details from where the food is eaten, the platescape is the container and devices like cutlery that actually holds and serves the food. Finally, we look at the food presented, the edible parts available and the appearance of this as well. In every scape we take notion on e.g. surface, texture and colour as the senses play an important role in the meal as a total experience (Korsmeyer, 1999). The main question of our research project is, how do we end up changing the behaviour of the elderly and include all of these mentioned aspects, units and other scape-insights with a new innovative packaging?

As part of the project 'Set the Table' we work in an intense interdisciplinary collaboration, as our workforce contains both scientific and practical approaches; the work and perspectives of researchers, designers and kitchen staff, of anthropologists, the care helpers and the elderly and future elderly are all taken

into account, and the insights from all involved will be used to develop a packaging prototype that will create a meal as a whole, evocative and multifaceted experience, than food as a singular unit.

The Total Work of Art - Setting the table

Even through a *Gesamtkunstwerk* can be translated as a 'total work of art', the ideal work of art so to say or a universal artwork that bond the synthesis of all arts, which is the method we have used in 'Set the Table', can in many ways be compared with this concept. We have made use of many disciplines from design and architecture or we have strived to do so, working with scale and proportions through an interdisciplinary process. Concerning the question if there is a difference between working with design and architecture, it is our thesis that both design and architecture give meaning to shapes by relating them to various scales, in fact to any scale. We often use the term *Gesamtkunstwerk* to signify circumstances where an architect is responsible for the design and overseeing of the totality of architecture: from the shell of the building to the accessories, the furnishings and even the surrounding landscape. It is exactly this idea that has run though 'Set the Table', connecting design and architecture through an interdisciplinary work process.

The fundamental idea of the innovation design project – 'Set the Table' – was foremost through an interdisciplinary-based corporation to develop a process where we were able to transfer disciplines between scales and professions to the design of new prototypes. In many ways, it is a distinct modern approach to the concept of architectural *Gesamtkunstwerk* emerged with new methods, based on interdisciplinary design process.

What is the 'ideal meal'? For Mrs. Hansen it is not the particular ingredients put into the microwave; it is the memories of cooking for her husband, her children. Of Sunday dinners, of using the best china, enjoying a glass of wine - of good conversations, of favourite dishes and of forcing a four-year-old to eat broccoli. Working as designers and architects with this subject, it is considering the meal in its next larger context (Jesonen & Jetsonen, 1956, p.11).

This is why, in the project 'Set the Table', designers, catering practitioners, scientists/researchers and anthropologists are collaborating in an interdisciplinary work process, trying to answer the questions: How can we transform the processing of ingredients, the mechanical procedures of large-scale cooking and packaging food, the carefully planned and organised delivery, and the subsequent microwave-heating of the delivered food into a worthy, joyful experience? In other words, how can we transform food into a meal?

Our mission is not to centre on only one particular aspect of the delivery of catered food to elderly people; it is not the optimising of a singled-out procedure or the improvement of a specific ingredient that will provide us with a solution. It is our belief, that to develop a prototype for an innovative packaging, a model that can not only improve the life quality of elders through a good meal experience, but also improve their desire to eat; we must consider the delivered food in its larger, multiscalar context. Taking inspiration from the concept of the *Gesamtkunstwerk,* it is our belief that the interdisciplinary approach, where different disciplines and practitioners are working together, will help us getting closer to the optimal answer of our questions.

The Gesamtkunstwerk of 'Set the Table'

'Set the Table' is a project with an innovative approach, constructed in a way that allows scientists/researchers and practitioners to work in an interdisciplinary collaboration and in a coordinated partnership towards a common professional goal, working with a common language, and in a common and ongoing work progress. Additionally, within the project, the users are also heavily included in the process, as the opinions, needs and experiences of both current users as well as the future users, are essential to get key insights into the user-needs of the packaging prototype. We can conclude that the collaboration between science, represented by a university, and praxis – a design company and a catering facility will allow the project to have an ongoing design process that constantly evolves around the insights gathered from all experts included, with a common goal of developing a new food-packaging prototype.

The project 'Set the Table' has an overall goal of improving life quality for the elderly who receive food from the catering facility every week, by developing a new and innovative packaging prototype which will enhance, change and transform the way food is brought, prepared and consumed.

We want the elderly to eat their delivered portion of food, carefully selected to each individual's need and enjoying the experience at the same time. It is our belief that by introducing a food packaging that encourages the elderly to act on their own, might make the elderly regain some self-determination and autonomy in their life and thereby higher their self-esteem, the meal experience and thereby increase their food-intake, and in the long term, life-quality.

We want to point out that with the scape-tool in hand analysing the catered food more holistically and multiscalar, we can through our different disciplines develop and present a packaging-prototype that enhances the food as part of a meal, making it an experience as a whole, more than food as a singular unit and need, and thereby illustrate the meal as a totality of space, place and spectacle.

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R/EVOLUTION OF SUPER DIVERSITY: HISTORICAL YELDEĞİRMENİ NEIGHBORHOOD

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Abstract

After the worldwide migrations began to emerge in the 90's, a new term called 'super-diversity' show up. Super-diversity is a notion which explains the diversity in cities by increased mobility and transnational communication. These ethnic, religious, cultural, etc. differences cause positive and/or negative effects on urban life pattern. Super-diversity is a term to describe diversity in a more compact way in the post-modern world. The most important element of super-diversity is migration, which has various positive and negative effects. Diversity in urban areas started to occur with migrations which cannot be understood without considering migration which may occur in different ways. There are two basic migration types as chain migration and impersonally organized migration. Chain migration can be defined as a movement in which migrants learn from opportunities that are provided with transportation, initial accommodation and employment arranged by means of primary social relationships between previous migrants. Chain migration, which causes positive super-diversity, is one of the most fluent ways of social transformation in metropolitan cities. In this case, Kadıköy, Yeldeğirmeni Historical Neighbourhood in İstanbul, Turkey has transformed repeatedly in the axis of super-diversity (Macdonald, J.S. and Macdonald, L.D., 1964: 82,97).

Yeldeğirmeni Neighbourhood, by its new name 'Rasimpaşa Neighbourhood', is one of the most socially diverse neighbourhoods of İstanbul, Anatolian side, Turkey.

Known as the first apartment settlement of İstanbul, Yeldeğirmeni contains various diversity elements both in social, economic, cultural and religious perspectives. Until the 20th century, the population of the neighbourhood had ethnic and cultural diversity. At the beginning of the 20th century, Jewish people constituted the majority of the population in Yeldeğirmeni. During the initial years of the republican period, the number of Turks and Jewish were nearly equal, and there were fewer Greeks and Armenians. Before the urban renewal project which started in 2010, Yeldeğirmeni encountered a safety problem because of lack of investments and attention, meanwhile, the multicultural social pattern damaged. In 2015, after the renewal project, the chain-migration triggered in the area and Yeldeğirmeni re-gained its multi-cultural pattern in a distinctive way. The average age of the inhabitants has decreased, and a new user profile occurred in the region such as artists, musicians, academicians and student. This new user profile re-constructed the super-diversity character of the region in a rather different form. Today Yeldeğirmeni still has super-diversity and chain-migration but not in an ethnic-religious way. (Barkul, 1993; Eyüboğlu, 1991; Giz, 1988; Tarkay, 2010).

The main aim of this research is to understand the transformation characteristics of super-diversity in a historical neighbourhood by chain migration through the developing urban dynamics in Yeldeğirmeni Historical Neighbourhood. In this case, on-site observations, interviews and surveys had conducted in two different time periods; firstly, in 2015, at the end of the urban renewal project and secondly, in 2018. The final assessment will be discussed through mapping the process of urban migration and super-diversity in Yeldeğirmeni Neighbourhood.

Introduction

İstanbul as a mega-city offers home for a very diverse groups of people. These differences can be seen through their religions and cultural backgrounds or economic incomes. In İstanbul, it is possible to witness that people are living in harmony. Apart from their differences, they use the same routes to their works, they work together at the same places, eat at same restaurant or shop from same markets in their daily lives. These conditions point out the term; super-diversity. In a mega city, it is quite normal to encounter with the super-diversity notion. From this point forth, the research focuses on to observe, analyze and evaluate the daily life of a district where it is possible to see that diversification. In order to ensure these conditions, Yeldeğirmeni Neighborhood in Kadıköy district is selected as the case study of this research about super-diversity. Being located in the Anatolian side of İstanbul, a densely populated mega city, and having a rich history layers are the reasons behind the selection of. Over the course of many years, the district has seen various communities with a variety of backgrounds. In more recent times, from between these varieties, different religious beliefs of inhabitants at Yeldeğirmeni district has been the prominent subject for super-diversity. Through the living conditions and the communication in between local people, this research is about the super-diversity term and how it is affecting the locals in Yeldeğirmeni.

Chain Migrations and Super-Diversity in Metropolitan Cities

It is more reliable to examine the concepts of chain migration and super-diversity together and in an integrated way. In another way, the notion of diversity

in urban areas started to occur with migrations. That is why super-diversity cannot be understood without considering migration which may occur in different ways. There are two basic migration types such as chain migration and impersonally organized migration. Chain migration can be defined as that movement in which prospective migrants learn of opportunities, are provided with transportation and have initial accommodation and employment arranged by means of primary social relationships with previous migrants (Macdonald, J.S. and Macdonald, L.D., 1964: 82,97).

A new historical condition of transnationalism by chain migration arising from the global flows of people have been undergoing quantitative and qualitative changes since the late 1980's. ''Apart from marking a rapid change in the global design of chain migration, super-diversity shows that 'a new approach is needed to replace the inadequate model of multiculturalism by taking into account the fluidity and intricacies of the new diversity in the age of heightened mobility and transnational communication''(Arnaut, 2012).

About Kadıköy and Historical Yeldeğirmeni

In the mega city of Istanbul, the case was selected in one of the densest districts. Located in the Asian side of İstanbul, Kadıköy district has a strategic and socio-cultural importance for the city. Another specialty of Kadıköy district is that it has lots of historical areas which are Haydarpaşa Bay, Yeldeğirmeni and cape of Moda. According to archeological resources, the history of Kadıköy district extends till the ancient times. Another feature can be said for Kadıköy is that the Fikirtepe region which is thought as the oldest settlement in the Anatolian side. In the Ottoman period, Kadıköy district was a meadow like place where agriculture and animal husbandry are the resources for living and the Kadıköy district has become popular for summer houses and picnics. After that period, public auctions have started to sold lands with the military reforms and that leads change in the usage of Kadıköy. In the 18th century, Haydarpaşa district was using as a horseman's training area and Yeldeğirmeni and Talimhane districts as battalion's training area. Another quality of the area is the construction of windmills in the Yeldeğirmeni district. There were four windmills at first but the remains of them had been destroyed in 1903. Between the years 1789-807, street constructions started but with the military reforms called 'Tanzimat' cause restrictions and destruction of these streets. Having a coastline over the İstanbul Bosphorus and being a neighbor to Üsküdar district, Yeldegirmeni Neighborhood has same features as Kadıköy district (Figure 1). In addition to these informations, Rasimpasa is another name which can be seen in the legal channels for Yeldegirmeni Neighborhood.

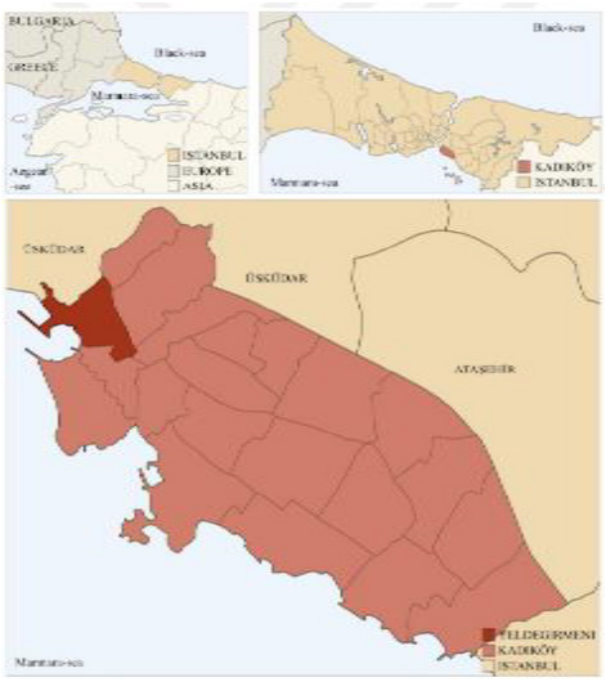


Figure 1. Map showing location of Yeldeğirmeni neighborhood (Beşikci, 2018).

Each happening through the history of Yeldeğirmeni district has affected not just the built environment but also the people. Especially, various restrictions after the military reforms damaged the social life. Kadıköy was an eligible housing district before the first World War where mostly non-Muslims, Levantines and people with higher income used to live. They were living in big pavilions at Bahariye and Moda. The group of people called 'Levantine' who are used to engage in trade and had different lifestyles than Muslims. They have a major impact on the development process of Kadıköy. They were living mostly at Rasimpaşa, Moda, Bahariye, Altıyol, Yoğurtçu, Erenköy and Bostancı. They constructed different building types such as a synagogue, church and schools which supply the needs of different social groups, especially in Yeldeğirmeni district. Kuban (1996: 397) stated that, upper class people and Levantines imitated the new architectural trends of European capitals in İstanbul. Yeldeğirmeni neighborhood had been ethnically diverse until the beginnings of 20th century. Turks, Jewish, Greeks and Armenian inhabitants were living in harmony at Yeldeğirmeni as stated by Besikci (2018).

The population of the neighborhood which is formed around people with different ethnicities created a safe, ascendent and vivacious environment during the beginnings of republican period. At the initial years of 19th Century, building plots and street forms had been shaped as attached housing and villa type buildings in general. Around the middle of the 20th century, most of the villa type buildings were demolished and new building plots were defined by the construction of apartments in Yeldeğirmeni district (Beşikci, 2018). The building plots, from the time between 1936 and 1983, can be seen on the plans drawn by Jacques Pervititch

(Figure 2). After the demolishment, new street typology and building plots containing apartments started to become visible. A decade after the foundation of the Republic, the area between Yeldeğirmeni in the north and Mode in the south were nearly full of buildings (Figure 3). Because with the establishment of republic, Kadıköy could benefit from certain modern public utilities like city power which came to the region in 1928 and tramway in the same year.

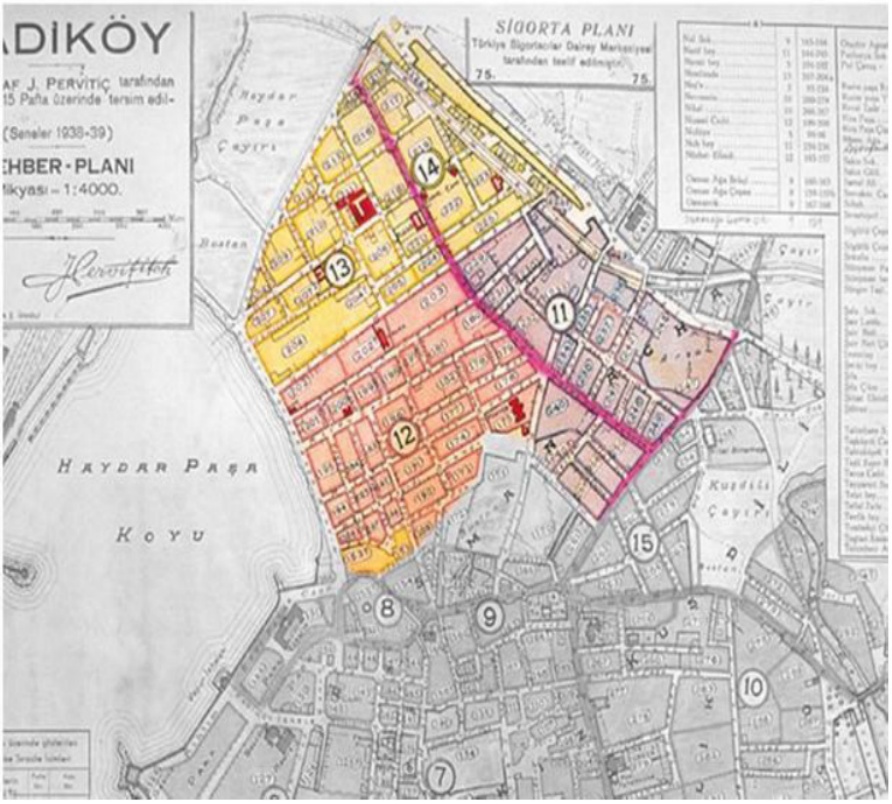


Figure 2. Pervititch map of Kadıköy district (Pervititch, 2000)



Figure 3. Map of Yeldeğirmeni Neighborhood in 2018 (Beşikci, 2018).

On March 23, 1930 Kadıköy was registered as a district. Today, in terms of the density of population and economic activities, Kadıköy is one of the most important districts of İstanbul. Beşikci (2018) claimed the nowadays, the population of the neighborhood is mainly constituting by rural immigrants in contrast with the ethnically diverse population of former years. Although the trace of bourgeois life in Kadıköy is lost, it has settlements that have urban life culture. We can see this when we look at the increase in population of Kadıköy. Today one of the residential neighborhoods of Kadıköy is Yeldeğirmeni.

Yeldeğirmeni Neighborhood Renewal Project

The renewal project for the Yeldeğirmeni Neighborhood was initiated by the cooperation of Kadıköy Municipality and ÇEKÜL, a non-governmental organization in Turkey. In 2010, the renewal project was planned for 3 years period. However, it will not be reliable to state that the renewal was completed by 2013. This situation is more than understandable considering the context of the Yeldeğirmeni Neighborhood Renewal Project which is mainly focused on the socio-cultural texture (Beşikci, 2018). By means of this cooperation, Kadıköy Municipality and ÇEKÜL non-governmental organization aimed to protect the history and the

neighborhood culture; to develop integrated vitalization strategies; to promote social solidarity and participation; to strengthen neighborhood's connection with the city (Arısoy, 2014). Before the development of the renewal project, the overall atmosphere was quiet and traditional. Protection of the historical character and the special neighborhood culture was important for the context of the project in order to increase social and economic sustainability for the neighborhood. Followingly, increasing the participatory activities and creating an environment which offers participatory grounds for inhabitants regardless of any kind of dissimilarity considered as an important objective. In addition to these socio-cultural initiatives, increasing the physical and economical connection of the neighborhood with its surroundings was considered to help sustaining main aims of the Yeldeğirmeni Neighborhood Renewal Project (Beşikci, 2018).

Project process

As it can be understood from the aims of the project, the importance was given to renewing the neighborhood's social texture more than physical renovations. The practices of the renewal project formed in order to create public spaces and to mobilize the civil initiative (Beşikci, 2018). The general timeline of the project is summarized in the timeline diagram below (Figure 4).

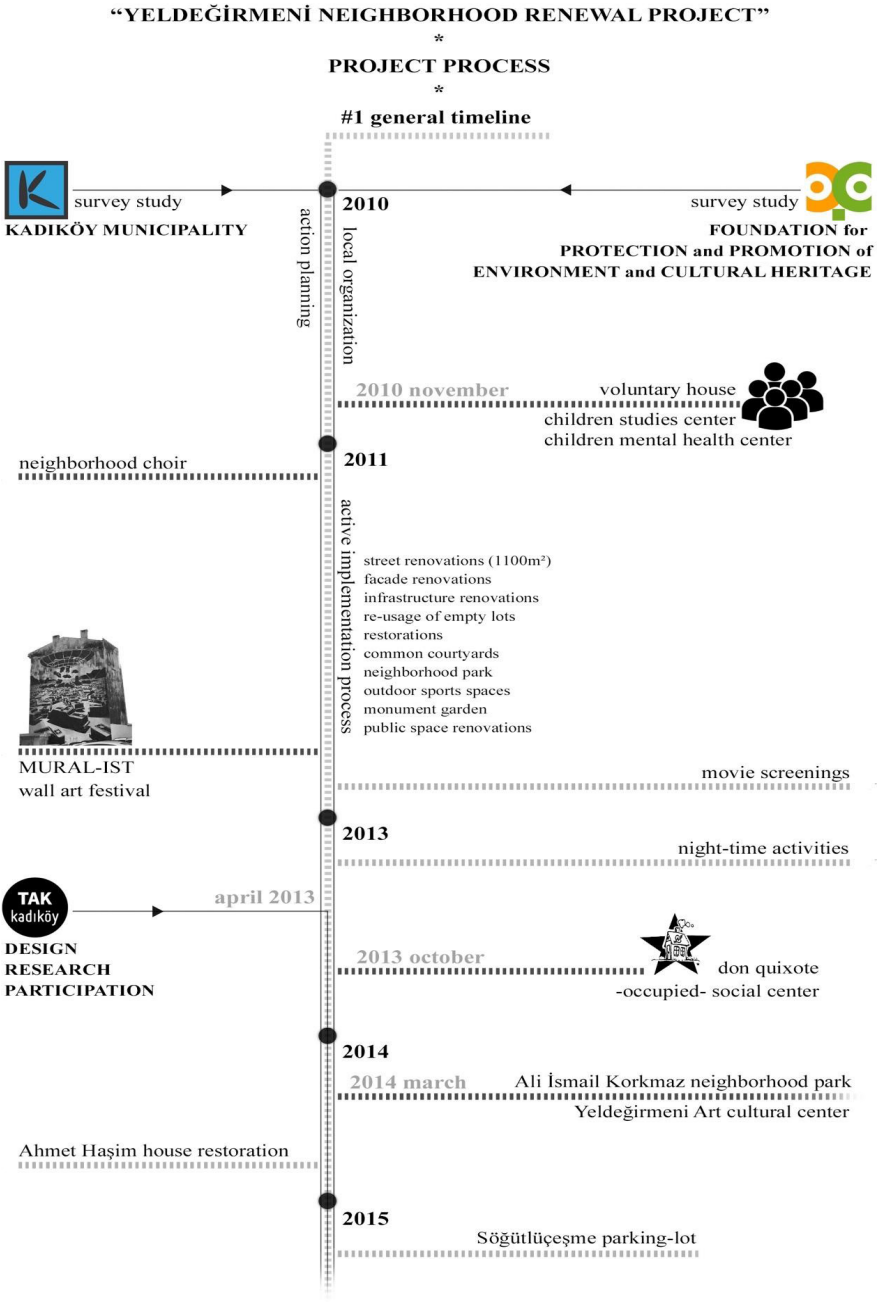


Figure 4: General timeline of Yeldeğirmeni Neighborhood Renewal Project.

The project process was commenced with a survey in 2010 which was focused on determining and understanding the opportunities and problematics of Yeldeğirmeni. After the process of action planning, the first action was the

establishment of the Voluntary House. Beşikci (2018) stated that the voluntary house was used as an office for the project to provide collaborative grounds for project authorities and the inhabitants. This Voluntary House which was granted by Kadıköy Municipality also offers service as children study center and children mental health center (Arısoy, 2014).

The implementations for the physical environment was conducted in between the years of 2011 and 2013. Vitalization corridors planned to create focal points, communal spaces and service buildings. In this context, street renovations, facade renovations, infrastructure renovations, re-functioning empty lots, historic building restorations, re-constructing common courtyards, a neighborhood park, outdoor sports spaces, a monument garden and public space renovations implemented (Figure 5). Over the course of renewal project, Ali İsmail Korkmaz neighborhood park, Yeldeğirmeni Art cultural center, Ahmet Haşim House restoration and Söğütlüçeşme parking-lot step forward as physical implementations (Figure 6). (Beşikci, 2018).



Figure 5: Street renovations in Yeldeğirmeni neighborhood.



Figure 6: Ali İsmail Korkmaz neighborhood park.

Effects of Chain Migration and Super-Diversity on Social Life in Yeldeğirmeni Through Renewal Process

One of the first apartment districts of Istanbul, the settlement has maintained its traditional neighborhood texture with its backward structure until the 2000s, and after 2000s it has formed into a transformation process with the effect of high-scale urban projects. Within these years, young professionals, artists and people from middle class have started to increase their interest in this neighborhood. In recent times, the neighborhood has become the focal point of the gentrification debates. Caused by its close location to the Bosphorus, the transportation facilities and the metro line opened in August 2012, the neighborhood has started to be affected from the developments in the city much more. Due to the reinforcements about the neighborhood's connection with the city, the advantageous location and more attractive rents compared to the surrounding districts increased the the number of students moving in to the neighborhood since 2012 (Arısoy, 2014). It is noteworthy that the Municipality of Kadıköy has carried out various projects within the context of cultural industries in the neighborhood. Arısoy (2014) described that the neighborhood has becoming the new art center of Kadıköy. Mural Ist-Yeldeğirmeni Wall Art Festival, Karakolhane Sculpture Garden, Street Festivals, newly opened Cultural Centers, Sharing Economy Platforms (such as Zumbara) are some of the projects that related with arts. Nowadays, there are many luxury cafes and restaurants in the neighborhood. (Table 1)

Year	Location	Neigbourhood	Population
2018	Kadıköy	Rasimpaşa Mah.	13.898
2017	Kadıköy	Rasimpaşa Mah.	14.276
2016	Kadıköy	Rasimpaşa Mah.	14.198
2015	Kadıköy	Rasimpaşa Mah.	14.169
2014	Kadıköy	Rasimpaşa Mah.	13.900
2013	Kadıköy	Rasimpaşa Mah.	14.143
2012	Kadıköy	Rasimpaşa Mah.	14.174

Table 1. The population change in Kadıköy between 2012-2018 (Url 1).

Diversity at Yeldeğirmeni in 2015

In 2015, at the first field trip to area, site observations and pop-up not-structured interviews has conducted. When it was decided to study about super-diversity in perspective, Yeldeğirmeni was a good choice because of being the first apartment settlement in İstanbul which hosts many people from different locations. The location of case area was also important as being a central neighborhood in Kadıköy which is known as the most crowded and alive part of the Anatolian region. Thanks to its central location, the access to the area was quite easy. The main entrance to the neighborhood was through the Misak-ı Milli Street. Before experiencing the atmosphere of Yeldeğirmeni, the main thoughts were that it is a desolated and insecure place. The street between seaside and Karakolhane Street (İskele Street, Uzun Hafız Street, Misak-ı Milli Street) verified the prejudgments. The only things worth to see were the leftover wall arts of the Mural-İST Festival 2012-2013. But the Karakolhane Street, has vanished the prejudgments. The area which was one of the main locations of Yeldeğirmeni Renewal Project, the street has become a secure, alive and modern place which also has a successful integrity with the historical texture. Many cafes, markets, bakeries of historical Yeldeğirmeni neighborhood redesigned. These additional functions of the area bring different types of users, so that besides the visual attraction, the diverse user profile creates a more livable area. The interviews made at a local coffee house, which is "kıraathane" in Turkish. Kıraathane's are one of the places in neighbourhoods in Turkey where old, local people, mostly men can be found. At the interviews, it is corrected that there used to be a diversity in the area based on religion and race:

"...There was a synagogue, which belonged to Jewish people, also there was a school, even than it converted into a dormitory, in that sinagogue, i used to catch fight with Jewish students everyday. I was impish. I was going to primary school, 3rd grade. After than we became (clasps his hands together) that close friends, brothers with them. I had such a time with those people…"

"…There used to be Italians, English people. Once upon a time they occupied Turkey, in II. World War. After than, now the life in here is very beautiful, very good. Everyone settled down here, everyone has a home, everyone has an apartment. They got retired. They support themself with retirement salaries. Life goes on here like this. A simple neighhourhood life…"

"…I mean, nowadays lots of foreigners are coming here. Mostly in Yeldeğirmeni. But foreigners are good people, they have dialogues with people. They get more attention and respect than their own countries here. They don't assimilate…"

Diversity at Yeldeğirmeni in 2018

The survey for the Yeldeğirmeni Neighborhood Renewal Project was held in the Yeldeğirmeni neighborhood in 2018 again by considering the effects of renewal project. It was possible to contact the Kadıköy Municipality and ÇEKÜL as local authorities, but TAK, considered as the designer for the project, refused to participate, claiming its work in Yeldeğirmeni was not started at the beginning of the project. Questions were posed to interviewees concerning social interaction in the community, inhabitants' chats with others in daily life, their friendships with neighbors, and collective activities held by inhabitants both before and after the project (Beşikci, 2018).

The questions comprise an evaluation of the perceptions of these actors about the project process, how the participatory process was maintained, and about the urban policies related to the project. According to the answers of the project coordinator and the project reporter:

- There could be more research conducted before implementation,
- The neighborhood does not have enough public space, although it is better than before,
- The opinions of the community were considered throughout the project process,
- Information meetings, on site meetings, exhibitions and festivals, design workshops and focus group meetings were conducted throughout the process,
- There was not enough participation from the inhabitants.

The questions which asked to the neighbors were derived in order to understand the outcomes and success rates of the projects regarding the social sustainability. According to their answer:

- Most of the neighbors still have social interaction with community
- Most of the neighbors still had an emotional connection to their neighborhood.
- There is still a distinct need for regulations concerning social sustainability and public participation
- Collective activities in the area has not been changed
- Increase in relationships between neighbors
- Increase in perceived historical texture quality/protection level
- Decrease in preservation of local values
- Inhabitants' willingness of living in the neighborhood for future years has not been changed. (Beşikci, 2018)

According to Uzgören and Türkün's article in 2018, their survey results show that 38% of the population consists of students and 16% of the population consists of artists, photographers, designers, directors, and 11% of cafe operators. According to these data, it is observed that the neighborhood has experienced a rapid migration wave in recent years and the intensity of students and young professionals has increased along with the migration. When inhabitants asked about changes in the neighborhood, a 37% group showed their suitability for young people (such as

cafes, restaurants, proximity to entertainment centers) and 24% of them showed the historical value and the existence of traditional neighborhood culture. It is seen that there are conflicts with the former residents of the neighborhood in such a way as to have a young / student population and the life style, consumption preferences and expectations of their neighborhood. It has been determined that the population and the number of Erasmus students increase on the common denominator. Another remarkable point is that the group that we can include in the new middle class coming to the neighborhood after 2010, feels like a native of the neighborhood and defines the new population coming to the neighborhood in 2014-2015 (Table 2). (Üzgören; Türkün, 2018).

Tablo 3. Anket çalışmasından elde edilen veriler

Değişken	Seçenekler	Sayı	Oran	Değişken	Seçenekler	Sayı	Oran
Rasimpaşa	1-3	32	0.35	Burada	İşime Yakın	3	0.03
Mahallesi'nde	4-6	28	0.31	Yaşama	Merkezi	20	0.22
Yaşama Süresi (Yıl)	7-9	5	0.05	Nedeni	Evim Burada	13	0.14
	10-19	15	0.16		Gençler İçin	34	0.37
	20≥	10	0.11		Uygun (Kafeler, Restorantlar)	22	0.24
					Tarihi Değeri ve Geleneksel Mahalle Kültürü Var		
Yaş	0-25	42	0.46				
	26-49	16	0.17				
	50-64	12	0.13	Başka Bir Yere	Var	32	0.35
	65≥	20	0.22	Taşınma İsteği	Yok	58	0.65
Yaptığı İş	Sanatçı (Ressam, Fotoğrafçı, Tasarımcı, Yönetmen vb.)	15	0.17	Başka Bir Yere Taşınma İsteği Varsa Neden?	Kamusal Hizmet Yetersizliğinden Dolayı	2	0.06
	Zanaatkar	6	0.07		Şehrin Gürültüsü, Trafik ve Nüfus Yoğunluğu	4	0.12
	Ev Hanımı	3	0.04				
	Cafe İşletmecisi	10	0.11				
	Ticaret (Bakkal, market, nalbur, elektrikçi, yufkacı, emlakçı vb.)	12	0.13		Mahalle Kültürünü Kaybetmesi/Nüfusun Değişmesi	9	0.28
	Emekli	9	0.10				
	Öğrenci	35	0.38		Kira Fiyatlarının Artışı	17	0.53

Table 2. The results of the questionnaire from Üzgören and Türkün (Üzgören; Türkün, 2018).

Results and Conclusion

As it is understood from the interviews from 2015, the migration and super-diversity was still happening, but most of the local people moved to other cities. As it has learned from neighbors, Yeldeğirmeni allows immigrants, which are also emigrates. It is understood that there is a migration circle here, because of the chain migration system in the area.

The results in 2018 are also examined according to the site observations and interviews. According to the analysis, there is no distinct difference observed for

daily chats and friendships with the project implementation. The sense of place refers to the questions about emotional connection of inhabitants with their neighborhoods and how they perceive the change among the quality of historic texture and conservative attitudes towards local values of neighborhoods. The results reveal that there is no certain difference within the Yeldeğirmeni case however, the interviewers from Yeldeğirmeni claimed that they have the emotional connection with their neighborhood. The last factor mentioned in the interview, the interviewers' will to live and to raise future generations in the neighborhood has no definable change for Yeldeğirmeni Renewal Project. However, inhabitants from neighborhood revealed almost %40 rates about their desire to move away (Beşikci, 2018).

Most people in Historical Yeldeğirmeni region are happy to live here together, they are welcoming. The diversity in the area was not so visible in a negative way. In the past, when the first migrations happened, that was hard for them to be close with foreigners, especially the ones from other religions. But as time passed, they embrace themselves so now there is a nearly perfect diversity without marginalization. So, it is possible to say that there was a positive diversity in the area.

In conclusion, super-diversity is a new term to describe diversity in a more compact way in modern world. The most important element of super-diversity is migration. By chain migration, when people decide the place where they are going to live by themselves, like Yeldeğirmeni region, a positive diversity occurs. Yeldeğirmeni is a good example to observe affirmative feedbacks about super-diversity.

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THE URBAN PERCEPTION: A STUDY OF USERS' ATTITUDES AND REQUIREMENTS TOWARD THE REDESIGN OF THE PEDESTRIAN WAY

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Abstract

Urban physical contexts have influences on people's everyday living. Buildings, streets, trees, and pedestrian ways are not only in response to people's functional requirements but also affect people psychologically. The Nakornsawan Municipal Office (NMO) has recently launched the city new renovation plan to develop urban environments under the concept of "the city for all". According to the initial survey, existing conditions of the pedestrian way in Nakornsawan Municipal area were mostly illegally occupied and misused by residents living along the pedestrian way. So, to achieve the concept, the city for all, the redesign and the renovation of the pedestrian way in Nakornsawan Municipal area has been considered the urgency. Although redesigning the pedestrian way with the concept of "the city for all" was expected to provide a great benefit for all users, from the initial survey it was so difficult to convince residents living along the pedestrian way to cooperate with NMO making more effective urban develop the plan. In addition, these residents were also considered as one of the key stakeholders that NMO needs to understand their attitudes and requirements, and this can help NMO to set up the efficient urban redesigning plan in response to all users' needs and expectations. This paper aims to present how people perceive the everyday urban and what are people attitudes and requirements toward the change of their everyday urban environment through the adoption of the photo-elicitation, the participant-produced-photograph (PPP), as the key research method used to obtain in-depth information from individual's perspectives. Participant-produced photograph (PPP) allows key informants freely express their opinions, attitudes, feelings without researcher's influences. Key informants were recruited from residents living along pedestrian ways on Wiman-maen Road, in Nakornsawan Municipal area. This road was selected to be the linkage between Nong-Som-Boon recreation park and Chapraya riverfront. The informants were assigned to take photographs representing their everyday experiences of existing pedestrian ways. The photographs were used as the key mediums for the

elicitation interviews. The results revealed three emergent themes for users' urban perception toward the redesign of the pedestrian way, 1) local conflict, 2) public sharing, and 3) contextual linkage. The three emergent themes were adopted to develop the framework and direction for the redesign of the pedestrian ways in Nakornsawan Municipal area.

Introduction

The urban built-environment contexts play important roles in people's everyday life (Papadimitriou, Lassarre, &Yannis, 2017 pp.2003). These contexts have influences on people's everyday living. Buildings, streets, and pedestrian ways are not only serve people's functional requirements but also affect people's daily life psychologically. In a particular neighborhood, built-environment contexts, including public facilities and spaces, are perceived as supportive parts of the community (Corazza, Mascio, & Moretti, 2016 pp. 204). The changes of physical aspects in the contexts has inevitable effects on people's everyday ways of living (Wılliams, 2014 pp.75). Also, the redsign of the neighborhood contexts may has results in both possitive and negative ways for people living within the area. For redesign projects of such public facilities as streets and walkways, there are both people who gain benefits from the project, and there are also people who may be affected from the changes (Zhang, 2019 pp. 40). For the former one, the changes or redesign may help them gain more conveniences to use public facilities, while the latter one may get difficulties during implementing the project. To minimise negative effects on changes of built-environment in the particular neighborhood, the participative decision-making has been in advocated in all levels of public projects (Zhong & Mol, 2008 pp. 899). The changes can be success with the participation by people living around prospective projects. The participation can guarantee the right of access information in decision-making for the public project (Glucker, Driessen, Kolhoff, & Runhaar, 2013 pp. 104). To gain supports from people living around prospective projects, people's needs and requirements toward prospective projects should be replied and fulfilled. Understanding people's attitudes and requirements toward changes of their built-environments can be used to generate the project directional framework (Zhang, 2019 pp. 42). Gathering information from relevant stakeholders, the public inquiry is considered as one of key processes to be completed at the initial stage of public projects (Vivant, 2018 pp. 61). The process can help the project owner, the local government in this case, to reveal stakeholders' attitudes and requirements (Zhou, Hou, Yang, Chong, & Moon, 2019 pp. 80). In public inquiry, the interview questioning has been widely used to obtain information from all stakeholders or key informants. This type of inquiry can be done through such different approaches as individual and group interview (Zhang, 2019 pp. 39). Many techniques can be applied to ask questions in the interview. Using structured-interview may help questioner to obtain rigid and forthright answers from key informants (Correia & Aguiar, 2017 pp. 54). Asking structed- questions; for example, asking direct questions with "wh.." and using close-ended question, questioners can obtain pertinent answers, but it can be a lack of fluent responses from informants. On the other hand, semi-structure interview gives questioners more flexibilities to use questions in the interview. Semi-structured interviews also to allow in-depth exploration of key informants' attitudes, behaviors, and experiences. In addition,

this type of interview questioning provided a flexible approach to be taken allowing important topics to be investigated (Thomas, Hewlett, Swales, & Cramp, 2017 pp. 2). For research with qualitative approach, semi-structured interview suite to explore people's attitudes and experiences and allow people flexibly response to interview questioning. In some circumstances, interview questioning with verbal conversation cannot obtain such specific and in-depth information as people's perceptions of the particular things, events, and phenomenon (Moore et al., 2006). The visual contents have been brought into the interview giving participants more alternatives, flexibilities, and convivences during the interview to reflect their perceptions of things than only verbal interview (Tonge, Moore, Ryan, & Beckley, 2013). Exploring people's attitudes through the perceptions toward their everyday neighborhood built-environments is the main objective of this research. Using only the verbal interview may not enough to allow informants to reflect their in-depth feelings during the interview. Thus, using visual contents as the main medium in the interview was adopted for the interview method in this research. The photo-elicitation interview was applied as main interview method with participant produced photograph (PPP). The participant-produced photographs (PPP) allows research participants or informants to freely take their own photographs during experiencing their built-environments in-situ.

In 2018, Nakornsawan Municipal Office (NMO) launched a plan to redesign the pedestrian ways within the city creating new built urban environment under the concept of "the city for all". The project was founded partly from Royal Thai Government and local business sectors, starting initial stage of the project from 2018-2020. This research was a part of the initial study stage of the project, consisting two parts; the first one was the survey of existing urban conditions of the studies site—the pedestrian way along Wiman-Maen road, and the second one, that is this research, was exploring people's attitudes toward this redesign built-environment project. The people, here, in this research mainly focus on key stakeholders; the people who live along Wiman-Maen road. This research was also considered as a part of public inquiry or public hearing required to be completed in the initial stage of the project. In Thailand, although public inquiry has been conducted at the beginning of govern projects, there was a lack of the in-depth information without any interfere from the researcher. Using interview questioning may allow researcher to obtain people's attitudes and opinions at a certain level of information, however generating interview questions may be too dominated by the researcher. So, the interviewees may not allow to freely express their true feelings, attitudes, and opinions. In this research, the inquiry method as interview questioning was integrated with the photo-elicitation, helping participants freely express their attitudes and opinions through visual mediums generated by participants themselves. The inquiry focused mainly on stakeholders' attitudes and requirements, through the perception of their everyday urban context, toward the redesigning of the pedestrian way on Wiman-Maen road. The results will be used to generate the framework guiding direction for the project. In addition, super-ordinate themes emerged in this research was added into the conceptual framework explaining the way people experience the everyday context previously generated from prior research.

Scope

2.1 Participants

This research was conducted on the east-side of Nakornsawan Municipal area, shown in figure 1, on Wiman-Maen road, where pedestrian way will be redesigned as connection route between the waterfront Choapraya River and Nong-Somboon Recreation Park. Expected participants were residents who living along Wiman-Maen road.

2.2 Studied site

Nong-Som-Boon recreation park is the only main public recreation park located at the heart of Nakornsawan Province. Its history dated back to hundreds of years since Ayudhaya Era. According to NMO record in 2018, in the weekday there were nearly 500 people visiting the park for running, playing sports, and having family picnic, and there were around 800 people visiting the park in the weekend. Nong-Som-Boon recreation park has been used to for many special events through the whole year, such as Chinese New Year festival and Loy-Kra-Thong Festival (Thai Water Lantern Festival). The biggest event held in this park every year is the Chinese New Year Festival (CNYF). Numbers of people visiting Nakornsawan Province for CNYF event can reach hundreds thousand of people every year. So, this park not only serves local people but also is a destination for visitors. On the east-side of Nong-Som-Boon recreation park, Nakornsawan old town has been continuously extended along Chaopraya River for hundreds of years. The Chaopraya River waterfront has been occupied not only for commercial purposes but also used as the public space for people's recreation activities. Currently, these two main areas of the city; Nong-Som-Boon recreation park and Chaopaya River waterfront, have not been linked especially with the concept of "city for all"; the built environment should be designed to allow all groups of people freely access to the particular areas and places.

Nakornsawan Municipal Office (NMO) launched the plan to redesigned Nakornsawan public facilities to be accessible for all, making all public facilities and spaces accessible for all individuals. NMO began the project with the initial survey of all such as public facilities, buildings, and bus-stations. This research is a part of NMO's city redesigning project. The survey of the existing city contexts was conducted prior to this research and found that Wiman-Maen road suite to be the linkage between Chaopraya River waterfront and Nogn-Som-Boon recreation park because this road is the shortest route connecting two main public areas of the city. This linkage was expected to create not only physical connection between two landmark areas but also to enhance relationship among people within the city.

In this paper, the study of people's attitudes toward the redesign of the neighborhood, especially the redesign of the pedestrian ways along Wiman-Maen road; the linkage between Nong-Som-Boon recreation area, was brought as the main focus. The studied site is shown in Figure 1. The yellow line covers Nong-Som-Boon recreation park. The blue line indicates Chaopraya River waterfront. The studied site in this research is shown in the orange line, Wiman-Maen road.



Figure 1. The boundary of the studied site; Wiman-Maen road (orange line), Nong-Som-Boon (yellow line), and Chaopraya River waterfront (blue line), source: googlemap modified by the author

3. Methods

Grounded theory (GT) was applied to direct the research in a systematic inductive interprative to reveal the idiographic, contectual nature of participants' attitudes . For GT, one individual's life is understood through his/her perspectives, making an individuals' interview data essential source of the data (Birks & Mills, 2011; Gasson, 2012; Jumsai na Ayudhya, 2018). According to GT, apart from data retrieved from the participants, theoretical sampling is considered as an important part in providing clues and new insights. Emergent concepts can be revealed within the framework of theoretical sampling (Strauss, 1987). The theoretical framework adopted in this research was brought from the theoretical framework in the researcher's prior works.

Attitudes and experiences can be measured through many approaches depending on the main purpose of the research (Henserson, Morris, and Fitz-Gibbon, 1978). The more people can express their real attitudes without any influences from such external factors as influences from the researcher's pre-conceptual ideas, the more real information can be retrieved and used to generate solutions in response to people needs (Boroel, Aramburo, & Gonzalez, 2017). The main objective of this research is to deeply explore what people's attitudes toward the change of their everyday built-environments; pedestrian ways. As the researcher, I set my research position as a summative evaluator who deeply explore comprehensive attitudes retrieved from key informants; people who living on Wiman-Maen road. To obtain in-depth information, qualitative approach was applied in this research. As known in qualitative approach, the interview questioning can be adopted to obtain information from key informants, however there were arguments that how can people express real thoughts or attitudes without any interference from such external factors as researchers' preconceptual ideas (Mars, Arroyo, Ruiz, 2016). Interview questions are prior generated with pre-concepts by the researcher before the interview session. Researchers' preconceptual ideas are

argued as the obstruction to participant freely express their real attitudes (Tuhkunen, 2007; Hudson, Orvisak, Hunady, 2019). To minimize the interfere of pre-conceptual ideas in applying only interview questions, in this research the photo-elicitation with participant-produced-photograph (PPP) approach was adopted as the main method for the interview. Participant-produced-photography (PPP) allows people freely reflect their thoughts and attitudes through their own photographs (Epstein, Stevens, McKeever, and Baruchel, 2006; Loeffler, 2004). So, in this research semi-structured questions were applied in the photo-elicitation interview.

At the beginning of the research, the initial study was conducted in Nakornsawan Municipal area to search for a route being as the linkage between Nong-Somboon recreation park and Chaopraya River waterfront. Apparently, Wiman-maen road was considered as the appropriated site for this project. The recruitment flyers were disseminated to every residential and commercial unit along Wiman-Maen road. In total, there are 76 units in total were registered with Nakornsawan Municipal Office, including both types of residential and commercial units. The objective of the research and the information of interview activities were indicated in the recruitment flyer. The recruitment flyers were delivered to all 76 units located on Wiman-Maen road. Eventually, there were residents 35 units including residential and commercial units replied to the research via e-mail. There were 53 participants involved the interview activity. These participants were asked to conduct photo-elicitation activities on the studied site. Key questions reflecting the main objective of this research were indicated briefly in the photo-elicitation activities handout, and a consent form was given to the participants. For the photo-elicitation activities, key questions of the research were given to participants; what are key aspects, both built-environment and natural environments, that represent your place?, what are your opinions toward changes of those built-environments?, and they were asked to take at least 30 photographs with their own devices, such as digital camera and mobile-phone camera, to reflect the key questions. The participants were asked to select 15 photographs that were most relevant to key questions and to send selected photographs to the researcher via e-mail. Interview appointments for each participant were made. The interviews were taken place at participants' places. The selected photographs were prepared and brought for the interview by the researcher to elicit participants' attitudes and needs (Hanson, Guell, & Jones, 2016). The excerpts of participants' selected photographs are shown in Figure 2 .



Figure 2. Two excerpts of participants' selected photographs submitted to the researcher

In the interview, semi-structure and flaxible questions in relation to the main research questions; such as "what built elements within your neighborhood can represent the identity of your place", "what do you think about redesigning your surrounding neighborhood context", "what if?" there will be a big redesigning of Wiman-Maen road, and "do you have any recommendations if Nakornsawan Minicipal Office launch the plan for redesigning pedestrian way in front of you place". These questions were given to participants during the interview. All participants' selected photographs were displayed on the computer screen during the interview. All interview conversation between the researcher and participants were recorded in both audio and video format. All interview records were carefully transcribed verbatim word-by-word for the interpretation. In the analytical process, Interpretation Phenomenological Analysis (IPA) was adopted in the main analytical method. Interview conversations were put in the analytical table that divided into five columns (an except of the analytical table is shown in Table 1).

Original Transcription	Initial Coding	Keywords	Themes	Memo
 **Researcher:** What do you want to mention about this photograph. **P1:** Here, I walk from my house to my workplace in the city every day. I do agree if there will be kind of renovate or redesign to improve this surrounding. My grandma, she goes to the park with my sister almost evening. After they finish jogging, they go to the evening market in the old town. It's always so difficult to my sister taking grandma...to the market. This project can help them to go from one point to another easily. However, some of my neighbors might not agree with the project. Redesigning the pedestrian way, especially in front of their houses, may cause a lot of inconvenience to them. This may cause conflicts between insider and outsider. I mean between people who are living in this area and people who just come to use the park, walking pass on the pedestrian way.	-Familiarity with the surrounding, -Supportive response to the project. -helping people move between two places easily -Expected conflicts between insiders and outsiders	-Connecting people -Between two different groups conflict.	-Contextual Linkage -Local conflict	in the next meeting, bring site plan for sort out for more connection between the interview data and planning.

Table 1. An excerpt of the analytical table of one of research participants

In the analytical table, placed in the first column were the original transcription from each participant and Participant-produced Photograph (PPP). At the initial analytical stage, the researcher read through the original transcriptions intensively to get familiar with all data and decide if a conversation was relevant to the research question. The more the researcher get familiar with interview data, the more the researcher can synthesize emergent themes and keywords. In the second column, initial analysis was adopted to identify issues in relation to key questions of the research. In the third column, an upper level of the concept was developed as keywords. The words with a similarity of meaning were placed in the similar category, named the emergent theme. The emergent themes, then, were generated in the fourth column. Emergent themes were created by looking for the similarity of keywords across all participants interview data. At the end of the analytical

stage, sets of super-ordinate themes in reponse to the research questions were generated. Super-ordinate themes emerged in this research were added in the author's architecture experience and perception theoretical framework. Analytical process is illustrated in Figure 3.

4. Result

Emergent themes represent the nature of how participant make sense of the everyday context (Eijkelenboom, erbeek, Felix, & Hoof, 2017 pp. 112). Super-ordinate themes emerged in this research were hightlighted and used as the guideline to generate the conceptual framework of MNO's redesigning pedestrian way project. Three super-ordinate themes were discovered in this research, and these emergent super-ordinate themes were also placed into the comparison with the four super-ordinate theme in the author's previous research.

There were three sub-themes emerged at the end of IPA process.

4.1 Local conflict.

It was found that participants, local people, considered about a conflict between the insiders; local people whose houses are on Wiman-Maen road, and the outsiders toward the redesign of the pedestrian way. For local people, there were notable two different groups; the first one is the group of local people who totally agree to the project. They had a precise positive attitude toward the project and gave such an interesting list of advantages of the project, for example; 1) getting good built-environment for free, 2) increasing business opportunity, and 3) having more secured neighborhood. For "getting good built-environment for free", regarding this issue, the local people had a strong positive support for the project because this project will be fully founded by the government and local business sectors. They also thought that the new environment will help increasing numbers of customers coming into the neighborhood. And, for the last example, "having more secured neighborhood", participants also added comments that if the new built-environment can draw people into the neighborhood, the local government (MNO) will also provide further security plan for the neighborhood.

In contrast, another group of local people expressed their attitudes toward the project that the new built-environment may have an advantage for the local shop owners, however the privacy of the neighborhood may be decreased due to the more numbers of the outsiders.

4.2 Public sharing.

For many stakeholders, especially the group of the outsider, they thought that with the concept of "city for all" this project will provide more accessible for all groups of people in Nakornsawan province society, such as the elders and the disabled people. And, this can be a great example for Thai society paying more attention to make our built-environment, especially public facilities, more accessible without any barrier for all groups of people. The more we share, especially creating more "opportunities" for

4.3 Contextual linkage.

The result of this research showed that the main purpose of the project,

the linkage between Nakornsawan two main public areas, can be distinctively appreciated by many participants. What participant added in the interview are not only do this project will link two public areas physically, but it will also create such linkages as economical linkage, psychological linkage, and cultural linkage. For the first one, many participants commented that the more accessible environments, the more people can easily access to the two areas. Participants also mentioned that for at least 3 years, many local shops along Wiman-Maen road have been closed due to economic recession. With a new built-environment allowing all groups of people easily access to pedestrian way and using public facilities, the rise of new local can be expected in the new future.

In previous research, the researcher proposed the theoretical framework explaining how people experience their everyday architecture. Four super-ordinated themes emerged; 1) building in (text)—people make senses of the everyday architecture in relation to building's elements itself, 2) building in human (text)—people make senses of the everyday architecture regarding the relationship between buildings and people, 3) building in con(text)-- people make senses of the everyday architecture regarding the relationship between buildings and surroundings, and 4) building in time (text)-- people make senses of the everyday architecture in relation to time or periods of times. The three emergent super-ordinate themes in this research can be placed into different categories in the theoretical framework. The theme "local conflict" and "public sharing" can be placed into the super-ordinate theme of "building in human (text)". Eventually, "contextual linkage" can be placed into the super-ordinate theme of "building in con (text).

In addition, the most difficulties for this research was a limitation of available time for photo-elicitation interview. The photo-elicitation activity was distinctive time-consuming activity. For the recommendation for the further research, activity schedule should be well arranged for prospective participants.

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URBAN REGENERATION APPROACHES IN HISTORIC URBAN FABRIC IN ARCHITECTURAL STUDENTS' PROPOSALS: A CASE STUDY IN YUKARI MAHALLE, AKCAKOCA

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Abstract

Today, cities are forced to change due to population growth, and socio-economic and political reasons. The historical areas in cities are the most vulnerable during this change. This is mainly because of the difficulty in establishing harmonious relation between old and new. Thus, regeneration or renovation is always an important design problem in these areas. Not to lose the historic character in such situation, conservation education is critically important in architecture programs. Given this, this study aims to evaluate the architectural students' view on regeneration in historic areas, then accordingly aims to establish students' view-based design criteria to guide planning and urban design in historical areas. For this purpose, a historic neighborhood, called Yukarı Mahalle was chosen as a case study from Akcakoca, a seaside town in the western part of the Black Sea Region in Turkey. The area is also in local planning authorities' current agenda for its potential regeneration scenarios. Before the governmental actions are done, the neighbourhood was given as a design studio problem to the 3rd year Architecture students. The study area was limited to approximately 24 acre that also consists of a high number of Grade II listed historic residential buildings. For 14 weeks, 8 hours per week, the students have worked to generate proposals for regeneration of the historic neighbourhood through socio-cultural, commercial buildings and residential units. In total, 60 regeneration projects were collected from the students. In these projects, as the main elements of urban morphological analysis, that are constantly used and changed over time, buildings, parcels/blocks and streets were analysed. The two-dimensional layouts of the blocks, plots and the composition of three-dimensional buildings were examined in detail. According to the comparisons, the student proposals have been grouped into several categories regarding the type of conservation approaches they offered. The study also adopted a social survey method amongst to the same students.

The students, after the project completion, have been asked regarding the general design principles in the historic environment, the regeneration potential of the chosen area, what they aimed for in their design proposal, and what they offered in comparison. The final outcome of this paper has been drawn on the comparison of the morphological analysis of the student design proposals and the survey outcomes. Overall, this study suggests that the general tendency in the projects was not to build anything against to the historic silhouette and protect the existing street layout, albeit mostly new building typologies were proposed.

Key words: Akcakoca, historic environment, new design in historical areas, urban morphology, regeneration

1. Introduction

Physical environment continuously transforms as a result of increasing human needs and expectations over time. Thus, cities are like living organisms changing under the influence of numerous factors, mainly population growth, and the socio-economic and political reasons. The changes, however, are not always constructive, but destructive. Today, cities that are mainly formed by historic neighborhoods are suffering from the loss of their urban value. Thus, these cities are the most vulnerable and require urgent interventions to provide economic and social vitality. These dilapidated zones that are mostly historical centers or old neighborhoods cannot keep up with the change proposed by such interventions applied in cities (Roberts, 2017, p.42-46). Such areas accordingly faces environmental pollution, depressions, social and economic exclusion.

One of the remedies to overcome this problem in such areas is urban regeneration (Alpopi and Manole, 2013 p.

178). In this method, a collapsed/dilapidated/excluded urban area is earned into the city by creating a new texture or improving the existing one (English Heritage, 2013; Government and Committee, 2004). This method deals with the rehabilitation, revitalization and redevelopment of this kind of areas which lost its original identity and value. This process affects their physical, economic, social and environmental dimensions. After the 1990's, urban regeneration has become a mostly and widely used urban intervention strategy in many cities (Government and Committee, 2004, p.6-8; Duzcu, 2006, p.7). Goal of this approach is to attract new population, to organize the environment, to prevent the disintegration of the area, to strengthen the transportation networks, to improve housing and settlement conditions, to increase education, health and job opportunities, social and individual participation (Alpopi and Manole, 2013, p.179).

Change is indispensable; however, what is the most important is the proper and effective management of change, in particular the management of changes in historic fabric to conserve the historic character and transfer it to the future living environments where a sense of place is naturally preserved (Serageldin, 1999, p.19; Gokce&Fei, 2018). There are a lot of discussions amongst the scholars of Architecture, Urban Design and Planning disciplines on how to preserve the old/historic character and the image while building the new to meet the new demands (Carmona *et al.*, 2010, pp.63-64; Özer, 2013, p.270; Roberts, 2017, p.48), When it comes to historic building conservation especially in practice, the erection of new

is like a taboo. It involves many disciplines to take into account of many factors beforehand. The main problem is generally found in the understanding of the historic character (English Heritage, 2013 p.17) and in determining the appropriate interventions in favor before the regeneration and renovation projects take actions (Serageldin, 1999, p.20; Government and Committee, 2004, pp.13-15).

The effective urban transformation is undoubtedly based on a number of key principles. First of all, each quarter might have its own historical, social and architectural values. These values create different layers which have to be revealed with a comprehensive study and should be examined (Tiesdell et. all, 1996, p.11; Roberts, 2017, p.49). Especially, in historical areas, the protection capacity should be determined rather than a purely conservative approach. Preserving the entire quarter can bring a complete halt to a city's development, the transformation should aim to benefit the social structure of the regeneration area, the historic character of urban fabric and the harmony of environmental conditions (English Heritage, 2013, p.8). But also, the area should be approached from the perspective of the Genius Loci. The continuity of the sense of place should be ensured (Tiesdell et.all., 1996, p.21, Gokce&Fei, 2018). Heritage assets are a key component of sustainable development that should be targeted throughout the whole process (Government and Committee, 2004, p.42; English Heritage, 2013).

New design developments in old should respond to urban structure and grain, density, scale and streetscapes. The new design should seek to comprehend, identify and make a positive contribution to the existing urban fabric, morphology of blocks, streets and buildings. Also the new has to establish the interrelationship of these elements and should respect the street pattern – rather than buildings and their individual physical design characteristics (Historic Scotland, 2010, p.7-8; Oliveira, 2016 p.7-8). New developments should promote the mixed land use and provide permeability through the streets. Generally, the existence of historic buildings has been fundamental to successful regenerations. According to English Heritage (2013), the success of the heritage-based regenerations' appears to be depend on:

- Mixed-use developments and typological variety in buildings;
- Pedestrian priority
- Widespread use of public spaces
- Streetscapes
- Human scale environment
- Interesting design features or detailing;
- Conservation of unique, distinctive and local character
- Associations with the past;
- Promotion of social interaction and a sense of place

Cities are constantly in a renewal process to comply with the requirements of the age. Besides, they are in an effort to protect their own characteristic and identity. Historical environments reflect the identity of the cities while they can survive as long as can sustain their cultural identity. Due to the new requirements, it is necessary to reuse old buildings or build new structures. For this reason, re-use of the old ones or the addition of the new ones has always been a topic of discussion. But the question of new building in historic areas is loaded with unknowns. Clearly, to insert new buildings in a historical context and to preserve the sense of place are

the most difficult tasks an architect confronts. Throughout history, there are two main methods for evaluating architectural heritage. The first one can be defined as direct historicism and the second as indirect historicism (Özer, 2013, p.267). Direct historicism can be explained as an attempt to stop the flow of history and even time. This understanding freezes the heritage structures of the past and does not go beyond the way to directly imitate them. Indirect historicism, however, is to benefit from the essence of a past style by using a new interpretation without imitating analogies of two or three dimensions (Özer, 2013 p.268). Indirect historicism is widely accepted in recent years. Özer(2013, p.269) examined the example of Ottawa, the capital of Canada, which was founded in neo-gothic manner. In her study, she points out that in recent years there is an understanding that has benefited from its essence is dominant without copying the neo-gothic style. She states that there is an attitude that respects the general architectural understanding of the city and avoids repeating it but takes care to remain at peace with it. The way to combine the old with new in a historic area pass through the interpretation of the past with contemporary eyes and also the old form is not copied out but respectful cooperation is made with it (Serageldin, 1999). Architecture actually has more meaning than style and aesthetics, it provides historical continuity as a cultural product and also manifests identity of the community (Tiesdell et al., 1996, pp.10-12; Rossi and Eisenmean, 1982; Rapoport, 1966). Heritage buildings in historical areas have important roles so as to provide sense of place for citizens and also strengthening the community attachment and place attachment (Furlan and Faggion, 2017, pp.14-17). The greatest difficulty in the historical areas of regeneration is the sense of place and the preservation of the character of the place (Serageldin, 1999, p.19).

2. Methodology

This study aims to evaluate the architectural students' view on regeneration in historic areas, then accordingly aims to establish students' view-based design criteria to guide planning and urban design in historical areas. For this purpose, Yukarı Mahalle which is a historic neighborhood was given as a design studio problem to the 3rd year Architecture students. During 14 weeks, 8 hours per week, the students have worked to generate proposals for regeneration of the historic neighborhood through socio-cultural, commercial buildings and residential units. The existing buildings in the study area were divided into two as registered buildings and others. The students had to protect the registered buildings in the neighbourhood and, if they deemed necessary, they could propose a new building or buildings to conserve in the neighbourhood. Also, they could completely remove other buildings from the area so as to they had to propose 16 000 square meters social, cultural and commercial building according to the project content. During this period, the design studio was run by four tutors. In total, 60 regeneration projects were collected from the students. Then, the students' projects were evaluated by morphological analysis approach and a survey method. These two methodological procedures of the study will be explained below, respectively.

2.1. Morphological Analysis

According to the morphological view, the city is made of urban tissues, which streets, plots, blocks and buildings constitute (Oliveira , 2016 p.8). Given this,

urban morphology can be defined as the organization and formation of urban space and the science of settlements. Formation of the city is provided by the two-dimensional layouts of the blocks, plots and the composition of three-dimensional buildings. These are the main elements of urban morphological analysis, which are constantly used and changed over time(Conzen, 1960, p.5). This study also proposes a typological framework that involves such typo-morphological elements in order to examine the student projects. The two-dimensional layouts of the blocks, plots and the composition of three-dimensional buildings of the proposals were examined in detail. The students' proposals have been grouped regarding the type of conservation approaches they offered. While evaluating projects, two basic morphological elements, namely street and building typologies were taken into consideration. In the projects, the street pattern was classified according to organic or grid character, whether newly proposed or sustained. In the project, how many houses were conserved and how many new structures were added to the project was evaluated as an important criterion. The formal characteristics of the new structures proposed in the project and the mass dimensions of the new structures (footprint) were evaluated as a separate criterion. The formal characteristics of the new structures proposed in the project and the mass dimensions of the new structures were another important criterion. Especially building heights were a typological feature that could affect the characteristic silhouette of the neighbourhood. The full typological frame used in the evaluation of the projects are presented below in Figure 1.

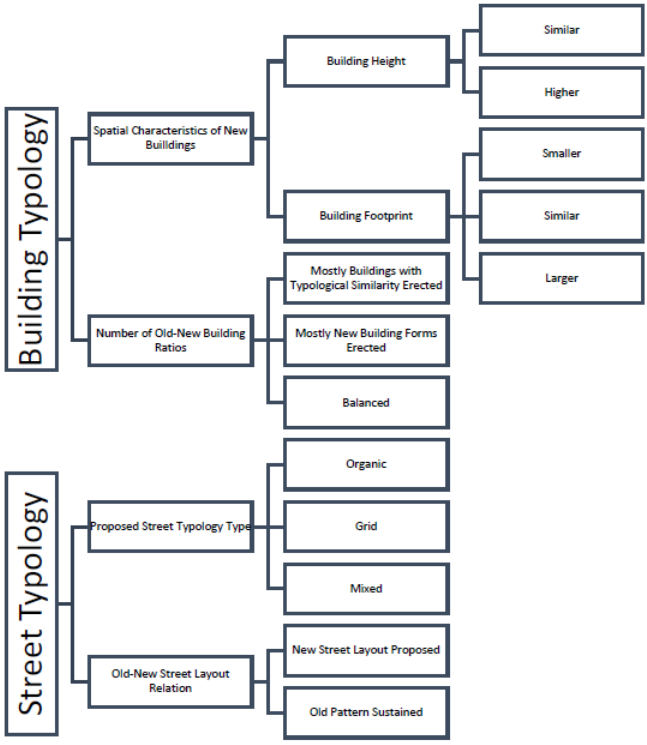


Figure 1 Typological frame used in the spatial & typological analysis of the design proposals

2.2. Survey Method

The survey aimed to evaluate the quality of urban regeneration projects designed in line with the tradition from the perspectives of the students. The sample group was the 3rd-year Architecture students and it was conducted to 60 students in the studio milieu. The questionnaire consists of three parts, in the first section, demographic information was questioned. The students were asked about their age, gender and whether they lived in the historical environment or whether they want to live in a historic environment. In the second section, the students were asked the questions about the evaluation of the new design in the historical environment. The responses were given regarding whether the new design should take reference from listed/ historic buildings more in appearance, material, form, facades, colour, dimensions, and proportion. The third section was designed to determine the general approach taken to establish the link between old and new after regeneration, either with similarity or opposition. In the questionnaire, 7-point Likert scale was used and the results were analysed through SPSS software.

3. Study Area / Yukari Mahalle

Akçakoca which is a seaside, sub-province in Düzce is located in the western part of the Black Sea Region in Turkey

(Figure 2). The study area, Yukarı Mahalle is one of the oldest neighborhoods in Akcakoca.



Figure 2 The location of Akcakoca

The neighborhood consisting of three different villages - Yukarı Köy, Aşağı Köy, Koç Köy - had been established during the reign of Ahmet I who was the Sultan of Ottoman Empire. Because of the residents, the name of the neighborhood was called Yukarı Mahalle (Figure 3), of which the residents were rich and prestigious people (Naldan,

2012).



Figure 3 The location of the project area

In 1926, in the neighborhood had occurred a big fire so some part of the area had burned and a new development plan was partially implemented in this neighborhood (Yerlikaya, 2001). With the new plan, the organic street layout of the neighborhood has been partly replaced by the grid layout. The study area was limited to approximately 24 acre that also consists of a high number of Grade II listed historic residential buildings. The traditional residences in Yukarı Mahalle have sustained its functional characteristics to a large extent.



Figure 4 The neighborhood plan with the listed houses and views from the neigbourhood

Most of the registered buildings are used as housing. In the neighborhood there are mostly two-or three-storey detached houses in the garden. The ground floors of the houses are stone masonry, the upper floors are wooden framed and the interior is filled with brick. Most of the facades are not plastered so their brick and wood texture constitutes the character of the streets. As the first owners and heirs of the residences have been increasingly separated from the quarter, some

of the buildings are abandoned and some of them are used as warehouses. The neighborhood retains their historic integrity and cohesion as a residential area rather than fragmentary remnants of previously much larger entities. Throughout history, the traditional market established for only women and has resumed in recent years. Especially, on the weekends, local and foreign tourists have come to buy local products to this local market.

4. Analysis

This section will present the initial results of spatial analysis of the students' projects and the descriptive results of the survey analysis below.

4.1. Spatial Analysis of the Design Proposals

The students' projects were grouped according to certain spatial characteristics that are explained above in methodology section (See **Error! Reference source not found.** above). The analysis was carried out on these characteristics of two main groups: 1) the type of buildings and 2) the type of street layouts proposed against to the existing fabric.

4.1.1. Analysis based on Street Typology

Considering the street typology, 43% of the projects showed tendency to sustain the old/existing street pattern, while 57% have proposed a new street layout. When these two groups were compared, the prominent similarities and differences were noted in their design principles.

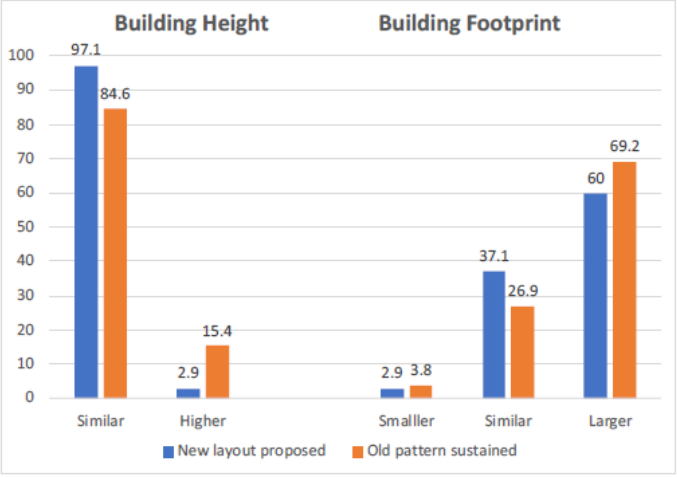


Figure 5 Building height and footprint comparisons based on street typology

The general tendency in both groups was to sustain the historic character to build new buildings with similar height to the existing historic fabric. However, the new proposed building footprints were larger, even though the parcel size are mainly similar. The interesting result was that the projects where the new street layouts were proposed showed more tendency to sustain the land coverage. When the old street layout was sustained in the projects, the land coverage also increased with

the proposal of the buildings with larger building footprint (See Figure 5).

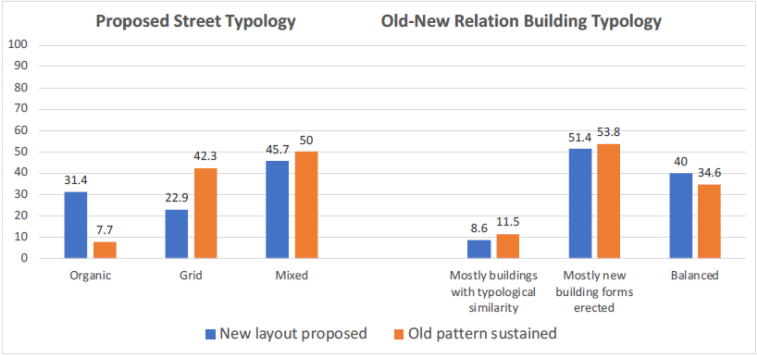


Figure 6 Proposed street types and the ratio between the old-new building typologies

The street network in the project area had a traditional organic pattern, before the fire was occurred and the current grid layout was applied with new planning regulations. Given the fact that, the projects proposing the prominent changes in the existing street layout showed more tendency to propose organic street network as before the fire took place in the area. There were not prominent differences noted regarding the ratios in the numbers of the old and new building typologies after the project completion. However, the general trend was to erect new building typologies rather than seeking for typological similarity in the new proposals (See Figure 6).

4.1.2. Analysis based on Building Typology

In terms of building typology, the projects are classified into three groups: (1) where mostly typologically similar buildings were proposed; (2) where mostly new building forms were erected; (3) where the numbers of buildings with typological similarity or difference are equally distributed, so balanced. The distributions of these three categories are 10%, 52% and 38%, respectively.

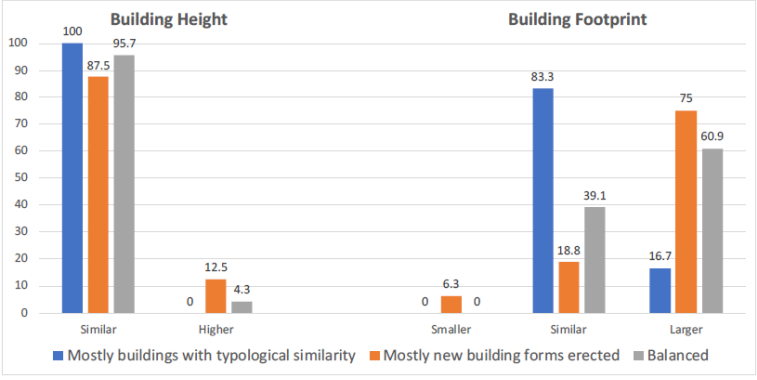


Figure 7 Building height and footprint comparisons based on building typology

As seen in Figure 7, the projects in all three categories kept the building height at around 2 to 3-floor high as in the traditional Turkish houses located in the area. The number of buildings with similar height proposed in the area was slightly more in the projects achieving more typological similarity. Understandably, in those projects, the ratio of similar building footprint/land coverage (83%) was proportionately higher than the projects where either mostly new building forms (19%) or equally distributed new or old-style building typologies (39%) are proposed. Similarly, larger building footprints and land coverages were mainly (75%) adopted in the projects where mostly new building typologies were offered. (See Figure 7).

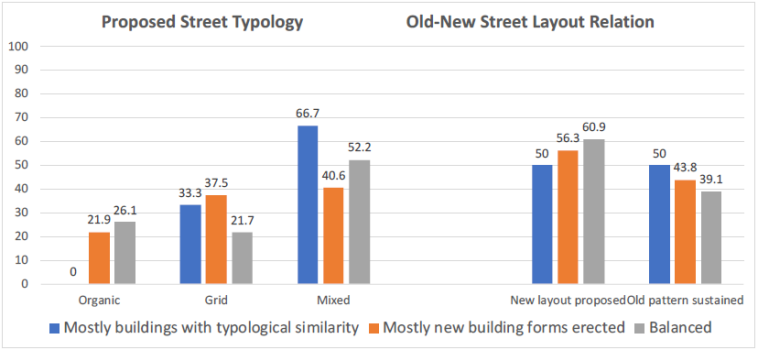


Figure 8 Comparisons of the proposed street typology and old-new street layout relations

Proposed street typology was mainly mixed where organic and grid street form are integrated in the given area. The highest ratio of such street design was seen in the projects consisting of mostly typologically similar buildings. Besides, grid street network is the second mostly adopted street typology and its highest percentage was also noted in the projects aiming for mostly new building typologies in the study area. Furthermore, in those projects, the tendency was to propose a new layout rather than to sustain the old street pattern. It can be predicted that students are generally looking for some similarity in typological characteristics of the neighborhood. However, its implemention is only seen in either the similarity in street typology or in the building typology, not both typologies. (See Figure 8).

4.2. Survey Analysis

The survey has started to ask questions regarding the demographic differences amongst the students. The demographic variables are mainly controlled in this study. Because the questionnaire participants are all architecture students, in their third years, and at around the same age. They have also given the same historic quarter to work on. Project completion duration was also the same. Moreover, they have all given critiques by the same tutors. The differences were thus tested only regarding gender and age. Alternatively, the survey has also evaluated whether they have lived in a historic environment or not affected their attitude towards designing new in the historic areas. The students were also asked regarding what kind of environment they would like to live: Historic, modern or mixed. The analysis of the demographic data is presented below in Figure 9.

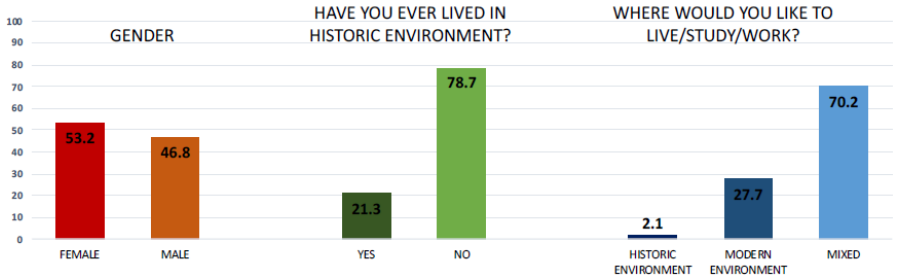


Figure 9 Comparisons of the demographic data

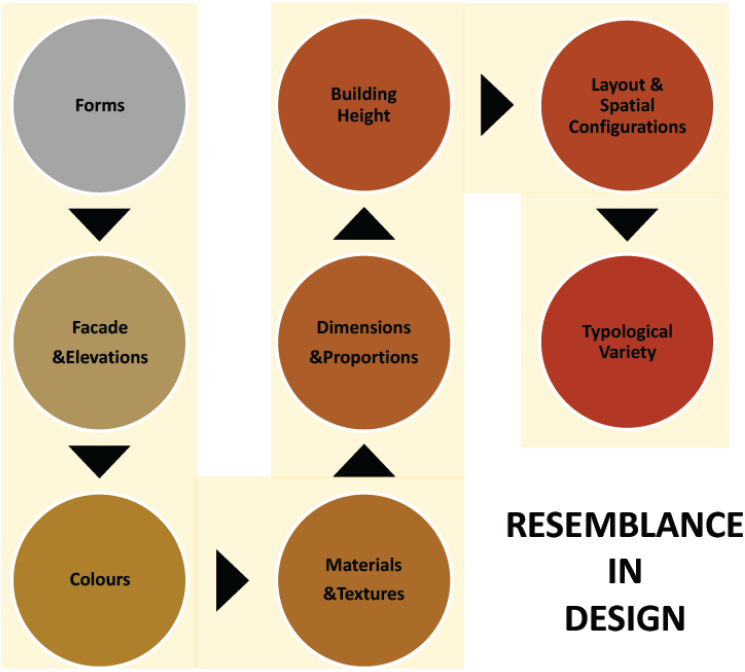
As seen in Figure 9, the number of male and female participants are more or less the same. Almost 80% of the respondents reported that they have never lived in a historic environment. Not surprisingly, its impact was noted on the small percentage of the respondents (only 2%) who would like to live/study/work in a historic environment. Despite this, it is interesting that students preferred living in a mixed environment where old and new buildings are harmoniously distributed rather than living in completely new environments (p value < .005).

Table 1 The distributions of the choices on the way to establish links between old and new

	Establishing old and new relations with similarity	**Establishing old and new relations with opposition**
	Valid Percent	Valid Percent
STRONGLY DISGREE	6.4	6.4
DISAGREE	6.4	10.6
SLIGHTLY DISAGREE	12.8	10.6
NEITHER DISAGREE NOR AGREE	29.8	27.7
SLIGHTLY AGREE	14.9	21.3
AGREE	21.3	10.6
STRONGLY AGREE	8.5	12.8
Total	100.0	100.0

The study also tested the impact of living in a historic environment on how to treat to the historic environments as a design problem. No statistically significant difference has been found in the responses of the students regarding the regeneration potential of historic environments (p value > .005). Besides, although a small number of respondents have interacted with historic environments during their life, the general tendency amongst the students was to believe that the historic environments have a regeneration potential (r: 0.698). Moreover, the students generally believe that the high number of listed buildings do not affect this potential (r: 0.433). Besides, a good new building surrounding by those listed ones is a source a pride (r: 0.743). Moreover, there was a consensus regarding the establishment of

harmonious relations between old and new design. The students also reported that the link between them can be established through both similarity and opposition from the old. The responses to these statements showed similar distributions from strongly disagree to strongly agree (see Table 1).



	FORMS	FACADES& ELEVATIONS	COLOURS	MATERIALS AND TEXTURES	DIMENSIONS &PROPORTIONS	BUILDING HEIGHTS	LAYOUT& SPATIAL CONFGURATIONS	TYPOLOGICAL VARIETY
NEW DESIGN	.634**	.584**	.547**	.480**	.437**	0.232	0.224	0.115

Figure 10 New design elements to seek resemblance to old fabric (from the most important to the least important)

The students reported that in the regeneration of historic neighborhoods, the new design should look for the resemblance to through certain spatial aspects of the historic fabric. Figure 10 illustrates the new design elements that should need to seek resemblance to the old fabric from the most significant one to the least. Given this, the higher importance should be sought in the resemblance of forms, facades and elevations and colors. These are followed by materials and textures, dimensions and proportions. In contrast, the low correlations were noted in building height, layout and spatial configurations. Typological variety showed relatively low correlation.

5. Discussion and Conclusion

This study conducted two separate analyses as illustrated above. One is through the design principles adopted in the architectural students' design proposals for

the regeneration of the historic neighborhood, Yukari Mahalle. The other was the survey analysis which mainly aimed to general attitude of the architectural students towards constructing new buildings in the historic regeneration areas.

Considering the descriptive analyses indicated above, the research implications can be discussed from two aspects:

1) through the proposed street typology and 2) through the proposed new building types in comparison to the existing historic fabric. When the proposed street typology prominently differed from the existing or when the old pattern was sustained, typological similarity was mainly not established in building forms. The proposed new street layout was mostly mixed type where grid and organic street typologies were combined. Thus, the plot and parcel sizes and dimensions also differed from the original fabric. Besides, the land coverage in these plots and parcels was increased by the erection of new buildings with larger footprints. However, similarity was achieved dominantly in the building heights (although the survey results indicates the opposite). This may be interpreted that the general tendency in the students' projects was not to build anything against to the historic silhouette and protect the existing street layout, albeit mostly new building typologies were proposed. This mainly indicates that whether protecting the existing street layout and parcel/plot arrangement were not a determining factor in conservation-led regeneration projects of the students. Looking at the projects where the typological similarity was achieved in building typology, it is noted that similarity was only sought in building heights and building footprints. However, street typologies were mainly mixed, as a result this was reflected in different sizes of plots and blocks in the neighbourhood.

The implications of this first part of the analysis are partly reflected in the survey results. When the students were asked regarding how to establish the old and new relation during the design process, they mainly reported that the resembles should be sought in building forms, facades and elevations. However, when it comes to practice, it is the case only in the projects where the mostly typologically similar new building forms were proposed. It is clear that the students are aware of significance of cultural heritage and what architectural and typological elements of the historic environments should be sustained or taken into consideration in the new design. The authors who are also two of the design studio instructors of these students, state that the students showed effort in the first weeks of studio critiques to develop a new design that is inspired by the traditional Turkish house typology, the size and the dimensions of their footprints, their façade patterns, door and window shapes and sizes, and colours and textures appeared naturally in their building surfaces and facades over time. This is also exactly reported in the same way in the questionnaires. However, it is observed that they were not successful at realising what they really aimed for. As the project completion deadline closes, the students changed their attention to street typology and looked for the similarity in two ways. Either they aimed to not to change current grid formation of the project area or they made an effort to convert the current grid formation to its previous organic formation. Despite this tendency, almost 60% of the projects offered a new street layout without considering the resembles neither to the current grid layout nor the organic layout before the fire. It is also reflected in survey results that the students gave noticeably less significance (r= 0.224) to the layout and spatial configurations

while looking for resemblance in design. Another significant result of this research was seen in the students' attitude towards the typological similarity as a design element to establish a harmonious relation between old and new. Interestingly, over 50% of the projects designed mostly new building typologies, while only 10% of the projects showed sensitivity to provide familiarity to the old fabric through typologically similar buildings. It was also reported similarly in the survey results with the lowest correlations in typological variety variable (r= 0.115). This shows that the students may not strictly think that the old- new relations can be only achieved through similarity to the historic fabric. The survey results also proved that the students think that the old and new relations can be established not only through similarity (50%) but also by differing (50%).

Overall, this study evaluated the conservation approaches adopted in architectural students' projects regarding their success to establish old and new relation in the regeneration process of a historic environment. It is seen that typological similarity was not the dominant design element taken into consideration for this purpose (See also Serageldin, 1996). Instead of looking for the unity in building typologies, they mainly aimed for integrity in the street network (See also Oliveira, 2016). One may argue that this freedom and the variety in the proposed new building typologies might be because of the design program including the new building typologies such as commercial and cultural buildings rather than only residential ones. However, the authors evaluated the results except of this impact and only compared to the buildings that are functionally comparable to the existing ones. Given this, typological variety can be explained by the changing human needs over time with modernization. It is in particular indispensable due to the universal solutions to residential architecture. Therefore, it is suggested that before such regeneration projects, the needs of the residents of the area and new comers should be scrutinized in detail (English Heritage,

2013). it is important to establish balance between building heritage conservation and meeting human needs for successful regeneration in historic environments (Historic Scotland, 2010).

Cultural heritage has been continuously lost for centuries and most is because of the inappropriate interventions applied by non-specialists in the conservation field (Tunçoku, 2004). Conservation education has been introduced to Architecture Departments mainly after World War II, and after 1970s in Turkey (Karakök and Gökarslan, 2017). But merely, it is accepted a part of an education discipline of restoration and as a specialty. However, it should be taken into consideration that students have the authority to do conservation restoration project and application works after obtaining a bachelor's degree. Also they have the possibility of making a contemporary addition in the historical texture with their new structure design in the historical texture in their professional lives. Therefore, architectural students need to be equipped with the knowledge and skills as much as possible about this discipline before completing their undergraduate education (Karakök and Gökarslan, 2017). It is also important to note that all the students in this studio work simultaneously were also given lectures on historic building conservation. It is believed that its positive contribution definitely reflected on the results. As a proof, this studio work is important both for the provision of high-quality architecture education and for the transfer of our tangible cultural assets to future generations by better protecting our

architects' projects and applications. This study particularly stresses the importance of conservation education so that the architectural students' view on regeneration in historic areas started to be shaped from the undergraduate level. Accordingly, this will benefit the cultural heritage to be taken great care.

This study overall has reached its aims and objectives, however, further study can be carried with more sample size and in other historic neighborhoods. Moreover, based on the results of this paper, a further research can be designed with more detail on the design elements in order to propose a design guidance so that the Akcakoca Council can take it as a reference before the planned regeneration takes in place.

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URBAN TRANSFORMATIONS IN ISTANBUL: THE FENER-BALAT GRAMMAR

ELENI STYLIANI OIKONOMAKI

The study attempts to describe from a computational point of view, various transformations that shape the continuously changing building environment of Fener and Balat area in Istanbul. As these transformations are not the result of a particular design process, they can falsely be considered as random.The focus of this study is to uncover patterns of relationships between them and provide a formal description; to show how and why a change occurs through time, based on an underlying continuity of forms against which changes can be measured.

Firstly, to measure and analyse these transformations an archive research was conducted in an effort to record them and form a basis upon which comparative methods between different periods can be used to investigate social, cultural and spatial changes and their relationships, from the urban to city block and building scale. Secondly, shape grammars, a computational theory introduced by Stiny and Gips in 1972, is used here to describe these transformations, their interrelations and spatial relations in a systematic way. A set of parametric rule schemas is used to manipulate-transform shapes in a recursive process to form a shape grammar.

More specifically, essential transformations of buildings solid and facades were analysed in detail to create a set of addition and subtraction parametric rules that constitute the Fener-Balat grammar. A series of derivations were produced to show how rules apply on an existing building block and on the dominate facade typology to illustrate a timeline of transformations. Finally, to examine how this grammar can be used to generate possible future transformations, seventeen interviews with the inhabitants of the area were conducted, to take into account theirs wishes and needs.

This approach can further evolve to apply on other cases as it not only provides new insights on the understanding and analysing of a changing building environment which has been shaped through a sequence of transformations, but more importantly, derives the generative and synthetic principles to form a grammar for transformations.

ARCHITECTURE AS A MEANS FOR SOCIAL INCLUSION FOR PEOPLE WITH DEMENTIA

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Abstract

The Department of Economics and Social Affairs of United Nations (Report on the World Social Situation, 2016) defines social inclusion as "the process of improving the terms of participation in society, particularly for people who are disadvantaged, through enhancing opportunities, access to resources, voice and respect for rights."

As a person grows older, she/he may face physical or cognitive declines, which most likely are related to ageing and often lead to social exclusion. Sometimes though, their declining skills may be symptoms of certain diseases eg dementia. According to World Alzheimer Report 2018, "today, over 50 million people live with dementia worldwide" (Alz.co.uk, 2018).

Building dementia friendly communities is an initiative from World Health Organization and Alzheimer's Disease International, that aims to reduce the stigmatization and social exclusion -of people with Dementia- (pwD) (Lin, 2017).

Lin and Lewis (2015) claim, that a community can be a certain place, social and physical environments, an organization, a group of people, a society or virtual communities.

Certain spaces host activities of a specific community. So, having access to a community requires physical and /or mental accessibility. Dementia friendliness can be linked with the design of buildings, common and public spaces. In other words, architectural design as a care-by-design approach in (existing) private or public environments can serve as an alternative means of caretaking. By making spaces accessible, pwD can be socially included in their communities and social networks' activities.

More specifically, the aim of this paper is to find new areas of intervention in architectural design practice for pwD. At first, there will be an overview of literature review on existing best practices in spaces and related services custom designed for pwD. Moreover, applied guidelines and evaluation tools for (existing) spaces will be presented.

Keywords: architecture, cognitive decline, dementia friendly, mental accessibility, care-by-design

Introduction - setting the context

According to United Nations report "World Population Ageing 2013" (United Nations, 2013) there is a significant increase of the population ageing worldwide. To be more specific, "the global share of older people (aged 60 years or over) increased from 9.2 percent in 1990 to 11.7 percent in 2013 and will reach 21.1 percent by 2050" (United Nations, 2013). According to U.N. Census on World Population Prospect (United Nations, 2015), the life expectancy at birth is projected to rise from 70 years in 2010-2015 to 77 years in 2045-2050.

The phenomenon of the vast aging of the global population is based mainly on three factors: the increase of the life expectancy, the decline of the birth rate and the enhanced medical care (Imrhan, 1994). As Juarez et al. (2015) point out, this trend will be intensified since there are no signs of change.

Aging is characterized by a steady decline in the physical and mental functions of a person, a process that is completely personalized. The most common mental deficits of ageing are:

- The weakening of memory
- Loss of orientation (Tsolaki and Kazis, 2005)

Various diseases or disabilities can affect the decline in abilities, one of the most common being dementia.

Dementia: definition and symptoms of the disease

Dementia is "an overall term that describes a wide range of symptoms associated with a decline in memory or other thinking skills, severe enough to reduce a person's ability to perform everyday activities" (Alzheimer's Association). Its most prevalent type is Alzheimer's disease accounting for 65%-85% of cases. It is wrongly associated as a normal effect of ageing.

Its symptoms can vary greatly among people with dementia (pwD). It affects core mental functions but in order to be considered dementia at least two of the following core mental functions must be significantly impaired (Alzheimer's Society 2013),:

- Memory
- Communication and language
- Ability to focus and pay attention
- Reasoning and judgment
- Visual perception

People with dementia may have problems with short-term memory, or orientation. Many dementias are progressive, that is symptoms start out slowly and

gradually get worse. In particular, it affects the patient's daily life and his / her independent living as he / she fails to manage his / her finances and perform simple household tasks (cooking, washing clothes, house cleaning) and fails to manage his personal care at more severe stages their personal hygiene, nutrition etc. Also, due to the loss of orientation, she/he may be unable to drive, or use public transport sometimes even in early stages of the disease. As it turns out, patients with dementia can live independently as long as the symptoms of the disease are mild. As the disease progresses, however, more and more often they may be dependent firstly on their family and/or friends (informal caregivers) and later, they may need also professional caregiving.

For the time being, available treatments (pharmaceutical or not) delay the progress of the disease, so an early dementia diagnosis may allow a person to get the maximum benefit from available treatments and be able to decide about her/ his future.

Dementia Friendly Communities and their relation to built space

Among the goals for the Europe 2020 strategy for smart, sustainable and inclusive growth is lifting people out of social exclusion (Ec.europa.eu, n.d.). It will promote initiative for active ageing, that is to *"help people stay in charge of their own lives for as long as possible as they age and, where possible, to contribute to the economy and society".* Dementia friendliness is aligned to the aims of active ageing.

Social exclusion of old aged people is a multidimensional phenomenon (Walsh, Scharf and Keating, 2016), (Nations, 2016).

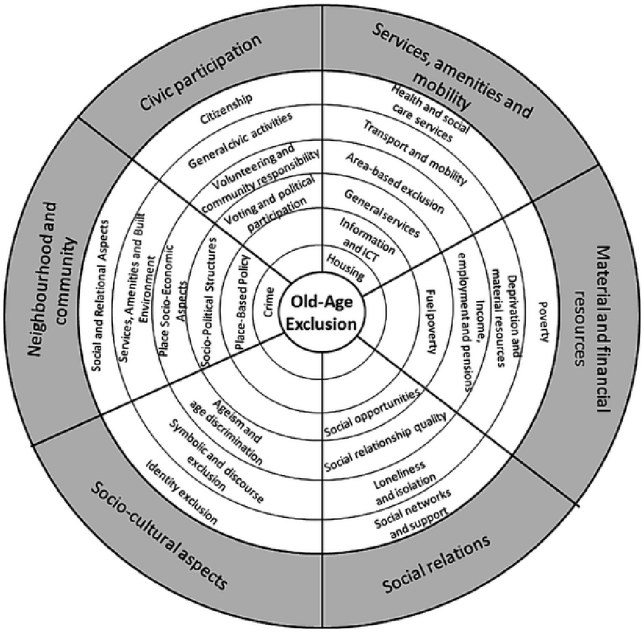


Figure 1. Old-age exclusion framework depicting interconnected domains and sub-dimensions (Walsh, Scharf and Keating, 2016).

All the interrelations of the dimensions of the social exclusion, presented on the diagram above, have to be taken into account in order for scientists to understand and find viable solutions. For instance, access to healthcare services may be unsuitable if an old aged person cannot afford it, or if the design existing premises do not take into account their special needs.

Dementia Friendly Communities (DFC) are defined as *"places where people with dementia (pwD) are understood, respected and supported, and confident that they can contribute to community life."* (Alzheimer's Society, n.d.). According to the World Health Organization and Alzheimer's Disease International (Lin, 2017), the existence of DFC is a way to eliminate the stigma of dementia in a certain society.

Karp et al.(2015) claim that the concept of community is a complex one, as it can be applied to a variety of situations settings and forms of a social group's life. A community can have various forms (Lin and Lewis, 2015) such as:

- A certain place
- Social and natural environments
- An organization
- A group of people
- A society
- Virtual communities

From the above definition the spatial and / socio-spatial dimension of the community are highlighted. Communities interact with the space that hosts their activities and vice versa. Therefore, a further analysis on ways of designing DFC's in the architectural and urban context is needed.

Aims of the present work

As outlined in the previous section, there is an increasing interest in employing DFC initiatives and consecutively redesigning the spaces that host their activities. In order for the community to become dementia friendly, it should be redesigned in a multidisciplinary manner ie infrastructures, transportations, services, as well as as the relevant (public and or private) spaces (WHO - Age friendly communities). Even if the topic of designing dementia friendly spaces is not so new, we would like to outline the existing context and find possible uncharted areas.

Method

This paper will discuss about the role of architecture as a means of social inclusion of pwD.

For this reason we researched on the concept of DFC and the design of environments that host their activities. More specifically, we searched for related scholar papers, conference proceedings, books on Google Scholar, Sciencedirect, Researchgate and Academia.edu databases, in websites of dementia related associations and world health organization (WHO) and in the local library catalogue of Aristotle University of Thessaloniki. The keywords used were "dementia friendly communities", "dementia friendly architecture", "care centers for pwD". Inclusion criteria were, topic relevance and articles aged less than five years old.

For investigating the current status of existing case studies we conducted a google based research on existing built care centers for pwD. We retrieved to the extent possible photographs, drawings and descriptions of the built structures.

Examples using Ambient Assisting living technologies, ie "innovative products, services and systems based on information and communication technologies that support the independent living of the elderly" (Singh et al., 2017) were excluded. Assisting living environments may be a promising solution for pwD residences.

The role of architecture in forming a dementia friendly community

One of the most important symptoms of dementia is the loss of a person's ability to navigate in the space (O'Malley, Innes and Wiener, 2017). At early stages of the disease, pwD are most likely to get lost in new, unfamiliar for them environments (Allison et al., 2016). But as the disease progresses, disorientation may happen also in familiar environments. Moreover, they need encouragement to perform everyday activities. This cues must be important design parameters (Feddersen and Lüdtke, 2014).

Social inclusion In the realm of dementia friendly architectural design, introduces the need of enhancing the opportunities in a building environment to have access to community. In other words, architecture has to cater for accessibility, both physical and mental, of certain living environments (indoor and outdoor environments, public and private spaces).

Accessibility is a key factor in (re)designing or adapting built space in order to cope with henceforth continuously limiting physical and mental capacity. Physical accessibility diminishes all the obstacles which could limit an old aged person's access into certain spaces, due to physical decline (eg hazard-free streets and buildings, even floorings etc). Mental accessibility, on the other hand, means creating readable environments mainly by providing sensory cues so as for pwD to be able to orient themselves in it, remain independent and secure, despite their abilities and engage in meaningful activities that take place in a certain space to the extent possible.

Guidelines for designing dementia friendly spaces

Spaces that have to be (re)designed for people with dementia are their houses, nursing homes or hospital facilities, in which pwD might enter for a specific time. Also, the proper redesign of public buildings, stores may enhance the independence of people with dementia.

Our literature review demonstrates that the field of residential care units, as well as the field of assisted living technologies designed for pwD has been extensively researched. To a lesser extent, the design of public buildings or spaces has been examined. Many applied guideline frameworks and toolkits for designing dementia friendly spaces can be found and are issued from various bodies (governmental or dementia related associations).

All of them have some common principles which can be summarized as follows: (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015):

- **Safety:** Safety for pwD has to cover various aspects of their everyday life. The spaces they live in must prevent accidents, promote the correct use of spaces and protect them from meaningless wandering. Also, an environment with familiar for each person elements, may relax a person with dementia from confusion. (**Size of used space):** the larger a space is the more confusion

it causes to its residents. This principle may apply to care facilities as well as public or semi private spaces (eg shopping malls, museums etc). In case of nursing homes, hospices and/or hospitals, arranging residents -pwD in small groups, provides better care services. (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015).

- **Visual accessibility:** The simpler an environment, is the less confusion it causes in pwD. The majority of the sensory cues are the visual ones. So, mental accessibility is highly linked to visual accessibility. Excess visual cues and repetitive patterns in floor plans may confuse pwD. Readable environments (eg simple building layouts, or readable routes) may help them when moving from one space to another. Moreover, care facility stuff is also able to control residents - pwD. (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015).

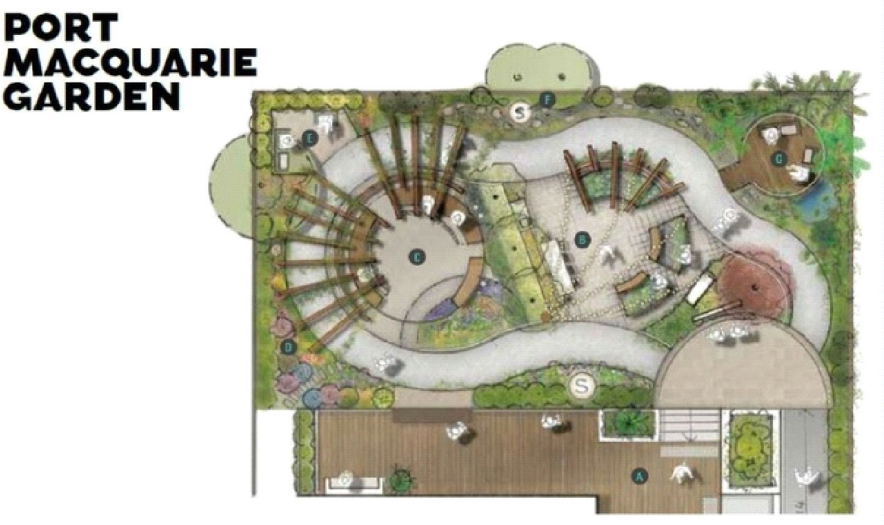


Figure 2. Clear routes in a dementia garden. PwD can enjoy a walk by easily finding their way in or out. Caregivers can easily control the patient's movements (Port Macquarie dementia gardens, n.d.).

- **Stimulus reduction features:** Care units' design has to reduce excess sensory stimuli (mainly visual and auditory cues), that are unimportant for the everyday life of a patient. (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015).
- **Highlighting useful stimuli:** Contrary to the previous guideline, cues that are important for the everyday life of pwD should be enhanced. For example, signs that highlight the correct use of spaces (eg toilets, exit to safe areas), or aids to recognize bedrooms (photographs, personal items etc), color coding of spaces (spaces to relax or spaces to socialize). (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015).



Figure3. Color coding in the interior of a toilet, highlighting the proper use of the space

- **Provision for wandering and access to outside area:** Meaningless wandering is a common feature for pwD. Design of care facilities should not encourage such behavior but also ensure a person's safety if he/she does so. (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015).
- **Familiarity:** PwD usually recall past memories easier than recent ones. In order to provide a familiar environment, homelike decor (in case of care facilities) or prominent visual cues (eg certain public landmarks) must be provided. (Fleming and Bennett, 2003), (Health Building Note 08-02 Dementia-friendly Health and Social Care Environments, 2015).
- **Privacy and community:** Designed environments have to provide various opportunities for social interaction. Sometimes pwD prefer to socialize with other people, whereas sometimes they prefer to sit alone or with a smaller group of people.

Some of the most common toolkits for dementia friendly architecture are

(O Malley et al, 2017), : The dementia audit tool (DAT), EVOLVE design toolkit, Enhancing the healing environment assessment tool (Enablingenvironments.com.au, 2013), The Environmental Audit Tool – High Care, NHS Scotland wayfinding document (Health Facilities Scotland, 2007b, p.15), ABLE model etc.

To sum up, all these guidelines, when applied, give to pwD a feeling of independence and provide them the opportunity to participate in the activities of everyday life to the possible extend. In the smallest nucleus of a person's social circle, his/her family, adapting the home to their needs, has a positive effect on the whole family's activities as pwD may be less dependent on them and confident to participate in family's activities (eg cooking a meal, interact with her/his loved ones etc).

Regarding the design of care facilities, the current trend is the development of new types of people centered buildings and services entirely focused on patients' needs and diminishing their institutional character (Garcia & Flores). So, in home-like facilities, proper design may transform her/his sense of initial insecurity caused by the unfamiliar environment and encourage them to participate common activities of the new community he/she enters. He/she can interact with other pwD, but also be less dependent (to the extent possible) to the facility's personnel.

In most case studies reviewed for this paper, home like care facilities were either new built buildings or renovated buildings designed especially for pwD or (in some cases) for old aged people in general. They used color coding to distinguish places of relaxations (eg bedrooms) from spaces for socialization (living rooms, dining rooms). Proper signage defined the use of spaces or enhanced the orientation of pwD in the facilities.

But what about public spaces? Which should be the proper way to redesign them?

Dementia villages as a source of inspiration for public space?

Proper design of dementia friendly public spaces in an existing city context is a Regarding public space (re)design, three types can be distinguished:

- public buildings: This category might apply for buildings used by a large, diverse group of people such as shopping malls, airport, hospitals, public authorities buildings, libraries, cafes, museums, restaurants recreation buildings etc in which a pwD may use frequently or rarely
- Public spaces in between buildings (eg parks, streets, squares, monuments etc): There is an extensive literature on dementia gardens and how they are properly designed to offer meaningful experiences as well as a means of socialization for public spaces. Sensory cues (visual, auditory, smell) provide a pleasant experience.
- dementia villages: are homelike care centers that are designed more or less in the same manner as building blocks. They provide small residences for pwD which are supervised by professional caregivers.

One of the most well known examples of dementia villages, De Hogeweyk village, a care center designed by Molenaar & Bol & VanDillen architekten and based in Netherlands (Rupprecht, 2012),(Raak ICT BV, n.d.). It was built in 2009 and consists of 6 small dwellings in which groups of pwD cohabit. Their interior spaces have homelike decor and pwD may choose in which dwelling they would like to

reside according to their preferences. What is important, though, from our point of view, is that their outdoor spaces mimic life outside the ward. More specifically, the spaces provided, are hazard free, allowing pwD to enjoy their walk or simply wander in the ward. Cafes and shops are located in the ground floor of the buildings. The ward is open to the whole neighborhood, mixing the residents of the ward, with the residents of the surrounding local community. Moreover, it has a navigable size for pwD to be able to live around, since it contains small residences and a variety of small, well structured mini squares and/or parks. Wandering of pwD is well supported, since the entrance and exit from the ward are well controlled. What is more, the fact that both the interior and the exterior of the building use familiar materials and decor for this old aged residence, create a friendly environment for pwD and provide various types of social interaction (privacy and community) by the proper design of common areas. The concept of dementia friendliness is extended to the design of the services provided (ie well trained personnel in residences but also in stores), but also to the opening of the ward to the local community, which eliminates the stigma of dementia in it.

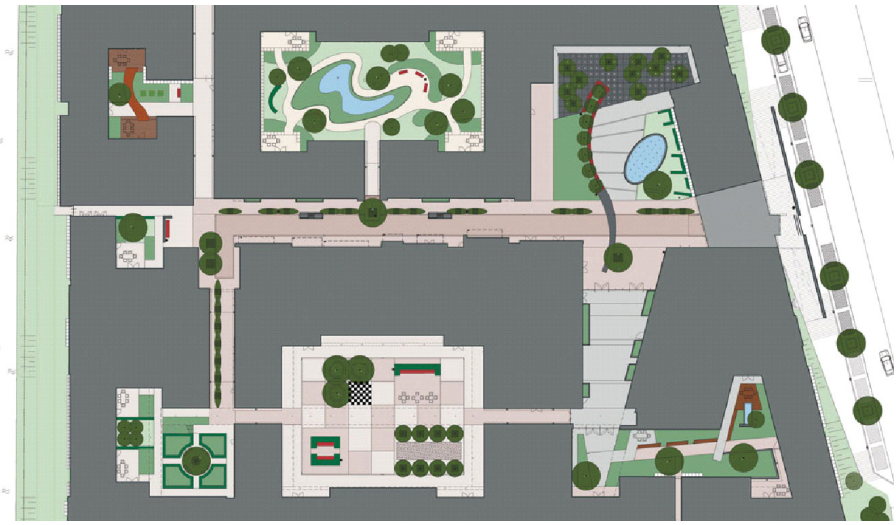


Figure 4. De Hogeweyk Village, floor plan

At the time De Hogeweyk village was built, it was a revolutionary approach in architectural design for dementia care facilities. Nowadays, this care-by-design approach is one of the most applied trends in such wards, as dementia villages are built worldwide and they will be completed during 2019 (eg in Langley, Canada and Dax, in France etc). To our point of view, dementia villages are both a very interesting best practice, but also an example that has to be further improved. As it was mentioned above, De Hogeweyk is aligned to all the appropriate design guidelines but as also Biggs and Carr (2016) point out, its residents still live in *"a self contained, gated community".* To our point of view, this fact should not be disappointing for further architectural practice, but dementia villages may be the inspiration for redesigning parts of the cities eg neighborhoods. In other words, the "takeaway" message from these case studies should be to shift the focus of

architects' design on the capabilities of the patients and not on the consequences of their cognitive decline.

Discussion and future reflections

This section will point out some of the uncharted areas in the literature of dementia friendly architecture guidelines, as a future reflection for ongoing research.

As a person grows older, she/he may be restricted in everyday life to certain spaces such as their neighborhood. This fact also applied to pwD who may be hindered to live independently in their neighborhood, due to lack of both physical and mental accessibility of the provided spaces. As Bosch and Gharaweis (2017) point out, existing design guidelines for improving wayfinding and quality of life of pwD may be abundant, but there have been relatively few empirical studies examining their effect on the wayfinding behavior of older adults. Most of them are recommendations derived from the field of Environmental Psychology. Research on measuring how objective spatial features of a neighborhood can promote to the inclusion of old aged people is crucial (Dahlberg and McKee,2018). The above referred guidelines should be combined with frameworks extracted from environmental gerontology (Dahlberg and McKee, 2018) and therefore, tested about their effectiveness on pwD compared to traditional nursing home practices (Bosch and Gharaveis, 2017). A good starting point for redesigning neighborhoods could be dementia villages as they incorporate successfully, to our point of view, most of the concept of dementia friendliness.

Another subject of our ongoing research could be limited to focus groups with pwD in various stages of the disease conducting empirical research on the effectiveness of the aforementioned guidelines. In our point of view, it could be very interesting to see how pwD interact with cues in their environment, how do they cope with problems resulting with dementia (eg loss of orientation, irritation, wandering) and if architectural and urban design can offer solutions on how to deal with these symptoms.

What is common to both research "pathways" is the fact that, since there is an abundance of best practices worldwide, there must be an upgrade for dementia friendly architectural design to more crucial needs of pwD than just using color coding or proper decoration tips to keep pwD safe. The lack of empirical studies is an opportunity towards this direction.

DFC initiatives have to approach the need of pwD in a more universal way to the most possible extent. In other words, they should take into account all the dimensions of social exclusion (Walsh, Scharf and Keating, 2016). Improvements on the quality of life of pwD are influenced by material and financial resources, status of healthcare services, social relations, eg family bonds, the overall cultural context of a specific community as well as spatial policy (legislation or guidelines), issued by public bodies regarding the guidelines for designing spaces for people with dementia.

Moreover, and in the framework of economic crisis, dementia friendly architectural design should be align to Universal Design (known also as inclusive design approach). Designers, architects and urban planners in our case, can be inspired from the needs of a certain group of people (in our case pwD) and

redesign existing spaces, focusing on how to improve the quality of life of the overall population. The increase of population of pwD along with the urbanization, further research on resource and economic viable solutions have to be found. Existing unused building stock could be used for new nursing homes and hospices. Moreover, we have to promote the right of independence for pwD to the extent possible and support them in their everyday living in outdoor environments too.

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GLOBALISATION'S IMPACT ON URBAN IDENTITY

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Abstract

Phenomena such as globalisation and technological advancements are unifying most aspects of contemporary life, including the fields of architecture and urban planning, especially on European scale. Cities incorporate similar socio-economic models and exchange best practices, thus slowly acquiring comparable characteristics. Architecture studios are no longer limited to designing locally, hence spreading their individual styles globally without much respect to context and identity of the place. The construction methods and building materials used are oftentimes limited to the same internationally renowned brands, equalling close to identically looking buildings - an office building in Sweden, Poland or Bulgaria would be without much difference in appearance.

The two aspects of perceiving a city - the urban image and the urban identity, are interconnected, and generally influence each other. However, the image is greatly based on varying external factors while identity is strongly related to more permanent elements such as historical development, urban texture, traditions, memory of place and society. The focus of this paper falls on the dynamics of the urban identity and the aforementioned elements involved in it, as well as its connection to the process of globalisation.

Concurrently, the strive for sustainability and "green buildings" leads to implementation of generally-accepted techniques and construction systems, sometimes without their local adaptations, which inevitably causes the increasing universality of contemporary architecture. Contextuality of a new design is reduced to fulfilling the master plan's requirements and regulations (height, density, greenery, etc.). Despite the overall positive impact on the urban image, the aforementioned tendencies are slowly bringing cities to a point of identity loss.

The current research is set in the context of European medium-to-large sized cities, located in various parts of the continent, and with different socio-economic, cultural, and climate settings. Taken into account are a number of most commonly undertaken investments influencing the built environment - residential and office buildings, leading to the formidable conclusions that cities with diverse backgrounds are metamorphosing into becoming one and the same.

Keywords: *Architecture, Urban Identity, Context, Globalisation, Europe, European cities*

Introduction - Globalisation and Urban Identity

For the purpose of this paper, it is of essence to remind and formulate the definitions of the terms globalisation and urban identity.

Globalisation has various meanings, although not all of them are crucial to this research.

- a multi-dimensional process characterised by the acceptance of a set of economic rules for the entire world designed to maximise profits and productivity by universalising markets and production, and to obtain the support of the state with a view to making the national economy more productive and competitive (UNESCO Glossary)
- refers to all those processes by which the peoples of the world are incorporated into a single world society, global society. (Martin Albrow, 1990)
- a phenomenon by which the experience of everyday life, as influenced by the diffusion of commodities and ideas, reflects a standardization of cultural expressions around the world. Propelled by the efficiency or appeal of wireless communications, electronic commerce, popular culture, and international travel, globalization has been seen as a trend toward homogeneity that will eventually make human experience everywhere essentially the same. (Encyclopedia Britannica, 2019) on "Cultural Globalisation")

Urban Identity is most commonly defined as having a direct correlation with the users' intuition about the place/city, and their perception of its unique appearance, including "environmental, historical, socio-cultural, functional, and spatial values" (Arbak (Erdem), 2005)

Taking into account the above, it is evident that globalisation has a tendency towards unification, standardisation, and universality, which is in rather big contrast to the uniqueness of urban identity. The indicated controversy has been a topic of interest to researchers in the past several decades - architects, urban planners, sociologists, etc. However, while the usual study cases involve large metropolises world-wide, this paper focuses on examples from cities in former communist countries such as Bulgaria and Poland in comparison to Western European ones.

Globalisation and Architecture

Exchange of best practices among architects has been around since the beginning of civilisation, and less developed states has always aspired to learn from the more so. In the past, the rise, spread, and fall of a style has been a rather slow process, often taking decades, even centuries. Nowadays, acknowledging the accelerated pace of technological advancement as an addition to the considerably simplified access to and exchange of information, the time of knowledge sharing and processing is reduced to sometimes mere months. In the past, the architectural styles had their regional variations, due to the differences in local materials, traditional building techniques, and climate features. The same cannot really be claimed for present times - materials are being imported from all over the world, HVAC building systems are so advanced that climatic conditions are almost irrelevant, and a handful of globally renowned companies provide a number of construction systems, hence unifying the construction process. Is it such a surprise then that the outcome is

more often than not an universal building, which could exist anywhere in the world, no matter of context?

The tendency towards such universality could be traced back to the birth of the "International Style" in the early 20th century, when architects such as Mies van der Rohe and Walter Gropius, claimed modern age requires new architecture in response to new industry, technologies, mobility, and social and political orders (Eldemery, 2009). And while then it was a purposeful strive towards globalising architecture, nowadays it is a semi-natural outcome, provoked by the culture of commerce and the culture of design. As Eldemery (2009) explains, the global culture of commerce, driven by changing consumer expectations, market opportunities, and business agendas, manifests in architecture via "iconic, sky-scraping banking towers, chains of standardised hotels, franchise restaurants, and shopping malls full of all-too-familiar name-brand stores". He also defines the global culture of design as "supported by architects who study what other architects are creating no matter where". Such approach can often be observed in countries in transition, where inspiration are sometimes implemented directly, without taking into account the contextuality, leading to disastrous impact to the urban texture. (fig.1 (sofia vs new york)).

Additionally, the process of "globalization has led to the phenomena of the mobile architect" (Faulconbridge, 2009). Architects are no longer limited to designing in-situ, thus spreading their own styles globally, no matter of context or local tradition. Though such results, according to Faulconbridge, are more often than not an outcome of client's requirements, it is still quite bothersome how, rather than preserving and promoting their own identity and image, cities are aiming to resemble others.



Figure 1. Hearst Tower /Foster +Partners/, New York (left) and European Commision headquarters /ProArch AD/, Sofia, Bulgaria (right)
sources: Wikipedia, http://www.buildingoftheyear.bg

At this point it is relevant to outline the differences between urban identity and urban image, and their correlation.

Urban Identity vs Urban Image

When discussing place identity, it is usual to mention the urban image as well, and oftentimes these phrases are used as interchangeable. But are they really? To fully grasp the meaning of both terms, it is essential to first understand what the words "identity" and "image" represent.

Identity /aɪˈden.tə.ti/ is who a person is, or the qualities of a person or group that make them different from others. (Cambridge Dictionary, 2019)

Image /ˈɪm.ɪdʒ/ has a number of meanings, the most relevant ones in this particular case being:

- a picture in your mind or an idea of how someone or something is;
- the way that something or someone is thought of by other people;
- a mental picture or idea that forms in a reader's or listener's mind from the words that they read or hear. (Cambridge Dictionary, 2019)

With respect to the above, it could be concluded that identity is more internally oriented, while image is rather externally focused. When applied to cities, these terms do not change in their core sense - urban identity is closely related to the city itself and its inhabitants, its meaning to them, whereas urban image is more about the perception of a place from external point of view.

A number of studies supports the direct correlation between place identity and the identity of its citizens (Verhaar, 2012; Arbak (Erdem), 2005; Lynch, 1984; Proshansky, 1995; Eldemery, 2009; Kaymaz, 2013). The sense of "belongingness" is emphasised as a key component, involved in building the character of a place, alongside socio-economical and political factors. Those statements lead to a conclusion that when the inhabitants and their identity change, the cities they live in change as well. But, as it requires major historical events, technological advancements, and/or natural phenomena, this process could oftentimes take generations to fully occur and have any visible impact. Considering the above, it could be said that urban identity has a rather static nature, changing only ever-so-slightly. Additionally, it is somewhat objective, as its set characteristics are objective - urban texture, inhabitants, historical development, etc.

Concurrently, the urban image, being an outcome of each individual's perception, and based on memory, is quite subjective - each observer, no matter local or a visitor, creates their own image depending on their personal experiences, abilities, senses (Walczak, 2015). With this in mind, it becomes evident, that the image is relatively dynamic, and could experience changes more rapidly over shorter period of time. Urban image is usually used for marketing purposes in order to attract investors, tourists, even new residents, which means cities are competing to develop as attractive representation as possible (Walczak, 2015). Oftentimes labels, selling an initial perception of the place, are used with pride - Lodz is described as "the Manchester of Poland", Aveiro as "the Venice of Portugal", Ruse as "the Vienna of Bulgaria", etc. - references intended on playing on the senses of the familiar. Even though such branding is essentially successful in making a city more appealing, it simultaneously might act as a suppressing mechanism to the unique urban identity. Afterall, a copy is never as valuable as the original. At the same time, each new

investment in turn alters the image. Huge projects, such as flagship buildings, are the most influential, seeing as their fundamental purpose is improving the urban image. In some cases, such as in Bilbao's Guggenheim, they could result in complete transformation of the urban identity as well. Renovation and revitalisation projects are also used as "image boosters", and more often than not strengthening the urban identity as well.

Taking all of the above into account, it could be concluded that changes in the urban image often do not directly contribute to change in the urban identity, but rather lead to a shift towards its loss or enhancement.

Globalisation's Impact on Identity

Less developed countries have always looked up and strived to resemble the more developed ones. In the context of Europe, for the past several centuries, the West has been considered a trend-setter, and the East has been constantly trying to catch up. Additionally, the end of the 20th century has been marked as a transition period for many of the Eastern European states, during which they had to systematically redefine both their identity and image. With the shift of the political and economical systems, along came a transformation into the architecture as well - firstly the renunciation of everything from the former communist regime, and then the importation and adaptation of new forms and functions - private office buildings, big shopping centers, reconsidering the residential districts as well as recreational areas - resorts, holiday villages, etc. The period marks the first private architectural practices in those countries, meaning architects were given the complete freedom to design anything they wanted. The borders to the West were opened, and references to the capitalist architecture started to find their way to the Eastern states.

The construction boom in the early 2000s brought with itself new investors, who were interested in quantity rather than quality, and the aesthetics were either unimportant, or reduced to "to look like building X" - oftentimes example from a fancy magazine, completely out of context. The architectural community in countries such as Bulgaria, fell under the trap of the "copy-paste culture", oftentimes implementing cheap adaptations of projects, with little to none regard to context, in order to satisfy the investor's demands. During that period, well planned vacation resorts became concrete jungles (fig.2), whole districts with single-family houses were rebuild with multi-storey residential buildings, thus completely transforming the identity of the places, usually involving remorseless destruction of valuable building structures.



Figure 2. Bulgarian resort Slanchev Bryag (Sunny Beach) 1990s (left) and 2010s (right)
source: http://socbg.com

Nowadays, with the rapid evolution of technologies, and the more strict authorship laws and policies, such practices are very much frowned upon. Nonetheless, with globalisation in play, and the new generation of architects having more of a "global state of mind", the contemporary architecture projects are greatly influenced by international trends. Office districts, technological parks, closed residential communities - all of these incorporating a certain set of characteristics with basically no variations when it comes to location or context. Undeniably, the quality of the newly emerging buildings has improved drastically, but, despite that, their contextuality is reduced to the regulations requirements such as height, density, greenery, which in practice results in a good piece of architecture, which could be located anywhere (fig.3 i 4)



Figure 3. Cinnamon Tower /Bolles + Wilson/, Hamburg, Germany (left) and Red Apple Apartment Building /Aedes Sstudio/, Sofia, Bulgaria *sources: ArchDaily (Christian Richters (left) and Aedes Studio (right))*



Figure 4. Residential buildings – The Maze Apartments /CHT Architects/, Richmond VIC, Australia (left) and Labyrınth Resıdentıal Complex /STARH Svetoslav Stanislavov/, Varna, Bulgaria (right)
sources: ArchDaily (Christine Francis), http://www.buildingoftheyear.bg

In addition, in the past decade, major international construction corporations have established their presence in former communist states like Poland, Czech Republic, Hungary, and have been erecting akin looking buildings, similar to ones previously built in Scandinavian and Western-European countries (fig.5). Such structures undoubtedly have improved the image of the city, but at the same time are leading to an urban identity loss, as it is becoming harder to distinguish one city from another by its architecture. Even when it comes to revitalisation projects, the practices are following a number of pre-set rules, which leads to basically the same results - the former harbour areas of major on the coast of the Baltic sea are (being) refurbished as creative districts with residential parks, regardless of country, socio-economic peculiarities, and if it is financially viable. Once more, even though such projects solve certain urban issues, like urban voids and brownfields, and inevitably improve the perception and image of a city, they rather lead to loss of identity of that particular place.



Figure 5. Malmö Live /Skanska and schmidt/hammer/lassen k/s/, Malmö, Sweden (left) and Nowa Fabryczna Office Building /Skanska/, Łódź, Poland (right)
sources: Wikipedia (left) and https://www.skanska.pl (right)

Conclusion

Globalisation affects almost every aspect of the contemporary way of living, providing various opportunities such as travelling, experiencing different cultures,

taking inspirations. Each new experience adds or changes the needs and values of a person, all coming down to the phenomena of the "global man". The Internet, and the near-effortless exchange of information has enforced the transformation from local to global way of thinking in the past couple of decades, both in the architectural community, as well as in the rest of the population. And with the change in the inhabitants, comes the change in the urban identity. The global man requires a global city, hence the identity of the city slowly begins to evolve - world-renown chain-stores, exotic cuisine restaurants, international-brand coffee houses appear everywhere. Regardless of the undeniably positive impact on the socio-economic aspect, the globalisation process has been merciless on the urban identity. The dream of the modernist architects - the International style, once intended on purpose, have become the reality of contemporary architecture by coincidence.

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THE AESTHETICIZATION OF YUGOSLAV ARCHITECTURE THROUGH STRUCTURALIST ANALYSIS OF FORM-MEANING RELATIONSHIP

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Abstract

This paper addresses the aestheticization of Yugoslav architecture through the implementation of structuralist form that took place between the early 1950s and the late 1970s, and calls attention to the need for contemplating the relationship between formal and intrinsic elements in architecture. An important component of the interest for the formal issues of architecture was to make a distance from functionalistic philosophy, which led to novel understanding of form and to the aestheticization of architecture. Structuralist aesthetics, which was accepted in the 1950s, changed the concept of form for the concept of structure, and focused on the elucidation of internal construction and organization. With reference to structuralist theoretic-methodological approach, an aspiration of Yugoslav architects for achieving inter-relationship between physical and semiotic structure via invisible laws that define and form elements of structure is pointed out. Different aspects of aesthetics of Yugoslav architecture reflected in various approaches for accepting the formal principles: the recognition of constructive aesthetics and importance of integration of constructive and formal elements of an organic entity, the interest in relations between the elements of architectural system, the idea of fluid space, and the evolutionary growth, development and transformation. This paper starts from the premise that the aspiration for aestheticization of architectural form through articulation of the unity of elements promoted Yugoslav architecture to build a connection between formal structure of an object and the meaning of its structural elements.

Introduction

The theme of aestheticization emerged in Yugoslav architecture in mid-1950s through the critics of functionalism, which questioned the value of function over aesthetic form. In the early 1950s, a tendency to oppose modernistic functionalism

and to promote a more formal and semiotic approach in architectural theory and practice, promoting. Structuralist concepts spread all over the world under the influence of Aldo van Eyck and Team X, which rejected functionalism doctrine in urbanism. Structuralism represents the most important avant-garde movement in the 1950s and developed as a reaction to CIAM's functionalism. The development of new approaches in architecture in that period was aimed at abandoning functionalist paradigm and turning to formal aspects and physical interrelations between architectural elements, which found theoretical background in structuralism. Michael Hays pointed out that architecture 'tried' to resolve the search for meaning by applying structuralist projections of the system of formal elements and rules of combinations and transformations that were analogous to rhetorical formations in the language (Hays, 2010). The central issue of structuralist approach is related to the connection between physical and semiotic (meaning-related) structure, i.e. to invisible laws that define and form the elements of structure. In contrast to the common formalistic approach, the form in structuralism is interrelated with the content. Lévi-Strauss noted that structuralism does not oppose the abstract and the structure is not separated from the content which is realized through the logical organization as the quality of reality (Levi-Stros, 2012). Pertinent to this, the initial concepts of structuralist form in Yugoslav architecture have been developed by pointing out the importance of integration of constructive and formal elements and by creating the organic whole. Different approaches in the application of formal aspects could be observed in the anesthetization of architecture in Yugoslavia in the early 1950s: application of constructive aesthetics, exploration of relations between elements in architectural compositions, the idea of articulation of architectural form through smaller structures, the idea of evolutionary growth, development and transformation, and the concept of brutalist form.

The constructive aesthetics

In the early 1950s, the progress in construction engineering facilitated an aesthetic approach in architecture. The breakthrough of new constructions in architecture enabled the incorporation of both, an improved technical component and 'emotional' need for aesthetical shaping. Pier Luigi Nervi, an engineer and architect, noted that without the interconnection between aesthetics, statics and techniques that were present in the past, there could be no architectural achievements and that 'only together those three spirits can create the true architecture' (Nervi, P.L., 1962). Pertinent to this, the first concepts addressing structuralist form emerged in Yugoslav architecture through the recognition of the importance of integration of constructive and formal elements and creation of the organic whole. In the article entitled 'Structuralism' that was published in 1960, Nikola Dobrović expressed enthusiasm for the aesthetics of constructivism as an integration of constructivist concepts and aesthetic and shaped forms. He pointed out that, in comparison to structuralism, previous constructivism was of relevance only as a program with defined aim to equalize architecture with construction, even if the latter is of poor value (Dobrović,1960, pp.20-21). In regard to this, the artistic approach to constructivist aesthetics represents a synthesis that should deliver new forms and constructions – 'Because of close relationships between technical and aesthetic qualities of an artwork, only impeccable structure can deliver architecture

with character' (Dobrović,1960, pp.21).

Belgrade Fair was one of the first works that were based on the principles of constructive aesthetics (1953-1957). Milorad Pantović applied original domal shape structures to construct fair halls and bring off an organic balance of form through a coherent composition of different elements of structure. In the Belgrade Fair project, Pantović renounced stiff orthogonal shapes and created round forms that are incorporated into the surroundings. The largest hall in Belgrade Fair complex – Hall I, was a constructive and technological experiment of engineer Branko Žeželj. The construction was made of pre-stressed concrete ribbed arches that were connected into a monolithic structure, with a 106 meters span, which was the largest in the world at that time. Two smaller halls – Hall II and Hall III were designed as thin shell pre-stressed concrete structures (only 9 cm thick). Uroš Martinović noted that the halls of Belgrade Fair represent the first urban super-structure in Yugoslavia (Martinović, 1978, p. 122). An articulation of structural elements in the framework of round forms is also present in the project of Ivan Štraus - Aeronautical Museum in Belgrade (1969). Štraus creates a new aesthetics through the sculptural treatment of the object, which is based on the unity of technical and aesthetic postulates: 'Rational and sensible at the same time, he proves the existence of new contemporary aesthetics, the aesthetics of mechanical design, through forthright materials, clear constructive ideas, and visual beauty of form that is both, functional and rhetorical (Kurto, 1986).



Figure 1. Belgrade Fair (1953-1957), Milorad Pantović. Taken from http://beogradskonasledje.rs/kd/zavod/savski_venac/hala_1_beogradskog_sajma.html

One lineage of experiments in the 1960s introduced umbrella-like structures into the Yugoslav architecture. The first structures in that form have been projected by Feliks Kandela in 1952. Kandela criticized functionalistic views that 'function makes an organ' and that 'form follows the function', and emphasized that the

creation of new forms can be achieved only through structure and structuralist solutions. Dobrović noted that 'the new constructive possibilities of reinforced concrete promote gradual metamorphosis of new aesthetics' (Dobrović, 1960, p.11). In Station House Kosovo Polje project (1964), Nikola Dobrović developed the structure by implementing the basic constructive element that resembles an up-side-down umbrella (Mitrović, 1967, pp.34-35). Within the research project entitled 'The development of standardized design and prototypes of family house, with the full application of synthetic materials from domestic production', Jurij Neidhardt worked on the development of serial residences from prefabricated elements made from synthetic materials (Neidhardt, 1966, p.7). Neidhardt stressed out that such approach in architecture brings a brand-new type of form that resembles the modelling of car body. Neidhardt developed 'modular architecture' by assembling several units under one roof and by further organization of such structures within the residential area.

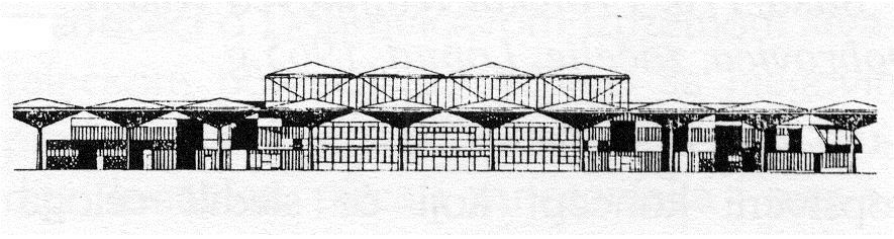


Figure 2. Project Station House Kosovo Polje (1964), Nikola Dobrović. Taken from (Vukotić Lazar, M. 2002, p. 123)

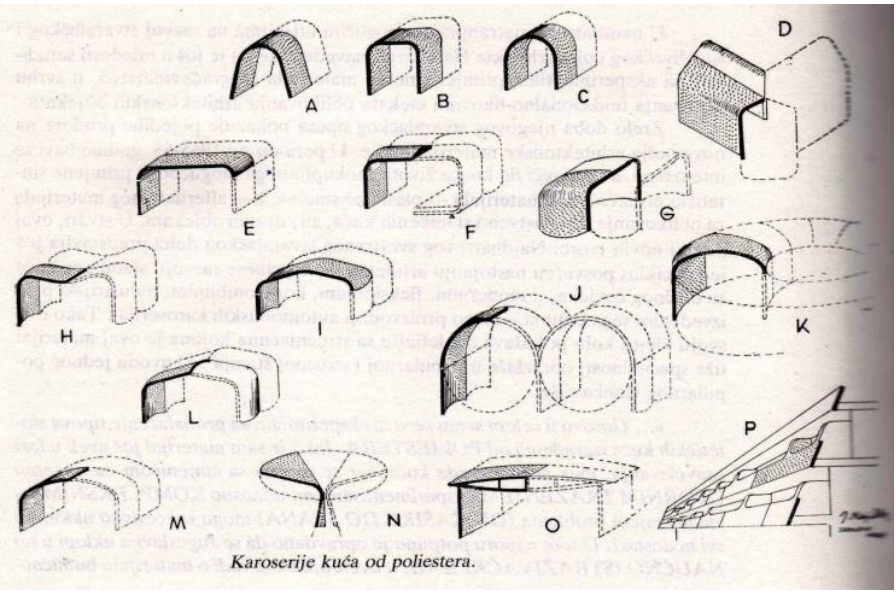


Figure 3. 'The development of standardized design and prototypes of family house, with the full application of synthetic materials from domestic production' (1966), Jurij Neidhardt. Taken from (Karlić – Kapetnović, J. 1990, p. 238)

The articulation of architectural form through smaller units

Yugoslav architecture implemented a formal structuralist approach which promoted the articulation of smaller units within architectural composition. This had an impact on the perception of anesthetization of architectural forms and promoted the development of more humane living environments, which was in contrast to the previous functionalistic approach. Arnulf Lüchinger acknowledged the time as an important formative factor (the fourth factor), and pointed out that growth, coherence and transformation represent the main principles of structuralism in architecture (Lüchinger, 1981, p.43). The articulation of architectural form through smaller units was aimed to make architecture more comprehensible to people. According to Hertzberg, the structures may become large only through a multitude of smaller units, because any excess provokes repulsion (Hetzberg, 1977, p. 27). The project for Museum of Contemporary Art in Belgrade (1961) by Ivan Antić and Ivanka Raspopović was conceived as a series of crystal forms that can be multiplied if needed. Through aesthetic constructive forms, the object gained a complex crystalloid structure which is composed of orthogonal, clear-cut, cubic bodies. The spatial coordination is generated by the shearing of two rectangular planes, the intersection of vertical slopes, and cascade organization of horizontal planes in the interior groups of exhibition units. The main value of Museum of Contemporary Art lays in 'the crystal forms that can be functionally multiplied' (Manević, 2008, p. 9). Ivan Antić and Ivanka Raspopović implemented the concept of growth also in the project Museum '21st October' in Kragujevac (1968-1975). The project is based on a three-dimensional module 3×3×3 m, which is multiplied to generate all elements of Museum. The form of the object abides to the principle of three-dimensional grid, which is developed as irregular series of vertical cubic forms of different heights from 4.5 m to 21.5 m. The object is placed into geometrically organized space, which is put, together with the abstract memorial content, into an abstract context of realistic continuum (Anonym, 1965, p. 39).



Figure 4. Project Museum '21st October' in Kragujevac (1968-1975), Ivan Antić and Ivanka Raspopović. Taken from: https://sr.wikipedia.org/wiki/Спомен-музеј_"21._октобар"_Крагујевац

In the design concept for Youth Centre 'Sedam Sekretara SKOJ-a' (1966), Andrija Mutnjaković explored experimental and avant-garde features of architecture that could properly represent the memorial for the fallen young communist leaders. The synthesis in Mutnjaković's project relied on contemporary exploration of the phenomenon of shaping the volume, pointing out the problem of formalism and artificiality (Mutnjaković, 1982, p.89). Mutnjaković projected structural shape by adding volume and created dynamics through wavy growth of forms. The object contains 500 units, and the construction could begin with any of these units and may encompass any number of units: 'Structural agglomeration does not have composition elements. It represents a complete structure in any stage of construction, which means that the object can be built in many phases, in accordance with economic capacities of the society' (Mutnjaković, 1982, p.89).

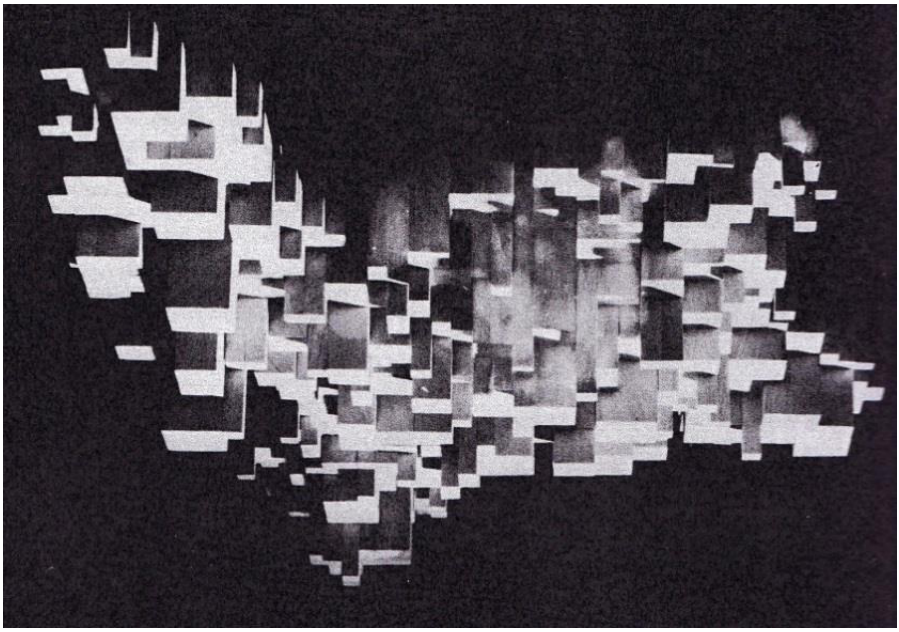


Figure 5. Design concept for Youth Centre 'Sedam Sekretara SKOJ-a' (1966), Andrija Mutnjaković. Taken from (Mutnjaković, 1982, p. 94)

The exploration of interrelations between elements in architectural structure

Structuralist experiments focused on interrelations between elements of the whole that function and are organized and formed by invisible laws. Architect Vjenceslav Richter addressed the theme of such interrelations: 'Contemporary spatial expression represents materialization of the most eminent spiritual ideals, which are reflected in new order and relations that are recognized here as well abroad' (Rihter, 1964, p. 16). Richter explored the laws of organization of sculptural elements in architecture and introduced aesthetical and logical visual experiment in the field of spatial geometry. Richter pointed out that large complex forms can be conceived in a way so that spatial and formal relations result in a harmonic synthesis of all nominal units. The starting point of Richter's formal explorations were models of systematic forms that used sphere and cube, curved and flat surfaces, circle and

square, and observation and postulation of relations between these elements to produce new spatial structures. One example of Richter's work is an experimental model named *Reljefometar* (1964), which is based on the design of mobile prefabricated orthogonal units. Since the number of formal relations between mobile elements is unlimited, *Reljefometar* represents an open system with unpredictable and immense combinatory potential (Horvat-Pintarić, 1970, p. 15). System theory, which explored the relations between units and the whole, and the derivation of meaning, i.e. the manifestation of creative imagination through the interactions of elements and principles, enabled Richter to develop projects with solutions for the synthesis of human environment - *sinturbanism* (1964). Sinturbanistic city is composed of variations and multiplications of same elements, whereas a diversity is accomplished by the presence and composition of the system. This approach overcame the absence of system in contemporary heterogeneous agglomerations and urbanistic monotony, achieving urban intimacy of Mediterranean cities. In the project 'Catering School' in Dubrovnik (1962), Richter applied the style of ancient builders, who established objects on slopes (Anonym, 1961, p. 5). By disintegration of spatial mass, Richter showed that visual surroundings can be shaped by simple means and dynamic change of spatial intervals, which forms a synthesis of ambient.

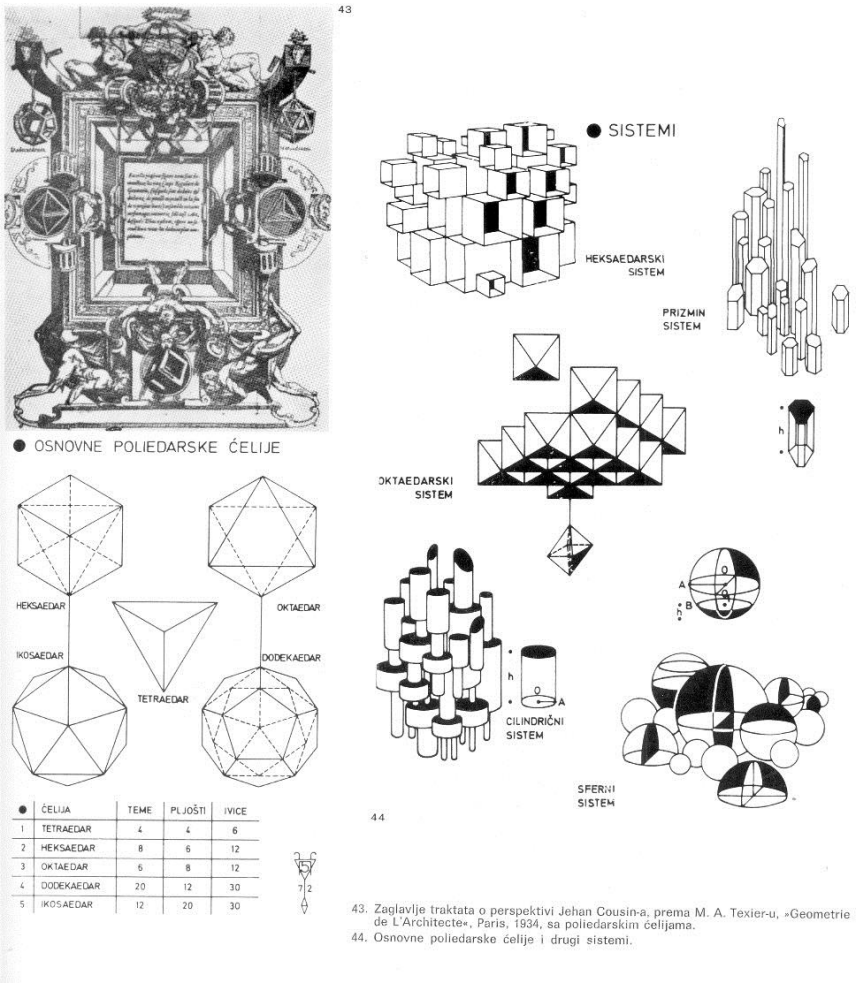


Figure 6. Project 'Catering School' in Dubrovnik (1962), Vjenceslav Richter. Taken from (Horvat-Pintarić, 1970)

Djordje Petrović presented visual explorations of structuralist form and the experiments of interior of structures through perception of relations between units of space in monograph 'Visual Research of Human Environment and Urban Design' (1972). Petrović brought together visual exploration and different optical structures that facilitate the development of creative capacities in the organization of visual experience, the originality of individual expression, and three-dimensional experience which enables the perception of environment, analysis, organization, and synthesis of architectural space. Petrović conducted visual experiments in the courses at the Faculty of Architecture in Belgrade, exploring interrelations between elements – 'cells' of the model, convergence, support, contact, overlap,

and structural aspects of the system. He started the organization of the system with transparent or non-transparent material elements and further explored new spatial qualities of dimensions, relations and optical experiences through confrontations of surfaces of the elements. Alterations of visual impressions were developed by light and shadow, the illusion of vibration of space. New forms are built by 'cell' moving, whereas rotation is used to transform initial composition of 'cells' into new systems. This opened new unpredictable possibilities for combining the cells of the system into groups.

By accepting structuralist concept, the perception of architecture is placed into a context of the structure that provides an insight of interrelations between elements (Lüchinger, 1981, p. 16). The elements are constant, whereas the changeability of structure is enabled by interrelations between elements. According to Hertzberg, the structure represents harmony and unity: 'It is the way the elements function or connect' (Hertzberger, 2015, p. 32). Aleksej Brkić (1978, 1979) examined the theme of architectural form as logical system in the series of texts 'The Inversion of Dialectics of Form' in *Izgradnja journal* (1978-1979). He pointed out that 'the architecture is real as much as it represents a logical framework or system' (Brkić, 1978). According to Brkić, the form as presentation and architecture does not contain absolute norms or ideals. It is a product of specific logic or social reflection of a certain truth that is derived from previous, inter-dependant truths (Brkić, 1978). The design has dual role in human survival – real, as an object of physical relevance, and abstract as an object with specific statement. In the project of business building 'Invest-Import' (also known as Hempro building; 1953), Brkić diverged from functionalistic schemes and opted for 'actual' multi-layered architecture to promote the frequency of events in the system. He was one of the protagonists of intellectual avant-garde that showed a resistance to traditional construction and orthodox functionalism (Manević, 2008, p. 58). His inspiration was the rhythm of streets in faraway lands, 'where the architecture was born'. He wrote: 'Closely packed buildings, intersections of walls, sudden breaches, sun in the zenith, sun on the horizon, playful colours, and bottomless infernal shadows, all kinds of movements and crossings, created a magnificent theatre from events in the streets. (Brkić, 1992, p. 147)"



●	ĆELIJA	TEME	PLJOŠTI	IVICE
1	TETRAEDAR	4	4	6
2	HEKSAEDAR	8	6	12
3	OKTAEDAR	6	8	12
4	DODEKAEDAR	20	12	30
5	IKOSAEDAR	12	20	30

43. Zaglavlje traktata o perspektivi Jehan Cousin-a, prema M. A. Texier-u, »Geometrie de L'Architecte«, Paris, 1934, sa poliedarskim ćelijama.
44. Osnovne poliedarske ćelije i drugi sistemi.

Figure 7. Basics of Polyhedron cells and other systems of Đorđe Petrović. Taken from (Petrović, 1972, p. 41)

Brutalist form

Brutalism was developed in the late 1950s. It was characterized by the use of 'raw' concrete ('beton brut' in French), which emphasized the aesthetics of form of the object. Team X generated two different movements – new brutalism, which was developed by English members with Alison and Peter Smithson being the most prominent figures, and structuralism, which was developed by Dutch members with Aldo van Eyck and Jacob Bakema as leaders. Although both movements originate form Team X and the critique of functionalism, they differ in material processing and the organization of function. New brutalism emphasized the authentic aesthetics of raw materials with their overt natural structure. With the unveiling of 'the truth of materials', concrete, which was previously a constructive material with no aesthetic effects, became an element of decorative and visual expression. Concrete was casted using a rough wooden formwork with the aim to produce

an effective and interesting appearance. Rich plastic and sculptural expression of monolithic brutalist buildings accentuate content and function as well as the form of the object. Brutalist structures are formed by the repetition of modular elements that are grouped in specific functional zones making one complex, which makes the concept of the object comprehensible.

Many projects of Yugoslav architects in the late 1960s and early 1970s showed elements of brutalism. The works of Mihajlo Mitrović from that period contain two architectural concepts – new brutalism and critical aesthetics (Perović, 2003, p. 183). In the project of Hotel 'Putnik' in New Belgrade (1970-1971), Mitrović applied raw, unfurnished concrete, cylindrical and cubic forms, and a combination of horizontal and vertical fragments of facade, to generate structural composition of 'megalithic contours' (Kadiljević and Mitrović, 1999, p. 68). He also used the sculptural approach, rough materials, and brutalist principles for the project 'Geneks Towers' in New Belgrade (1980). Inspired by contemporary Japanese architecture, Mitrović designed residential and business towers that are connected via attic stories. This project was presented at the exhibition of brutalism in Wien in 2008 (Mitrović, 2012, p. 128).



Figure 8. project 'Geneks Towers' in New Belgrade (1980), Mihajlo Mitrović. Taken from (Kadiljević and Mitrović, 1999, p. 73)

Institute of Urbanism that was designed by Branslav Jovin and built in the centre of Belgrade in 1970, represented 'a reflection of recent brutalist experiments in the world' (Ignjatović, 2012, p. 701). In the project 'Residential Block in Red Army Boulevard' (1971-1974), Stojan Maksimović developed a scattered structure of the object. According to Manević: 'The combination of concrete, as the constructive element, and bricks, as facade panel, reflects Maksimović's style, adopted credo, the principle of organic sythesis of differet constructive methods, function and elements of visual art (Manević, 2008, p. 247). In the project Electric Substation 'Filmski grad' (1977-1979), Aleksandar Djokić formed a compositions of elements of circle, cylinder and arch, merging them into playful scattered brutalist form (Kadijević, 2013, p. 110).

Conclusions

Structuralist approach performed a radical critique of functionalism through explorations of relations between elements and of universal laws of social and cultural structures. Structuralism also criticized formalism which emphasized a structural approach to architectural form but was limited to the manifestation of form not going into deeper comprehension of relations between elements. Structuralist approach insisted on the liberation of architecture from the elements of formalism, and promoted new freedom of interrelations through temporal transformation of architectural form and adaptation and flexibility through the addition, subtraction and alteration of shapes. The critical approach of the members of structuralism movement promoted the change of functionalistic principles and values in Yugoslav culture of high modernism. In that context, a new contemplative system, which was oriented to formal and semiotic approach, was established. In the early 1950s, Yugoslav architecture showed a progress in engineering construction, which enabled the creation of balance between aesthetic forms and constructive foundations of objects. At the same time, regarding the development of concept of time/duration as a generic factor, themes of growth, development and evolution, as well as semiotic approach that reflected in the importance of interrelations between elements of the system, were introduced into architecture. The aspiration for anesthetization of architectural forms through articulation of harmony of elements influenced the development of connections between formal structure and the meaning of structural elements in Yugoslav architecture.

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ARCHITECTURE AS AN ARTILGET OF GENTRIFICATION, TOURISM, TERTIZERING AND DISPLACEMENT IN CITIES OF LATIN AMERICA

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ABSTRACT

Cities today, as a reflection of social dynamics have been subject to processes of complex root, ranging from gentrification, turistification, tertiarization have in common are manifestations of power, specifically economic.

Far from a genuine social concern, some cities in Latin America in recent years have encouraged interventions of an economic nature with arguments to reinvent and benefit their inhabitants, while paradoxically these are displaced and replaced by the powerful class.

The objective of this work is to analyze the intervention of urban planners and architects, who have paid little attention to the social implications of these practices, being unwitting participants in displacement and dispossession.

As an argument, three Latin American cases of urban interventions are deconstructed:

A. Santa Fe, in Mexico City, old mines and garbage dumps inhabited by the humble class, which will later be expelled to convert that space into one of the most exclusive shopping areas in the whole country.

B. Puerto Madero, in Buenos Aires, Argentina, a space whose economic activity typical of a port had decayed a few decades ago, so it intervenes to rescue it, at the cost of discouraging the original activities and reconfiguring the space as a privileged area where restaurants and exclusive shops converge.

C. Las Peñas in Guayaquil, where the urban regeneration project, is erasing the prominence of historic spaces such as Las Peñas and Santa Ana, places that saw the city emerge, to interpose a recreated space without the consideration of the inhabitants. from the city.

It is concluded that, under a practice derived from sustainable principles (reuse and rescue), urban spaces have been intervened producing veiled evictions and generating speculation, in which the social and anthropological role of the "place" creator has transformed into a builder of scenographies that meet economic and status requirements.

INTRODUCTION

This work focuses on the role that urban planners and architects have developed, in the simulated displacement processes, carried out through urban practices, which argue the interest to regenerate, conserve or reactivate spaces of the city but whose undeniable consequence it is the generation of socially displaced people.

This study starts from the origin of the urban proposals that accompany the postindustrial process in cities, a phenomenon that is reflected in the return of privileged social classes to previously abandoned spaces (such as the center of cities or residual spaces that are suddenly reconfigured to manipulate the surplus value) where the beneficiaries are the investors and businessmen themselves, resulting in the expulsion and displacement of the original inhabitants who return again to a situation of increasingly marked marginalization.

Result of neoliberal interventions, which are expanding globally, this study analyzes three cases of urban interventions in Latin America, in which the displacement always coincides with the most vulnerable social class, emphasizing with this the great distance that separates wealth from poverty.

The three cases are located in emerging countries: Mexico, Argentina and Ecuador, which despite their geographical distance have become reproducers of arguments where economic power privileges any of the principles that should regulate human settlements.

A SOCIAL RE-FOCUS OF URBAN PLANNING CONCEPTS

The city has historically been a phenomenon studied under functional, formal but scarcely anthropological approaches. Its configuration has been defined by more economic and political than functional issues. The spheres of power have delineated urban phenomena, an effect that is seen historically in pre-industrial, industrial as well as post-industrial cities.

The pre-industrial city, confined around natural elements such as water, fertile land, etc. they generated surplus value in the downtown land, so the powerful classes settled around the center building great palaces and residences, where the religious, political and economic powers also resided, displacing the humble class to the periphery.

For its part, the industrial city caused the deterioration of the center of the population, so that before the urban chaos, bourgeois classes flee to the suburbs, transferring the dynamics of the better-off population to the periphery, which increased the deterioration of the center, both because of the overcrowding phenomena of the poor people who reside in the old palaces (today neighborhoods)

and because of the lack of conservation of the old buildings and with evident lack of maintenance.

The postindustrial city, saw reverse the phenomenon, because before the postmodern wave of an ideology based on the revaluation of the old, as a synonym of identity and belonging, the interest of the powerful classes returns to the center, which claims and reinvents, seizing now of this space where restaurants, bars, shops, etc. appear for high-level users, once again moving the lower class to residual spaces in the city.

NEOLIBERALISM AND DISPLACEMENT

We understand by neoliberalism a program of economic policies of global dimension, that favors the interests of the most powerful economic groups and, with it, causes the rupture between the economy and social realities. This global phenomenon that shapes the last decades of the 20th century and the beginning of the 21st century is characterized by the globalization of financial markets, the progress of information techniques, ensures the mobility of capital and offers great short-term profitability (Bordieu, 1997).

This is due to the relatively recent processes of proliferation, under the scheme of urban reorganization and economic reactivation in neighborhoods and towns that are intervened as urban income production strategy: "the displacements not only appear for urban renewal in the form of expulsions of the neighborhood for a specific project, but because of the need for financial capital to renovate the neighborhoods "(Vives Miró & Rullan, 2017), which accentuates the generation of new urban geographies that exacerbate the unequal through these new appropriation mechanisms of urban income, giving rise to a phenomenon that today we can describe as gentrification, turistification and tertiarization.

GENTRIFICATION

Gentrification is a gentry term that refers to bourgeois society with a high purchasing power, which is capable of causing changes in the urban configuration. This is not new, as noted above, but its evidence is based on a simulated interest in values such as "appreciation for the historical" or a praiseworthy sustainable position that forces the conscious user to "reuse" objects, including buildings.

In this regard, the defenders of gentrification say that this process seeks to lead a people to a better status, a way of economic reactivation, but they do not clarify who are the true beneficiaries of this reactivation. The same happens after pointing out that it is preferable to reuse old buildings, on the one hand as a way to preserve the history of a city, and on the other, it is ideal to reuse a building that build a new one, for the ecological footprint that the construction generates.



Image 1 Reuse of a colonial house, now converted into Boutique hotel in Morelia, Mexico (Solano, 2018)

What is certain is that after this veiled sustainable consciousness, gentrification supports economic interests, since it seeks to increase the cost in these properties, while displacing the original settlers, generally poor and giving rise to the return of classes accommodated to whom these exclusive spaces are destined.

TOURISTIFICATION

Turistification on the other hand, refers to the orientation given to an urban space to become an area of interest for tourists, providing services, facilities and equipment designed more in the interests of tourists, than in the original residents who live in them permanently.



Image 2 Use of old palaces now converted into restaurants around St. Mark's Square, Venice (Solano, 2018)

An example of turistification in Mexico, is a program promoted in 2001 by the Government of Mexico, called "Magic Towns" developed by the Ministry of Tourism in recognition of the cultural wealth of a people, related to traditions, historical places and the legacy of the place. Interestingly, although originally sought to boost the economy of the people, the real economic benefits fall on investors: restaurateurs, designers, etc. that, without being original settlers, they emphasize the failure of the original intention. Again the practice excudes the original inhabitants to favor the interests of privileged social classes.

Regarding Fernandez Poncela says:

"The Program has also brought political conflicts, social exclusion of sectors and social actors, concentration of benefits in old and new elites of political and economic power and their social networks in their regions of influence, Increase in real estate value and consumer prices. ... The population has not been informed, called or consulted, often directly marginalized "(Fernández Poncela, 2016, p.28).

In general, the magical towns have now fallen into formats approved for globalization: in all of them are the same restaurant chains, the same craft shops, the same experiences are offered, and what originally sought to reinforce the identity, it is sadly becoming a generic show.



Image 3 Tepoztlán, Morelos, example of "magical town" program promoted by the Mexican government to boost tourism (Solano, 2018)

TERTIARIZATION

Another economic phenomenon that affects the urban space is tertiarization. Originally conceived as a recrudescence of tertiary economic activities (services) over primary (extraction) and secondary (industrialization), in our field of study translates into the replacement of living spaces (housing) by commercial (commercial plazas, bars , restaurants, bookstores, etc.) generally with a tourist focus. This progressive mixture of tertiarization and turistification of the territories has changed the configuration and uses of public spaces, presenting as a common phenomenon the invasion of them to accentuate commercial activity, under the halo of social spaces. With this machinery it also becomes an ambiguous discourse of public and social space, which becomes a space with an economic bias**.**



Image 4 Invasion of public space with restaurants in the Historic Center of Tlaxcala, Tlaxcala (Solano, 2018)

ANALYSIS OF URBAN INTERVENTIONS IN LATIN AMERICA

Outsiders to a true intension of social nature, some cities in Latin America in recent years, have led gentrification interventions, tertiarization and turistification, with veiled economic interests supported by arguments of reincentivation and benefit for its inhabitants, while paradoxically these are displaced and replaced by the powerful class.

As a basis for this argument, three Latin American cases of urban interventions of the last decades are analyzed, a result of this neliberal approach that floods recent urban interventions. These analyzed cases are located in three different contexts:

Santa Fe, Ciudad de México

Santa Fe is an area located to the west of Mexico City, whose impressive development is relatively new. Today it is one of the most important financial and corporate centers of the country. This region, until before 1982, the year in which its urban regeneration began, was a space for very low-income residents: destitute and pepenadores who lived in what would have been sand mines and garbage dumps in the city, as well as popular colonies and ancient towns located in its surroundings as San Mateo and Santa Rosa (Ciudad Futura, 2013).

The original urban development intervention project dates back to the 70's of the 20th century. This project aimed to retake the area to build an industrial area with the intention of providing sources of work for the inhabitants of the area, at the time was also proposed to be the headquarters of the Center for Social Readaptation Poniente "CERESO." A decade later, After the expropriation carried out by the government of Mexico City in 1984 (EFE Agency, 2017), almost all garbage dumps had been eliminated and the city was evicted "that had emerged there and that was known like the "Viñita".



Image 5 Photograph of what was an irregular settlement called "La Viñita", populated by homeless and pepenadores until before the 1970s. (Taken from https://www.trendsmap.com/twitter/tweet/1054381086090952705)

The great trigger was the transfer of the Ibero-American University (institution of great renown, directed to an economically privileged class) that suffered serious damages after an earthquake at the end of the 70's. This fact would cause the change of industrial zone to residential zone for the type of people that demanded the services of that private university. propitiating what would later be the most important post-industrial city example in recent years.

The urban transformation apparatus began with an unjust purchase of lands and the expropriation of others driven by a regulatory instrument called the Special Controlled Development Zone (ZEDEC) through which, arbitrarily and with obvious economic interests, they were modified land uses as well as densities (Ramirez, 2012). The original inhabitants were displaced and 50 hectares were given to them to build houses in the village of Jalalpa, where they relocated the native families.



Image 6 Village of Jalalpa, space to which the original inhabitants of Santa Fe were confined (Taken from https://www.imagenesmi.com/im%C3%A1genes/col-jalalpa-santa-fe-mexico-city-cf. html)

Also, to build the Santa Fe Shopping Center, the inhabitants of the area known as La Romita were evicted and other irregular settlements were removed, which they accommodated in San José, Cuajimalpa.

The historian Maria de Jesus Diaz (Ramirez, 2012) states that "Many lost more than half of their heritage and others affected them in a few meters, made them believe that they were going to pay and did not comply. After they were told that they had not signed a donation, they were deceived, it was an arbitrary extension because they were not notified in time, they closed the two ends of the road, at the beginning and end of the town and started throwing with There were people who did not have time to get their things out, many of their personal papers were buried in the mud "perpetrating one of the most impunity events of urban interventions in recent times.

Today, this complex is configured by a large number of skyscrapers, corporate and hotels. It houses modern shopping centers, top-level universities, entertainment centers, restaurants, etc. that have joined the presence of large companies that compete to hire firm architects as a way to hold power. In this way, architects such as Agustín Hernández, Ricardo Legorreta, Rafael Mijares, Sordo Madaleno and José Moyao, among other Mexican architecture detachments, have contributed consciously or unconsciously to the processes of exclusion and displacement described here.





Images 7 and 8 Current photographs of the Santa Fe area, Mexico. The cost of this urban intervention of great value was the displacement of its original inhabitants, who did not benefit from the urban intervention (Solano, 2010 and 2012).

The urban development of Santa Fe, congruent to its neoliberal roots, has suppressed the interference of the collectives, since the government has not been the main promoter, but has given its role to private initiative. For its development, practices were carried out such as the exchange of urban land by the government, in exchange for infrastructure carried out by entrepreneurs, giving rise to the speculation of space, since the land was revalued for the benefit of the investors themselves. In this context, the urban planning of Santa Fe has been characterized as a homogeneous space of exclusivity and exclusion, which moves away from the notion of making a city. The idea of the city as a friendly environment, of coexistence and relationship has been replaced by that of a space where fragmentation and

social segregation prevail (Solano Meneses, et al., 2014). The image of the world city is opposed to the reality of the world-city: the first is constituted by the circulation routes and the media, which disseminate an image of the world that is increasingly homogeneous; while in the second, the population condenses producing difference and inequality (Auge, 2007).

As can be seen, the urbanism of Santa Fe is based on the rupture of the urban fabric of the whole city and its diverse land uses, with the pretense of economic profitability rather than functional and social homogeneity. This anthropic urbanism eliminates, through the generation of exclusivity and exclusion, any possibility of encounter, significance and experience (Solano Meneses, et al., 2014). According to data from the Association of Settlers of Santa Fe, during the day up to 350,000 people live, but only 15% are residents of this area. (Agencia EFE, 2017)

Its process of segregation and discarded displacement accounts for the true intentions of tertiarization, a phenomenon vividly repressed in Santa Fe.

Puerto Madero, in Buenos Aires, Argentina

Another case worthy of analysis is what happened in Puerto Madero, in which turistification under the guise of an apparent intention to regenerate a space whose economic activity typical of a port had decayed a few decades ago, accounts for another case of displacement and segregation.

In the last decade of the twentieth century the area is intervened to rescue it, with the high cost of discouraging the original activities and reconfiguring the space as a privileged area where exclusive restaurants and shops converge.

In 1991 the urban regeneration project of Puerto Madero began, which concentrated large buildings and high towers that adjoin the Río de la Plata, as well as the generation of public, commercial spaces (hotels and exclusive restaurants) and the cable-stayed bridge designed by the Catalan Santiago Calatrava, which is the only work of this architect in Latin America and is called precisely "Puente de la Mujer" (CORPORACIÓN ANTIGUO PUERTO MADERO SA, nd).



Image 9 Imposing buildings, large hotels and luxurious restaurants, part of the proposal of Puerto Madero
(taken from http://www.plataformaurbana.cl/archive/2013/03/06/operacion-puerto-madero-estrategias-de-gentrificacion-en-buenos-aires/).

The history goes back to around 1860, when Eduardo Madero, important Argentine investor, makes the proposal of the construction of a port, which due to its size will surpass the open one in the area known as La Boca, a project that was completed around 1890.

This port modeled this area of ??the port city of Buenos Aires, being the scene of a boom of short duration, since the port was overtaken, being replaced by 1920 by another structure further north of the city, so Puerto Madero fell in disuse, becoming a residual zone, where the less fortunate classes, generally port personnel, found a way of life around containers and transport, which was developed until the early 90's of the twentieth century (Ramírez Houses, 2012). It was also a refuge scenario for excluded population groups, such as those who held sexual diversity.



Image 10 Photograph of early twentieth century of the deposits (docks) of red partition, characteristic of the port. (Taken from http://arcondebuenosaires.com.ar/puerto_madero.htm)

Towards the end of the 80's the predominantly neoliberal economic context, imposed by the then President Carlos Menem, which focused on the privatization of public goods and services through the Law of State Reform, led to the integration of the Puerto Madero Corporation Old Corporation (CAPMSA). The Puerto Madero Heritage Protection Area was created, in charge of supporting the conceptual and legal bases of the intervention, the result of which has been the transfiguration in the last twenty years of the urban landscape after which the old port constructions are intervened and transformed into buildings for residential use and commercial spaces for the big elites (Ramírez Casas, 2012). Likewise, densification was encouraged by promoting high-rise buildings and the privatization of spaces for corporate and residential use, hotels and other typologies for tertiary use.



Image 11 Photographs of the famous docks, after the interventions made in the turistification process (Taken from https://i.pinimg.com/originals/f1/0a/65/f10a650f41ca47262cf1155281d12a5e.jpg)

In this way, CAPMSA puts on sale these spaces declared of patrimonial interest and favored the acquisition of convened buyers. The transaction was carried out in the following way: the investors were responsible for the construction of corporate buildings, residential buildings, etc .; while with the proceeds of sales, CAMPSA was in charge of the necessary infrastructure for redevelopment (public and green spaces, rainwater network, drainage, electric power, etc.). (Ramírez Casas, 2012).

On the other hand, it is important to mention that the argument of "patrimonial conservation" was only a mediatic matter, since the reality registers "the demolition, towards ends of that same decade, of a set of grain silos that dated from the beginning of the 20th century and who had been praised by W. Gropius and Le Corbusier to prioritize the liberation of lands destined to real estate development "(Ramírez Casas, 2012).

Again, the intervention of recognized architects, urban planners and designers have contributed to the legitimation of these urban interventions, participating in it: Santiago Calatrava (responsible for the Puente de la Mujer, an impressive example of engineering functioning as a pedestrian and rotating); César Pelli (head of the Repsol-YPF headquarters); Philippe Starck and Norman Foster (assiduous collaborators of the developer Faena Properties).

As a case analogous to Santa Fe, the surveillance of the space is in the hands of private individuals, being in this case the

Neighborhood Association of Puerto Madero.

It is important to mention that the number of homes offered far exceeded population growth, so some buildings are used only temporarily or as a shelter for investments, but this does not prevent it from being the most expensive area in the entire city.



Image 12 Puente de la Mujer, an impressive work of engineering
Santiago Calatrava, located in Puerto Madero
(Taken from https://www.101viajes.com/buenos-aires/puerto-madero)

As can be seen, the power discourse that underlies the implementation carried out in Puerto Madero today reflects its distance from those social and urban intentions that were proclaimed at the time. In spite of the great economic spill that this process of regeneration has left nothing, it has been transferred to the improvement of other zones in clear deterioration to the south of the city. There is not and never was a program with a social sense that openly "manifests great contempt for the alleged diversity of fabrics" (Tella, 2013).

Las Peñas in Guayaquil, Ecuador

Las Peñas, a small hill in a small hill called Santa Ana, at the foot of the Guayas River, is the place with more history in Guayaquil, since 400 years old, was the first neighborhood emerged in that town.

It was born as a colonial neighborhood founded by the Spaniards (El Telégrafo, 2012), constituting a resting place for high-income families. Unfortunately, after suffering from two fires, the buildings of those times disappeared, losing the colonial buildings of the 17th century, becoming an urban space that hosted the home of humble artisans and fishermen for some centuries until, as a result of the bonanza generated by the cocoa boom at the beginning of the 20th century, the powerful classes take over the place again building many of the luxurious houses that are still preserved today. However Las Peñas will once again witness the abandonment and destruction that its buildings already showed for the mid and late 20th century. The space that once was a landmark of the city, little by little was deteriorating. The region became an insecure area, with buildings in poor condition, with few green areas and recreation (Arquitectura, 2008).

This area was intervened after a project of urban regeneration promoted towards the year 2000 by the Municipality of Guayaquil, however the project obeys more to a stylization program than to a deeper intervention, again as a turistification process to encourage the installation of restaurants, shops and bars.



Image 13 Reincorporation of services, infrastructure and equipment in Las Peñas as a way to encourage tourism (Solano, 2015)

The regeneration included the reconstruction of the main stairway with an ascent length of 310 meters from "El Fortín" to the Plaza de Honores, where the facades were rehabiilitaron and painted with vivid colors (Arquitectura, 2008), while they were implemented platforms, a lookout point, the tourist equipment, the street furniture and the lighting of the area were improved.





Image 14 and 15 Stylistic intervention carried out on the facades of the neighborhood of
Las Peñas, as a turistification resource of the place (Solano, 2015)

Simultaneously, the beautification process of Las Peñas, and as a clear oxymoron, presents the urban project called Ciudad del Río, which precedes Cerro de Santa Ana and competes with large buildings in a global discourse. This project, in charge of the powerful Norbis group (a company that is a multi-business group, operates as a multinational corporation with a focus on Latin America) boasts an avant-garde architecture at the foot of the Guayas River, contrary to the identity discourse and history that supported the intervention in Las Peñas. The proposal offers surplus value, exclusivity and international category (Pronovis, Vision Creator, s.f.).

The real estate proposal was launched in April 2006 with the aim of building five residential buildings, offices, restaurants, museums and shops. The project considered three stages, concluding in 2011.



Image 16 Urban project called City of the River, space that cancels the interventions of historical tendency made in Las Peñas. (Taken from https://www.pronobis.com.ec/index.php/proyectos)

As can be seen, this urbanization project "declines the prominence of historic spaces such as Las Peñas and Santa Ana, to interpose a recreated space visually and culturally without the consideration of the inhabitants of the city" (El Telégrafo, 2012). The struggle between government power and the investor sectors, clearly leaves evidence of the hegemony of the economic versus the public and social, are again the depressed social classes that are affected, tainted, displaced and excluded.

CONCLUSIONS

The urban interventions pass under the shelter of a series of arguments that from any perspective, continue privileging the economic interests over the social and even the political ones. Unwitting allies of this machinery, architects, designers and urban planners have the duty to reconsider their role in the process of displacement and exclusion described here, and redirect their work under an ethical and social approach to their work demand.

History shows us that practice has always existed. That power has always been behind urban configurations, but it is evident that the practice has been exacerbated in recent periods, to the extent of displacing the role of administration of these spaces, once held by the government and now held by independent organizations that little comrpomiso has with society, as expressed in Santa Fe and Puerto Madero (Association of Settlers of Santa Fe and Puerto Madero Old Corporation, respectively).

The neoliberal tendencies deliberately hidden under the mask of "sustainable" principles (such as the rescue through reuse, conservation and rehabilitation) or arguments of reincentivation and benefit for its inhabitants, in each of the cases analyzed here unfortunately only they glimpse the tip of the iceberg in the urban projects that are generalized all over the world; projects that participate in this veiled distribution of goods and their benefits, that maintain power structures, that catapult investors and powerful entrepreneurs, and bury every time the social classes that remain perpetually in misery.

As it is denounced here, differentiated urban phenomena such as gentrification, turistification and terialization are discourses that share the same root: segregation, misery, displacement and exclusion.

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BIOPHILIC ARCHITECTURE: NATURE-BASED DESIGN SOLUTIONS FOR HEALTH AND WELL-BEING IN LIVING SPACES

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Abstract

This research focuses on improving the well-being and health of citizens in terms of design and development of living spaces in harmony with nature. In the contemporary moment the most cities suffer from health and environmental problems. Also, the growing awareness of climate changes issues make it even more apparent and essential to bring nature into our living spaces. Scientific studies have pointed out on a multiplicity of benefits of nature for people, especially for children and older populations. Bringing nature indoor causes increased participation in physical activities, improved mental health and cognitive function and an increase in social interaction between people. Nature and its elements have great power on the human body. The concept of biophilia advocates that there is an innate connection between humans and nature and that people tend to show a positive response when they experience a connection with nature. Accordingly, biophilic design is the design of spaces that promotes and encourages the interaction of humans with nature and natural systems. This paper researches different design methodologies, strategies, principles, scales, concepts according to patterns of

biophilic design and with a focus on their influence on the health and well-being of users. The research also opens further discussions about the potentials of sensitive and responsive biophilic design to improve health and environmental problems of contemporary urban areas.

Keywords: biophilia, well-being, architecture design, interior design, urbanity

Introduction

This research focuses on improving the well-being and health of citizens in terms of design and development of living spaces in harmony with nature. In the contemporary moment the most cities suffer from health and environmental problems. Also, the growing awareness of climate changes issues make it even more apparent and essential to bring nature into our living spaces. Scientific studies have pointed out on a multiplicity of benefits of nature for people, especially for children and older populations. Bringing nature into the built environment causes increased participation in physical activities, improved mental health, and cognitive function and an increase in social interaction between people. Nature and its elements have great power on the human body. The concept of biophilia advocates that there is an innate connection between humans and nature and that people tend to show a positive response when they experience a connection with nature. Accordingly, biophilic design is the design of spaces that promotes and encourages the interaction of humans with nature and natural systems.

Within the Design studio courses at University Belgrade – Faculty of Architecture students get acquainted with different Nature-Based design frameworks such as Biophilic Design, Regenerative Design, Resilient Design etc. In the first phase of the design they critically research relevant case studies how different Nature-Based design is applied, from the scale of the city to the scale of the singular object. In this way using Integral approach students get acquainted how to implement resilient and sustainable solutions that aim at a wide range of societal, ecological and economic challenges and problems. This approach enables them to integrate Nature-Based design within their own projects.

This paper researches different educational design methodologies, strategies, principles, scales, concepts according to patterns of biophilic design. The research also opens further discussions about the potentials of sensitive and responsive biophilic design to improve health and environmental problems of contemporary urban areas.

Nature-Based Design Solutions

In 2015 the European Commission published the report titled "Towards an EU Research and Innovation policy agenda for Nature-Based Solutions and Re-Naturing Cities". In this report Nature-Based solutions are defined as follows:

"Nature-Based solutions aim to help societies address a variety of environmental, social and economic challenges in sustainable ways. They are actions inspired by, supported by or copied from nature; both using and enhancing existing solutions to challenges, as well as exploring more novel solutions, for example, mimicking how non-human organisms and communities cope with environmental extremes. Nature-Based solutions use the features and complex system processes of nature,

such as its ability to store carbon and regulate water flows, in order to achieve desired outcomes, such as reduced disaster risk and an environment that improves human well-being and socially inclusive green growth" (European Commission, 2015 p.24).

The report referred on many research and innovation possibilities that are linked to the new design strategies which are relied on natural components as an important material and tool for improving health and wellbeing of living spaces in cities and supporting building resilience. The focus of this research are Nature-Based solutions resilient to change and adapted to local conditions. With reference to the four priority goals (in the same report) to be pursued this research focuses on the implementation of Nature-Based solutions: 1 – to regenerate urban contexts and 2 – to improve wellbeing in urban contexts.

Besides this report the document from 2017 titled "The city of the future. Manifesto of green economy for architecture and urban planning" created by the "Working Group of the States General of the Green economy" also states that Nature-Based Solutions have a key role in developing new action models capable of combining environmental needs with social and economic needs (Working Group of the States General of the Green economy, 2017).

Nature-Based Design implies an understanding of the structure and functioning of ecosystems, including human behaviour, experience, activities etc. It recognises the importance of nature for contemporary cities and requires systematic changes in environmental action and understanding of our environment. Many of contemporary health and environmental problems are a consequence of our incorrect careless behaviour that failed to recognize ecological limitations and the inseparable connection of people with nature. Nature-Based Design is seen as a step in changing this kind of action, an alternative that is found in looking at nature as design inspiration and process knowledge.

It is very important to emphasize that this is a multilevel approach that can be utilised for interventions at different levels and scales, ranging from single objects and lots to the community, city, the region and wider, operating synergistically among the various levels and scales. At an architectural level, both in buildings and within open spaces, nature components enable benefits which could hardly be achieved with traditional principles and techniques. To implement Nature-Based solutions implies to use the various strategies and principles which view "natural capital" and ecosystem services as founding elements of new urban models. Nature-Based Solutions consist in substituting or integrating functions generally offered by non-renewable resources with those provided by ecological systems (Mussinellia, et al., 2018). Another very important characteristic of Nature-Based Design Solutions is that they are locally sensitive and place-based. Interventions depend on recognising and identifying the correct balance between performance/ functional needs and whether-climate/environmental characteristics of the site of intervention (Mussinellia, et al., 2018)

Biophilic Design

Biophilic design promotes and encourages the interaction of humans with nature and natural systems. Besides visual and aesthetic qualities, it's great importance from the aspect of sustainability and health is the fact that it can reduce stress,

improve cognitive function and creativity, improve our well-being and expedite healing; as the world population continues to urbanize, these qualities are ever more important. Biophilic design reconnects us with nature and it is essential for providing people opportunities to live and work in healthy places and spaces with less stress and greater overall health and well-being (Browning, at al., 2014, p. 4).

The biophilia hypothesis suggests that there is an innate connection between humans and nature and that people tend to show a positive response when they experience a connection with nature. It states that since humans originated from savannah-like environments they have "the urge to affiliate with other forms of life". When connected with nature and natural systems, humans can feel more emotionally content, and this has the potential to increase their life span (Wilson, 1984, p. 85).

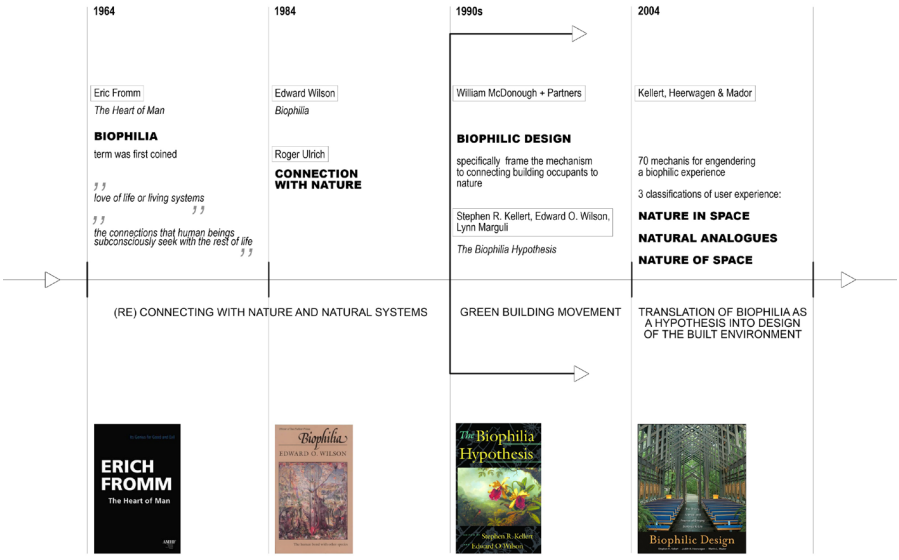


Figure 1. Scheme – Translation of the biophilia hypothesis into the design

Regarding the translation of the biophilia hypothesis into the design it is very important to mention conference on biophilic design organized in 2004 and subsequent book with the same topic. It this book Kellert identified more than 70 different mechanisms for engendering a biophilic experience while contributing authors Browning and Seal-Cramer emphasized three classifications of user experience: Nature in the Space, Natural Analogues, and Nature of the Space (Kellert, at al., 2008).

Multiple scientific studies have pointed out the benefits and importance of nature for people, and especially for children and older populations. New research supports measurable, positive impacts of biophilic design on health, strengthening the empirical evidence for the human-nature connection and raising its priority

level within both design research and design practice; however, little guidance for implementation. In the recent moment, there is an increase in interest in the relationship between neuroscience and architecture both in research and in practice. Also, green building standards have begun to incorporate biophilia, predominantly for its contribution to indoor environmental quality and connection to place (Browning, at al., 2014).

Nature – Design Relationships

As already explained in the preceding paragraphs biophilic design can be organized into three categories – Nature in the Space, Natural Analogues, and Nature of the Space. This classification provides a framework for understanding and enabling thoughtful incorporation of a rich diversity of strategies into the built environment (Browning, at al., 2014). Each category encompasses different biophilic design patterns. These 14 patterns have a wide range of applications both in interior and exterior environments. They should be flexible and adaptive in order to provide an appropriate implementation.

As one of the Nature-Based design frameworks, biophilic design should be locally sensitive. In that sense, the great advantage of these biophilic design patterns is the fact that they can be scaled and adjusted to the surrounding environment. Patterns can be applied at very different scales from the micro to the macro environment, from the scale of a singular room, a building, a neighborhood or settlement, to a scale of the city. Each of these scale requests different design approaches and challenges depending on the programming, users, climate, culture, and various physical contexts and parameters.

This paper presents research that was done at University of Belgrade – Faculty of Architecture within the course Studio Project. The examples of students work within this studio-based education are directed towards the elaboration of conceptual projects which incorporate program and spatial complexity with specific qualities regarding biophilic design and the implementation of Nature-Based design solutions. In relation to the structure of spatial frameworks, specific context, these examples show a diverse opus of design research questions and approaches. In this sense, it is required from students to study both design and program, as well as all other (sociological, historical, technological, technical, behavioral, economic...) determinants that define the identity of specific place.

In the first phase in order to be capable to recognize and identify appropriate design strategies and interventions students should understand this specific theoretical background, especially from the point of health and well-being in living spaces. They should understand that there are countless combinations of design patterns and interventions and that health-related priorities will help focus the design process. Incorporating a diverse range of design strategies can satisfy the needs of various user groups from differing cultures and demographics and create an environment that is psycho-physiologically and cognitively restorative (Browning, at al., 2014).

The shown examples of student work are proof that each context supports a platform for myriad opportunities for integrative biophilic design and mainstreaming healthy building practices for people and society. In the following paragraphs are shown in brief some key results, principles, and ideas that may help focus the

design process.

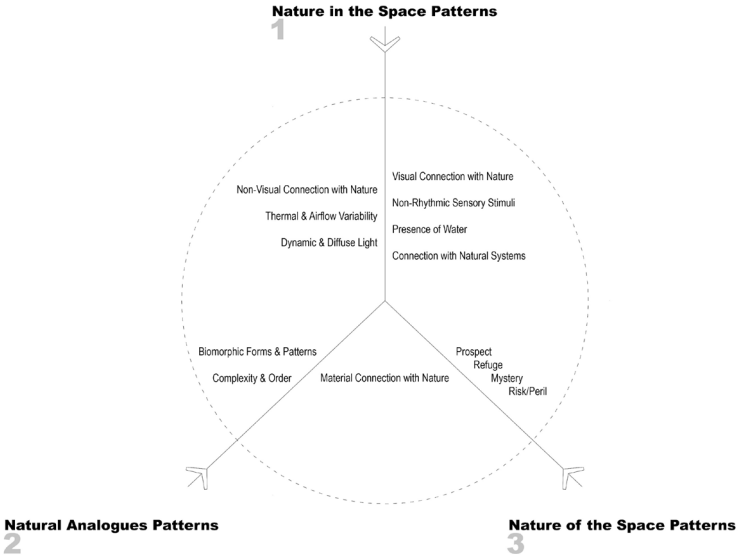


Figure 2. Scheme – Classification of biophilic design on categories and patterns. According to (Browning, at all.)

Nature in the Space Patterns

"Nature in the Space addresses the direct, physical and ephemeral presence of nature in a space or place. This includes plant life, water and animals, as well as breezes, sounds, scents, and other natural elements. Common examples include potted plants, flowerbeds, bird feeders, butterfly gardens, water features, fountains, aquariums, courtyard gardens, and green walls or vegetated roofs. The strongest Nature in the Space experiences are achieved through the creation of meaningful, direct connections with these natural elements, particularly through diversity, movement, and multi-sensory interactions." (Browning, at al., 2014).

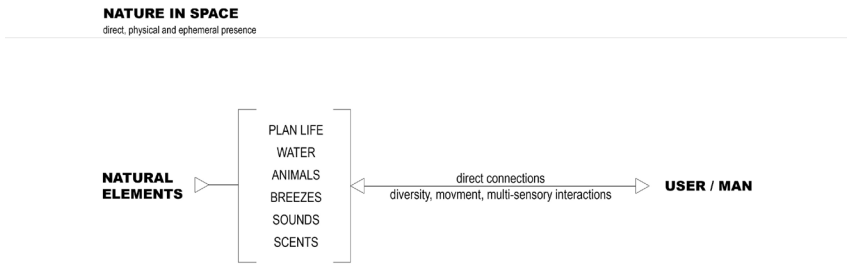


Figure 3. Nature in space relations

There are 7 specific Patterns to this first category of Nature in the Space:

1. Visual Connection with Nature,
2. Non-Visual Connection with Nature,
3. Non-Rhythmic Sensory Stimuli,
4. Thermal & Airflow Variability,
5. Presence of Water,
6. Dynamic & Diffuse Light,
7. Connection with Natural Systems.

Although most natural elements in modern society urban areas are designed, they can provide us various experiences and benefits. According to "14 patterns of biophilic design" complex and variable views to nature, living systems and natural processes, as well as different auditory, haptic, olfactory, or gustatory stimuli can provide a deliberate and positive filling, reduce stress and enhance well-being characteristic of the space. Also, subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments and change over time are welcome. (Browning, at al., 2014)

Students examine in their designs how movement and varying intensities of light and shadow in interior space can simulate some effects of natural conditions. Experiencing those effects users associate interior space with natural qualities and that connection improve the comfort of the space. Some works investigate how bringing water indoors in a form that resembles some natural conditions (such as water with biofilters – plants that purify the water) can shape the way people think about the environment even in the isolated and artificial space. Other works are focusing on temporal change in elements of interior space, and in that way bring the awareness of natural processes, especially seasonal and temporal changes. Finally, some works deal with programmatic compatibility of growing plants, with other standard parts of acquired programs.



Figure 4. Student's work - Petar Tatić. Biophilic design patterns: Thermal & Airflow Variability and Presence of Water

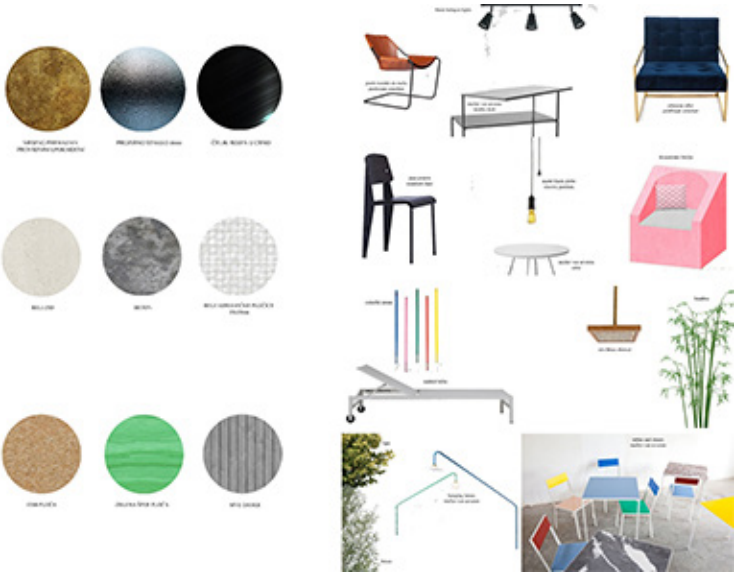


Figure 5. Student's work - Petar Tatić. Biophilic design patterns: Non-Visual Connection with Nature



Figure 6. Student's work - Jelena Bošnjak. Biophilic design patterns: Dynamic & Diffuse Light, Connection with Natural Systems



Figure 7. Student's work - Marta Mrkobrada. Biophilic design patterns: Visual Connection with Nature



Figure 8. Student's work - Marta Mrkobrada. Biophilic design patterns: Non-Rhythmic Sensory Stimuli

Nature Analogues Patterns

"Natural Analogues addresses organic, non-living and indirect evocations of nature. Objects, materials, colors, shapes, sequences, and patterns found in nature, manifest as artwork, ornamentation, furniture, décor, and textiles in the built environment. Mimicry of shells and leaves, furniture with organic shapes, and natural materials that have been processed or extensively altered (e.g., wood planks, granite tabletops), each provide an indirect connection with nature: while

they are real, they are only analogous of the items in their 'natural' state. The strongest Natural Analogue experiences are achieved by providing information richness in an organized and sometimes evolving manner." (Browning, at al., 2014)

Natural Analogues implies three patterns of biophilic design:

1. Biomorphic Forms & Patterns,
2. Material Connection with Nature,
3. Complexity & Order.

There are researches that show that people have a visual preference for organic and biomorphic forms. Contoured, patterned, textured or numerical arrangements that persist in nature have symbolic meanings and associations. Use of materials and elements from nature reflect the local ecology or geology and create a distinct sense of place. Natural textures and colours enhance creative performance and comfort, decrease diastolic blood pressure and enhance calm. Spatial hierarchies found in nature have very characteristic complexity and order. Including rich sensory information in architectural design, that adheres to a spatial hierarchy similar to those found in nature, has a role in enhancing health and reduce stress in living spaces.

Students were searching for possibilities of organic and biomorphic forms in their designs. The search was for metaphoric, not literal, means of contoured, patterned, textured or numerical arrangements that persist in nature and have symbolic meanings and associations. Use of materials and elements from nature reflect the local ecology or geology and create a distinct sense of place. Natural textures and colours enhance creative performance and comfort, decrease diastolic blood pressure and enhance calm. Spatial hierarchies found in nature have very characteristic complexity and order. Including all this rich sensory information in architectural design, students examined how constructing a spatial hierarchy like those found in nature can reduce stress in living spaces. (Browning, at al., 2014)



Figure 9. Student's work - Jovana Radujko. Biophilic design patterns: Material Connection with Nature



Figure 10. Student's work - Jovana Radujko. Biophilic design patterns: Material Connection with Nature

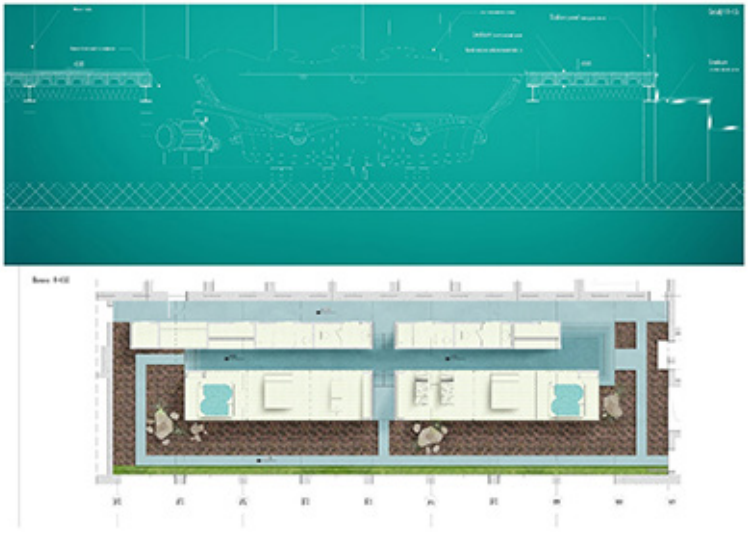


Figure 11. Student's work - Milutin Jovanović. Biophilic design patterns: Complexity & Order



Figure 12. Student's work - Milutin Jovanović. Biophilic design patterns: Complexity & Order

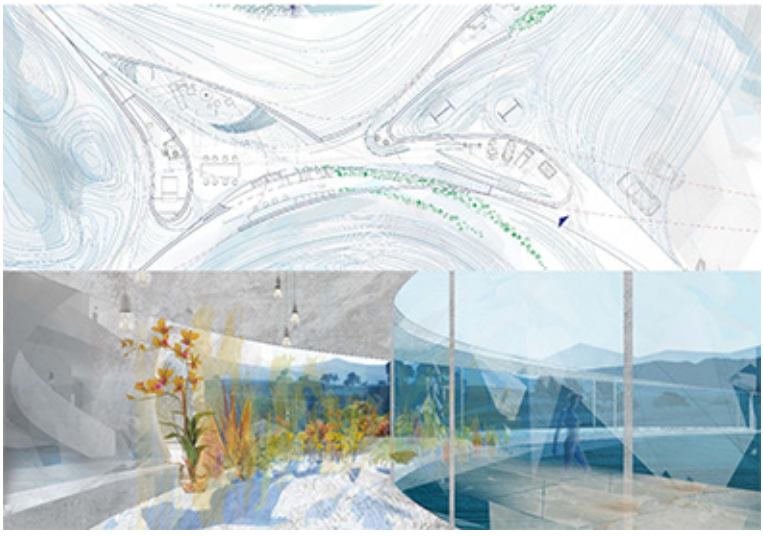


Figure 13. Student's work - Teodora Arsenijević. Biophilic design patterns: Biomorphic Forms & Patterns

Nature of the Space Patterns

"Nature of the Space addresses spatial configurations in nature. This includes our innate and learned desire to be able to see beyond our immediate surroundings, our fascination with the slightly dangerous or unknown; obscured views and revelatory moments; and sometimes even phobia-inducing properties when they include a trusted element of safety. The strongest Nature of the Space experiences are achieved through the creation of deliberate and engaging spatial configurations

commingled with patterns of Nature in the Space and Natural Analogues". (Browning, at al., 2014)

The 4 Patterns of this category:

1. Prospect,
2. Refuge,-
3. Mystery,
4. Risk/Peril.

The Prospect implies an unimpeded view over a distance. This pattern refers to characteristics of a space such are a sense of safety and control. Comfort with good Prospect has its roots in our beginnings on a savannah, an environment with an open landscape and groups of shade trees for safety. Implementation of common feature such are transparent materials, open floor plans, elevated planes, and views including shade trees, bodies of water or evidence of human habitation are examples of ways to optimize visual comfort and enhance the Prospect.

In students works presented below, the subject of refuge was examined. A refuge is a place for withdrawal from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead. This is a private space were user feels separate or special, and away from the primary environment. Design in this way has a role in reducing blood pressure and heart rate as well.

Mystery space encourages exploration and promises more information achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment. Mystery implies participation and excitement of the user.

Finally, the Risk/Peril pattern is defined as an identifiable threat, coupled with a reliable safeguard. For example common features in architectural design to reach this pattern are: double-height atrium with balcony or catwalk; architectural cantilevers; infinity edges; facades with floor-to-ceiling transparency; experiences or objects that are perceived to be defying or testing gravity; transparent railing or floor plane; passing under, over or through water; proximity to an active honeybee apiary or predatory animals; life-sized photography of spiders or snakes etc. (Browning, at al., 2014)

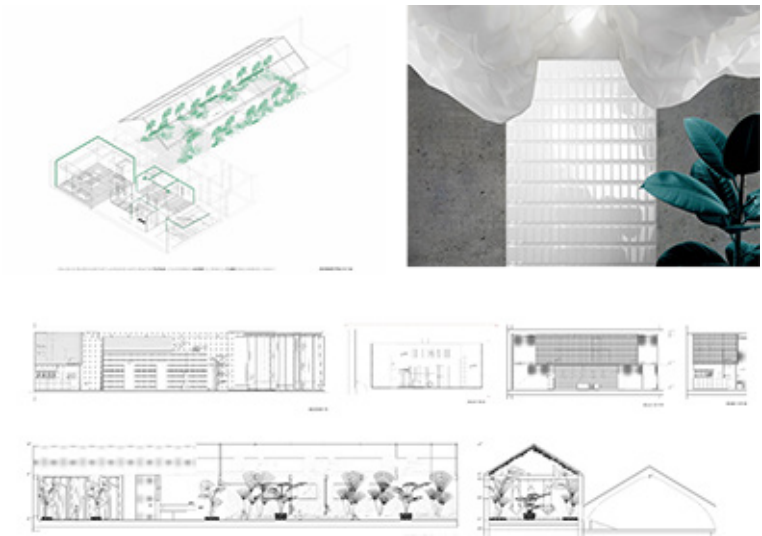


Figure 14. Student’s work - Jelena Aksentijević. Biophilic design patterns: Prospect



Figure 15. Student’s work - Jelena Aksentijević. Biophilic design patterns: Refuge

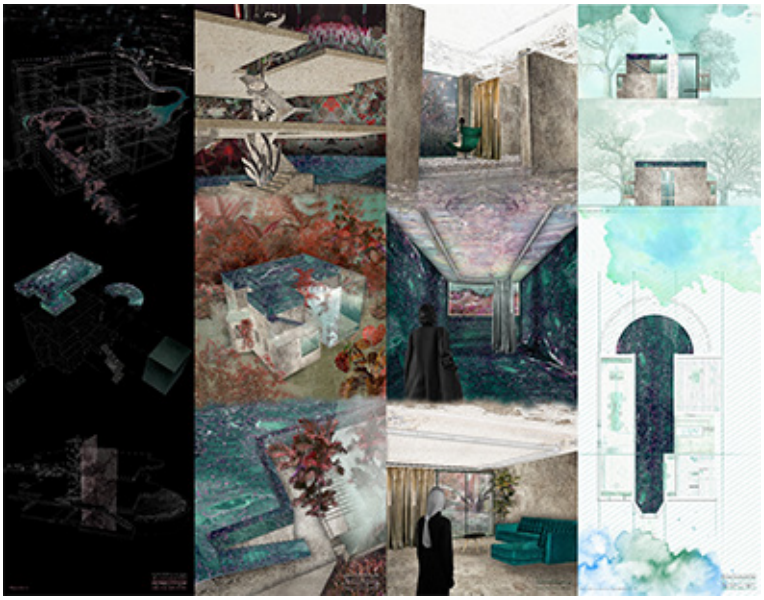


Figure 16. Student's work - Jovana Radujko. Biophilic design patterns: Mystery

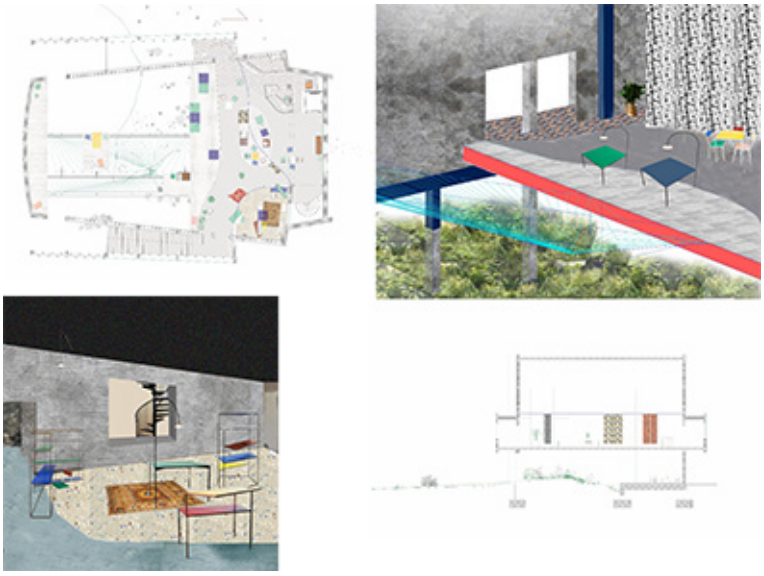


Figure 17. Student's work - Petar Tatić. Biophilic design patterns: Risk

Final remarks

This research indicates to the necessity for thinking more critically about the human connection with nature and how biophilic design patterns can be used as a tool for improving health and well-being of our living spaces, either on the scale of the singular objects and spaces either on the scale of the city. It is required to understand the identity of a specific place, not just from the aspect of climate, but

also from all other relevant aspects (sociological, historical, technological, technical, behavioral, economic...). Also, it is necessary to understand the character and density of specific place: rural, suburban and urban environments. For example, in suburban settings, biophilic design patterns and principles are typically intuitively applied, while the potential human health benefits are underappreciated in high-density urban settings. Therefore, students' projects should find its usefulness primarily in the specificities and characteristics of a place and in a more responsible relationship with the natural, artificial, tangible and intangible components of the architecture. Use of Nature-Based Solutions enables achieving of various benefits and values, not only environmental but also cultural, economic etc. Furthermore, the design concept is usually based on a very dynamic context, defined not only by physical elements but also and especially by cultural and socioeconomic ones.

"Nature-Based Solutions – being ontologically founded on the use of living elements, thus in progressive transformation and with the ability to adapt to the changeable conditions of the surroundings – represent a consistent solution that relates to a said complex scenario in a correct and adaptive manner (Mussinelli, at al., 2018)." Accordingly, this approach is very important for the process of planning and design of our living environments.

The research stimulates further discussions about the question of how bringing nature into the design (at different scales) can improve well-being and health. High-quality design solutions should be defined by the richness of program, user accessibility, sensitivity and, as mentioned before, diversity of strategies. This implies creating a sensitive and responsive design that highlights a) visual connection to nature, b) palpability and soundness of nature and c) nurturing a sense of place, a community in which the role of aesthetics is crucial for behavioural change.

Acknowledgments

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FLEXIBILITY AS A TOOL TOWARDS IMPROVEMENT OF EXISTING HOUSING DESIGN IN TIRANA

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Abstract

The majority of what makes up cities are buildings of domestic character: houses, apartments and apartment blocks, and this fact claims clearly their importance. Housing is directly connected to its inhabitants and should not be seen as a solid product of architectural design, but on the contrary it should be thought and designed as a flexible process. Optimization of space in housing is taking greater attention, especially in high-populated urban areas, and a lot of innovative approaches such as flexibility and adaptability have been growing through years, trying to improve the actual, and future situation.

Since cities today keep expanding, the need for housing is increasing proportionally and often housing markets build apartments for the sake of the industry more than for the sake of people's demands. Tirana, as the capital city of Albania, in the last decade has been growing constantly, and for instance has become endured to this massive and continuous building of housing blocks. As they are classified by their price and location in the city, it seems that also their quality is labelled as such. In this research there are studied two apartment buildings, one from low and one from medium income housing zones. The spatial qualities of different apartment typologies from case studies are analyzed according to housing design criteria that directly evaluates their degree of flexibility. More specifically this estimation criteria are based on factors of design such as structure of the apartment, solution of technical services, geometry of the plan, size and orientation of the apartment, and the entrance position. In addition, a questionnaire is conducted with the inhabitants aiming to understand their point of view on their living conditions and affront the spatial results with real housing experience.

A review of the analysis shows that the fast pace of building apartment blocks

has definitely left its trace on the poor spatial quality that these apartments offer. This is also confirmed by the opinions of inhabitants, who raise different complaints about their apartment spaces, and also think of moving out of their apartment in the near future. Regarding these, housing construction which is based on the principles of flexibility may become a solution for the adaptation of the apartments towards the real needs of inhabitants. There can be proposed a system of modifications for these housing blocks, to change their future spatial quality. So, to increase the flexibility of apartments, the previously analyzed criteria (structure of the apartment, solution of technical services, geometry, size and orientation of the apartment, entrance position) were revised and modified and the potential scenarios of use were developed.

Introduction of the principles of flexibility to the housing market makes it aware that design of domestic buildings is very important, and it should be a process reflected on daily basis in the spaces they occupy. Considering this, flexible housing is not just enhancing a new era in housing design and living, but it is embracing and cultivating a new sustainable, user and environment-friendly way of designing.

Keywords: Flexible housing, Tirana's apartment design, adaptation to families' lifecycle, housing market, flexible technologies.

Introduction

For years the meaning of the word 'building' has been the main subject of a lot of researches and discussions all over the world, especially regarding architecture. The word contains both meanings, the noun as a physical object everyone can see, and the verb as a continuous action. Saying continuous action is very important, since buildings should not be seen just in a moment in time, but in and as a continuous process. The longer the users use a building the bigger is the connection and relation between them, and domestic buildings are the peak of this interaction. Houses, as a lot of other architectural artifacts, have been seen for years as solid products of architecture, but they are actually systems of activities that come out of a process, such as architecture. Consequently, whatever physical or social modifications happen in the lifecycle of people occupying a house or apartment, should definitely be reflected also on their apartment, having a continual flow with the lifecycle of the inhabitants.

Even though theoretically it seems really easy to follow these simple rules in housing design, practice has proved that reality is not that easy-going with them. Often housing markets build houses, apartments and apartment blocks for the sake of the industry more than for the sake of people's demands. In Albania also, especially in the capital city, Tirana, the construction industry is becoming one of the leading industries because of this phenomenon. But what if apartments in Tirana were designed and built in a way that they could be adaptable to future needs of people? It then will not be necessary to build large quantities of apartments but use the existing ones qualitatively. This is a promising approach in terms of space, economy, environment and people's welfare.

As this is a phenomenon that has been seen in a lot of other places, especially after the 20th century, architects and scholars during the last decades have started to consider this fact and understand the importance of focusing the most attention

to the users of buildings. The users should be the ones shaping the building, according to their different experience in time. And shaping and reshaping their house, proves that there is an essential demand for new concepts in housing design such as flexibility and adaptability. Their principles offer a wider range of freedom and opportunities, that is why their integration in housing and apartment design is being encouraged day by day.

The aim of this research is to incorporate flexibility as an approach in the design of apartments in Tirana and change the future of housing design, the vision of housing market, and the way apartments are comprehended in the industry. This is an innovation that will be applied not only to future designs, but also to existing conditions, when it is possible. By applying the theories of flexibility, like open building and polyvalence, existing apartment blocks can be modified and driven to new flexible solutions. Accordingly, this paper aspires to give answer to this question and to how flexibility can intervene in housing design. So, the main objectives that this paper follows and aims to work on, clarify and solve are:

- Understand the current situation of the apartment blocks in Tirana, how they are perceived and what are the main problems in housing design in this city.
- To see if the apartments in Tirana can embrace flexibility as a concept, socially and physically, in their present condition.
- To see how flexibility can be induced in those apartments and propose new prototypes of flexible apartments by possible modifications of different criteria.
- Incorporate the new prototypes of flexible apartments in Tirana and change the future of housing design and housing market, and the way apartments are comprehended in the industry.

Flexible Housing, Its Principles and Implementation Framework

Considering the users' needs more carefully through the years, architects have understood that not only having a house or apartment is necessary, but the most important part is people's lifecycle on those apartments. The problem is that most buildings are not designed, financed, constructed in a way to adapt to future changes, but they are stuck at the permanency of architecture. But all buildings (except monuments) adapt anyway, however poorly, because the usages in and around them change constantly (Brand, 1995). After the First World War, an era of industrialization came, and this became a need also in housing. So, as a response to that need, in 1914 Le Corbusier proposed Domino system, an open floor plan structure made of concrete, that consists of only columns and slabs, giving the possibility to separate the interior of the house from its structure. Le Corbusier used the term 'plan Libre' for this spatial flexibility of the house (Risselada, 1988). A decade later, Theo van Doesburg came with an approach that architecture is elemental, formless and open. In addition, "produce the functional surfaces arising out of practical, living demands... The dividing surfaces, which separate the spaces, may be movable" (Doesburg, 1924). In the upcoming years there were also other publications and proposals of models that dealt with this exact same issue in housing, but just tried to explain it in different ways and with different approaches. Then came the definition by Jeremy Till and Tatjana Schneider, who

defined the term "flexible housing" in the book with the same title and claimed: "Flexible housing can be defined as housing that is designed for choice at the design stage, both in terms of social use and construction, or designed for change over its lifetime" (Till & Schneider, 2007). And flexibility of a space itself develops on two main points, the degree of adaptability in the different social uses that can be given to a space and on the degree of flexibility of physical arrangements that are possible to be done in this space.

This can be called a quite broad definition, and this is not unintentional, since there are a lot of ways to implement flexibility, varying on different aspects of the dwelling, such as spatial properties, time etc. Some of them start from the very beginning of the design process with concepts implemented on the plans of the apartments, giving them new ways of arranging spaces and leaving in the same time that degree and possibility for future changes. The Residential Open Building movement by Stephen Kendall (2000), is one of the very first movements that introduced flexibility as a concept and it is a method that starts with the modifications of the physical elements of the building, like the foundation and the facades, with technical changes inside the apartments or the substitution of columnar structure to the one with more bearing walls and supports (Kendall & Teicher, 2000). Another approach applied on the plan's configuration is Polyvalence, proposed by Bernard Leupen (Leupen, 2006) . On this approach Leupen divides the house according to its main activities and gives to each of them their dedicated space, keeping the spaces for services (cooking area and bathroom) always fixed, and then creates different models on how these spaces can stand together. In the schemes that come out from those models, the higher the degree of polyvalence, the higher is also the flexibility on that apartment.

In addition to theories of flexibility, there are also spatial factors that indicate the degree of flexibility in an apartment, and that also these theories follow. These factors are important not only in terms of flexible design but also in the general designing process; but to achieve adaptable plans of housing units, they are modified. These aspects or principles are: the structure of the apartment block, the solution of the technical services, the geometry of the plan of the apartment, the size of the apartment and its units, the orientation of the unit and the position of the entrance (or entrances, if more than one) (Živković & Jovanović, 2012).

1. Structure of the apartment block. This is one of the most important elements to define the flexibility of a housing unit. Since it is one of the permanent parts of the complex, but in the same time a very crucial one not only to flexibility of the apartment. According to previously mentioned theories related to flexibility, structure is the fixed part of a flexible housing unit and it needs to be designed in a way to allow modifications to the left space. Mostly such a structure is made up by columns and beams, creating a skeletal-like structure and leaving the infill as an open space to be changed in the future.

2. Solution of the technical services. As important as the structure, also the technical services play their specific and quite important role in making a space flexible. These services consist of both the access services (like stairs, elevators) and the technical installations, utility cores for the wet spaces. Their position starts to determine where some of the activities and their spaces might be, like bathrooms, toilets, kitchens etc., since they need to be accessing those technical installations.

3. Geometry of the plan. The form, general shape of the apartment is very crucial on what degree of flexibility it can achieve, since it is the asset that would then give space for re-allocations, interchangeability in the number or sizes of the rooms. A compact, regular geometry, with a square or rectangular shape gives more possibilities for such a flexible future.

4. Size of apartment and its units. When a house is designed, one of the criteria for the division of the activities is the size of space they occupy. For a housing unit to work in the first place, it needs that the areas in square meters dedicated to each facility to be in accordance to a standard, decided by the country, government or from an institution of higher importance, and it may vary from culture to culture as well. "Under-dimensioned flat is a social and economic harm, oversized one is economic unreality" (Tomova, 1974).

5. Orientation and openness of the apartment. The orientation of the housing unit has to do with the openness of the apartment, with the number of the facades it has. This is a very important aspect because no activity in a house can be thought without access to natural lighting. The most usual examples are one, two and three-sided apartments.

6.Position of entrance of the apartment. On the overall outline of the apartment, the entrance also plays an important role, since it helps with the organization of other spaces and influences their positions. The entrance can be central or peripheral. A central entrance leads more to a flexible approach and avoids the creation of long corridors.

Methodology

The research methodology used in this paper consists of two parts: the theoretical part and the practical part. In the theoretical part everything needed about the housing design and flexibility is explained, from the simplest definition of it as a concept in housing to the main theories and practices it has found through years. This helps on understanding the need of studying housing design, understanding the actual situation in apartments design and considering flexibility as an asset in the field. In this part flexibility is defined as a concept in housing. Later on, there are listed some very important ways of implementation of flexible housing, that consist on theories that existed before and threw the first steps to principles of flexibility. The chosen theories are Open Building, that existed before flexible housing and dropped the first insights of the need of a housing design that can change in the future, and Polyvalence, which is a very important concept of flexibility and has several principles in designing apartments that makes it easier to perceive changes in the future for the inhabitants. In addition, there are explained some of the factors affecting flexibility of the apartments. These are aspects of apartment design that are considered every time an apartment is designed, but by using them in a specific way and modifying them can bring to an apartment a greater degree of future flexibility. Listing and explaining those factors is very crucial, since they will be used later on the practical part of the thesis to do the spatial analysis of the chosen samples.

Sample selection

In this practical part are done the spatial analysis of existing apartments, in order to understand the actual situation and then develop a future strategy. The first step

in the practical section is choosing samples of apartment blocks, and in this case, Tirana fits the best, since as the capital city has a large population and there is a giant need for flexible housing and apartments. Data from INSTAT (Institute of Statistics in Albania) show the number of apartment blocks built per year in number in the last years, for all cities of the country, so it is easy to make a distinction of how the actual situation in Tirana.

The next step is choosing samples of apartment blocks from this city. This choice is based on the means of price per meter square of the apartment blocks, since it is the main factor considered while buying an apartment by the users, and also used by the housing market while identifying the blocks, advertising and selling them. So, a categorization of the apartment buildings is made, in residential zones referring to names of streets or important landmarks near each zone, where the means of grouping is the price per meter square. For each of the groups a range of numeric price per meters square defines the group, in three groups consecutively from the one with highest prices to the ones with lowest. This information is generated by articles for sales of apartments online and websites that give information for interested buyers, by construction or sale companies. From this categorization, two samples of apartment blocks are chosen; the first is taken from the group of the 'low cost' group of residential buildings and the other one is taken from the 'medium cost' group. Both apartment blocks belong are new constructions, constructed around the years 2010 to 2015.

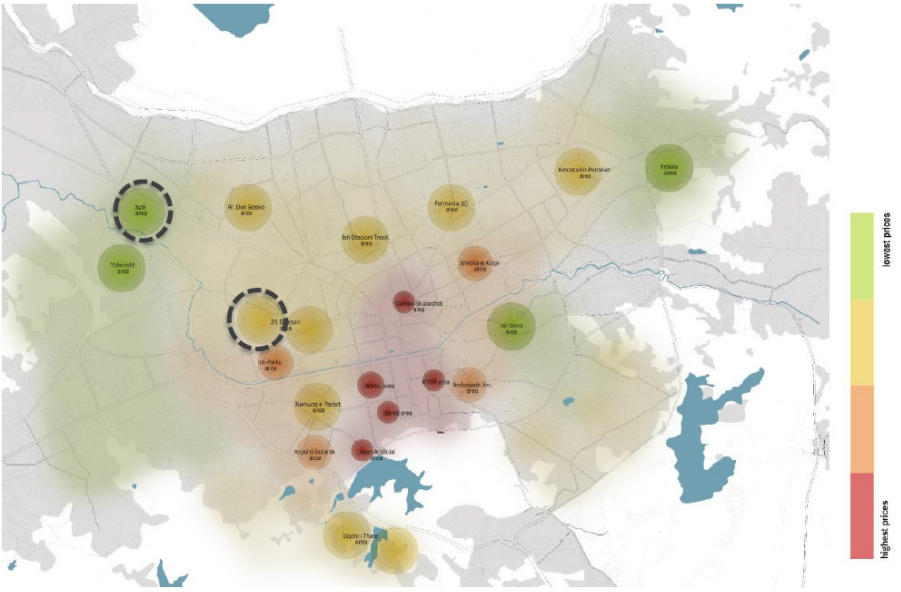


Figure 1. Map of apartments price variations in Tirana, and selected sites of study

To analyze the existing conditions of the chosen apartment blocks, each apartment will be interpreted spatially according to the factors affecting flexibility, explained in the theoretical part of the paper, in the following order: structure of the apartment block, position of technical services, geometry of the plans of the apartments, size of the apartments and apartment units, orientation of the

apartments, and position of the entrance. Both case studies are taken through all the points and compared with the ideal flexible situation and their current situation. An important point is the check of the units with the **Albanian Standards of Housing Design**, published by the Ministry of Urban Development. This shows not only if they meet the numeric standard but evaluates even the configuration of the layouts of different spaces.

Another step is also the **Questionnaire** with current inhabitants of the apartment blocks, in order to get a full information of the actual situation. Comparing the feedback of the people from the answered questions, with the spatial analysis and the check with the standards, will also show the reality of the apartment design better. In the same time, it will give tips on which areas need more improvement and which ones are nearer to the desired and needed level, both in terms of consistency with the standards and people's demands. The survey took place in Tirana, in the locations of the two apartment blocks, respectively near '21 Dhjetori' neighborhood (Case Study 1) and in 'Astir' neighborhood (Case Study 2). The sample was made of 50 people; 30 people from the first site (Case Study 1) and 20 people from the second site (Case Study 2). The questionnaire was designed to be with 9 multiple choice questions and one last open question and was conducted in Albanian with the participants.

Respondents were asked to express their opinion regarding their satisfaction with the spaces within their apartments, and the overall, the comfort in terms of lighting, heating, areas and possible furnishing scenarios within their apartments, in terms of the time they had been occupying them. It was important to also stress the factor that indicated and brought people to these apartments, if it was a matter of quality or location. In addition, they could discuss about the possible spatial changes in the apartment layout, what they would like to be different, or whether they wanted to leave their apartment or not.

Questionnaire Results

As important as it is to know the spatial properties of a design, the opinion of people that have experienced it is way important too, since it gives as a real experience of it in terms of time. That is why the questionnaire results with the inhabitants of the case studies is very crucial to understand the current situation of the housing in Tirana and to investigate if a future for the induction of flexibility is possible. In general people had complaints about the spaces in their apartments, where the living room, dining and kitchen and since mostly these activities are mixed up in the same large area, their space is not really distinguishable or it is difficult for some people to define where to put what, and to manage the space. There is also a common issue with almost all the apartments; the lack of storage room. And the problems with the areas for the different activities has made sometimes difficult also the furnishing of the spaces. A lot of people in their responds were complaining about not placing their wanted furniture in a particular room or claimed they had tried different maneuvers in order to fit at least the necessary furniture in a space.

Another outcome that came from the questionnaire was the fact that people, even though had been living in their apartments for around 3 to 4 years, more than half of them said that they were surely or at least thinking of moving out their apartment. Having been occupying their house for such a short time, and thinking

of moving, only shows and emphasizes the non-comfortability of the apartment and its solid character to change. The answer also that most people choose their apartment mainly because of the location than the quality also reinforces this and the fact that also heating problems came to them because of poor quality of the apartments. People are not finding what they need in these apartments in terms of spatial quality and in aspects of time. As the housing markets focuses on selling the apartment, they try to sell firstly the location and then its attributes. People later realize they have not found what they need, so they decide to move. But a house is supposed to be the base of its inhabitants in the long term, but unfortunately these apartments are not embracing this as their future. To understand these problems better, the spatial analysis is conducted also, to understand now in terms of design and architecture the issues and lacks that these apartments have.

Spatial Analysis Results

For an apartment to be flexible it has to complete some requirements, to follow some principles, like polyvalence and open building, and all of those are in the end reflected at the spatial composition of the apartment. The spatial properties include all residential features like the structure of the apartment block and of the apartment itself, the solution of technical services, closed and opened spaces, its size, lighting, etc., that are given a specific character, so it can achieve the initial concept that the designer wanted to give to the unit. Concerning flexibility, these properties should be designed, modified and used in terms of a possible flexible future.

To see if the chosen case studies could embrace flexibility, they are analyzed according to the spatial properties affecting flexibility and then the degree of flexibility of each of them is evaluated. It is important to understand the actual situation of the variables, to understand if they can be modified, or completely changed to achieve a potential degree of flexibility, wherever it is possible. The factors are analyzed step by step, sorted out as they were explained above.

1. Structure of the apartment blocks. Structure is a permanent part of a building, so usually it should be designed in a way to be flexible for the rest of the infill area to be flexible too. A flexible structure is made up by columns and beams, creating a skeletal-like structure and leaving the infill as an open space to be changed in the future. In the given samples the structure is actually made mostly by beams and columns, creating skeletal structures (Figure 2), even though in some cases they still use supportive walls, encouraging a flexible approach, and if spaces are arranged properly, the infill can be easily flexible.



Figure 2. Structure and technical services of the case studies, case study 1(left), case study 2(right)

2. Solution of technical services. In the studied cases, the position of technical services seems to have been done after the design process according to the given function to a space. It means that firstly are defined the apartments' boundaries and then the layout and space of each activity. Unfortunately, this is not a very approbative solution, since there does not seem to be an overall strategy. Technical services' position inside the housing units is mainly peripheral (Figure 3), freestanding in the boundaries of one apartment or between the sharing walls of two apartments. The aim of polyvalence's principle of centrally allocating the services is that of collecting several functions in the same place, like kitchen and toilets, since they need access to the water supplies. But what is found to be in the current situation is reducing the possible flexible future of the apartments.

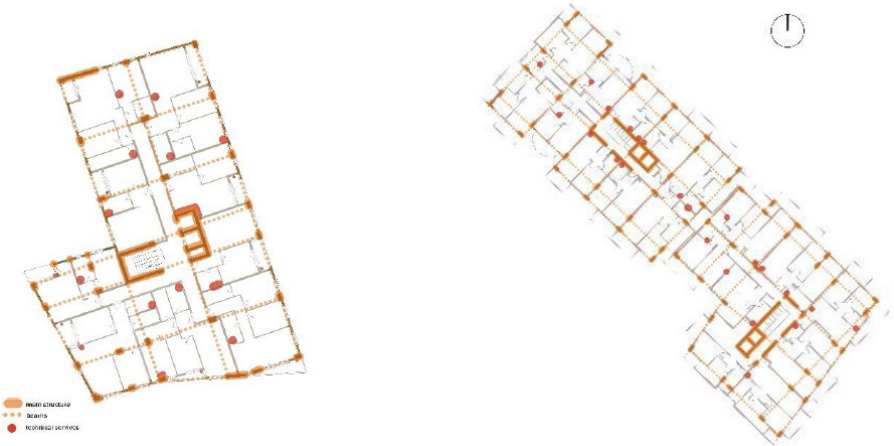


Figure 3. Examples of compact geometry (left) and distributed geometry (right), taken from the case studies

3. Geometry of the plan of the apartment. To have a flexible apartment it is recommended to have a compact, regular geometry, with a square or rectangular

shape, which gives greater opportunities to the layout for the future. While if the plan of the apartment has a more distributed, irregular and uneven geometry, it limits the possibility for future change. The samples of study show the existence of both distributed and compact geometries (Figure 3), but the distributed geometries are more in number, and not encouraging flexibility.

4. Size of apartment and its units. The samples taken in this study are checked according to the Albanian Standards of Housing Design, which are published in a book written and illustrated by the Ministry of Urban Development. Each of the apartments from both buildings is checked, and every space in it, according to the standards for the design of the rooms. The important fact is that the activities imply to these standard dimensions, otherwise it is quite difficult to even have a comfortable house with basic needs. To see if the apartments are implying the standards in their current condition, the area of each of the spaces inside an apartment is put in a graph (Figure 4), where the x-axis consists of the standards of each of the rooms named one by one. Then every column above the axis is in green and shows that that particular room implies the standards, while the ones under the axis are in red, and do not fit the standards. The graphs also show the difference in square meters, so how much bigger or smaller from the standard a room is. After applying this method to all the apartments, it can be said that there are some issues with the spaces in the apartments, which creates a problematic situation, not only for flexibility, but even general comfort. The main problems identified were the standards of living and sometimes dining room, which were below the standards, while corridors, meaning circulation, was in most cases way higher in values. This is not a positive outcome, since corridors are part of the inhabitable spaces and the bigger their areas, the bigger becomes the apartment's inhabitable space. This is not only a disadvantage for creating a flexible future, but also it shows a flaw of the apartments' design for medium and low-income groups.



Figure 4. Graph comparing an apartments spaces/rooms to the Albanian Standards of Housing Design

5. Orientation of the apartment. The samples of study were analyzed by taking each apartment separately and defining the type of orientation and openness it had. From what was inspected in both samples exist only the one-sided and two-sided apartment typologies, while the three-sided apartment was not included in any of the cases. From the lack of existence of such a typology it can be understood that the degree of flexibility of those apartments is not high. Even considering the existing typologies, the fact that there are a lot of one-sided apartments restricts the prospective changes an apartment can have, since there is not much opportunity for a space to be replaced or exchanged with another, while both of them will need natural lighting.

6. Position of entrances. From the spatial analysis of the case studies, it was seen that both types of entrances, centered and peripheral (Figure 5), but the percentage of apartments with peripheral entrance consists of 63% while the one of those with central entrance to 37%. It is clear from this values that also the positioning of the entrances is not as encouraging to an eventual flexibility too, and explains the outcome discussed before, for the sizes of the corridors, since more peripheral entrances mean more elongated corridors.

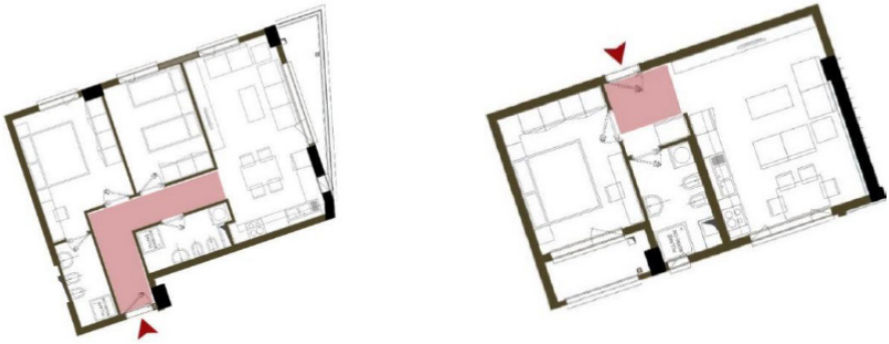


Figure 5. Examples of peripheral (left) and central (right) entrances, taken from case studies

So, from the spatial analysis conducted in both samples of study inspecting all the variables that affect flexibility, it is understood that not all of them in their current state support a flexible. The structure of both apartment buildings offers a promising approach with a skeletal-like structure, but the technical services are not solved with the principles of flexibility offering a small rate of flexibility. Other factors like geometry of the plan, position of entrances and openness of the apartment have positive impacts in some cases and not in others, but the largest problem is that these features are not supported by the size of the apartments, which in lots of cases are quite different from the standards. The most important fact is that these are new constructions and it seems to be quite disputable on what designers and housing market keeps in mind while producing non-effective apartments; the inhabitants' goods or their own profit. Apartments need to change the relation each variable has with the other and consider modifying them to induce flexibility.

Proposal for Implementation of Flexibility

Evaluating the existing conditions of the apartment blocks from the chosen samples, the outcome was presented to a problematic situation. The spatial analysis, combined with the opinion of people living in them daily, showed they do not support a comfortable living firstly, and are far from reaching a degree of flexibility in their current state. Inhabitants' responses on what to change on their apartments also are a factor suggesting that there should be modifications on the way the apartments are designed and perceived. It is important to understand that these changes are not only to adapt a flexible approach to the apartment units, but also to improve their quality.

In order for this to happen what these apartments need is more compact than distributed geometries, that the apartments do follow the standards, have more apartments with central entrances and be at least two-sided apartments concerning their openness. As explained before the compact geometries bring a more still configuration where functions can be joined, mixed up and then divided again. Having apartments that convey the standards in sizes and even exceed them, can give more comfortable spaces to use, and more space for needed changes in the future. And combined with more openness to the facades, again the opportunities are bigger.

The overall strategy for the new prototypes of apartments uses the principles of Polyvalence and tries to modify the problematic spatial properties, in order to increase the degree of flexibility. According to polyvalence the bigger opportunity for an apartment to be flexible is to have a high rate of interchangeability between activities or rooms, while some activities need to be fixed. So, a fixed unit of the services such as wet spaces and kitchen is defined, sharing the technical service, where the kitchen stays aside to the wet spaces' unit, and is used in the new configurations (Figure 6). For this unit to function correctly, it is advisable from polyvalent apartments to have a central position, so the boundaries of the apartments are renewed. This new separation of space also gives to the apartments a more compact geometry, a larger space in disposition for an apartment, and more apartments become two-sided, and there are even cases of three-sided apartments. These modifications were applied to the second case study, where the structure was kept the same and the technical services, which help for the re-allocation of the kitchen and wet spaces. The new proposed apartment floor has 7-8 apartments depending on future possible scenarios.



Figure 6. Kitchen-wet space fixed unit, applied to the new prototype of apartment floor, from case study

Prototype Example

To better understand the modifications and how they increase the degree of flexibility, a sample of one of the new prototypes is explained. In this apartment the location of the technical services helped deciding the location of the wet space-kitchen unit and making it fixed as in polyvalence' principle. In Figure 7 & 8, are placed the possible configuration this apartment can have; the first scenario when the apartment is thought to belong to a couple, so it has a 1+1 layout, with a big bedroom that includes a wardrobe, the in the second scenario, the apartment again is occupied by a couple, but now it becomes an office apartment, so a particular space for an office is needed. For this space to take place, the dining and living room are exchanging places with the bedroom, which becomes smaller to give extra space for the office, which again can be a flexible space depending on the dividers the users decide to use. And then a third scenario can offer a scenario of the same couple that expands the family, and now there is a need for a child's room, which can be easily located at the area of the office, but this time separated by a solid wall to create a good separation and a new room. These small changes bring a completely new configuration for the apartment in its present and future use, which shows that flexibility not only can extend its lifetime and respond to modifications but can also increase the quality of living.



Figure 7. Different scenario schemes of the prototype apartment



Figure 8. Three-dimensional illustration of the prototype apartment

Conclusions

In this paper it was introduced what is flexibility, how it can function and benefit housing design and the ways it can be implemented in new and existing designs. The first thing that should be understood is why it is needed in today's housing design, and especially in expanding cities, like Tirana. Considering house as a process, helps understanding that it should reflect the changing needs of people inhabiting it, and its lifecycle should develop aligned to that on their inhabitants. But in a lot of cases housing market does not understand this and builds houses and apartments, for its own interest than that of the user, pretending that it is responding to the expansion of the urban area by the high rate of construction. From this research it was understood that a lot of new constructions take place since a lot of people after a short period of time get the need to move out from their apartment and to look for a new one, since their current one does not comply to their changing needs. This is a consequence of the wrong way housing blocks are designed and thought; as a solid product that cannot be used after a short time. But what cities like Tirana need are concepts like flexibility, polyvalence, flexible housing and apartments, that rely on principles making people live a longer lifecycle in the same place and personalize it even more. These principles and other variables affecting flexibility,

help apartments adapt to a future different than the current one, a flexible future.

As housing in Tirana has these kinds of problems, to get a better understanding of it, two case studies of apartment blocks are chosen and analyzed according to flexibility principles, polyvalence and factors that indicate the degree of flexibility in an apartment. The spatial analysis is also accompanied with questionnaires with the inhabitants, in order to get a better idea of their experience in their housing. After conducting both of them, and comparing, we get from both the spatial analysis and people's opinions, that there are issues with the apartments, that not only hold them from being flexible, but even in many cases from creating a comfortable living. This is a proof of the way how housing markets works in Albania, and how people are more and more getting housing that does not comply to their needs completely, except from location or price.

Even though the results of the analysis were not as expected, design as a process does not end after the housing is built. In this paper it is shown that with modifications and alterations to the current situation of the samples, there is an opportunity to increase the degree of flexibility in the apartments. By changing current state with the appliance of principles of polyvalence and fixing the problems like the size of the apartments, compactness of plans, position of entrances, etc., new prototypes are proposed. The new prototypes give different flexible scenarios for the same apartment, showing an increased degree of flexibility. A lot of cases are successful, but there are other ones were only the comfort was returned to the apartment and the degree of flexibility was raised, in promising prospects. The fact that there are new auspicious proposals, that can be flexible and assure changes comfortably in the future, shows that it can be easily achieved. But however successful the modifications are, what is needed is for the apartments to be designed to be flexible.

As an overall conclusion, flexible housing is a means not only on developing a new way of housing, but also on developing qualitative housing. Design of domestic buildings is very important, and it should be a process reflected on daily basis in the spaces they occupy. However profitable it can be as a branch of industry, it should never get out of the main aim of housing design, which is the comfort of the user. If to that comfort it is added flexibility, the apartment can easily follow the lifecycle of people living in it. Flexible housing is not just enhancing a new era in housing design and living, but it is embracing and cultivating a new sustainable, user and environment-friendly way of designing.

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OPPORTUNITIES FOR TRANSFORMATION THROUGH ADAPTIVE DESIGN: EMERGENT STUDENT WORK

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Abstract

The Design Research Studio, Studio Adapt! in the post-graduate architecture programme at the University of Cape Town, engaged with transformation through the adaptive redesign of existing structures. This paper will look at activities undertaken by students in the studio environment during the 2017 and 2018 academic years.

Starting with the premise that a building could be understood as standing in for abstract thought, the studio introduced the students to a range of theories. Seminars on the found object in art, significance in heritage studies, gentrification, the right to the city, conflicting rationalities, social transformation through spatial transformation and sustainability, encouraged the students to address the problem from multiple angles.

More specific concepts were identified by each individual student through field work, including mappings and conversations with the various stakeholders of their selected sites. The students were required to identify the specific characteristics, challenges and potentials of their sites of study and to allow the found potentials to guide their investigations and design moves. Students were encouraged to treat their design interventions as a means through which to instigate dialogue between various conflicting positions surrounding their sites and areas of investigation, and they were required to consider the social and material implications of interventions on a site.

Projects by students, both theoretical and practical, are used in this paper to illustrate concepts that hold potential for transformative design practices in adaptive reuse. The research reveals issues of interest embedded in the selected sites and presents possible approaches towards the transformation of the city through a series of design propositions presented by students. These include issues such as the right to the city and social justice, typological disruptions, programmatic adaptations, memory and archaeology, and the adaptation of ways of making.

In all cases, the students built on the theoretical framework offered by the studio seminars through a careful reading of the specific character of the existing building, following the narratives provided by the tension between the found form and the new demands brought about by a changed context. In every case the existing was evaluated for what it might offer. Through a series of imaginative explorations, interventions involving various combinations of preservation, erasure and addition, were tested for how they might unlock the hidden potential of these found buildings to contribute to social transformation through their spatial and material transformation.

Key words: Adaptive reuse, specificity, socio-spatial transformation, student work.

Introduction

Studio Adapt! has been one of four Design Research Studios in the Honours and Masters architectural programmes at the University of Cape Town since 2016. The Design Research Studio model aimed to improve the depth of design investigation of Masters' dissertations in architecture. This model allowed for Honours and Masters students to work side-by-side within a studio whose focus was narrowed and defined by two studio teachers. A seminar-based theory course was embedded within the studio that gave students the opportunity to develop ideas through staff and peer presentations and discussions, and to research and write up a focus of interest that would improve the depth of their design investigations.

In Studio Adapt! the students were challenged to design interventions for existing structures in response to change. Adaptive design relies on the potential of old structures to be reimagined for new use, the selective erasure of parts required to unlock that potential, and the insertion of new elements to complete the design.

The position of this studio has been to explore transformation through adaptive design, treating the found building as the "crystallisation of abstract thought" (Bhabha, 2007). Students were required to research through walking and mapping, to engage with the built fabric and the people who inhabit it. They were challenged to identify the specific characteristics, challenges and potentials of their building sites and to allow the found potentials to guide their design moves. They were encouraged to treat their design interventions as a means through which to instigate dialogue between the various conflicting positions surrounding their sites and areas of investigation. Writings by Vanessa Watson (2003) offer an awareness of the conflicting rationalities that exist between communities and the governing structures intended to serve them. The students were required to interpret conflicting information and to use it to generate ideas for designs that aim to transform the environment in response to needs revealed through dialogues with stakeholders. They considered the existing city as made up of "strategies", ways in which the city is controlled or governed, and how these may conflict with the needs of the people living in it (de Certeau, 1984). The students were challenged to design a "counter-strategy" (Low, 2005) that will either accommodate the needs of its users or new emerging demands on the environment or building.

The adaptation of the old buildings begins, in the studio, with an interpretation of their meanings and, through imagination, transforms them into structures

that can stand for new meanings relevant to current conditions (Low, 2003). Social transformation requires spatial transformation that is more than just a material or superficial improvement of space. It implies a corresponding change in the way of seeing, understanding and representing space (Allen, 2000). The term 'transformation' refers to changes in the theoretical and practical approach within the discipline that can lead to meaningful dialogue with changing realities. These realities can be social, but they might equally refer to the global scarcity of resources, the global disparity between rich and poor, and changes effected by on-going innovation in transportation and information technologies (Tschumi and Berman 2003: 285).

The embedded seminar series, presented by studio lecturers, invited guests and students themselves, provided a wide range of approaches towards adaptive reuse as a platform on which students could then add further readings guided by their individual investigations and design explorations. Presentations included global trends in the emerging field of adaptive reuse, learning from the 'found object' in art, the 'right to the city' by social activists, concepts of 'significance' and 'authenticity' from heritage studies, issues around 'gentrification' and developer-driven interventions, and concerns around 'environmental sustainability'.

The idea of the right to the city is presented both as a theoretical framework (Lefebvre, 1995) and in its practical lived reality in the city of Cape Town through Reclaim the City, an activist movement supported by the NGO *Ndifuna Ukwazi*, that challenges the city to provide centrally located temporary public housing for citizens evicted from private properties. These properties are typically destined for large lucrative developments with tax rebates offered by the city to stimulate development, but they can have devastating implications for tenants who have lived for generations in these neighbourhoods. This activist group has identified abandoned or underutilised municipal buildings such as schools, hospitals and hostels for nursing staff, that could be adapted for housing in the city without falling prey to gentrification. Gentrification is a condition discussed in the seminars, through which value systems are emphasised as key to adaptive design.

To emphasise the importance of imagination, adaptive reuse is likened to the found object or the 'ready-made' in art, through which several principles are explored that open the scope for design possibilities. The students are challenged to identify the specific characteristics, challenges and potentials of their sites of study and to allow the building, as found object, to guide their design moves.

During the design process in the studio, several exercises are introduced to stimulate imagination for the transformation of the found. These are: working with partners to brainstorm multiple design possibilities; the physical transformation of a found object, exploring its potential to become something else; the use of a three-dimensional photogrammetry app to generate a point-cloud model of the found through which interventions can be tested; the quick production of diagrams, to test possibilities; the use of collage to explore the qualitative characteristics of spaces in the found building juxtaposed with the possible qualities of the new; design through section to establish the scale relationship of the body to the found structure and the surrounding context; and the building of material models through which the found building can be thoroughly understood and analysed.

The work of students, both theoretical and practical, has been used here to

illustrate concepts that hold potential for transformative design practices in adaptive reuse. The research reveals issues of interest embedded in the selected sites and presents possible approaches towards the transformation of the city through a series of design propositions presented by students. These include issues such as the right to the city and social justice, typological disruptions, programmatic adaptations, memory and archaeology, and the adaptation of ways of making.



Figure 1. "The Found Object" project where students are required to physically transform random household projects into something new (Authors, 2018).

The Right to the City and adapting for social justice

The Right to the City, as proposed by Henry Lefebvre in his book *Le Droit à la Ville* in 1968, has found a strong resonance in contemporary South Africa, and particularly in the City of Cape Town. This city's persisting socio-spatial marginalisation is due to many factors, including the net results of pre-democracy *Apartheid* spatial planning practices, urbanisation, population growth, poverty, unemployment, and a high inequality rate. Spatial marginalisation and displacement are restricting access to the City and its potential employment opportunities: Transport is expensive and travel times to and from Cape Town's peripheral neighbourhoods are long. At the same time, there is underutilised and surplus building stock in the City which can be adapted from its current use to a mixed-use model with a high percentage of residential stock, specifically, social housing, affordable housing and transitional housing.



Figure 2. A section and a diagram of the adapted Helen Bowden Nurses Home showing the process of subtraction that allows for more social engagement on and across levels (Bezuidenhout 2017).

As noted by Harvey (2012: 22), there are many urban social movements in existence, but he argues that they should focus on gaining control of the surplus in the City. While this implies financial surplus, it can also be regarded as spatial surplus. An organisation in Cape Town called *Ndifuna Ukwazi* is actively promoting the supply of transitional housing and it argues that "It is possible and cheaper to use existing public buildings for transitional housing or purchase suitable affordable office, commercial and industrial buildings that are structurally sound and do not require significant repairs." (Pillay, Russell, Sendin, Sithole, Budlender, & Knoetze, 2017: 50) It describes the disused Ahmed Kathrada House (formerly the Helen Bowden Nurses Home) in Greenpoint as an ideal opportunity for such an adaptation. This Brutalist building has been occupied by activists who are demanding that the City releases it for housing. The thesis project *Adapting to Transformation* (Bezuidenhout, 2017) explores the adaptive potential of this building, and it aims to show how adaptive design can contribute to social, economic and environmental sustainability. It proposes a mixed-use programme where commercial activities and additions to the building cross-subsidise the social housing component, which is accommodated in the former apartments' framework that has been modified to allow for social engagement and the integration of residents from different income groups.

As opposed to adapting an underutilised building, *Architectural Space in Marginalised Communities* (Zuma, 2018) explores the spatial characteristics and

adaptive potential of the oversubscribed *Old Flat Hostels* in Langa, Cape Town. These buildings were originally built by the *Apartheid* government to house male African migrant labourers who predominantly came from rural areas in the Eastern Cape. The rooms were small and there was a severe lack of social space for the labourers; this condition was exacerbated due to an increase in migrant populations in the 1970s, driven by rural unemployment, to such an extent that the hostel buildings in Langa, Nyanga and Gugulethu housed an average of four people per bed in the 1980s. The *Old Flat Hostels* in Langa are currently occupied by families and single people who are sharing accommodation, with an average of 1.8 people per bed (the best ratio of all the old hostel buildings) and a staggering ratio of 31 people per toilet (Ramphele, 1993: 26).



Figure 3. The Old Flat Hostels highlighted within the wider context of Langa, showing the lack of thresholds and the undefined public space between the hostel buildings. (Google Earth image adapted by Zuma, 2018).

In her book *A Bed Called Home*, Ramphele uses the bed as the common spatial denominator in the hostels. She argues that space is multi-dimensional, and she describes these dimensions as "physical, political-economic, ideological-intellectual and psycho-social" (1993: 2). The adaptation project used this as a starting point to expand the existing building, to allow more dignified living spaces and public spaces, commercial and educational opportunities, and a healthier social environment. By combining a few former two-bed rooms, incorporating the former central passage, and expanding outwards, a series of comfortable family apartments were created to provide dignified dwelling spaces. Combined with educational facilities and commercial opportunities on ground level and a youth hostel in the top level (which consists of bedroom pods that are a tongue-in-cheek reference to *A Bed Called Home*), the adaptation allows for a variety of occupants. The expanded buildings provide a series of thresholds between the commercially active sidewalks and new semi-private internal courtyards, thereby combatting the sense of alienation and placelessness that can be seen in Figure 3. In both examples, adaptation holds the

key to unlocking the potential of existing buildings to engage with the issues of social justice and the Right to the City, and through that, to allow for the possibility of social transformation.

The Modern Project and typological disruption

Güney (1992: 8) describes the theory of type in terms of modernist ideology as being focused on the production process where standardisation and typification were used as a basis for projects: "Type in the processes of mass-production required repetition, type had become prototype. The discussion on types by the various protagonists resulted in a conformation with the rules of industrial capitalism and lead [sic] to the idea of prototypes mechanically and serially produced ad infinitum." This practice is also evident in Cape Town where the foreshore precinct in the Central Business District (CBD) was designed in accordance with modernist principles and was followed by the design of numerous tall buildings based on the modernist type. These buildings are predominantly mono-functional office buildings which are in many cases partly vacant, and like the buildings in the previous section, they present an opportunity to investigate the potential of adapting them for other uses, specifically, inner-city housing for the poor. The adaptation, particularly of the tower block, is however generally less about the new programme, and more about the challenges associated with the type itself and how to imagine new ways of inhabiting it and making it climatically suitable to its environment.

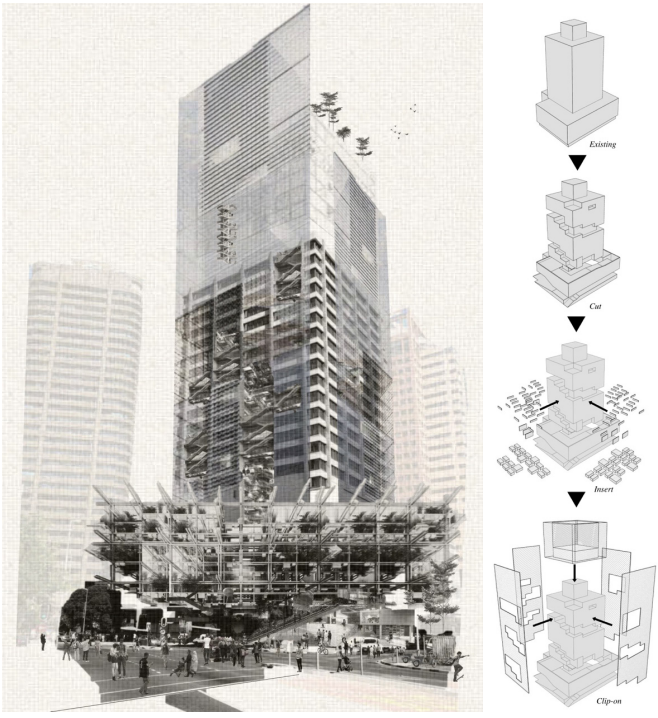


Figure 4. A collage showing the adaptation of *Mobil House*, a modernist skyscraper in Cape Town, and the key adaptation moves employed to facilitate the transformation. (Bischof, 2018).

In *(Re)Imagining an Underused Mono-Functional Office Tower in the Cape Town CBD: The Case of Mobil House,* Bischof (2018) investigated the Downtown Athletics Club in New York, designed by Starrett and Van Vleck in 1931. Rem Koolhaas describes it in his book *Delirious New York* as a "constructivist social condenser: a machine to generate and intensify desirable forms of human intercourse" (Koolhaas, 1978: 152). This building, which housed a range of sporting activities throughout its height, was criticised as being artificial and having a lack of connection across floors. By investigating Alison Smithson's "mat-building" theory, the aim was to address this criticism by improving connectivity across floors, facilitating easier access, and allowing for a mix of programmes. Candilis, Josic, Woods and Schiedhelm's *Free Berlin University* has been identified as a mat-building, and it has also been referred to as a "ground-scraper" that offered improved social connectivity on a horizontal plane. Applying the ground-scraper's principles to a skyscraper provided a lens through which to challenge various preconceptions of the tower block type.

The value of the tower block, according to Bischof, lies in its robustness, its potential flexibility and the high embodied energy embedded within it. The adaptation of Mobil House challenges the lack of access to the City, and offers access to all levels of the tower, by providing an intricate weaving of public programme and private programme (which consists of a mix of housing types for different incomes). This programmatic weaving required the disruption of the tower's podium, basements, circulation systems, roof, and skin, amongst others. The most visible disruptions include the excavated podium, a spiralling promenade along the building's perimeter that alternates between public and private use, a new façade treatment, and the additional floors at the top of the building which house a public sports facility; the mixed-use cross-programming envisages a combination of both public and private uses along the entire height of the tower block, in what could be regarded as facilitating the general public's Right to the City's skyline.

A similarly difficult mono-functional type is the sports stadium. This building type is often constructed specifically for a mega-event, after which it can sometimes fall into disuse, or be demolished, or if it is still used regularly, it is often economically unsustainable. The Cape Town Stadium, which was built for the 2010 FIFA World Cup is a case in point, and its commercialisation is currently being investigated. The project *The Afterlife of Megastructures: In the Aftermath of Mega-Events, the Case of Cape Town Stadium* by Mwedzi (2017) tested the potential of turning the stadium-type into a multi-functional civic, educational and commercial entity which is programmatically tied to its surrounding context. In a similar way to Bischof, Mwedzi valued the robustness of the existing structure, and he used Metabolist theory as an approach to differentiate between permanent structural elements and transient programme-specific elements. The deep floor plates represented a particular challenge environmentally, as did the building's size; approaches like Rayner Banham's "Megastructures", Kenneth Frampton's "Megaform", Rem Koolhaas' "Big", and David Gissen's "Big and Green" were investigated to find ways to engage with the building's scale.

The key to disrupting type seems to be the clear identification of what the found building's inherent values are, and which adjustments need to be made to make it socially, economically, and environmentally sustainable, while being more rooted in its context. Mwedzi (2017: 59) notes that Cape Town Stadium and its

surrounding urban context is alienating and inaccessible in many ways and that the Stadium's public role should be re-acknowledged. He argues that adaptation of this type can provide "the prospect of changing the legacy of the Stadium from one of underutilisation and public financial burden to one of nurturing self-sustaining talent and to public service, recreation, engagement and education."

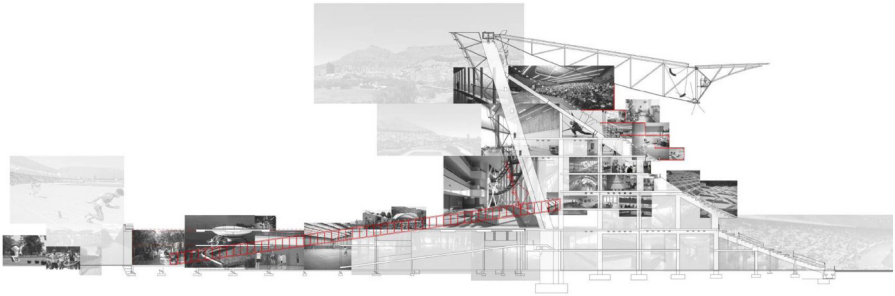


Figure 5. A sectional collage showing the stadium's existing structure overlaid with photographs of the proposed new activities and conceptual interventions in red. (Mwedzi, 2017).

Programmatic adaptations

While programmatic adaptation has some similarities to typological disruption, it usually retains the primary existing programme (sometimes in conjunction with additional new programme) and it aims to optimise the existing programme or to adjust it for changing conditions. This type of adaptation often occurs in light-industrial manufacturing areas that are situated in good locations close to the city centre: Property values in these areas are prone to increase and sprawling single-storey factories or production facilities operated by a single entity generally must make way for other commercial uses or high-end residential development. This often results in gentrification, and it can result in job losses if the production facilities have to relocate beyond the reach of their employees.

Saville (2017) investigated the potential of verticalizing a former single-storey leather factory to democratise the ground plane and to activate the building as a social condenser in a predominantly industrial area with limited public space. Using Rappaport's concept of *Industrial Urbanism* (2015) as a reference model, space was created for smaller local retailers on the now accessible ground plane, while the singular horizontal productive model was changed to a multi-tenant model with productive linkages in an adaptable tower. The aim was that the adaptation would become an enabler for small-scale local craft industries to access global markets within a networked productive condition that is referred to as a Community Workshop Model, and that the accessible nature of the building will improve social interaction in the area without displacement of the community.

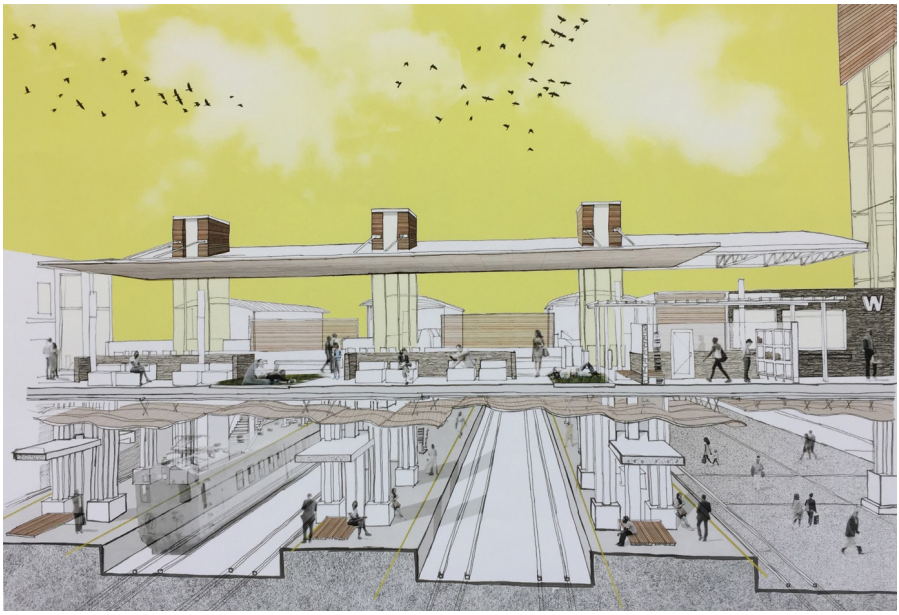


Figure 6. The new public plaza over the platforms at Woodstock Station, Cape Town. (Komane, 2018).

In *Architecture + Intimacy: A Place for Pause*, Komane (2018) programmatically adapted Woodstock station, which is an important transport interchange linking Cape Town's rail, bus and minibus transport systems. The movement flow of both rail commuters and pedestrians wishing to cross the railway tracks was combined into a raised public plaza with controlled access to the platforms. This was done to increase the efficiency of movement, to improve public safety, and to allow for commercial opportunities and homework space for learners. The aim was to counter the sense of alienation that can be experienced in areas of rapid movement by designing spaces for pause, intimacy, and refuge – both in terms of planning and programmatic terms, but also in terms of sensory experience. In both programmatic adaptation projects, a wider urban contextual analysis and a clear understanding of programme were required to be able to adapt both productive flows and social opportunities optimally. While the programmatic adaptation improved efficiencies, it was primarily aimed at improving social conditions and a person's experience in the building and its surrounding urban fabric. Speaking about a very personal experience, Komane (2018: 5) writes:

"The quick pace of my movement has been temporarily paused… This sudden change in my movement and the atmosphere begins to change my mood. The densely packed information clouding my brain begins to weigh less as I sit and contemplate this space. The now. The present. At this moment, it is in this atmosphere, this moment of pause that I am most at peace."

The lack of refuge in an often-frenetic urban environment can be detrimental to a person's physical, mental and emotional wellbeing but if an inclusive space of pause can be created through adaptation, it can transform an existing place and the wellbeing of its inhabitants without the negative effects of displacement or by

replacing a sense of alienation with an alien object after demolition.

Memory and archaeology

Pierre Nora wrote extensively about sites of memory and he argues that while places can easily have embedded memory, they can also become symbolic and have deeper meaning for a specific society by becoming part of its identity. Writing about remnants of the past he notes that "We no longer inhabit that past, we only commune with it through vestiges – vestiges, moreover, which have become mysterious to us, and which [we] would do well to question, since they hold the key to our 'identity', to who we are." (Nora, 2002: 6) Wren-Sargent used this link between memory and identity to adapt Cape Town's former Non-White Main Line Concourse in his thesis *Engaging Vestiges of Negative Social Memory: From an Order of Segregation to Linkage* (2017). He argues that this building was a tool of the *Apartheid* government and, like the buildings in Johannesburg's Constitution Hill, is a symbol of former oppression and segregation. His project aimed not to erase this negative social memory, but to adapt it into a site of learning where visitors can reflect on the past; the adaptation was approached so that "stigmatised historical buildings may be interacted with architecturally to benefit society." (Wren-Sargent, 2017: 8) The intentional spatial domination of the building is countered through the juxtaposition with newly inserted elements that are in dialogue with the existing. Improved spatial connectivity, visual linkages, the incisions that allow light deep into the oppressive platform spaces, and the removal of spatial hierarchies transform it into a democratic social gathering space that invites commuters to pause (similar to Komane's intervention) and interact with each other and the building.

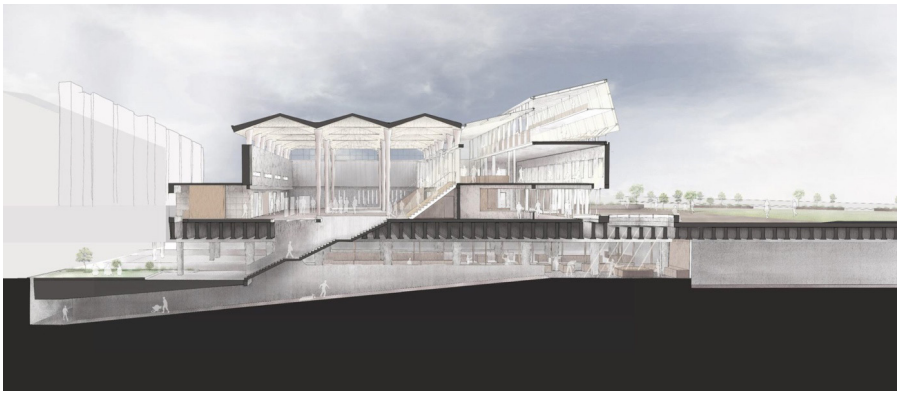


Figure 7. A section through the adapted "Non-White Main Line Concourse" showing some of the adaptation strategies, including juxtaposition, incision, spatial connectivity and the intentional atmospheric manipulation of light. (Wren-Sargent, 2017).

A strong sense of negative social memory also persists in the area known as District Six in Cape Town. The community that formerly lived in District Six was forcibly removed by the *Apartheid* government under the Group Areas Act and almost all the buildings were demolished. Lehabe, in her project *In Service, On Common Ground: Finding Commonality Between User, Architecture and Landscape*

through the Ritual of Dining (2017), engages directly with the complex issues surrounding this contested space. She uses the terms of transference, translation and ambiguity to frame her investigation, and while she admits that ambiguity is often perceived as negative, she searches for multiple meanings within ambiguity to generate a stronger connection between a person and his or her environment. Her programme of a Service Dining Room that provides food for marginalised people adds further layers of complexity to the project.

"District Six is a site of ruin and decay, a ruin that not only speaks of the past but continues to breathe into the present and into the future. It is a living ruin. The ruin seen as void, becomes the absence of what was there before. What makes this absence so powerful, is that it is not a void of silence but one that speaks. It speaks, in the language of translation, thus, the spoken word remains alive. The fact that the ruin is alive, alludes to a temporal quality. The void represents perplexity and complexity, therefore becoming ambiguous in nature." (Lehabe, 2017: 27)

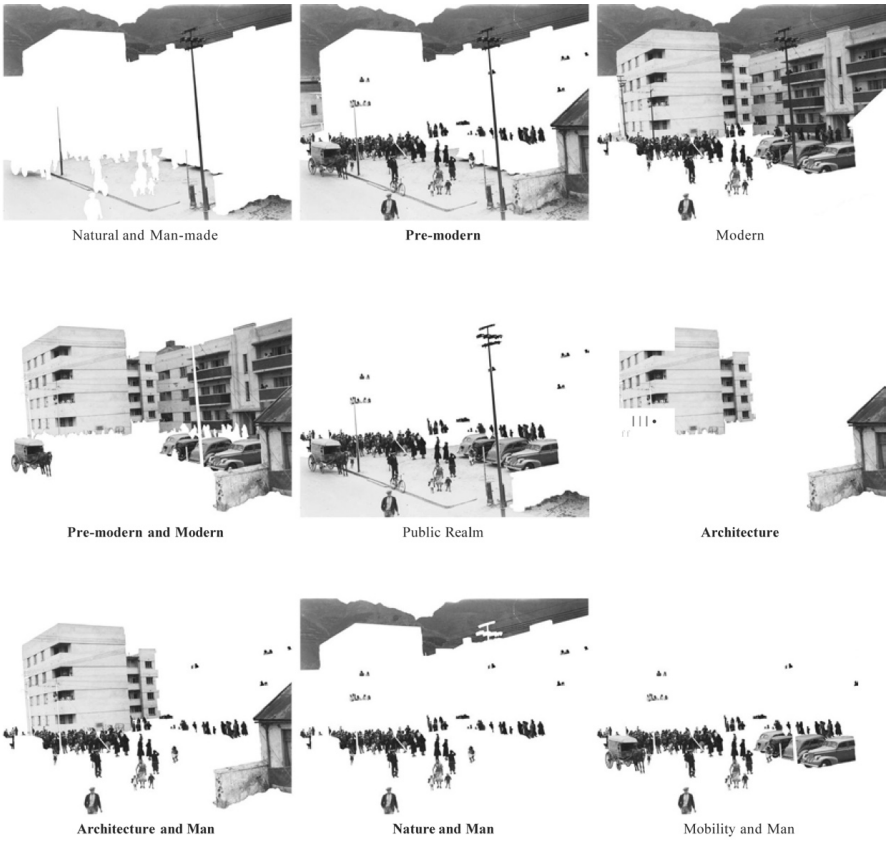


Figure 8. An analysis of the Bloemhof Flats, which were built in 1938 following slums clearance in Wells Square (which was renamed Canterbury Square), identifies multiple meanings or readings of the space to emphasise relationships between specific elements by creating a void between and around them. (Original photographer unknown, The National Library of South Africa, adapted by Lehabe, 2017).

In another project called *Biotic Machine* (Austin, 2018), beauty is found in the ruin of the former Collier's Jetty in Cape Town's harbour. Austin set out to preserve its weathered character and its economic importance to the local fishing community in the context of the rapidly gentrifying Victoria and Alfred Waterfront. It is a liminal site that separates the touristic Waterfront (which includes the new Zeitz MOCAA) and a working fishing harbour. His project explores ways of combining these two aspects to provide benefit to both, but by purposefully privileging the fishing community by inserting a range of additional commercial opportunities that build on their existing skill base. He cites Douet (2012: 8) who stated that "To advocate preservation of a redundant industrial site, basing the arguments on traditional heritage values, does not always look attractive to a community afflicted by economic collapse or high levels of unemployment."

Something that all three of these projects have in common is their thorough analysis of the found building: They all involved "excavations" or "biopsies" of the found building or space that allowed a clear identification or taxonomy to be made of its constituent parts. This was done spatially, structurally and materially to relate its physical elements to its socio-cultural meaning which is more than the sum of its parts. They aimed to retain, and in some instances, emphasise the embedded memory and symbolism, despite the fact that these memories are often painful. The commonality between Lehabe's and Austin's work, however, is that both projects engage with the ruin in such a way that it serves the vulnerable communities in a contested space by uncovering the value inherent in the ruin.



Figure 9. An initial collage that attempted to capture the industrial character of the site and a rendering of the final project that shows the inclusive nature of the final intervention. (Austin, 2018).

Adapting ways of making

The process of adapting existing buildings for social transformation can be augmented by adaptations of local construction technologies which will provide a platform for local involvement in the transformation of the existing buildings. All three projects described here touched on the idea of architecture as having agency

for social and material transformation. This can take the form of adapting locally available craft skills, as was done in *Re_Skill* by Siebert (2018) by analysing boat-building methods in Hout Bay Harbour, and designing methods of adapting these for use in building construction. The process of adapting the production of the building was combined with the adaptation of the building itself and of its context to allow improved connectivity for the marginalised community of Hangberg, and by designing for potential future adaptability of the spaces and programme by using Herman Hertzberger's concept of polyvalence (1991: 146).

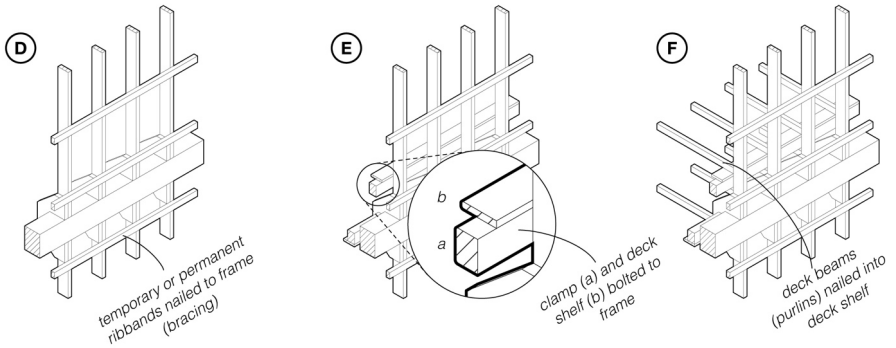


Figure 10. An extract from a building manual created by Siebert that demonstrates the processes of adapting boat building technologies for building construction. (Siebert, 2018).

Madolo (2017) investigated the material sustainability of indigenous timber and the socio-economic benefits that can be designed in by specifying locally grown and sustainably harvested timber, the use of local craft skills in its processing and the upskilling of local labourers for its use in construction. Malan (2017) on the other hand used material normally regarded as waste to construct her adaptation of an existing waste handling facility in the Western Cape town of Kleinmond. She describes the commonality between both site and material as being regarded as residual. She argues that the "relationship between waste materials, waste infrastructure, society, and the urban and natural landscape needs critical evaluation." (2017: np) The project's aim was to contribute to the creation of a circular economy, to use waste as an employment generator, and to design the building to be a mechanism that can address the divided spatial legacy of the town. This was done through improved connectivity, access, and designing the recycling depot as a commercial and touristic drawcard, through a re-valuing of discarded materials and the re-valuing of a discarded community.



Figure 11. A perspective through a communal space demonstrates how an existing concrete frame office building can be transformed by inserting sustainably sourced timber elements (Madolo, 2017).

Conclusion

These student projects mostly grappled with multiple issues simultaneously, and despite being grouped into specific themes, they all aimed to address social transformation through adaptative design. This was done either by improving the public's experience of a building, by improving its potential for social interaction, by disrupting monolithic mono-functional structures, by addressing the very real need of access to the city and its inherent opportunities, or by preserving traditions or memories of the past.

In all cases, the students built on the theoretical framework offered by the studio seminars through a careful reading of the specific character of the existing building, following the narratives provided by the tension between the found form and the new demands brought about by a changed context. In every case the existing was evaluated for what it might offer. Through a series of imaginative explorations, interventions involving various combinations of preservation, erasure and addition, were tested for how they might unlock the hidden potential of these found buildings to contribute to social transformation through their spatial and material adaptation.

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A BIOMIMETICS-BASED DESIGN METHODOLOGY

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Abstract

We present a design methodology for a community library based on the application of biomimetics, a field that drives inspiration in models, systems and features from nature to solve complex human problems. In architecture, it is a philosophy that works towards solutions based on natural forms, but instead of replicating these, the aim is to understand the rules by which these shapes are governed. (Pohl e Nachtigall, 2015)

The methodology is divided into the following phases: (1) registering the site through sketches focusing on topography, vegetation massing, physical boundaries, man-made or natural landmarks, geometric patterns and textures; (2) generating both framework and stereotomic physical models based on these initial sketches; (3) extracting typical sections from models to understand its geometry and 3D scanning these sections in order to produce a digital model in Revit software; (4) building a laser-cut large-scale physical model of the site for massing studies; (5) combine site analysis with Agkathidis (2017) form-generating biomorphic processes in order to test possible solutions and choose a specific strategy; (6) initiate preliminary design phase by adding specific contemporary library program (Worpole, 2013; 2004; Jakovlevas-Mateckis, Kostinaité, and Pupeliené, 2017) and site requirements.

Adopting biomimetics in architecture may be especially effective while dealing with a site where nature is prominent but not properly applied into the design. To test the proposed methodology we selected a site located alongside a main city river in an underprivileged neighborhood occupied both by formal and informal houses. Although situated in an urban environment, next to a river with high pollution levels, the site is characterized by vast mangrove vegetation and wildlife. Buildings are mostly small prismatic-shaped residential structures, organically set in the landscape with different heights and construction materials.

Based on these conditions, we found that the biomorphic strategy of "branched blocks" (Agkathidis, 2017) would fit the spatial needs of the library and the fragmented nature of the site overall building massing. The rational of the branching derives from the mangrove roots' system, which is composed of a main body from which secondary support branches originate. This system is applied on the library's layout by positioning the main social spaces in the center of the plot and branching

the remaining spaces out, towards the edges. The program inside the fragmented building happens according to the similarity of uses and library contents, which are related to the needs of the local community.

Another strategy used was "hills and valleys" (Agkathidis, 2017), which consists of a waffle structure roof that rests over the building blocks and generates shaded areas that become social spaces. This was a way to unite the library fragmented program by keeping it within a continuous roof, as well as to make it resemble the vegetative massing through mimicking the varied levels of the tree canopies that form an undulated surface. The placing of the undulation's highs and lows is related to the specific characteristics of the site, such as the bridge that connects the opposite sides of the river and the location of the busier streets in the community so that those can serve as access points to the library.

In architecture there are many possibilities when it comes to form-generating strategies, for this paper according to the building program and site, the use of biomimetic principles was adopted as a systematical approach with the potential to visually connect building and site features.

1. The path towards biomimetics

Nature has long been a field for scientific observation and analysis, inspiring artists, architects, and designers. This relationship goes as far back as the ancient times gaining momentum when precedents collected in archives of natural science museums helped a larger audience to observe nature. This tight connection has left marks perhaps in all movements in architecture, from the Art Nouveau and Art Deco periods through the Avant-garde Expressionism, leading to the modernist curvilinear profiles of Oscar Niemeyer and Alvar Aalto, and reaching bolder structural plasticity - initiated by Antoni Gaudi earlier in the twentieth century – in the works of Eladio Dieste, Frei Otto and Félix Candela, to name a few. This relationship has been extended to the twenty-first century in several architecture practices, who have experimented with even more ambitious geometries, seen in projects both by the older generation of the so-called star architects, such as Santiago Calatrava, Norman Foster, Frank Gehry, as well as the younger ones, in the likes of Ma Yansong (MAD architects) and Bjarke Ingels (Bjarke Ingels Group).

If nature may be considered "*a laboratory filled with infinite and unique forms, variations of shape, and manifold phenomena and processes*" (Reinhardt, 2016. p.1), biomimetics has become a growing emerging field in architecture and other disciplines that aims towards solutions acquired by mimicking strategies - designs or processes - from nature. That being said, it does not imply that a biomimetic artefact should strictly emulate geometries in nature, but also reflect the understanding that nature provides a large database of strategies that can be implemented towards its design (Badarnah, 2017), therefore nature should be taken as a source of inspiration for innovation and a facilitator of a more sustainable and even regenerative built environment.

An architectural object associated with nature does not necessarily have to resemble natural forms - form is one type of information inherent to structures in nature – but it should rather relate to the materiality of a natural context and be integrated to it, attempting to generate a balance to the point where form and natural context merge into one. Nowadays architects have been increasingly

making efforts to go further than replicating nature's geometry and order, aiming to enhance "*environmental, structural and material performance by learning from the mechanisms and properties found in nature*" (Agkathidis, 2017, p.8). When it comes to complex affordances and relations between form, material, and structure, solutions deriving from nature are limitless, providing unique variations that develop based on rules, reacting as specific response of a species. (Reinhardt, 2016)

The design methodology we will present here has been applied for design studio teaching in an architecture school with second-year students. It relies on form-generating biomorphic processes as proposed by Agkathidis (2017), a form-finding approach, which, although restrictive, it is one of the possible directions biomorphic experiments have moved towards in the past twenty years or so. As pointed out by Zari (2007, p.2) the design process in this field typically falls into two categories: "*Design looking to biology*" and "*biology influencing design*". While the first refers to solving a design (or human) problem based on how other organisms or ecosystems solve such problem, the other implies in identifying a particular aspect in these and translating it into the design.

According to the author, both directions have advantages and disadvantages. One of the questionable aspects in the path we adopted was that, due to timeframe issues, without the support of a biologist or ecologist, we were not able to look into potential biomorphic solutions through a fully in-depth scientifically understanding. By observing organisms and ecosystems at the site through site visits and bibliographical research, we were aware of the danger of remaining in a shallow level, as we could mimic forms and perhaps certain mechanical aspects of organisms, but it would not be possible to replicate chemical processes in these organisms without scientific collaboration. On the other hand, "*Despite these disadvantages, such an approach might be a way to begin transitioning the built environment from an unsustainable to efficient to effective paradigm*" (Zari, 2007, p.3).

Considering the two main routes in the field (design looking to biology and biology influencing design), Zari (2007) proposes a framework categorized in three levels - organism, behaviour and ecosystem – and to what extent each of these act upon, including: form, material, construction, process and function. While mimicking part or a whole plant or animal would characterize the organism level, the second level would imply simulating certain behaviour (one aspect or a larger context), and, in the third, whole ecosystems and common principles pertaining to their operating parts would be emulated. The levels of operation relate to the organism or ecosystem taken into consideration. So, *form* would refer to what the design looked like; *material* to what the design was made of; *construction* to the way it was built; *process* to how it operated, and function to how it worked in a larger context.

Taking this structure as an initial model, the project we will present later in this paper adopted a hybrid framework, tagging along the "*design looking to biology*", considering that forms and patterns inspired by nature have the potential to negotiate with building site and structural issues, and, mainly, organizational (or programmatic) aspects of the design problem. Instead of mimicking the exact shape of an organism – the roots of the local mangrove – the proposal took advantage of its systemic logic in relation to programmatic and spatial aspects identified as positive in contemporary libraries, as well as its fragmented geometry, a characteristic encountered in the predominant building massing at the site. In regards to replicating

a pre-existing form, it was understood that the site's peculiar setting, although man-made – a partially urbanized *favela*-, was an irrefutable natural element that should be addressed. As a response to these conditions the experiment dealt with two of the design strategies studied by Agkathidis (2017), branched blocks and hill and valley.

2.Notes on the methodological approach

Overall, the proposed methodology departs from the standpoint that learning design can be facilitated by focusing on emphasizing the importance of its process and, at the same time, valuing the informed architectural idea by taking into consideration the active reflection on that process and idea (Voulgarelis and Morkel, 2010). Based on our experience, it seems that it is not uncommon to witness a lack of formal methodological approach in studio teaching at architecture schools. Gross & Do (1997, p.4) refers to students enrolled in design studios to be learning "*the 'how to' skills through imitation of their teachers and more senior classmates (…) every student must independently develop her own process of method of design". It is the rare teacher indeed who shows students how to follow a systematic method".* Through the method we will describe in the next section, we aim to recall the significance of the design process and its effectiveness in the development of a strong architectural idea, which we claim to be often not taught in design studios.

According to Zeisel (2006, p.22) there are three elementary activities analytically distinct from each other in the design process: "*imaging*, *presenting and testing"*. While applying specifics steps within a particular field (biomimetics), our methodology aims to allow students to experience all three spheres. Defying the popular myth that the use of imagination is the most important component of creative action, *imaging* means going beyond the information given (Bruner, 1973), as it carries subject knowledge and represents a mental picture of a part of the world, offering a "*larger framework within which to fit specific pieces of a problem as they are resolved*." (Zeisel, 2006, p.23).

Presenting a design, on the other hand, relates to externalizing and communicating the *imaging*, occurring in many ways - sketches, plans, models, and photographs -, including both variety and reduction, as the more specific drawings are, the more they exclude further detailed possibilities. Finally, *testing* takes place when designers step back and examine critically what they have produced, which could happen on their own or in groups (Hillier, Musgrove, and O'Sullivan, 1972).

Amidst the increasing use of digital tools in the design process, in and outside architecture schools, and even more so of parametric software, the *testing* phase has become more dynamic due to the possibility of manipulating drawings and models directly, which influences users to go beyond simply editing the geometry of a building, thus facilitating the expression and exploration of the design intent itself by allowing alterations based on associative rules created by the designer. Although parametric tools optimize a broader multitude of possibilities in less time than traditional design approaches do, perhaps the most relevant aspect is its use both as a tool and an integral part of the design process (Lynn, 2013).

The design process in architecture is mostly iterative, as designers conceive solutions that lead to new issues, which are then investigated to produce new or

better solutions. In parametric design, intuition gives room to precise techniques to reach solutions that originate results responding to rules and inputs. This type of rational, in its essence, is independent from the computer, originating from Mathematics as an iterative process based on relationships between objects, as opposed to fixed metric quantities (Meredith, 2008).

Even though it has been said that what is natural and easy to do with our eyes may be difficult to be done through a machine (Knight and Stiny, 2015), the advancement in modelling complex 3D geometries inevitably increased the problems designers had to deal with, motivating the use of parametric software in architecture, as it eases the specification of relationships amongst the various modelling parameters. In the methodology to be described next we have employed both analogue and digital procedures.

3.Methodological phases

The first phase consists in stimulating students towards *imaging* the site. Of course the issue surrounding the definition of a site – what a site really is, and so forth - is highly complex, but a common point seems to be that the construct (of a site) is extremely important in order for architecture to develop. Thus, we acknowledge that before the design process begins, information about the site or place of intervention should be gathered, and that, once the representation of the site analysis begins, so does the design process itself. (Baudoin, 2016)

After an initial lecture on the application of biomimetics in architecture and prior to visiting the site, students are shown the first *presenting* format and the set of minimum aspects they should observe during the actual field visit, which consist of the following: Topography, vegetation and building massing, physical boundaries, man-made or natural landmarks, patterns and textures. The site to be worked upon is previously divided into different quadrants, whose quantity varies pending on the characteristics of the chosen location and the number of students. Such delimitations do not relate to specific physical boundaries, acting instead as a way to facilitate approaching portions of the site in a more detailed manner.

Each group, pair or individual student is assigned a quadrant they should register during the visit. Based on the afore mentioned aspects, each area should be illustrated through black and white hand sketches over white A5 size sheets of paper. Students are advised to utilize simple, abstract line drawings, avoiding detailed realistic tri-dimensional representations. During the site visit, then, photographs and sketches are captured and produced as previously suggested.

Back in the studio, students gather to reconstruct the site using their sketches to form what we call a patchwork map. The teams select which drawings should be placed over a digitally projected image of the site showing all quadrants. After finishing this patchwork, each team is asked to comment on one of their peers' quadrant, so they express verbally what the drawings (they did not do) elicit regarding the prescribed set of aspects to be observed at the site. Then students are asked to take a second look – or *testing* – at the patchwork and decide whether sketches should remain as originally placed or relocated, or even removed off the map. The final layout of the site patchwork is registered through photographs. (Figure 1)

Baudoin (2016) discusses the problem of site studies in architecture in four

themes, approached through different case studies and methodologies: defining, experiencing, spatializing and systematizing the site. Defining the site refers to constructing it by using the power of reduction in representation to help clarify the initial attitude and intents. Experiencing the place introduces two representational types: *composite montage* and *topography*. Borrowing from the Bauhaus' collages, Baudoin (2016) shows the technique proposed by James Corner that integrates fragments of images from other sources to convey a composite, resulting in an open-ended representational system.

Topography focuses on drawing the ground, the most basic aspect of a site, which can be easily seen sometimes (for instance, on hillsides, valleys, cliffs and edges), and other times reveal itself subtly, as in a landscape looking apparently flat. Based on the figure-ground studies in Collage City by Rowe and Koetter (1983), *spatializing* the site implies in hybridizing analysis and design, blurring boundaries between both. The figure ground is used as a tool for understanding space, and, at the same time, a technique that can lead to distinct results through the manipulation of aspects "*in the black of the figure or the white of the ground*"(Baudoin, 2016, p.5). Lastly, *systematizing* the site is taken as a complex order of assembled of relatable parts, and relates to the use of a systemic view of the site, which can be applied to different aspects, such as flow (of people and objects) and infrastructural networks.

Considering the relatively compact timeframe in a design studio, the intent of our design methodology is to address all these themes concisely, in which the patchwork map plays an important and initial role as it combines, to some extent, portions of all four themes, later adopted more specifically in subsequent phases of the design method.



Figure 1. Patchwork site map with sketches from design phase 1.

Complementing the patchwork map, in phase 2 students produce physical models. Based on representations from initial sketches of the predetermined site quadrants, they are asked to extend these into two types of 3D models: A stereotomic form and a framework-like volume. We borrow from Frampton's (1995) take on Gottfried Semper's work that, the author claims, broke away from the Vitruvian triad (*ultilitas*, *firmitas* and *venustas*) by differentiating elements into the categories of heavy/ stable stereotomics of the earthwork and lightweight tectonics of the frame. For the extent of this paper, it should be sufficient to state that the first category implies in a more solid, massy looking building, whereas in the other, the architectural artefact should be more light-weight, resulting from linear components assembled to give shape to a spatial matrix.

The models should be placed on a solid black-tone rigid base measuring 30x30cm. For the steretomic object, students were advised to use modelling clay or similar as the main material, while for the framework model they could utilize

preferably wood sticks or wire mesh. (Figure 2)

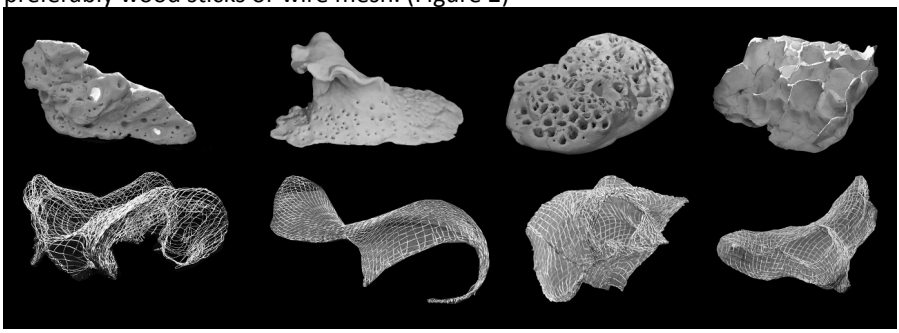


Figure 2. Stereotomic and framework models from phase 2.

By having students deal with materiality issues, although initially in a less controlled manner, we try to blur the gap between site analysis and design, and, at the same time approach the intrinsic relationship between architecture and material or the poetic of the constructed form in the Greek sense, referred to by Frampton (1995) as being an act of making and revealing. In a more practical sense, students start from early on to give an architectural shape to an idea extracted from the nature of the building site, which could later go through other stages and be revisited, tested and transformed to negotiate with other aspects of the design, such as program and orientation.

The same procedure is repeated for the two types of models, and similarly to what was done with the sketches, the objects are placed over a projected image of the site with quadrants, allowing the students to have both a stereotomic and a framework tri-dimensional patchwork map of the site (Figure 3). Each model is photographed against a neutral background prior to being manipulated in the next phase.



Figure 3. Tri-dimensional patchwork map of the site from phase 2.

Phase 3 focuses on further understanding the geometry of the physical models by manually extracting sections from these, registering them and importing their profiles to the digital environment, so that these can be reconstructed in order to generate a digital model. Students are advised to slice the stereotomic object they had previously built into 5-6 sections at equal intervals. Each profile is labelled, and then photographed in a way to allow sections to be captured as orthographic projections. (Figure 4)

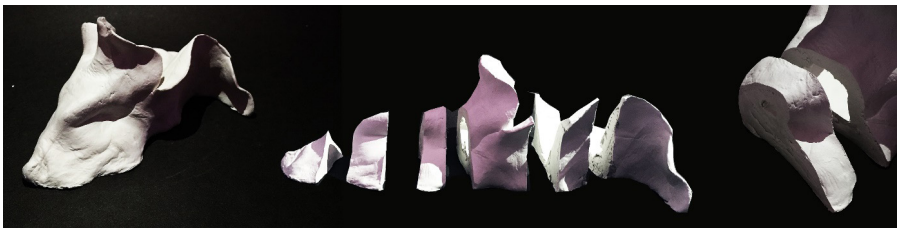


Figure 4. A stereotomic model and the process of sectioning from phase 3.

Once profiles are imported to the computer, students use their preferred software - Revit, Rhinoceros or 3ds Max – to redraw the sections, so these could be reassembled (or stacked) to conform the actual volume originally built manually.

Representational and construction modes are fundamental in architecture, even more nowadays when digital mediums and emerging technologies radically affect form, space and materiality. Orthographic projections (plans and sections) are effective tools to inform about a building. In agreement with Lewis, Tsurumaki, and Lewis (2016), we employ sections in our design process because we believe they should be both a representational and a projection tool in order to help spatial and material invention in architecture, as they are able to reveal interior and exterior profiles, the interior per se, and the materiality that separates interior from exterior.

Iwamoto (2009) refers to the evolution of the traditional concept of section, stating that this type of representation has influenced a digital fabrication method largely used nowadays called *sectioning*. She explains that drawing sections through computer modelling is not necessarily a bi-dimensional exercise, becoming more of a process of sectioning a tri-dimensional object that was digitally generated. Particularly in the case of non-Euclidian geometries, as most of the stereotomic models proposed by the students, slicing a volume is an efficient operation timeframe wise, revealing the formal and spatial nature of the object.

So, by utilizing sections at the very early stages of the design process, we ratify their ability to illustrate, test and explore architectural designs. Besides, as architecture needs to respond to gravitational (vertical) and wind (lateral) loads, sections may be able to provide the material investment and spatial invention necessary for a building to respond creatively to such loads (Lewis, Tsurumaki, and Lewis, 2016). In the proposed methodology students practice sectioning both analogically and digitally, which facilitates familiarizing them with the active role that these tools should have through the entire design process.

Phase 4 is a more production-oriented stage aiming to building a collective laser-cut large-scale physical model of the site for massing studies. Based on quadrants established in phase 1, the groups prepared a digital site plan to be used for laser cutting its parts in medium density fibreboard (MDF). The various labelled and cut parts were then taken to the studio where model was assembled collectively. The scale of the model varies per size of site, normally set at 1:500 to 1:1000. (Figure 5)

Various types of physical models are produced during the design phases. As stated by Philippou (2001, p.12) "*the craft of making functioned as a vehicle for thinking ideas in concrete matter"*, we agree that, although different in nature – clay, wood, laser-cut MDF – models are all used towards processing, idealizing and

reflecting upon the design, also working more pragmatically as *"an easy graphic form to access visually and verbally for both student and lecturer*" (Voulgarelis and Morkel, 2010, p.2).



Figure 5. Site models from phase 4.

In phase 5 the goal is to combine the site analysis done in previous stages with the types of biomorphic strategies proposed by Agkathidis (2017), which consist of various form-generating processes. Students are asked to associate their bi-dimensional and tri-dimensional representations for each quadrant with a specific biomorphic strategy, adding more controlled procedures towards the materialization of the object.

Agkathidis (2017) suggests three main groups of biomorphic design: Water, earth and geological formations; plants and branching systems, and animal structures and properties. To illustrate each one the author goes through case studies, which develop in the following design phases: analysis, morphogenesis, and metamorphosis. While analysis is the starting point (which relate to the elements themselves referred in the main groups listed above), the next two refer to the morphogenetic methodology and their potential for transformation into architectural solutions.

Case studies associated with the first group include geometries relating to the form of hill and valley, influx, caves and erosion, and liquid contours. To illustrate plants and branching systems, the author describes branched blocks, a tree-shaped canopy, and two other structures named *callipod* and the rose pavilion. Lastly, in regards to animal structures and properties, the artefacts and studies are materialized as a gradient transparency, a snakeskin, a bird's nest, dream vaults and a speculation on how error can be used to optimize design.

Based on our experience in the studio it seems that most students somehow tend to experiment more often with the formalizations of hill and valley, branched blocks, tree-shaped canopy and bird's nest. In the case we will present to illustrate the methodology the first two were applied in the design of a community library (Table 1).

Biomorphic strategies	Morphogenesis	Metamorphosis
Hill and valley 	An algorithm to generate a deformed surface in the shape of hills and valleys. The study mirrors the trajectory of the water through paths.	The generated typologies work as spatial prototypes for a spa, containing caves, hills and valleys which house mainly pools and saunas.
Branched blocks 	Based on observating how plants branch out, an algorithm is generated to organize branches in the shape of cubes.	The resulting form translates the prototype in a more organized manner, materializing through the accumulation of cubic spaces
Tree-shaped canopy 	A formal exploration of a tree which takes into consideration its structure and capacity to handle structural loads	The final structure is a 1200 sq. meter canopy that mimics both the appearance and the structural capacity of a tree.
Bird's nest 	A structural typology where each element is supported by the other, meeting one another, although not at vertexes.	Based on this strategy, various shapes of shells were created, including their finishes

Table 1. Some of the biomorphic strategies and their respective phases as proposed by Agkathidis (2017).

As Allen (2017, p.10) puts it, "*architecture is not so much a living body as it is the stage, or frame, for program and event… the resistant framework against which, and upon which, life unfolds*", thus in phase 6 requirements pertaining to specific programmatic aspects are added to the design process, followed by site orientation.

Instead of introducing program to manipulate space, the intent is to let the space that already emerged in the volume generating process to manifest itself. First, without being labelled according to a formal programmatic content, space starts to be defined within the delimiting surfaces and the topological properties inherent to these, such as "*proximity, separation, spatial succession, enclosure and contiguity*" (Vyzoviti, 2004, p.10), which configures a sort of abstract program. Then, an itinerary through succession of movements of a human body is introduced and reacts upon the preliminary spatial configuration. Organizational diagrams begin to emerge as architectural properties are attributed to these, starting to negotiate with parameters of program per se, material, and site context.

The architectural program varies pending on the problem being dealt with, such as the community library we will present next. From this phase on students proceed with design development, through revisiting previous phases, testing and addressing complementary issues, including building code, accessibility and overall design refinement.

4.Case study: On biomorphic responses

Biomorphic design responses are related to site and programmatic aspects. The site choice, an abandoned plot in an underprivileged community by the main river in the city of Recife, in the Northeast region of Brazil, was due to its proximity to nature, luscious mangrove vegetation and lack of public libraries in the area. During field visits several aspects were analysed, such as height of the existing buildings (varying from one and two-story), land use (mostly housing), as well as relevant spaces for

the community, whose leader informed during a meeting about their on going desire for a library in the area, materialized in an improvised reading spot furnished with donated furniture and books they had named the *Rioteca*, an anagram in Portuguese referring to river and library.

The form generating process initiated by responding to the fragmentation embedded in the way small buildings sit close to one another in the site, as well as the varying heights of existing trees and building masses, which led to adopting two of Agkathidis' (2007) strategies, "branched blocks" and "hills and valleys". (Figures 6 and 7)



Figure 6. Associating the site with the branched blocks design strategy by Agkathidis (2017).



Figure 7. Associating the site with the hill and valley design strategy by Agkathidis (2017).

Branched blocks, consisting of volumes branching out of each other, was first applied to the building itself, relating to the roots of the mangrove vegetation and to the spatial organization of the seven subjects chosen for the library volumes, which followed the rational of similar or correlating subjects being closer to and connecting one another. So, the way subjects are spread throughout the space (together with the use of open shelves) would allow the user to explore new volumes within each area of knowledge more dynamically, as suggested by Roth and Schütz (2011), which relates closely to the branched blocks strategy, as it would facilitate the branching of said subjects. (Figure 8)

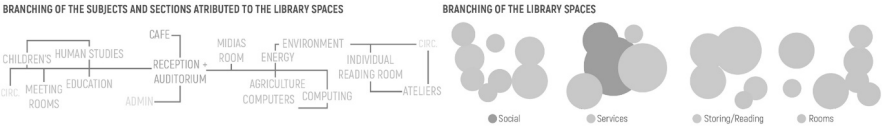


Figure 8. Branching of subjects and main spaces in the proposed layout.

Floor plan wise, a branched layout with circular-shaped spaces was adopted. This was to due to the circle's edgeless simple geometry and its ability to deal

with the existing building mass in a more neutral manner, besides utilizing 15% less construction materials than rectangular shapes. Circular shapes also provide better air circulation and natural lighting, as they perform more efficiently with solar insolation and winds through non-perpendicular façades, minimizing its wind load impact as physical barriers (Paraxo, 2014). Six different diameters were applied to the circles, working as cells laid out according to the following branching principle: Whereas larger circles were placed at the central portion of the site, smaller ones were added towards its periphery. (Figure 9)

As for the hills and valleys strategy, it mirrored the undulated profile extracted from site sections (showing varied heights of buildings and natural elements), which materialized in the waffle-structured roof resting over building blocks allocated for enclosed spaces and shaded areas for social activities (Figure 10).

Combining both biomorphic strategies, one could say that branching the program in blocks protected by a floating roof allowed to minimize the ground floor coverage while maximizing permeability, as the intervals in between branches (suspended circulation and blocks) let natural light penetrate through the building. Systemically wise, this is the same logic of the mangrove itself, whose aerial roots let natural light through its branched structure. By mimicking the existing houses on stilts that are, although precariously built, a smart solution for areas subjected to floods, such as the case here, the proposed ground floor on *pilotis* maximizes access and uninterrupted views towards the mangrove vegetation and the adjacent river, providing spaces for relaxation, reading, and playing. (Figure 11)

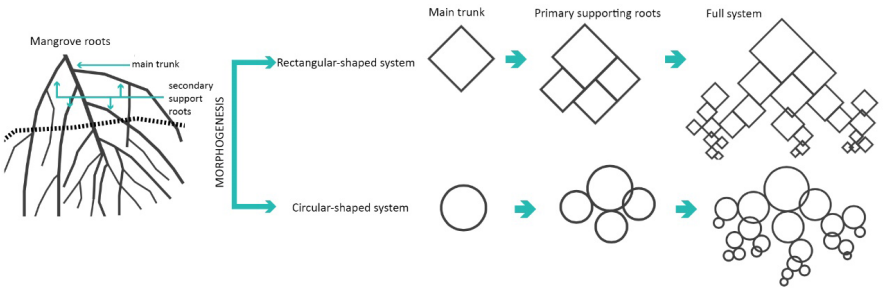


Figure 9. Branched block biomorphic strategy applied to the building spatial configuration.

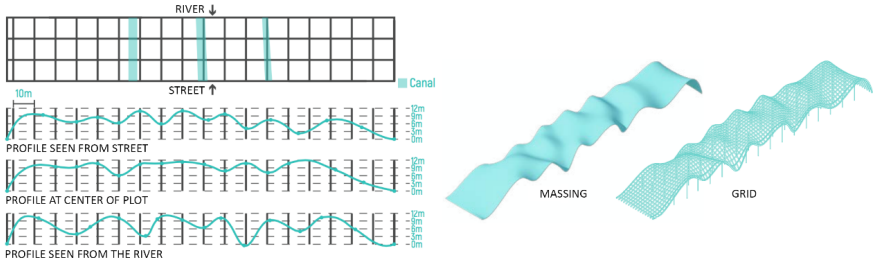


Figure 10. Hill and valley biomorphic strategy applied to the building roof.

5.Case study: Biomimetics meets contemporary library concepts, organizational systems and layout

For Worpole (2004) libraries have turned into places where one is as likely to do their homework, take part in an activity and meet a friend for coffee, as they are to borrow a book. This change, according to Oldenburg (1989), characterizes the library as a third place, a type of space where life must encompass the social realm, a neutral ground designed for social interaction. The domestic and the productive or workplace realms would be the first and second spaces, respectively.

Regarding library typologies, by associating Worpole's (2004) classification with site characteristics, the proposed design turned into a hybrid of the new civic landmark, the neighbourhood lifelong learning centre, and the themed library types. While a city landmark should attract city dwellers towards the site by providing social indoor and outdoor spaces (open square, cafés and meeting room), a learning centre contemplates local community-oriented spaces (meeting rooms, ateliers and collective vegetable gardens), and the themed library relates to the fact that the site is bordered by the city's main river, an abundant mangrove vegetation and a public school, therefore environment awareness becomes a specially important issue. This lead the subjects considered for the library to be human studies, general education, children's literature, environment, agriculture, energy, and technology/computing.

The organization of volumes was set, so that similar or correlating subjects could be closer to and connect one another, a strategy that, along with the use of open shelves, let the user explore new volumes within each area of knowledge more dynamically, suggesting the potential to use a branched block configuration in floor plans.

When it comes to library organizational systems, the traditional Dewey Decimal System (DDC) allows for only one entry and one exit point, which would not be desirable for a linear and fragmented building as the one in question here. The automated Radio-frequency Identification (RFID), containing more user-friendly equipment, such as entrance portals, portable manual readers and self-service terminals, would be more appropriate instead, as locating terminals at each access point would prevent the user from having to walk across the entire library to check a book out.

Departing from Edwards' (2009) patterns, types of circulation were associated to book-stack organization, and to the building morphology itself: rectangular-shaped unified slender space, atrium and other of merging spaces, which later were linked to Liang's (2016) spatial types, specifically juxtaposition, terrace, and threshold, which helped coping with the branched block overall design strategy.

Juxtaposition was materialized through the combination of a cellular and fragmented configuration juxtaposed with glass panels layered with a protective wooden *brise soleil* skin. In regards to terraces and thresholds, these were applied to specific spaces, such as the reading rooms, where terraces and a threshold separated them into sections, or the children's reading room that expanded to the outside through balconies, providing physical and visual contact with the exterior.

Complementary functions reinforce the branched structure. The auditorium and café were located in the central portion of the site, and at West, close to an existing public school and the main direct access to the neighbourhood, there were spaces specifically directed to the community, including the children's section. The

ateliers were positioned at East, in proximity to the proposed vegetable garden and an existing sports field. The rooms enclosing technology/computing subjects intersected with the space for computers, promoting interaction between the two, which also happened to the spaces for meeting and events, positioned close to the human studies and education sections. (Figure 12)

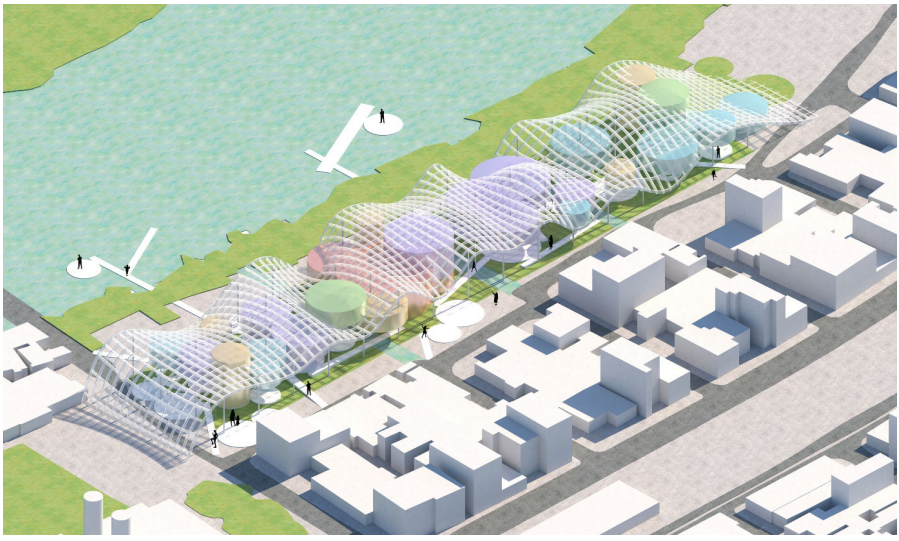


Figure 11. Aerial view of proposed library.

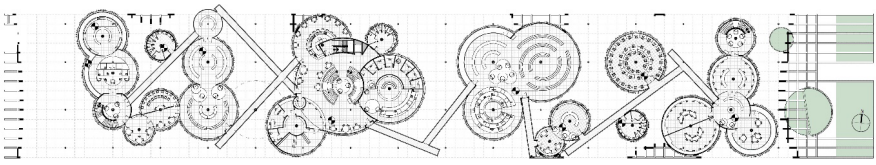


Figure 12. First floor plan.

6.Conclusion

Perhaps it is important to clarify that in the past two decades or so the biological metaphor has been dominant in advanced architecture studies and projects, and that nowadays there are two main tendencies guiding the so-called organic metaphor: natural form as a 'diagram of forces', based on D'Arcy Wentworth Thompson's description, and the direction that looks towards the collective behaviour of ecological systems. Acknowledging that our methodology remains mostly on the first path, we are aware that the form generating focus has conceptual and procedural limits, in the sense that they might resemble nature but not necessarily retain its performative or adaptive complexity (Allen, 2017). Although, at times, taking a partial or selective view of nature, we believe it to be useful in the learning process since the proposed methodology seeks to engage students in an active and method-oriented design process.

Balancing different kinds of media, we have encouraged students to actively build various working models, possibly the major activity in the studio, alongside

sketches, drawings and digital modelling, which, together concurred for the development of projects. The fact that tasks were broken down by phases helped to keep workflow at a tangible pace, which the vast majority of students seemed to handle with ease. Besides, during and after each phase, since there was always a construct involved - a sketch or a model – the communication process through ideas and critiques, both from professors and peers, was quite efficient and productive.

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A NEW FUTURE FOR ARCHITECTURAL PRAXIS: CONTEMPORARY ARCHITECTURE AMONG CONCEPT, THOUGHT AND RHETORIC

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Abstract

On one hand architecture praxis includes two inherent aspects as the architectural thought which lays at the background of the profession and the practice on the field, and on the other hand it also has two methods on its' communication, rhetoric and drawing. From another perspective it uses signs to communicate its function and meaning. This communication is rhetorical when it induces its perceiver to use or to understand its' nature. Movements in architecture, such as the Gothic, Baroque or the Revivals Style, promote certain values and beliefs, and can be studied as rhetorical movements. Without any doubt, architecture is a language. Like linguistic communication, architecture consists of codes, meanings, semantic shifts, and syntactic units. It seems that most visible in recent arguments of the designing space and definition of architectural concept is creating an argument of "A New Future for Architectural Praxis", which argues that making the connections among both the complexity and contradiction on the nature of the architecture and other disciplines related with creating a space. On contemporary architecture, architects are interested in concept creations more than articulating a theory of architecture on its' rhetoric comparing to the early 20's modernism; it seems that recently the single most important challenge is confronting eco-friendly and easy living spaces on a future-sight of the world, whereas mostly architects are focusing on Utopic concept creations including almost on Baudrillard's simulacr and simulacra theory. Thus, the paper will have the story of contemporary architecture among concept creations, architectural thought, confronting eco-friendly and easy living spaces on a future-sight of the world toward rhetoric of architecture.

Introduction

Architecture has been formed under movements such as Gothic, Baroque, Revivals, and etc. during pre-modernity, while inside a movement similar architectural features have been shaping on building stock. During this period, architecture was a practice which was put through by using of local materials and traditional production methods. On the other hand, before Modernism, architects used architectural representation on a rhetorical reason since Renaissance. Beginning since modernism, architectural production started to be changed into praxis as having two aspects as the architectural thought which lays at the background of the profession and the practice on the field, that were inherently included. It is seen that it also acts over two methods on its' communication, rhetoric and drawing. It can be said that there is a paradigmatic structure on architectural representation and as a profession, architecture became an integrity/ unity of expression on inherent professional jargon, design thought and practice, which is known as praxis. The architectural thought of modernism included an international overview, which was timeless and beyond the context, whereas contemporary architecture can be defined as colourful, as full of forms, moreover than this it can be characterised as searching of concept rather than sensitivity of including context on different personal point of views of architects. On some examples, it can be also said that searching of conceptual creation brought architects to create projects almost up to utopical designs. Thus, it can be said that the contemporary architectural production included some examples that are formed almost as if they are a part of Baudrillard's simulacr and simulacra theory and current building stock is formed under timeless extravaganza.

Historical Background of Design and Rhetoric in Architecture

Beginning from the Ten books on Architecture of Vitruvius, including the Four Books on Architecture of Palladio, De Re Aedificatoria known as On the Art of Building of Alberti, till Delirious New York of Rem Koolhaas, and Yes is More of Bijark Ingles there has been always one masterpiece book of the era, sometimes a treatise but mostly a text to criticise the soul of the architectural praxis of its' age, along with the developments on architectural styles, at first during the pre-modernity as long period effects of styles, and after modernism even as individual attempts of personal choices. There have been important 18th century architects, who were also authors, such as Horace Walpole, without any doubt their exchanges between literature and architecture offer, by the definition of Morrisey (1999), "a rhetoric of architecture" to contemporary architecture. On his book, From the Temple to the Castle, he interested in articulating a theory of architecture, which might facilitate a way of making connections between architecture and other disciplines. It seems that Gelertner's (1995) synthesis can be an entrance to understanding how literature might contribute to architectural design theory. Here Morrisey (1999) makes a suggestion, the idea that an architectural form is shaped by its intended function, which can be understood as *form is function*, and that suggestion overlooks that many buildings have a form that is more than what is required by their function. He suggests that according to another theory of architectural design, architectural form is generated within the creative imagination, or in Morrisey's (1999) words architectural genius. According to Gelertner (1995),

there are nevertheless similarities between buildings, and according to Morrisey (1999) this makes it difficult to cite them as isolated examples of architectural genius. He argued that architectural form is determined by the prevailing social and economic conditions; however, Morrisey (1999) puts through that similar economic conditions can produce a variety of different forms and defines that as for the belief that architectural form derives from timeless principles of form that transcend particular designers, cultures, and climates. Here it should not be forgotten that according to Gelertner, today only a few architects would argue that the Five Orders provide all the architectural knowledge of a practicing architect needs. On the other hand there is a general point of view that the prevailing Spirit of the Age is shaping the architectural form. As the history of architecture invites both spatial and stylistic consideration of form of shaped spaces out of styles, such as Romanesque, the Gothic, Baroque, etc. as Mies van der Rohe claimed that, "architecture is the will of the age conceived in spatial terms."" Thus, in the terms of classicism of 17th and 18th centuries, as a mechanism for creating spaces with reference to shapes -a ratio of human height to the built height, or of the built height to built width, etc.; therefore, the proportion would then be one way of understanding architecture historically. Horace Walpole's critique of proportionality points out that by the mid 18th century in England architecture no longer uses form to resolve determinate historical conditions, that architecture is no longer the will of the age expressed in spatial terms per se, says Morrisey (1995). He adds (1995) that what is called as a form, created the impression and that which is called form could disprove it. It is for sure, according to Franco Moretti (1988), the study of historical products organized according to rhetorical criteria, and he also offers a way around this impasse in design theory a treat form as rhetoric. Morrisey (1999), suggests that, "the problem that then haunts literary and architectural theory after Walpole is that people mistake rhetoric for form". Then he touch to Walpole's work and says that he suggests that form is rhetorical. That is why form can be apprehended as content; both form and content are rhetorical. moreover, it is precisely because form is rhetorical that it can be apprehended as content or that there can be a content of the form. Therefore a suggestion is came through, both form and content are rhetorical.

It seems that architects are concerned that linguistic approaches to architecture would separate architecture from what is thought to be its most important part, the hierarchical harmony on parts of the whole composition, with another words on forms and their total imaginative integrity. During 20's, Le Corbusier articulated modernist legacy. According to Boyer and Mitgang (1996), "It is a question of building which is at the root of the social unrest of today." Here Morrisey (1999) says that the concern is which considering architecture in literary, terms means a loss of architecture's social commitments. Thus, it is clear that what is rhetoric is also social and is also political, just like as architecture is too. According to Frampton, as in literary-architectural terms, rhetoric is "critical" and "contextual". Here Morrisey (1999) tells, "Saying that literature or architecture is rhetorical does not mean that either of them is somehow separate from social or political situations; instead, it affects how one imagines connections between the aesthetic and the historical". Burke (1967) says that, "critical and imagination works are answers to questions posed by the situations in which they arose, with the important proviso that, and adds, the situations are real" (1967).

In architectural production, which started to be formed by personal preferences/ choices in modernism, a design thought background was formulated and acceptances were the first born ones, then manifestos appeared and project process only then could started to be formulated as affirming manifestos. The form is important in International Style, but it is also far from the context, rather than being relevant to the location and contextual preferences of the place, it emphases the simplicity and innovation. On the other hand, the ornament could not pass away to the other side as being *old*, or being a symbol of *the other,* remaining from the past; the ornament was equivalent to *the murder* in architecture. The form would now take the road alone. In this context, the choice of materials became more important, and, the black-and-white harmony reached forward with the sibling in addition to the basic colours such as red, blue and yellow. While de-forming is popularized with Deconstuctivism, the histographic background included re-form, de-form continuity / or controversy in different examples. In contemporary architecture, the concept seems to be *the dominant runner* on the race in between the concept and the context. Such a conceptual based perception has been born that the relationship with the ground put to the shelf. For this cause, by a Baudrillarist approach it can be discussed that the concept becomes simulation full of simulacrs in different sizes, little or big, but alway in *the game*. However it should not be forgotten that, every approach has been put forward as a part of architectural thought background of manifestar point of view all through these epochs, as rhetoric moves by the conceptual victory on project production in architecture.

Contemporary Architecture Among Concept, Thought and Rhetoric

On his masterpiece Leach (1997) suggests that, "The discipline of architecture has gone through something of a metamorphosis in recent years. There is evidence of a clear shift both in the nature of debates within architecture and in its relationship with other academic disciplines. Not only are architects and architectural theorists becoming more and more receptive to the whole domain of cultural theory, but cultural theorists, philosophers, sociologists and many others are now to be found increasingly engaged with questions of architecture and the built environment. This volume was born of a desire to support this development, and to reinforce these links. It attempts to situate architecture within a broader cultural context, and to consider not only how debates from cultural theory, philosophy and so on might begin to inform a discussion about architecture, but also how architecture and the built environment might offer a potentially rich field for analysis for cultural studies and other disciplines".

Parallel to the demeanor of architectural project in pursuit of concept, it does not mean that the final architectural production is always in success and/ or becoming a succeeded one. As defining the process of designing as a triangle, which has three corners of the project itself, produced structure/ architectural result and searched concept, is thought that the basic foundation formula of triple sheet pillar, as the sub-pieces of an architectural meaning; it is not always seen that there is a harmony among these three endpoints, which means there should not be a succession in an architectural point of view always. The essence of the architectural expression which exceeds representation and surpasses to rhetoric, from a Baudrillarian point of view, could have simulative results; the results that

acts as if they are something else; they pretend to be something else; there can be replica productions; architecture in that point pretends to be like something, but actually at the end it produces something else in a result; it can be said that there is a copycat in the garden of producing; there is an architectural synthesis in the shape of *mimesis*. Thus, it can be said that what once with modernism and the avant-garde, postmodernists reject realism, mimesis, and linear forms of narrative, once again was born in contemporary architecture.

Here, it seems that it comes to a point where Ingles (2010) said once as "Yes is more", and touched to the suggestion of Darwin, "It is not the strongest of the species that survives, nor the most intelligent. It is the one that is the most adaptable to change". Thus, he can make a contemporary suggestion to not only the design side of the architectural praxis, but also to the rhetoric side of the field, too, as suggesting *a theory of evolution* in an architectural point of view. He says that, "The traditional image of the radical architect is the angry young man rebelling against the establishment. the avant-garde is defined by what it is against rather than what it is for. This leads to an oedipal succession of contradiction where each generation says the opposite of the previous". Without any doubt, it means that this contradiction comes forward with its' twin-sister complexity in the words of Venturi. Ingles added that, "And if your agenda is dependent on being the opposite of someone else's- you're simply a follower in reverse"; which means you remain avant-garde on your profession. Thus, it seems there are many architects who would like to be named as a pioneer of their ages by making some avant-garde projects on their point of view on contemporary architecture; whereas each and every project should be evaluated by well known worldwide critisesers of course. there is a highlighted complexity lays down at the background of being avant-garde here, contemporary architecture can be seen as *a catwalk of concept contest*, where architects of today would like to catch the best visibility and fast access to be a star architect of contemporary architecture.

Selected Projects and Comments

Antalya Lara Region of Tourist Resort Projects

The most important feature of the Lara-Kundu coastal band, which distinguishes it from other tourism regions in Antalya, Turkey, is the frequent introduction of its' thematic hotels. Starting with the construction of WOW Topkapı Palace Hotel, which was built by MNG Holding in 1999, the constructions of conceptual search based thematic hotel buildings continue without slowing down any day. As someone wander around the area, it can be seen that one may find himself on board of a Concorde or on famous transatlantic Titanic, or can go to another planet in Saturn, or make a visit to St. Mark's Square in Venice, or be a character in Kremlin Palace. This touristic resort region offers a Baudriallarian simulation with many little-big simulacrs as surreal atmosphere on Antalya to clients.



Figure 1. Lara Region, Antalya (from authors' personal Archive)

The construction of eight of the twenty touristic resorts, one of which are still under construction, belongs to architect Hasan Sökmen. Alper Erden Engiz is also an architect of these thematic point of view, who designed four hotels on this resort-land.

WOW Topkapi Palace Hotel

WOW Topkapı Palace, which was the first constructed of the thematic hotels in Lara region of Antalya, Turkey, was built in 1999. The architect of the project is Hasan Sökmen, explains why he built a hotel similar to Topkapı Palace in 2004 in the Hürriyet newspaper Cahit Akyol's report in the following way: 'It would draw attention with its architecture, and it would create the happiness of staying in the palace instead of the concrete mass in the eye of the tourist (www.hurriyet.com.tr). The hotel's features are described in the WOW Hotels website as follows: "Accommodation in comfortable rooms resembling to Harem buildings, eating in Palace Kitchens and Aya İrini, to become cool off by Soultan Ahmet the 3rd Fountain, drinking a wine inside of "Justice Tower" with the magnificent view of Bosphorous and tasting the Ottoman type water pudding in the Mecidiye Mansion and for having many more experiences.." This resort has 1500 bed capacity in 65.000 m2 land.

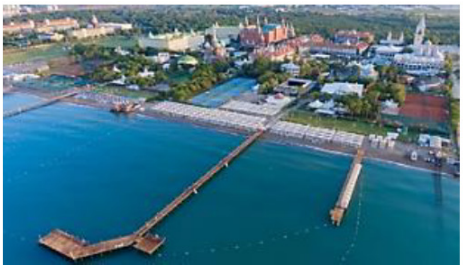




Figure 2-3. WOW Topkapi Palace (from authors' personal Archive)




Figure 4-5. WOW Topkapi Palace (from authors' personal Archive)

WOW Kremlin Palace Hotel

The entrance of the WOW Kremlin Palace Hotel is named after the Resurrection Gate at the entrance of the Kremlin Square. The main building, with its stylish lobby, main restaurant, reception and conference center, is almost a copy of the History Museum. 2002 is the date of the project, which is located on 80.000 m2.

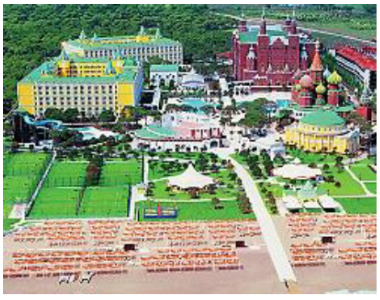
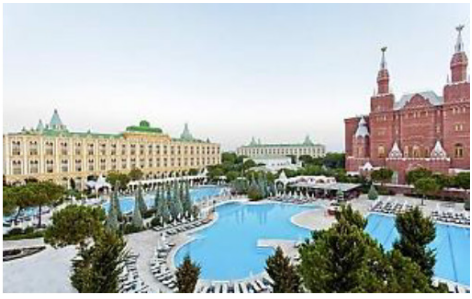



Figure 6-7. Kremlin Palace Hotel (from authors' personal Archive)




Figure 8-9. Kremlin Palace Hotel (from authors' personal Archive)

Venezia Palace Deluxe Resort



Figure 10-11-12. Venezia Palace Deluxe Resort (from authors' personal Archive)

This 37.200 m2 size touristic resort with 1300 bed capacity, by its' Venice City theme, stands among with the other two resorts on the same region designed by the same architect, Kremlin Palace and Topkapi Palace. The atmosphere of San Marco Square was created and the design of the resort belongs to Hasan Sökmen, in 2002.

Vialand Theme Park



Figure 13-14. Vialand Theme Park (from authors' personal Archive)

Vialand theme Park is a 70's Las Vegas type architectural production, whereas in Las Vegas theme space creation started in the design of the luxury hotels. The project is located in Eyüp district of Istanbul, Turkey in 450.000 m2 dated to 2012. Learning From Las Vegas of Venturi, what the strip can teach us about urban planning, David Levene for the Guardian on 2015, February 9th reminds us that, "...what kind of an urban experience has resulted? To a first-time visitor (myself included), the Strip can look and feel like the concretisation of unplanned chaos – with its waves of pulsing lights and scrolling video screens; its "riot" of clashing, garish architectural styles; the wide central river of frequently gridlocked traffic; and the swarms of tourists, all dressed with aggressive casualness and milling blindly every which way. But does it make any sense at all to apply the term "urban planning" to the Strip? Or is this simply what happens when money dictates every aspect of a built environment?" He says that, "The repulsion eventually fuelled a great aesthetic controversy in 1972, when the architects Robert Venturi, Denise Scott Brown, and Steven Izenour published Learning From Las Vegas, which dared to approach the built environment of the Strip on its own terms. By their own terms, "Las Vegas is to the Strip what Rome is to the Piazza". Again he argues that (2015), "the trio declared, having a grand old time enumerating the freakish architectural mini-movements that had emerged there, from *Miami Moroccan, International Jet Set Style* to *Yamasaki Bernini cum Roman Orgiastic* to *Bauhaus Hawaiian*. But they also noted that, while the Strip originally *just grew*, they were seeing the emergence of

the usual building and zoning controls and even a *Strip Beautification Committee.* It gets them worrying: "What will happen to the Strip when the tastemakers take over?" Here maybe it will be a common question for all of these half-utopic, half-f*airytaillish* projects while swimming in *an extravaganza ocean*, what will happen to the architecture at all, when the tastemakers take over? Does always becoming fashionable work to be an avant-garde on the praxis?

IC HOTELS TROPICANA RESORT

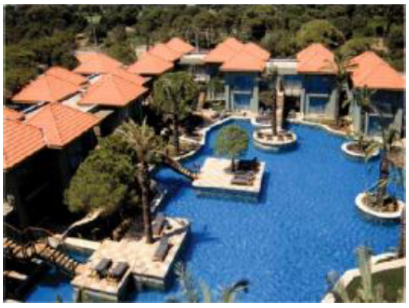
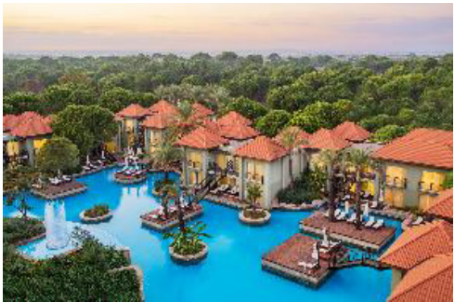



Figure 15-16. Tropicana Resort (from authors' personal Archive)

According to the statement made by Fatih Dardağan in Turizmde Bu Sabah (www.turizm.com) , the architectural feature of the hotel is planned to create a theme in a more flora and fauna environment. Dardağan's description continues as follows, there is a theme designed as a tropical structure surrounded by ponds and gardens, completely decorated by "herbal cover" which is called the Balinese style. So the basicly the landscape is processed here. The main aim here is to ensure that the guests will have a more comfortable and relaxing holiday. It doesn't have an eclectic architecture within a far away point of view. Our project criterias are producing an eco-friendly easy living space, having a comfortable rooms, and inside a comfortably solved landscape. The project offers tropical way of being in a holiday to the clients while being far far away from a tropic forests.

HAPIMAG HOTEL COMPLEX




Figure 17-18. Hapimag Hotel Complex (from authors' personal Archive)

Hapimag Hotel Complex is located in Bodrum, Turkey, on a 87.921 m2 land facing to the Aegean Sea. Project is dated back to the year of 1992, and offers an

Aegean island type holiday to the clients on the main land of Anatolia. Inside of the resort there are many small streets created full of romantic bougainvillea trees standing next to stone small Greek houses.

THE BEAMISH MUSEUM





Figure 19-20-21. Beamish Museum (from authors' personal Archive)

The Beamish Museum is a place it seems it is full of utopic feelings, whereas it is an old English town, in where people are living according to the 19th century life-fiction. It is an open-air museum of today where visitors can have their own personal experiences that could be dated back to 19th century.

TIANDUCHENG CITY





Figure 22-23. Tianducheng, Hangzhou, China and Paris (from authors' personal Archive)

As the *city of Love*, by its' well known title, Paris has been alway an attraction point. So, why not there could be more of it? In Hangzhou, China, with the title of New Paris, a city is created, Tianducheng City in 2007 on 31 km2. It is almost very hard to say if it is an utopic architectural design, or an ordinary concept creation or what else. Replica pairs of avant-garde creations thus can be now seen not only on fashion but also in architectural production, too. There is a long way in between mimesis in architecture and creating a synthesis architecture. It seems, in Ingles words, saying "yes" to all possibilities in architectural production creates mimesis

instead of catching the possibilities of creating a synthesis architecture in between the past and the future.



Figure 24-25. Twin of Eiffel Towers, replica one in Tianducheng, Hangzhou, China and the other in Paris (from authors' personal Archive)



Figure 26-27. Twin city squares, replica creation in Tianducheng, Hangzhou, China and the original one in Paris (from authors' personal Archive)

Zero Zira Island Project, Azerbaijan

While defending "Yes is More" in architecture, Ingles and his firm Big Architects pushed to the button of creating a concept that includes a designing an instant mountain with seven important peaks of Azerbaijan. Even though, it seems that there is an island with a mountain over with seven peaks, in reality it is almost a monolithic residence project having mix-use details inside, and seems as if it is a real mountained island in Azerbaijan. On the presentation brochure with the words of the team, the project is described as "The Seven Peaks are conceived not only as *icons*, but engineered as entire eco-systems, a model for future sustainable urban

development" (http://www.ziraisland.com/downloads/Mipim_brochure.pdf).





Figure 28-29. Zero Zira Island, Azerbaijan (http://www.ziraisland.com/downloads/Mipim_brochure.pdf)

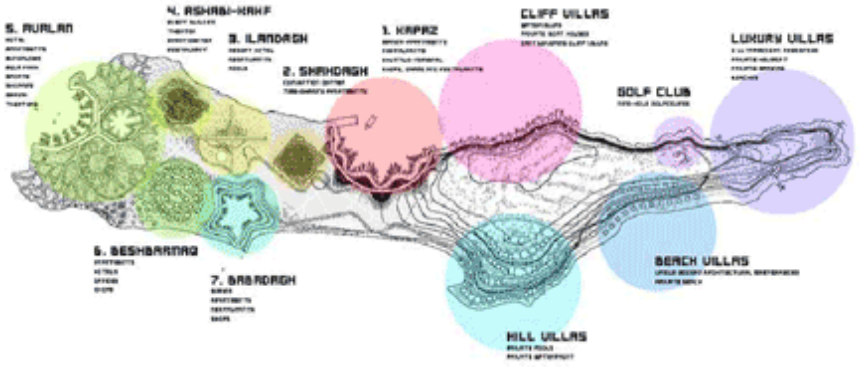


Figure 30. Masterplan Areas and Data (http://www.ziraisland.com/downloads/Mipim_brochure.pdf)

Robot Science Museum, Seoul, South Korea

Melike Altınışık Architects won the project competition of Robot Museum, which will be located in Seoul, South Korea. It is planned to be the World's first pioneer Robot Science Museum. According to the announcement of MAA on their web page (www.melikealtinisik.com) "The competition which was hosted by The Seoul Metropolitan Government called for the ideas to design Seoul Robot Science Museum (RSM) to support public education in robotics and increase the public knowledge and interests in robots". With their words the project is described as: "MAA's design for Robot Museum (RSM) which plays a catalytic role in advancing and promoting science, technology, and innovation throughout society is not only going to exhibit robots but actually from design, manufacturing to construction and services robots will be in charge. In other words RSM will start its 'first exhibition' with 'its own construction' by robots on site in early 2020 and is expected to be completed with the official opening slated for late 2022" (www.melikealtinisik.com). It seems that near future on architectural praxis, including both the design side and the rhetoric will be regenerated so soon in a new jargon and in a totally different point of view.



Figure 31. Robot Science Museum, Seoul, South Korea, designed by MAA MELIKE ALTINISIK ARCHITECTS and Visualisation by Ediz Akyalçın www.melikealtinsisik.com

Conclusion

As new technologies and constructional techniques are developed, by the light of the words of Bijark Ingles, a pragmatic utopian architecture takes on the designing of socio-economically and environmentally perfect spaces, and yet every will of the humankind started to become real as a practical objective; thus, we assume that we are living on the age and land of Yes is More!..

It seems rather than contextual background creation, all of the selected examples are located on *a fictional conceptual bases*, in the words of Sagdic, once indicated on her book chapter titled, Searching of the Concept on 21st Century: A Comparison Between World Architecture Examples and Turkish Architecture Examples, in 2017. She added that, "these fictional conceptual bases are more effectively shaping the form geometry of buildings and contemporary architecture examples all over the world and as it is seen and understood from examples", the geometrical form based on production of extravaganza, "where extravaganza is more powerful on the market, not only to sell the construction, but also to have a place on architectural discourse and history; thus, it is understood that architects", by a deep impact of their feelings, "thus, it is understood that architects are forced to make/ design their creations under *the deep impact* of finding/ creating *a popular concept*" rather than giving attention to context, where neo-liberal economies make everything more easier on this point of view.

All of the above examples are for users to make a kind of "venue experience"; the places used by aristocratic or bourgeoisie which cannot be reached / reached, or places where a life is not possible, to offer thematic fictions for the purpose of making a premium with this feature and with this feature, produced.All examples are copies of a building complex in another city or another country, or even more replicas of a city, independent of where it was built. However, one of these examples, "The Beamish Museum", is a region that is already existed. It has been designed

as an "open-air museum", to present the process since 1820 to visitors, with the improvement of existing buildings in this town-land and by the reconstruction of extinct structures.

As a result of these projects; The history of a town, the important architectural structures of an iconic city, simulating the places of a historical building and presenting it to the user are determined as common points for all examples. Simulative architectures that become part of real life after the film scenes create an artificial reality for the user. In parallel with the rapid increase observed in today's technological age of life, it is inevitable that the architecture will increase.

It seems that as once Ingles said "Yes is more", on the architectural tectonic it might be a new age for architects who would like to say "the strongest of us is gonna be the most adaptable to change" and who is going to create designs for a *robotic production base,* it seems, might be the one who will be standed as the most adaptable to change; who will write down the most appropriate architectural rhetoric. Thus it seems, it will be a proper future for pioneer architects, who might indite the architectural praxis as a formulation of manufacturing of the robotic based tectonic. It might be a future for star architects who will give architectural creations as results of a robotmanship just like to the craftsmanship of Arts & Crafts Movement, and write down a new rhetoric that supports robotic architectural production on the architectural field.

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EXPERIMENTS WITH DIFFERENCE: SIMULATING BODIES IN ARCHITECTURE

KIM KULLMAN

Although simulation techniques are key to architectural form-making, their involvement in anticipating the variability of human bodies remains unclear. This paper describes a series of collaborative experiments with disabled participants and practitioners that set out to investigate alternative methodologies for addressing bodily difference in the built environment. It discusses a range of approaches to simulation, from wearable devices to staged scenarios, demonstrating how these, when treated with care and critical awareness, can enable practitioners to cultivate affective and sensory connection to the experiences of others, which may then lead to more responsive design further down the line. At the same time, however, the paper notes some apparent dangers of simulation exercises and argues that the kinds of empathy and understanding they facilitate have certain limits, as people inhabit architecture in radically disparate ways that are often beyond intersubjective sharing. If unacknowledged, such limits might easily result in unfounded assumptions about corporeality that, at worst, reinforce stereotypical ideas through built form, which needlessly constrain the agency of those occupying and passing through buildings. The paper therefore proposes an orientation that contextualises simulation practices within the lived experiences of different bodies and, above all, recognises the inevitable limits of knowing the other.

FOLDED ASSEMBLIES: A METHODOLOGY OF ASSEMBLING MULTIPLICITIES OUT OF PAPER FOLDING

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Abstract

The current paper addresses a theoretical framework for new pathways, linking rotational procedures, with the embodied act of folding & the role of the handcrafted. By addressing principles that characterize ordered sequences and repetitive qualities within the process of paper folding, a methodology for assembling differentiated surface elements is proposed.

A contemporary process paradigm is unfolded, that relates process and form with pattern and behaviour and designates an architectural model driven by choreographies of inter-relationships and interdependencies.

In an attempt to establish a critical discourse of technical and scientific issues from a differential perspective, it is aiming to define a synergetic system; within a theoretical toolbox of methodological instruments derived from folding processes. It draws an argument about intelligence, performance and beauty for assessing case specific criteria by means of geometric behaviour, material characteristics, manufacturing constraints and assembly logics.

The mathematician and philosopher Whitehead (Whitehead, 2015 pp.36) argued that "*process rather than substance was the fundamental constituent of the world*".

As systematical approach is proposed that generates modular surface elements, out of the inherent properties of paper folding. Modularity is addressed by geometric rules. Scalability is fluctuating within a range provided by the manufacturing constraints of sheet folding technologies.

Materiality and the corresponding analysis direct the application output. This involves an investigation around the definition of folding, both in geometrical and material environments, form finding processes through paper folding experiments and the resultant flat and folded outputs, geometric analysis of experiments' outputs and their implementation into an assembly synthesis. The methodology that drives the assembly synthesis, is built up on the process that generates it.

Folded assemblies as a morphogenetic process, offers the potential for generating a population of architectural outputs. The methodology instead of defining a specific typology for a surface element, describes surfaces as a multiplicity; a quality related

to the processes that drive the appearance of a variety of forms.

Multiplicities are related to process paradigms as interrelated functions of form, structure and material behavior; constraint by assembly logics without differentiating between formation and materialization.

Rather than form generation the primary objectives of the research paper are focused on understanding the origin, flat state, and the sequential processes that guide the evolution of folding. Emphasis is placed on the chains of folding operations. Speculations upon regularities, symmetries and repetitive patterns inform assembly's morphogenetic strategies.

Analysis based on a real scale material combines geometric outputs with a structural system's logic and identifies performative capacities at a local, regional and global scale.

A flow chart that processes all the data into an integrated schema is illustrated as an epilogue for the specific research paper; providing a prologue for potential analysis methods and corresponding applications.

Keywords: morphogenesis, variation, performance, multiplicity, natural patterns

A 'Many' as a system of thought. The Natural Paradigm.

Ernst Mayr states that, *"For the typologist, the type 'eidos' is real and the variation an illusion, while for the populationist the type 'average' is an abstraction and only the variation is real"* (Mayr,1976 pp. 161) .

Modern typological thinking employs the idea of type to standardise norms, functions and manufacturing techniques. This manifestation does not account for the parameter of time; therefore any architecture of performance.

Peter Trummer (Trummer,2006 pp. 351) incites a transition from type based thinking to a population based approach according to the Deleuzian notion of multiplicity. Deleuze writes that *''between form and matter might be a zone of energetic and molecular dimension, a space on itself that deplores its materiality through matter and propels its traits throuh form''* (Deleuze,2003 pp. 409) .A concept related to the processes that drive the appearance of the variety of forms within our world. Multiplicities are related to process paradigms; delineated as interrelated functions of form, structure and material behaviour.

The developmental logics of natural systems suggest a paradigm which focalize on the process of formation instead of a set form. Their architecture is perceived as a system comprised of and working with a series of interrelated systems. It is considered successful in the sense that it uses the minimum amount of material to make their structure and because it is optimized to influence their local environment.

Behaviour rather than form constitutes the generative pattern under investigation. Behaviour is non linear and context specific.

The physical process that underlies the development of living forms is called morphogenesis and emphasizes on the forces that generate them. Within architecture, when morphogenesis is employed as a generative design tool, it facilitates the development of component-based, polymorphic systems.

Morphogenesis comes into view by two processes: differentiation and integration. Differentiation within a system manifests itself as an increase of differences. Integration accounts for an increase in number or strength of system's connections. Patterns demonstrate *''arrays of units that are similar but not identical,*

and which repeat but not necessarily regularly or with a well-defined symmetry'' (Ball, 1999 pp.69).

Like the old saying: They go with the flow, either animate or not, natural systems if given freedom, they organize themselves into patterns and shapes that help them get from one point to another in the most efficient way. It's the natural tendency of moving matter to organize itself into patterns that increase the efficiency of its flow.

Patterns are generated by the interaction of both energy and matter.

A design paradigm following principles abstracted from the natural world exhibits emergent properties. It also evolves and maintains its entity under the process of self – organization. Variable materiality, assembly strategies and iterative geometry operations account for the display of emergent and self organization phenomena. As Michael Weinstock (Weinstock,2004 pp.15) states, ''*an emergent whole form can be a component of a system emerging at a higher level and what is 'system' for one process can be 'environment' for another''.*

Folding as a Morphogenetic Technique. Research Analogies

The generative principle which manifests a methodology for assembling differentiated surface elements is multiple rotations addresssed by ordered sequences.

The methodology, instead of defining a specific typology for a surface element, describes surfaces as a multiplicity and it focuses on the variation of objects and their assemblage.

Additional to form generation, the primary objectives are driven by understanding the origin; flat state and the processes that guide the evolution of the artefact. Emphasis is placed on the chains of operations that are executed and on the formation pattern of the three dimensional; folded object.

Speculations upon regularities and symmetries both in flat and folded state along with repetitive patterns, inform the morphogenetic strategy of the assembly synthesis. Analysis based on a real scale material combines geometric outputs with a structural system's logic and identifies the assemblies' performative capacities at a local, regional and global scale.

Design experiments, physical or digital, take place through an envelope of possible formations and produce multiple variations of form, inseparable from their structure and material. Processes where form, structure and material act synergetically so that their interactive output cannot be deduced to a single object.

Self - organization principles are expressed by means of geometry. An increase in the order of system's behaviour is generated through geometrical iterations. Material inputs and assembly strategies create differentiated behavioural patterns; while local units have a dynamic relationship to each other and to an informing global geometry.

What emerges is the necessity for redefining local and assembly inputs across the design process. Emergence is produced out of geometry and material performance, when it comes to the point where the initial inputs to the system are not identified in the repetition pattern. Then, the system needs to redefine the initial input with regards to geometry, scale and materiality. Keeping constant the geometric form, differential material inputs result in differentiated performative patterns.

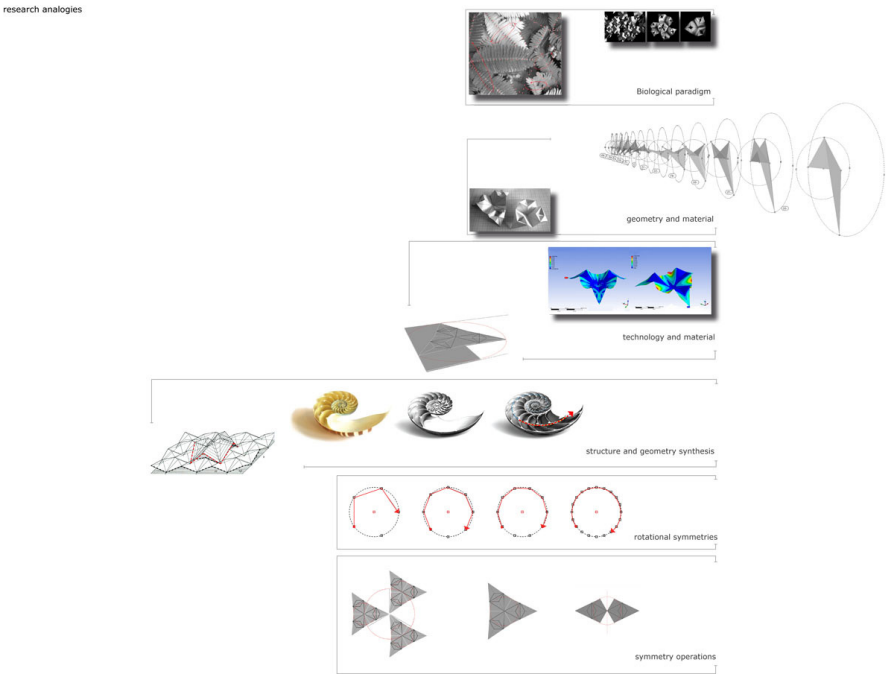


Figure 1. A diagram delineating the research analogies.

In natural morphogenesis formation and materialisation processes are inherently and inseparably related. Therefore, to understand the process of folding as a morphogenetic one, it is necessary to define a fold both within a geometric and material environment.

Natural material systems involve movement to achieve adaptation and responsiveness. In plants, the mechanism is differential pressure in an asymmetrical arrangement of cells.

The behavioural principles stemming from the reaction of the sensitive plant, Mimosa Pudica, when it is irritated, incites a morphogenetic folding scheme associated with hierarchy interdependencies.

The plant, when stimulated, folds its leaflets around an axis by rotating and bending them downwards. Specialized organs that constitute strategic nodes within plant's topographies serve as flexible joints that control the movement sequentially. Stimulus repetition enhances the overall performance and the polymorphic output.

The movement is reversible and operates as a defensive mechanism.

Hierarchies within hierarchies are established under local interactions, expressed through sequential folding by rotations around variant angles and axes that take place across plant's topographies.Natural systems' folding function in order to facilitate deployment, refers to a total of angles around a node more than 360^0.

Deployment in nature is by definition a criterion for survival. Growth itself refers to the deployment of a single cell. Effectiveness of deployment constitutes a parameter of success for all living organisms.

Folding in plant systems is actuated by changes in shape, as aforementioned in the sensitive plant, or changes in stiffness by controlling fibre orientation.

Leaf unfolding is actuated by a single fold. It is an irreversible process that indicates growth.

The leaves of most plants while folded inside the bud, unfold to generate a surface. Symmetry with regards to axes is crucial for system's stiffness while unfolding. Namely, leaves unfold in two ways: by a primary axis that elongates simultaneously while the surface unfolds in a biaxial or in a radial manner. The surface between axes expands simultaneously with them. The controlling factor is fibre orientation in the walls of cells of the upper and lower surfaces of the leaf. Expansion finishes when the fibres have rotated 900, where the process ends and the surface is stiffened in the expansion direction. The process is environmentally oriented. In this case geometry is integrated into a mechanical function. The axes (veins) transport water and assimilation products within the leaf and provide mechanical support. In parallel, they enable a leaf to decrease drag in the wind and subsequent mechanical damage and sustain their own weight and other small loads.

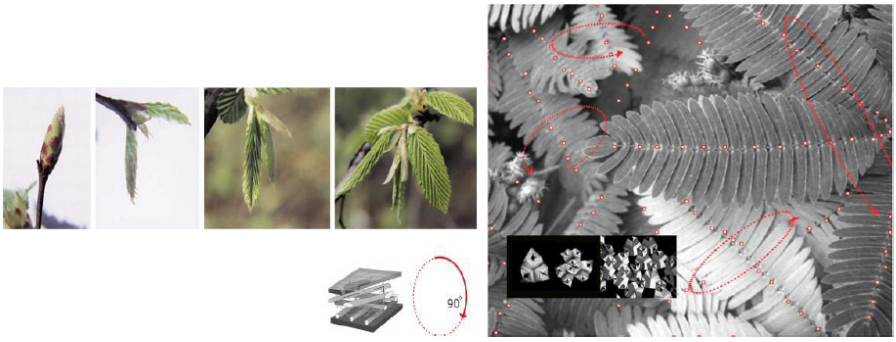


Figure 2. Rotational interdependencies and growth irreversible patterns, across plants' topographies.

Integrating Geometry and Materiality.

In stark contrast to natural deployment and within an abstract mathematic environment folding process constitutes a system of parametric equations. Folds' topology is related to rotational functions which coordinates points on a circular circumference by means of a constant radius.

Folding is accelerated (180^0, -180^0) or decelerated within a range of 360^0. Restrictions are related to the sequenced folding actions that take place, due to the fact that each fold added, varies the relational parameters of the folding equation.

A material adds certain constraints to the rotational function that characterizes the mathematical immaterial process of folding. These constraints regard fold direction and fold angle range. Taking the logics of a very simple material system interrelated with the folding process such as paper, certain constraints and limits of making through the self-forming tendencies of the material affect the folding function.

The process that facilitates paper folding is scoring. Paper folding and scoring are mostly a matter of understanding the properties of paper fibers. While folding, it stands crucial to consider paper scoring parameters such as grain direction - the direction in which the fibers align on a specific sheet of paper, fold sequence

and paper thickness. Therefore, the most efficient way to fold and score paper is positioning grain direction parallel to the folds and score.

In an attempt to scale up the process, additional constraints should be added to the folding function. Some of these constraints are related to factors such as material thickness, joint connection ensuring surface continuity and strain energy stored in each fold.

Folding as a process has the characteristic that no stretching occurs along the surface that is being folded as long as the surface thickness is relatively small.

Scale constraints of the flat pattern are imposed by sheet folding and cutting technology.

For example, a folded component is generated after a 3-fold rotation. Radius variations of the circle in which the component is inscribed is defined within a range of (75cm, 150cm) specified by flat sheet dimensions.

Static structural analysis will define the material thickness. Scale applied, is equivalent to the smallest radius

r = 75cm given by the aforementioned constraints at flat state. The material is structural steel analyzed under gravity loads. It designates a construction material that cannot stretch and has tensile yield strength of 250 MPa which shows significant resistance to plastic deformation. Analysis commenced shows that 1mm thickness component is the most appropriate to proceed because it demonstrates rather low stresses (the tensile yield stress of steal is at 250 MPa), while mostly deformed areas are the wide ones and the ones that are folded at a small angle.

From Mathematical Analysis to mathematical synthesis. Generating the Symmetry Operations.

Folding as a process itself constitutes a symmetry operation, since it preserves all lengths and angles occurring in an object.

A regular plane is defined as the one that is extended without boundaries in all directions and can be filled or divided into infinity, according to a limited number of symmetry operations, with similar geometric figures without leaving empty spaces. M.C Esher's regular tilling demonstrates a paradigm according to which symmetry operations are fed upon themselves to produce repetitive patterns.

Taking advantage of these dynamical relations of rotations and reflections applied sequentially, we generate a flat pattern. The component employed to proliferate the pattern is defined by a three-fold rotation of a unit of 120^0. Folded assemblies are generated by the symmetry operations of rotation and reflection applied to the component iteratively, both at a flat and folded state.

The assemblies perform an incremental loop of rotations and reflections till certain conditions are met. The flat pattern, being self-generated, has the potential to be repeated and generated endlessly. A domain is defined that affects assemblies' periodicity. Having applied a specific number of rotations and reflections, the initial component needs to be redefined in terms of scale, material and geometry so as to preserve its significance within assemblies' growth, under symmetry operations.

Synthesis. A lattice, a primitive cell and fold definition.

Two grids are constructed out of fold intersection. A rectangular grid resulting from evenly spaced horizontal and vertical fold lines; and a square grid from

diagonal fold lines. Fold intersection, generates nodes that define a lattice as a repeating arrangement of points spaced regularly. Any point can shift onto another by using symmetry operations.

A local geometric formation within a lattice establishes a primitive cell. The primitive cell is defined as the minimum topological area corresponding to a single lattice point demonstrating translational symmetry in two dimensions. Node connection of the two grid systems sets up a regular pattern attributed to triangulation techniques. Therefore, pattern hierarchies are invariant of node displacement.

What vary are the generative symmetry operations. Node displacement limits translational symmetry to the horizontal direction.

A fold is defined by a line. Any fold line subdivides a pattern in two regions. Any additional fold is integrated in this division. Node alignment corresponds to fold lines. Node interdependencies within this local domain generate a fold pattern. Triangle arrangements within this domain define fold sequences. Physical experimentation on paper folding detects that an angle of 120^0 degree appears to be the most efficient.

Folding is a sequence dependent process. Folds interact with existing folds, when a fold line is added to the pattern in an interdependent manner. Sequence and direction of folds added redefine the folded formal output.

Folding assigns rotational functions. Fold interaction synthesizes a synergetic system of successive rotational functions that exhibits self-organizing behaviours.

A fold addition adds a rotation mechanism, interrupting the relaxed folded state. A new function is defined that incorporates geometric information with regards to the points added by the fold line. Surface subdivision constitutes the corresponding output. A fold angle system is a dynamic system of sequential rotations, related to a specific fold angle. Aggregate rotations generate assemblies' formal output both in flat and folded state. Material parameters integrated geometrically, add information to the rotational function.

A fold layer strategy regulates the sequence of folds applied to the component. Folding progression characterizes component's transformation from a flat to a folded state. It constitutes of two hierarchy levels. The first one corresponds to the successive application of folds till the radial symmetry displayed in the flat pattern is exhausted and respond as fold sequence. The second one refers to layers of folds build upon fold sequences.

Fold interaction assess differentiated symmetry patterns across the folded surface.

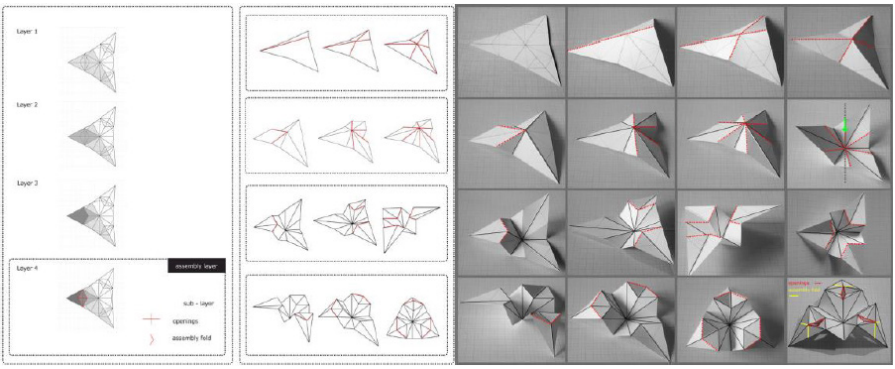


Figure 3: Fold layer strategy, fold sequence strategy and component's transformation from a flat to a folded state.

A sequential fold aggregation characterizes the final folded configuration. Assembly layer refers to a fold addition process; so as to facilitate edge connections between components while assembling. Any interference at flat state is reflected to the folded one and vice versa. The aim of the assembly process is to identify up to what extend repetition, is identified at a folded state. Therefore, rotation and reflection hierarchies constitute the operation toolset to generate assemblies in both states. Assembly connections refer to component possible connections. Assembly process necessitates additional folds to prevent paper from bending. A notation strategy is used following the sequence of operations applied. Differentiation manifests itself, on account of rotation centres; a multiplicative construct that recognizes the assembly logic. A threefold assembly represents a rotation centre. Assemblies' generation establishes hierarchies within rotation centres.

Assembly Strategies. Assembling Multiplicities.

A recurrent assembly methodology, generates folded variations, corresponding to three dimensional artefacts and two dimensional surface elements. The proliferation environment is defined by an algorithm that drives components' distribution. The algorithm is generated by a sequence of symmetry operations – rotation and reflection. Its successive states are traced by means of rotation centres, a multiplicutive construct that drives the transformation process into population outputs. Population outputs increase in number till material and therefore assembly constraints are reached; and the algorithm recurs.

Two assembly strategies direct component proliferation within system's growth process. The first one, A1, successively manifests itself into a three dimensional object. The second one, A2 manifests itself towards a surface element.

Assembly A1 exhausts its potential connections after being executed a finite number of times; by creating a loop within the global assembly system. A hierarchical arrangement demonstrates the geometric proliferation environment according to which the assemblies are self - generated under symmetry transformations (rotation – reflection). Each assembly within its hierarchy displays a geometric uniqueness.

Although the design process terminates to a surface element, the system provides variations of potential outputs. The notion of component is expanded,

opening the possibility of building up a larger system. Material aspects are incorporated into assembly logics.

The component needs to be redefined to reduce and maintain the complexity of the surface element. This is achieved by any successive sub-assembly system provided that displays similar rotational symmetry to the initial component. The process is repeated iteratively in a fractal-like manner till certain constraints are met. The algorithm will eventually terminate reaching an end state, provided by boundaries established through material and manufacturing constraints.

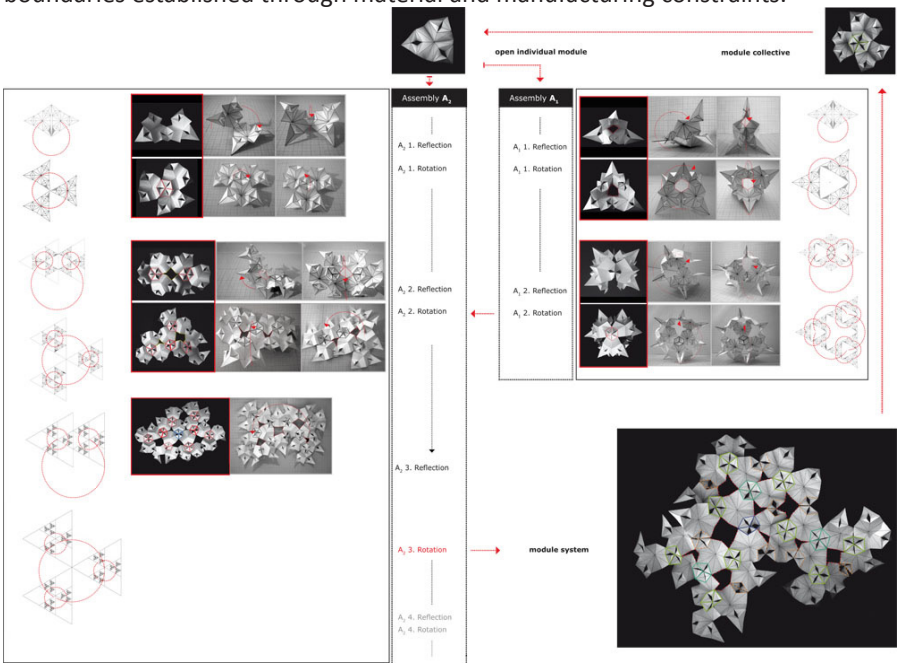


Figure 4: Recurrent assembly process diagram.

Rotation centres provide the focal areas to follow the traces of the geometric progression while the assemblies' growth process. Rotation centres' hierarchies provided by the sequence of rotations applied, assign local, regional and global topographies across the formal output; which constitutes a surface element.

Geometry hierarchies correspond to differentiation hierarchies induced from material constraints. Differentiation is introduced from local scale by interrupting the mathematically defined folded symmetry of the component.

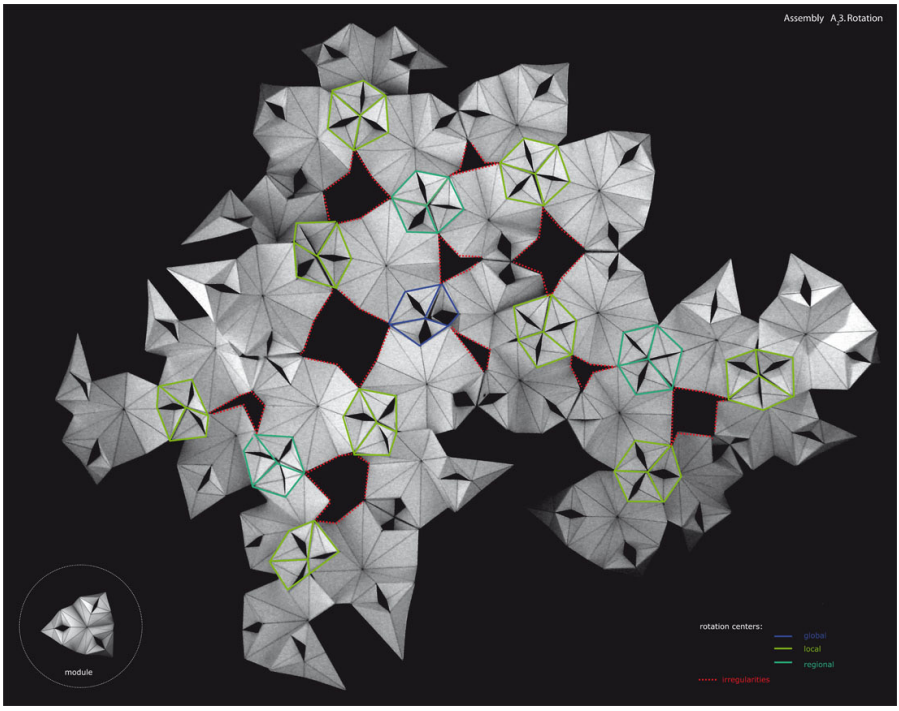


Figure 5: Assembly A2 demonstrating a surface element out of three iterative component's rotations.

The symmetries of a structure often reveal secrets about how an object behaves.

Analysis is conducted by imposing acceleration loads under standard earth gravity to the component and specified assemblies. The selected material for analysis is structural steel.

A recurrent analysis commences upon component's structural behaviour. It also attempts to identify relations between deformation gradients and symmetrical features. Interdependencies between fold hierarchies and parametric analogies between material thicknesses and orientated structural performance under rotations are detected. A diagram indicates interrelations among differentiated structural behaviours at a local and regional scale.

The structure's deflection recognizes repetitive deformation patterns. Fold addition is a method to reduce deformation provided that it is coherent to the structure's symmetry.

Symmetry preserving phenomena are detected between local and global topographies**.**

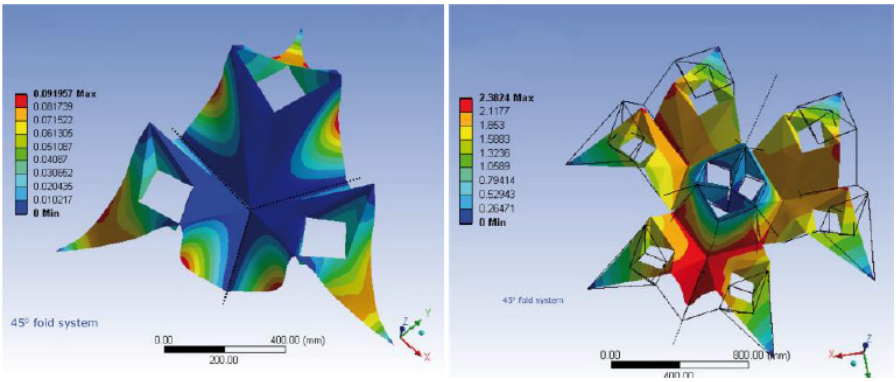


Figure 6: Deformation patterns after structural analysis exhibit analogous rotational symmetries with the synthesis process.

Deformation patterns display radial symmetry. A regional arrangement displays differentiated symmetrical deformation patterns. Scaling up, radial symmetry is shifted into reflection symmetry where deformation patterns are symmetrical along one axis. Rotation centres display the minimum deformation results. They function as structural symmetry regulators in a larger scale. Fold addition is a method for reducing deformation. The analysis indicates that when a fold is added the deformation is reduced by half. Deformation patterns display radial symmetry for all components regardless of fold hierarchies.

A Process Driven Diagram.

This research proposes a methodology for variable patterns and processes at a flat and a folded state, that synthesize architectures of multiplicity.

Both strategies involve the rigorous application of geometric rules and rely on the persistence of recursive accumulations of graphic matter which crowd out the intended result firmly towards the process itself; and they are equally abstract in their architectural implications.

The blueprint ant the physical form are developed at the same time: as a matter of fact are one and the same thing.

Therefore, the output is both process based and product oriented. Depending on the angle of consideration, it appears to be about the technical process whereby folds generate from rotations and through the endless subtleties of these rotations and equally it appears to be about the presence of a material artefact arresting in its own right.

Multiplicities, in the course of the research manifest themselves as interrelated functions of form, structure and material behaviour; constrained by manufacturing and assembly logics.

Variations are the output of recurrent geometric processes. Material constraints direct the number of iterations and therefore, population's output.

Assembly organizational principles incite architectural variations, additionally.

The first assembly strategy results in populations of three dimensional artefacts. It exhibits periodic behaviour on the course of the process recurring simultaneously with open – component redefinition. It terminates when its edge connections are

exhausted.

The second assembly strategy describes two dimensional populations and terminates when material properties do not allow for further geometric proliferation and necessitate either component redefinition or material substitution.

Criteria for addressing an application would include a context specific analysis conducted to an individual artefact. The contextual environment would dictate the formal output.

Further research would regard a parametric construct of all the aforementioned variables which integrates manufacturing constraints, assembly logics, material characteristics and scalability into a digital model and captures system's self-organizational properties to generate a repetition pattern.

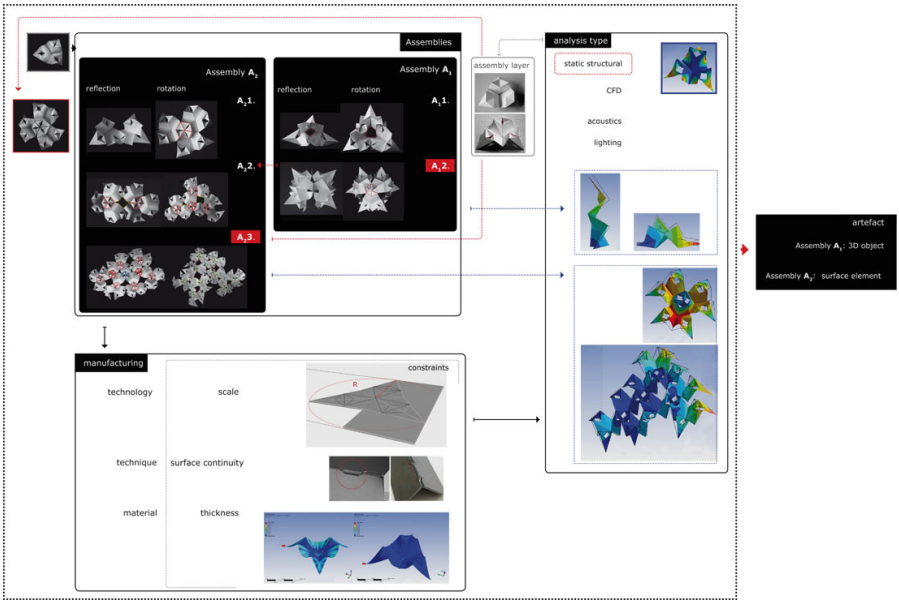


Figure 7: An aggregate process driven diagram.

Epilogue.

The research paper demonstrates variable folded assemblies emerging from geometric variations under radial symmetry by addressing formal and material multiplicities.

It attempts to question the inherent nature of an s art·e·craft, following the theoretical framework and the tools and techniques available provided by nature's process paradigm. Emphasis is placed on the primary objectives and the processes that define its substance.

The effort of the synthetic process is transferred from the formal properties to determining essential criteria and establishing the interdependencies and hierarchies between them. The question raised regards the essential nature of the art·e·craft, questioning its boundaries regardless its surrounding context and getting feedback from the process that generates itself.

What is an art·e·craft ?, a process paradigm, a methodological toolset,

diagramming techniques, formal variable outputs or the argument itself ?

''Providing that even the most abstract formulation of thought has a material dimension'' (Weinstock, 1998 pp.7).

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A PASSIVE SOLAR HEATING EXPERIMENT UTILIZING PLASTIC WATER BOTTLES AS THERMAL MASS

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Abstract

It is a critical concern for architectural educators to increase the awareness of their students about the importance of sustainability in the design of the built environment. This trend is a significant tool that can help the humankind to face many environmental challenges. The passive solar heating design is one of those powerful tools; it relies on specific materials to work as thermal mass or heat sink. Thermal mass can store the solar energy during the day and radiates it to indoor spaces at night in cold seasons, while the reverse process occurs in hot seasons. Due to its high heat storage performance, water is one of the most effective materials for this purpose. This paper aims to introduce a simple and easy process to prepare an experiment that can enhance the understanding and awareness of architectural students to the potential capabilities of water as a thermal mass. The authors asked the students to assign four spaces to carry on the experiment - two identical closed spaces, one semi-closed space, and one open space -; then, the authors directed them to reuse plastic water bottles to build the thermal mass and to constitute small groups that are responsible for monitoring and recording the air temperature within 24 hours. The authors advised the students to use the recorded air temperatures of each space as input data to a web-based thermal comfort tool and to compare the results. A quick survey to measure the students' satisfaction showed that the experiment participated in increasing the awareness of more than 93 % of the students about the positive effect of using water for thermal mass in elevating the indoor space temperature in cold seasons.

Introduction

Many researchers believe that the Greeks were the first who adopted the concept of passive solar heating -heating the indoor spaces without relying on mechanical or electrical systems. They designed and oriented their buildings to collect and store the solar energy during the day, but they could not retain it at night due to the unglazed window openings. The Romans developed the Greek's idea by providing glazed windows. The glass participated in forming a heat trap similar to what we now call the greenhouse effect (Butti, 1980 pp.1-21). The idea vanished with the fall of the Roman Empire, but Walter Gropius adopted it again in the 1920s. Then it took its way across the Atlantic to the Americas and the rest of the world (Grondzik, 2015 pp. 295-296). In passive solar heating design, the main building elements such as floors, walls, and windows do not be only satisfying the architectural and structural requirements but also the energy ones. Glazed windows trap the solar energy in the indoor spaces during the daytime, while the walls, roof, and floor slabs store and radiate the heat at colder times - nighttime and the early morning. Thus, any passive solar heating system consists mainly of three elements:

- Aperture: South-facing glazing - in the northern hemisphere - with no more than 30° of rotation to the east or to the west from the true south.
- Absorber: A hard, darkened and unglazed surface of the storage element.
- Energy Storage Element: Thermal mass such as rock, brick, reinforced concrete or water.

  In addition, the designer might incorporate the following elements as well:
- Heat Distribution: Small fans, ducts or blowers in case of the applied system is not strictly passive and relies only on natural heat transfer by conduction, convection or by radiation.
- Control: Overhangs or trees to shade the windows in hot seasons (DOE/EE-0342, 2010).

The relationship between these elements leads to three design systems: Direct Gain, Indirect Gain (Trombe Wall) and Isolated Gain (Solarium / Sun-space). Figures 1-a, 1-b, and 1-c clearly illustrate the major differences between the three systems (Neha Gupta, 2015 pp.305-335).

When compared to different building materials, water is non-toxic, completely transparent, fire resistant and abundantly available. Furthermore, it is light and has a higher Heat Storage Performance (HSP), which is a function of its thermal capacity and its conductivity (Table 1). Another important issue is that most of the building materials are usually isolated from the indoor environment by floor/wall finishes, suspended ceilings, furnishing... etc. Hence, leads to a significant reduction in the convective and radiant heat transfer between the thermal storage material and the indoor environment. For all these reasons, we can depend on water as one of the favorable materials that we can use as thermal mass when we design passive solar heating or cooling systems for our indoor spaces (Milan Ostry, 2013 pp.837 – 843).

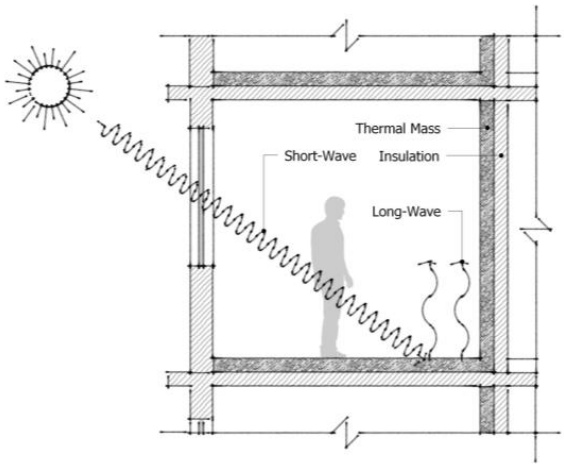


Figure 1-a. Direct gain

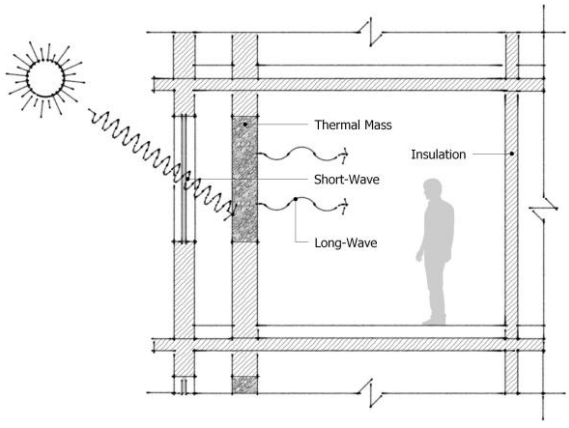


Figure 1-b. Indirect gain (Trombe wall)

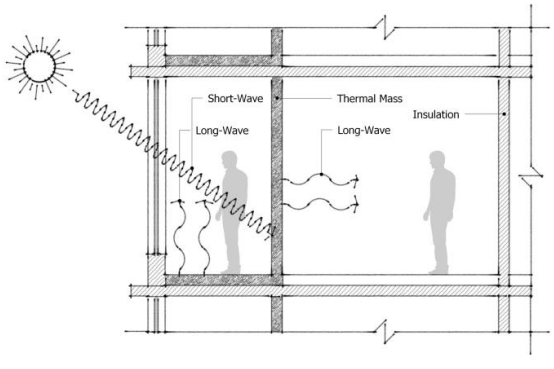


Figure 1-c. Isolated gain (Solarium / Sun-space)

For any thermal mass to be effective, we should consider the following conditions:

- The exposure of thermal mass to the direct solar radiation; therefore, floors are the first favorable choice.
- The combination of directly and indirectly exposed thermal masses when it is difficult to depend only on the directly exposed one. Thus, walls usually become the second favorable choice.
- The isolation of thermal mass from the outdoor environment.
- The surface area of the thermal mass, which is much more important than its thickness.
- The color of thermal mass surface, which should be dark to ensure a high absorption, while the surfaces of non-mass materials should be very light in color to reflect the solar radiation to the darker mass materials.
- The surface area of thermal mass, which is estimated as a percentage of the south glazing area (Table 2). However, this condition really matters, especially in both of the direct and indirect gain systems, while in the isolated gain system; the solarium is designed as a separate space (Lechner, 2015 pp.173-179).
- The relationship between the glazing area and the climate of design location (Table 3). In addition, the rules for estimating the glazing size (Bainbridge, 2011 pp.167).

Material	Water	Steel	RC	Granit	PC	Solid brick	Wood	Gypsum board
Density (kg/m³)	998	7850	2500	2500	2100	1800	400	750
Specific heat (J/kg K)	4182	440	1020	950	1020	900	2510	1060
Thermal capacity (10^6 J/m³ K)	4.17	3.45	2.55	2.38	2.14	1.62	1.00	0.80

Table 1. Characteristics of selected construction materials applicable for heat storage

Thermal mass	Exposure to solar radiation	Thickness & surface area ratio (to glazing area)					
		Direct gain		Indirect gain		Sunspace	
		Thickness	Surface area ratio	Thickness	Surface area ratio	Thickness	Surface area ratio
Concrete or Masonry	Direct	10-15 cm	3 times	25-40 cm	same	20-30 cm	same
	Indirect	5-10 cm		6 times		Not applicable	
Water	Direct	15-30 cm	Half	> 20 cm	same	12 cm	Half

Table 2. Rules for estimating the required thickness and surface area of thermal mass

Climate	Very cold	Cold	Temperate	Tropical	
				Dry	Humid
Thermal load	Heating only	Heating only	Balanced heating & cooling	Cooling & Small heating	Cooling only
Area of glazing as a percentage of flooring area	10-20 %	10-25 %	9-15 %	6-11 %	0 %

Table 3. Rules of estimating the optimum area of south-facing glazing for direct gain and Trombe wall

From the literature survey, the authors noticed that most of the researchers focused on the design guidelines and the field application techniques while less attention was given to the experimental and verification side during the undergraduate studies. Hence, the need for this experiment emerged, posing the major questions for this paper as follows:

- How to introduce a simple and easy experiment that may help architectural students to understand the potential capabilities of using water as a thermal mass in a better way?
- Could we conduct this experiment by utilizing a mobile thermal mass that is made of plastic water bottles without the need to make any changes in the interior design of the campus?
- Is utilizing plastic water bottles will be effective for this purpose?

Choosing the appropriate approach

To answer the first question of this research it was important to make a comprehensive comparison between the three passive solar heating systems to determine the advantages and drawbacks of each. This comparison was necessary to guide the authors in choosing the most appropriate system to conduct the experiment. From the comparison, we could find that:

- The direct gain system will put some restrictions regarding the location of the thermal mass and the way of its direct/indirect exposure to solar radiation, which must be either a floor or walls. In addition, it requires the thermal mass to be an integrated part of the building and this requires for structural modifications.
- Isolated gain system requires the presence of additional space, which is not applicable in the CIC campus.
- The indirect gain is the most appropriate system, as it gives an opportunity to use a movable thermal mass to function as a Trombe wall, where the students can use it only during carrying out the experiment.

To answer the second and third question, the authors divided the experiment into three main stages:

1. The Preparation Stage: Where the students will study, compare and assign the suitable spaces to conduct the experiment. In addition, they will prepare the thermal mass and calibrate the measuring tools, which in this case are analog thermometers.
2. The Experiment Stage: During this stage, the students will monitor,

periodically record and tabulate the weather data and the Dry Bulb Temperatures (DBTs) for the assigned spaces.

3. The Verification Stage: The students will study and analyze the effect of using water as a thermal mass on elevating the indoor space temperature in cold seasons.

Preparation Stage

It was important to study three main issues during the preparation process; these issues are the basic elements to conduct the experiment, and the way we choose or prepare them has a significant effect on the expected results, these elements are:

The Indoor Spaces: The authors asked the students to assign two indoor spaces in the CIC campus to conduct the experiment in a way that the chosen spaces satisfy the following criteria: They should be oriented - or nearly - to the true south and in the same floor level. In addition, the chosen spaces should be identical in the floor area, height, finishing materials, finishes colors, in addition to glazing dimensions and type. The students proposed two rooms B212 & B213 (Figure 2). The two rooms are on the first floor of the school of engineering, facing the true south with a rotation angle of 28° to the east direction (Figure 3). Both of the rooms have a floor area of 11 m² and a height of 2.8 m to the false ceiling level; the walls are painted in ivory white color and the floors are finished with light beige porcelain tiles. Each room has one window opening with the width of 2 m, height of 1.2 m and net glazing area of 2.04 m² of brown tinted glass, which satisfies the required glazing ratio - more than 10 %. In addition to the selected spaces, the authors proposed another two spaces to be included during the measuring process in order to enrich the comparison. One of the spaces is a semi-closed one, which is the corridor between classes and staff rooms, while the other one is an outdoor space, which is the campus courtyard.

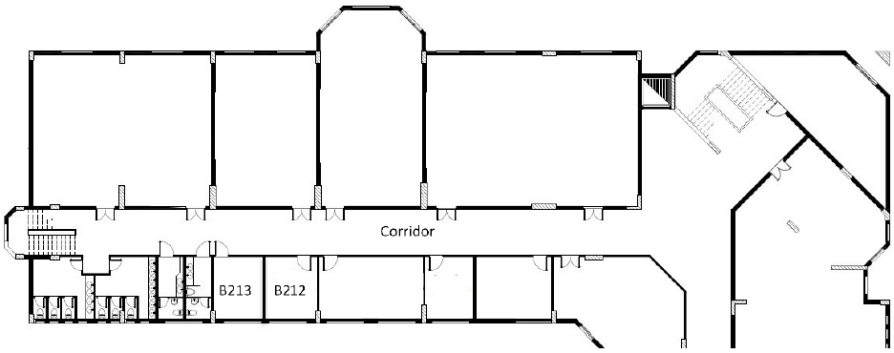


Figure 2. Typical floor plan for the School of Engineering, illustrating the proposed spaces to carry on the experiment, which are B212, B213, Corridor and Campus Courtyard

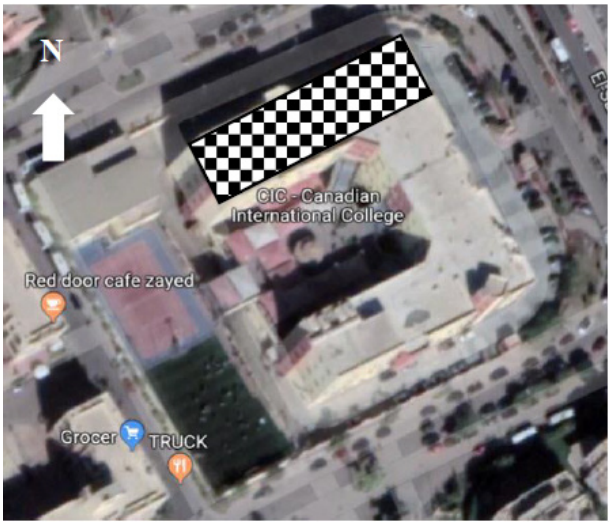


Figure 3. School of Engineering wing, CIC campus



Figure 4. The students preparing the thermal mass

- The Thermal Mass (Water Bottles): Regardless the already mentioned advantages of using water as thermal mass, it has some drawbacks such as the extra-added loads on the structure and the need for containers, which may leak or require maintenance. Therefore, it was important to prepare the needed thermal mass - water containers - and use it to conduct the experiment inside the CIC campus without any permanent modifications in the indoor spaces design or the finishing materials. As students use many plastic water bottles during their scholar day, they can present an appropriate alternative in such a case. Another issue was how we could use these bottles to construct the thermal mass; therefore, authors proposed that students could fix these bottles - after they refill them again with water - on mobile metal stands that they usually use for their architectural project

presentations by cable plastic zippers. Since the indirect gain approach necessitates that the exposed surface of the thermal mass to be equivalent to the glazing area, the students did not support the water bottles on all over the height of the metal stands but only on the upper part that matches with the windowsill height. To achieve the minimum thickness of the thermal mass, which is 20 cm, students supported double layers of water bottles - back-to-back - on the metal stands in a staggered way to increase the exposed surface area (Figure 4). To prepare the required thermal mass, they used three hundred and twenty eight bottles; each one has a height of 30 cm, a diameter of 10 cm and contains 1.5 liters of water, with a total volume of 492 liters of water.

- The Measuring Tools (Thermometers): The students installed four spirit thermometers - one Alcohol thermometers for each space - and fixed them to measuring sheets with clear caution signs to record the DBTs. periodically. A calibration process was performed on the used thermometers to ensure that each of them would give an accurate measurement before carrying out the experiment. After the calibration process, the students supported each of the measuring sheets in a suitable location in each space to make it easy for any involved student to observe and record the periodical measurements.

The Experiment Stage

To track the effect of using water as a thermal mass on the indoor environment, the experiment period was set to extend for 24 hours over two cold days - the 16th and 17th of December. The authors asked the students to constitute groups out of two members per group. Each group was responsible for monitoring and recording the DBTs in one of the four mentioned spaces for two hours period - one reading per hour, In addition to recording the official corresponding weather characteristics for the same time of the day. These characteristics such as relative humidity, air pressure, wind speed and the DBTs. are obtained regularly from the nearest certified weather station, which is Cairo International Airport (TWC, 2014). Thus, obtaining 100 records by the end of the experiment.

- The experiment took place on a weekend - from 8:00 am Saturday until 8:00 am Sunday - to eliminate any other thermal effects such as radiation from human bodies, working appliances, lighting fixtures…etc.
- In the morning of the experiment's day - 30 minutes before starting the experiment - the students moved the prepared thermal masses to one of the two identical rooms (B213). They placed the metal stands with the fixed on water bottles into their final positions, facing the window directly and 10 cm away from the glazing surface. At the same time, another group of students was responsible for installing the recording sheets with their fixed on thermometers into suitable locations in the four assigned spaces (Appendix A).
- On 8:00 am, the started the monitoring and recording task in two phases:
  - Phase 1: extended from 08:00 am until 03:00 pm, the windows on both rooms - B212 and B213 - were left without thermal protection to maximize the heat gain.

- Phase 2: started after 03:00 pm, students were asked to install polystyrene thermal isolation boards and strips to isolate the windows in both of the indoor spaces. This process was critical when the windows are not exposed to the direct sun to eliminate the heat loss as much as possible.

- By the end of the experiment procedures, the authors asked the students to tabulate the collected data in a comprehensive way (Appendix B) and to illustrate it in the form of a line chart diagram to demonstrate the temperature changes during the 24 hours in the four spaces compared to the reference weather readings (Figure 5).

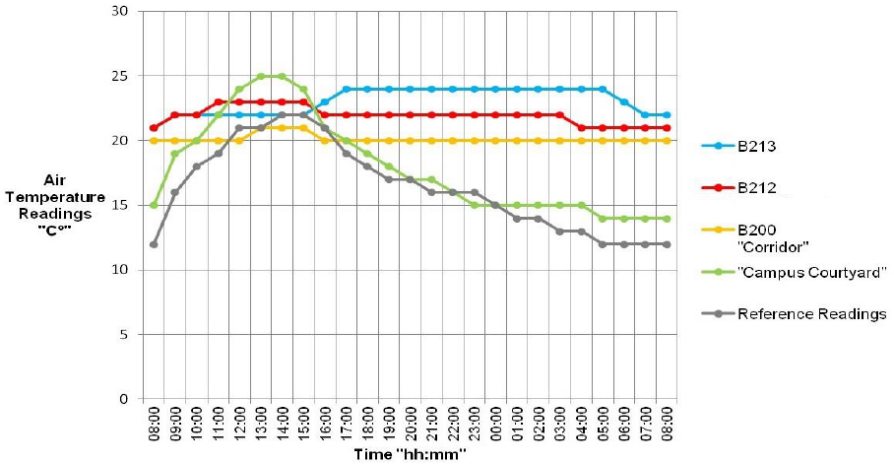


Figure 5. The recorded (DBTs.) of the four spaces compared to the reference (DBTs.) of the same day

Verification Process

To verify the effect of using thermal mass - water bottles - on the feeling of comfort inside the B 213 room, the authors advised the students to use their recorded air temperatures as input data for a web interface thermal comfort tool developed by the Center for the Built Environment (CBE), University of California Berkeley (Schiavon Stefano, 2014 pp.321-334). After that, the students repeated the same process for the other three spaces and made a comparison between the four spaces.

- The CBE thermal comfort tool enables the user to choose between two methods: the Mean Predictive Vote (MPV) method or the Adaptive method. In addition, either it enables the user to apply the European Standard (EN-15251) or the American Standard for Heating, Refrigerating and Air-conditioning Engineers (ASHRAE-55) to the selected method (CBE, 2017).

- The Adaptive method was the most appropriate choice in our case as it is based on a hypothesis that the outdoor climate influences indoor comfort. Both of ASHRAE-55 and EN-15251 standards apply for the Adaptive method; however, the latter fits more in our case (Figure 6). The ASHRAE standard is only applicable to buildings without any mechanical cooling or heating systems installed, while the EN15251 standard is applicable to mixed-mode

buildings, which have mechanical systems but they are not running, as in the case with the CIC campus. In addition, the EN-15251 standard considers the metabolic rates ranging from 1.0 to 1.3 met and the occupants can freely adapt their clothing insulation (CEN, 2007 pp.14).

- Supposing that the measured DBT equals the Mean Radiant Temperature (MRT), and the Airspeed is less than 0.2m/s; then, the Operative Temperature will have the same value of the DBT (ANSI/ASHRAE 2014, pp.16).
- However, it is not the case in the open courtyard; therefore, airspeed was set to 0 m/s for all the spaces, to eliminate the effect of the wind speed on the limits of the comfort zone.
- The last needed input data to the CBE thermal comfort tool is the outdoor running mean temperature. The students referred to the website of the World Meteorological Organization to get this value for the month of December in Cairo - Egypt, which was around 16 C° (WMO, 2017).
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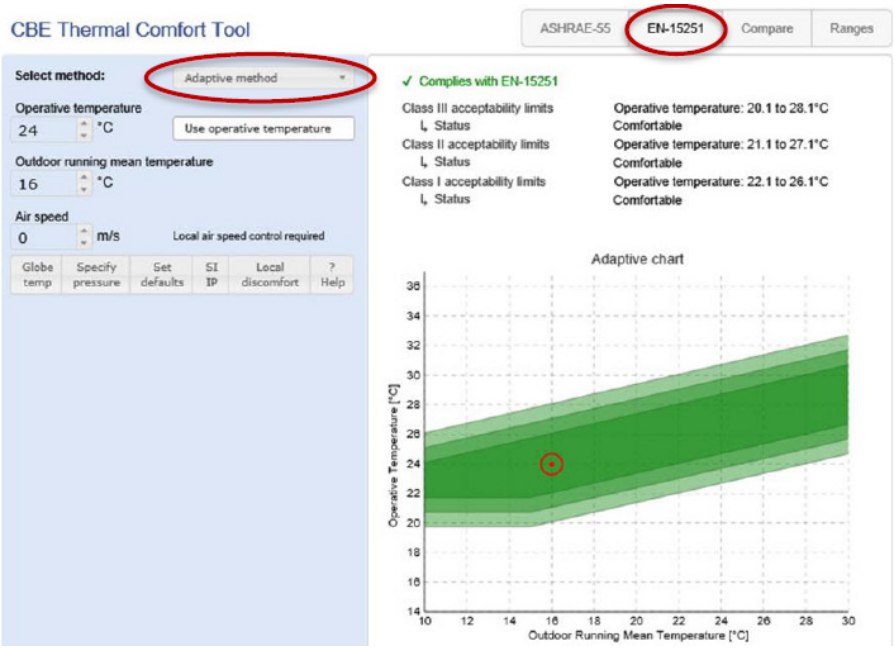


Figure 6. The CBE comfort tool interface (adaptive method) according to the EN-15251 standard

The results

According to the predetermined Outdoor Running Mean Temperature, which is 16 C°, the Adaptive method in the European Standard (EN-15251) classifies the comfort zone into three main categories as follows:

- Class I (the Operative Temperature acceptability limits of comfort is between 22.1 and 26.1 C°).
- Class II (the Operative Temperature acceptability limits of comfort is between 21.1 and 27.1 C°).
- Class III (the Operative Temperature acceptability limits of comfort is

between 20.1 and 28.1 C°).

For any of the three classes, the CBM comfort tool considers any adaptive temperature higher than the maximum limit to be very warm and anyone lower than the minimum limit to be very cool. When the students entered the recorded data to the CBE thermal comfort tool the results were as follows:

- The corridor recorded the least number of hours that satisfy the thermal comfort and only within Class III, which is too cool for the other two classes and it was as follows:
  - Three hours (12:00 am - 03:00 pm) → (Class III)

While the rest of the experiment period - 21 Hrs. - were located outside all the comfort zones.

- The courtyard had a longer period that satisfies the thermal comfort as follows:
  - Four hours (12:00 am - 03:00 pm) → (Class I)
  - One hour (11:00 am - 12:00 pm) → (Class II)
  - One Hour (04:00 pm - 05:00 pm) → (Class III)

While the rest of the experiment period - 18 Hrs. - were located outside all the comfort zones.

- Room B212 (Closed Space without Thermal Mass) was located within the limits of comfort zone during the entire experiment period as follows:
  - Five hours (11:00 pm - 04:00 pm) → (Class I)
  - 14 hours (09:00 am - 11:00 am on day one and 04:00 pm - 04:00 am on day two) → (Class II)
  - Five hours (08:00 am - 09:00 am and 04:00 am - 08:00 am) → (Class III)
- Room B213 (Closed Space with Thermal Mass) was located within the limits of comfort zone during the entire experiment period as follows:
  - 15 hours (04:00 pm - 12:00 am on day one and 12:00 am - 07:00 am on day two) → (Class I)
  - Three Hours (09:00 am - 04:00 pm on day one and 07:00 am - 08:00 am on day two) → (Class II)
  - One hour (08:00 am - 09:00 am → (Class III)
- Figure 7 illustrates the summary of the above results in a bar-chart form, while Figure 8 is an example of comparing the state of comfort in the four spaces at 4:00 am (the second day).

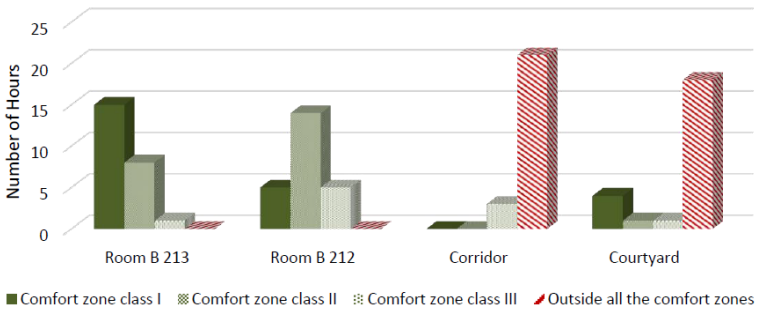


Figure 7. The comfort status in the four spaces during the experiment period (24 Hrs.)

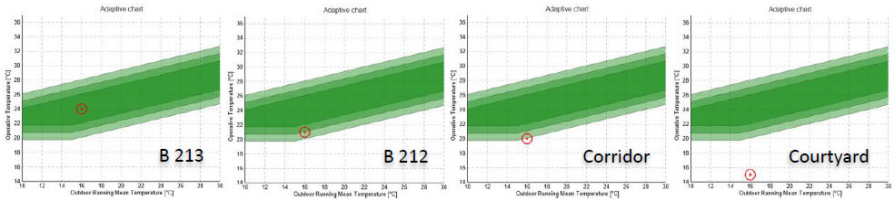


Figure 8. Example of the comparison between the comfort statuses in the four spaces at 4:00 am shows that: B 213 in class I, B 212 in class II, while both of the corridor and courtyard are outside all the comfort zones

Observations

- The recorded DBTs. in the courtyard are higher than the collected from of the reference station in most of the experiment time due to the effect of the campus building shape - U shape - and context.
- In the morning of the first day, both B212 and B213 had the same DBTs; yet, starting from 10:00 am until 3:00 pm, room B213 had lower DBTs as the thermal mass absorbed more energy. On the other hand, after 3:00 pm, the sun was away from the windows; yet the DBTs in B213 were higher than the DBTs. in B212.
- The effect of the thermal mass was obvious although it was the worst case. As the water was very clear - without adding any dark colors - and the use of individual bottles eliminates the effect of the convection.
- It was important to measure how the experiment could enhance the awareness of the participants in understanding the positive effect of using water as a thermal mass in passive heating systems. The authors' forwarded a quick questionnaire to the students for this purpose and the statistics of the answers showed that more than 93% gave positive feedback.

Conclusion

This paper discussed the applicable systems of passive solar heating design. A quick comparison between the different systems showed that the indirect gain (Trombe wall) is the most appropriate system to depend on when conducting a passive solar heating experiment inside the campus. The authors introduced a simple technique to build a temporary thermal mass by re-using plastic water bottles, which are re-filled with water and fixed on mobile metal stands. This experiment is applicable for execution in many of the academic institutions, as it only requires for two identical South-facing spaces and does not necessitate any temporary or permanent modifications in the interior design. Monitoring, recording and comparing the DBTs in the different spaces assured that utilizing plastic water bottles as a thermal mass is reliable to illustrate the effect of passive heating techniques in elevating the indoor space's temperature in cold seasons. The students play a major role in this experiment during the preparation, recording the air temperatures in the different spaces and while verifying the results. After the validation process, a quick survey showed that more than 93% of the participants were satisfied with the experiment's methodology and results.

Acknowledgment

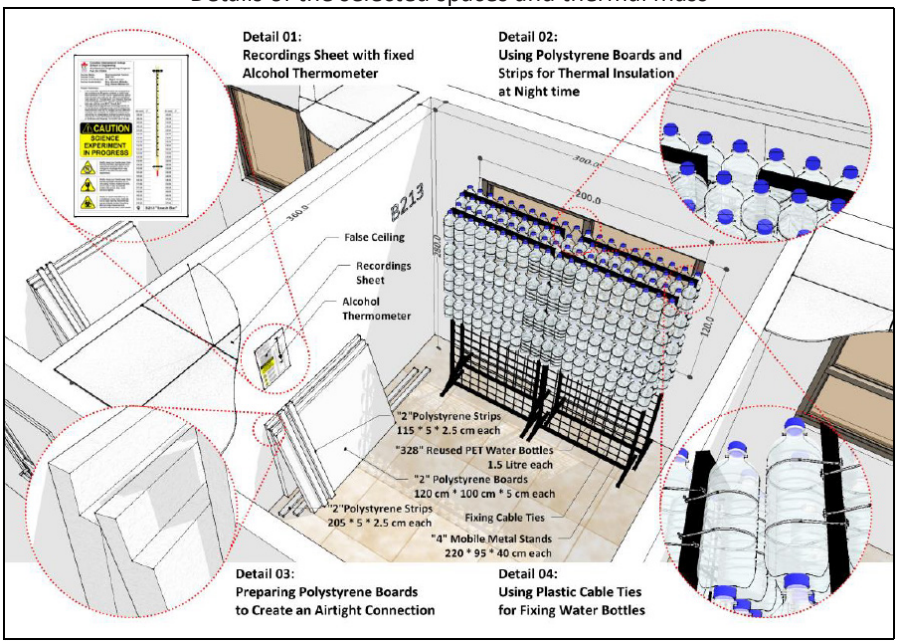
The authors would like to give special thanks to our diligent students - 46 students who are registered in the Environmental Control, Cohort 2015 - who participated in the different stages of this experiment (Google drive, 2019). In addition, we would like to thank all of CIC academic and administrative members who presented all the possible help to carry on this experiment in such a successful way.

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Appendix (A)

Details of the selected spaces and thermal mass



Appendix (B)

Tabulation of the recorded weather data during the experiment period

Day	Time "hh:mm"	Reference Readings				Air Temperature Readings "C°"			
		Relative Humidity "%"	Wind Speed "m/s"	Air Pressure "Pascal"	Air Temperature "C°"	B213 "Snack Bar"	B212 "Staff Room"	B200 "Corridor"	"Campus Courtyard"
Day 01 16-12-17	08:00	85	0.83	101930.00	12	21	21	20	15
	09:00	73	2.22	102240.00	16	22	22	20	19
	10:00	67	3.06	102240.00	18	22	22	20	20
	11:00	57	3.89	102200.00	19	22	23	20	22
	12:00	52	3.61	102130.00	21	22	23	20	24
	13:00	47	3.06	102030.00	21	22	23	21	25
	14:00	44	2.50	102000.00	22	22	23	21	25
	15:00	45	3.61	101930.00	22	22	23	21	24
	16:00	46	3.61	101960.00	21	23	22	20	21
	17:00	50	3.61	102060.00	19	24	22	20	20
	18:00	57	3.06	102000.00	18	24	22	20	19
	19:00	60	2.78	102030.00	17	24	22	20	18
	20:00	62	2.22	102070.00	17	24	22	20	17
	21:00	68	2.22	102000.00	16	24	22	20	17
	22:00	71	2.78	102100.00	16	24	22	20	16
	23:00	71	2.78	102200.00	16	24	22	20	15
	00:00	78	2.78	102030.00	15	24	22	20	15
Day 01 17-12-17	01:00	78	2.22	102000.00	14	24	22	20	15
	02:00	84	1.39	101960.00	14	24	22	20	15
	03:00	88	1.39	101930.00	13	24	22	20	15
	04:00	86	1.67	101930.00	13	24	21	20	15
	05:00	90	0.83	101900.00	12	24	21	20	14
	06:00	92	0.56	101900.00	12	23	21	20	14
	07:00	86	0.56	101930.00	12	22	21	20	14
	08:00	85	0.83	101930.00	12	22	21	20	14

GRAPH CHARACTERISTICS OF DOME STRUCTURES

REKA SARKOZI, PETER IVANYI, ATTILA BELA SZELL

In this research the graph characteristics of dome structures and their effect on the structural behaviour are analysed. Graph theory is a branch of mathematics which is useful in many fields of science. Graph characteristics can tell a lot about the behaviour of complex systems. The graph representation of different type of single layer Schwedler, ribbed, lamella and diamatic domes, and double and triple layer domes are analysed.

Since the goal is a topological analysis, the radius and height of the domes and the intersection and the material of the beams of the comparable dome structures are the same.

The transformation of patterns and structures into graphs maintains the topology but removes their geometrical properties. To be able to analyse the graph characteristics, the domes are interpreted as undirected simple graphs, single layer domes are represented with planar graphs. This solution allows the examination of the topology of the dome structures.

The number of the vertices and edges, the average degree, the average clustering coefficient and the global clustering coefficient of these graphs are calculated and their value is compared to the structural behaviour of the domes.

The results show, that these graph characteristics effect the behaviour of the structure, and can be a basis of an optimisation process.

LIGHTING METHODS AND PROPOSALS FOR THE MODERN HOUSE

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Abstract

Since the early 20th century, architects such as Mies van der Rohe, Le Corbusier and Alvar Aalto have tried to create a functional architecture that would allow natural light to diffuse inside the house, ensuring a better relationship between its interior and exterior spaces.

The transformation of private houses in modern times is of great interest in the evolving architectural structures and the new construction standards, emphasizing the new lighting technologies applied to them.

Modern house is one system with its user, lighting needs to follow changes in its needs and desires and, in order to achieve this, it should incorporate this changeability at construction level as well.

The main purpose of this study is to attempt to highlight the essence of architectural lighting, which must be human-centered and meet the functional requirements of a modern house separately, treating the user as a unique entity.

The development of a qualitative - creative approach to the design of architectural lighting in the modern house offers the possibility of achieving multiple goals. The sense of living in a flexible space that belongs to you, experiencing it as yours and which promotes the comfort and pleasure of those who live in it are elements that make up the architect's effort for a new way of living.

Through examples from modern lighting applications it is shown that with the new, energy-efficient, technological possibilities it is possible to implement any idea and proposal for the quality lighting of a house. Luminaires can now have any shape and be integrated into the structure of a building and form a new architectural identity in space.

Keywords:

natural and artificial light, modern house, energy efficient lighting, new lighting tecnologies

Introduction

Natural light has been one of the most important parameters of building design in the history of architecture. For hundreds of years all buildings were designed and built under a single light source, the sun with the sources of artificial lighting necessarily attached to the limits of the prevailing lighting technology. Many great architects had perceived the role of natural light as the main means of bringing people in contact with their environment.

Le Corbusier by defining his architecture based on light transforms it into an element capable of not only influencing matter but also shaping it. The main axes of the floor plans of his works, which eventually shape his faces and volume, are directed by light and the way it will penetrate space.

At the same time, for Le Corbusier artificial lighting played a very important role in its architecture. Artificial lighting substitutes natural sunlight during the night by connecting two opposing elements: day and night.

Subsequently, other architects followed who tried to create a functional architecture that would let the light diffuse into the house, ensuring a better relationship between its interior and exterior spaces.

Gio Ponti, in the first issue of Domus magazine, "La casa all' italiana" (1928), writes: "we need a new way to live and not a new way to build". Together with Bernard Rudofsky they discover that the essence of the experience of architecture is not academic, but it is hidden in the "dwelling". The sense of dwelling in a place that belongs to you, experiencing it as yours, the inclusion in nature, the extroversion, the light, the special importance given to the materials used and the resonance in the city shape the demands of a modern house.

Space and light are two interrelated elements in the architectural composition. The light gives quality and atmosphere in space and, according to Louis Kahn, "space could never have taken its important place in architecture without natural light". The light exists in all structural elements of the environment either in its natural form or in its artificial reproduction, being a key parameter for the visual perception of all the objects that surround us.

Light and architecture are directly connected as architecture is primarily expressed with the image, which is directly intertwined with the light that makes it perceptible to the human eye. Light is the most basic condition for which architecture is made perceptible.

The study of the use of light in architecture offers multiple levels of analysis. Bearing in mind the two-way relationship of light – architecture and the ability of light to transform an architectural project, giving it invaluable architectural qualities, emphasis is placed on the properties of lighting as an important synthesis tool.

1. The interaction of colours with our visual mechanism

The eye perceives an object based on the amount of light reflected from it. Three factors affect the amount of light that will be reflected from the object to the eye: colour, texture, and finishing. Light colours reflect more than dark colours. Smooth textures reflect a larger surface than the rough ones. Glossy surfaces reflect more than matte surfaces. Hard surfaces scatter light and significantly reduce the amount reflected to the eye compared to soft surfaces.

The apparent brightness of an object also depends on the brightness of the

surrounding space or the contrast to the brightness from one to the other. For example, a dark surface on a dark background will look brighter than a lighter background. Brightly coloured surfaces may affect other surfaces that reflect brightly coloured light on them. However, the eye adapts to the dominant colour and this reduces the effects of interreflection.

Each material reflects light in a different way. The white colour diffuses light evenly in all directions, so it covers a wall more effectively than any other colour. The light is affected not only by the colour of the wall, but also by its texture. Different surfaces break and reflect the rays in different ways. The sunlight can flow or spread or bounce over a wall, depending on the texture, and the inert materials suddenly acquire the shades of nature. Dark wood absorbs light, while metal objects are the most reflective.

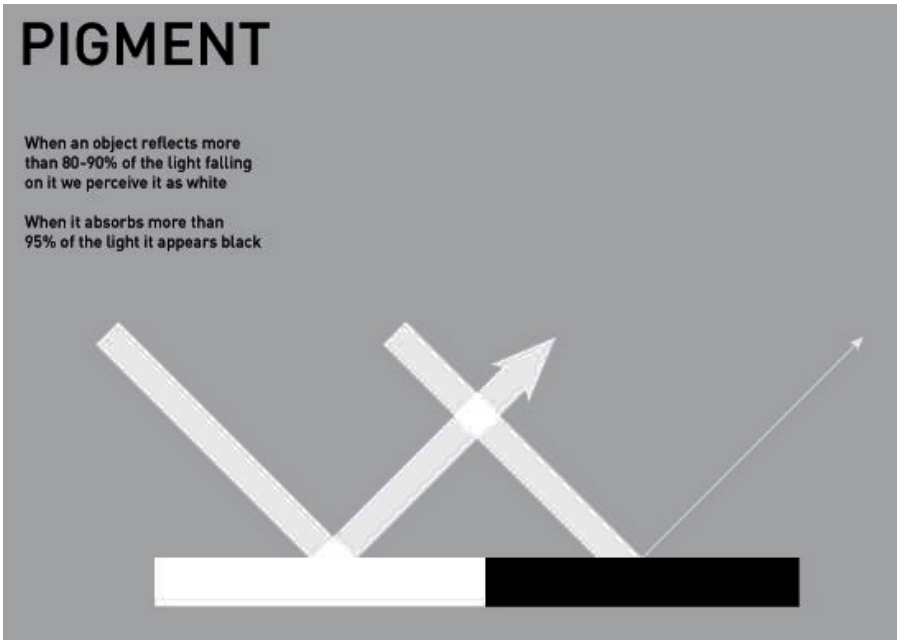


Figure 1. Smooth surfaces reflect light directly and appear lighter color because much of the light falling on them is reflected back to the eye. Matte surfaces are minutely, sometimes microscopically roughened and diffuse light evenly, so the reflected light is constant from any angle. The same material appears darker with a rough finish than with a smoother finish, while glossy surfaces reflect more light.

2. The influence of natural and artificial lighting on psycho-physiological wellbeing

Biologically, light has a significant effect on the 24-hour cycle of our body that dictates physiological functions, including mood, appetite and sleep habits. The human circadian rhythm is determined by natural light. In normal circumstances, when natural light falls, our body begins to secrete melatonin, the sleep hormone. The colour temperature and brightness of light tells our body the time of the day and the functions it should do. Body activity levels are affected by colour temperature

and brightness of light. Sleep disorders, depression, seasonal affective disorder and other disorders can be treated by natural light therapy, which includes exposure to specific amounts of light at specific hours of the day.

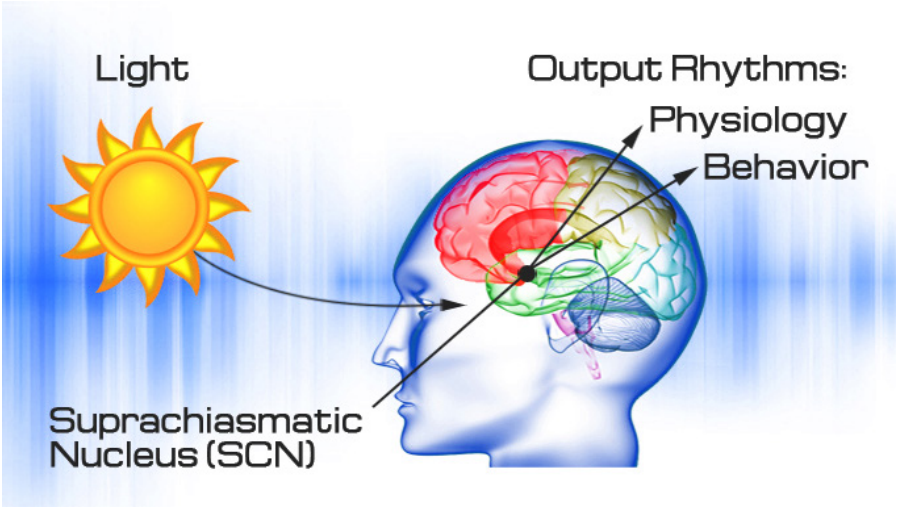


Figure 1. Natural factors within the body produce circadian rhythms. However, signals from the environment also affect them. The main cue influencing circadian rhythms is daylight. This light can turn on or turn off genes that control the molecular structure of biological clocks.

In the recent past, as far as artificial light is concerned, luminaires with dynamic lighting have been built to simulate the daylight. They were intended primarily for underground spaces or constructions where there was no possibility of natural light entering their interior. The use of this type of luminaires was aimed at avoiding disturbance of the circadian rhythm for people who lived in these spaces for a long time.

3. The lighting design in modern houses

In the 21st century, the use of light in architecture became even more intense and manifold, aiming at the creation and diversification of more and qualitatively different spaces; in essence, house is treated as a multi-use facility. The diversity in the use of natural and artificial light, qualitatively and quantitatively, contributes to the prioritisation of spaces and to their diversity in terms of function, use and importance.

3a. Natural lighting

In many cases, natural light in the architectural composition is a primary synthetical tool of the architect – lighting designer, shaping the whole concept based on the atmosphere that is sought to be achieved through light. The openings and surfaces that surround the house need special handling and processing, with the light contributing substantially to the performance of the hierarchy in space.

The light-induced transmutations give life and movement to the building,

changing its appearance in relation to time and day. Light affects differently each architectural work, since it can highlight or eliminate its form, construction or even its materials.

The natural lighting of interiors gives us information about its orientation. Most commonly, the desired lighting inside a building is sought through varied openings on the east and south, while the light on the west and north is limited with solid walls and smaller openings.

The openings to the east diffuse light into space in the morning, while the openings to the west in the afternoon. South-orientated openings create intense lighting. The openings on the north side or in the roof ensure uniform lighting.

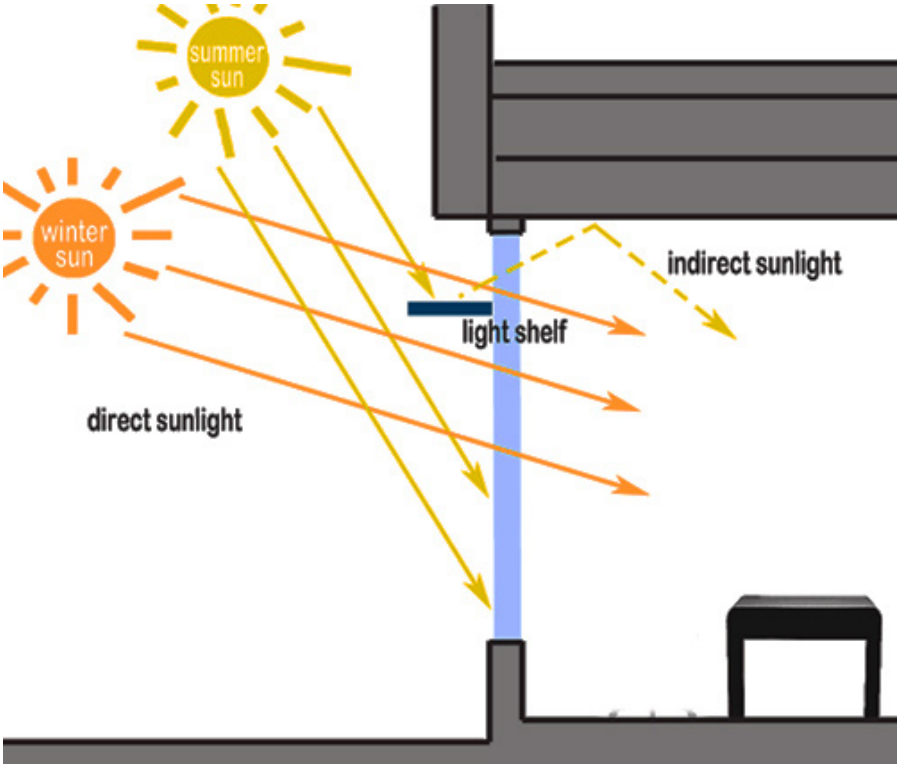


Figure 1. Using daylight is a method to optimize the energy-saving potential of buildings and contributes therefore to our health and well-being.

As far as natural light is concerned, the two basic types used in the interior spaces of houses are the following:

- **direct light**, which enters directly the space without being obstructed by any factor and provided that the construction and position of the opening make it a direct lighting source. An opening in the roof projects a direct light in the space.
- **indirect light** enters the space by reflecting on a surface, an object or a neighbouring building. Thus, in order the light to enter the interior of a house is first reflected from a surface, since the external environment of the building, its shape and the position of the openings do not allow the light beam to pass intact

and directly. Usually, the resulting light diffuses better in space than direct lighting. The degree of diffusion depends mainly on the properties of the reflective surface such as its texture, colour and inelasticity. In a space that is illuminated by indirect (diffuse) light, the shadows created have an unclear contour or no shadows are created depending on how the light enters.

Appropriate light management has the ability to create visual illusions through the reflections it creates in a space, which act as changers of real space. Specifically, regardless of its physical size, a space may be perceived either as smaller or larger based on its natural lighting. In particular a small space looks larger when it is sufficiently lit, while a large space looks smaller if its light is limited. Thus, reflections of light within a space help in the apparent magnification of its capacity.

3b. Artificial lighting

Artificial light can cause excitement, drama, mystery, romance, or any other mood. This power of light provides the ability to materially influence how a space looks and transform it literally. Light is the stimulus that influences most the human perception and the psycho-physiological wellbeing of the individual in everyday life, regulates mood and affects the quality of our lives.

Artificial lighting in the house spaces has significantly changed over the last decade. The technological development in the field of lighting with the use of LED (lighting emitting diodes) gas enabled the creation of compact lighting fixtures that are much more easily integrated into the construction details or are fully integrated into the shell of the building and create a very special atmosphere. The small dimensions of light sources, the choice of colour temperature, the low energy consumption and smart lighting (i.e. a lighting system connected to a network that can be monitored and controlled by a central infrastructure or through a Cloud) are the main features that have made lighting in modern houses flexible and functional.

With regard to artificial light in the interior spaces of a house, the following types are used according to their mounting:

- Ceiling luminaires: recessed luminaires with trim or trimless, surface mounted, pendant luminaires
- Concealed lighting on the roof, in architectural details, stairs, etc.
- Wall luminaires, surface mounted, recessed luminaires with trim or trimless
- Free standing luminaires
- Table luminaires
- Inground recessed luminaires

The set of luminaires operate either individually or in groups where they create lighting scenarios that meet the needs of the residents. Based on the scenarios to be determined, it is possible to create a desired atmosphere and quality of space Inside the house.



Figure 1. Architectural lighting design focuses on three fundamental aspects: the aesthetic appeal of a building, the ergonomic aspect and the energy efficiency.

Appropriate artificial lighting can make a difference in how residents feel about their space, helping them perform activities easily, feel safe and comfortable, and enjoy the space in all its small but important details. It can create the right atmosphere for fun or fill the residents with a feeling of serenity and relaxation after a difficult day. It is necessary for the human psycho-physiological balance to regulate the mood and influence the quality of life.



Figure 1. The objective of lighting design is the human response, to see clearly and without discomfort.

Poor light distribution, with high contrast in brightness, or poor colour rendering can adversely affect the psychological state of people and cause discomfort and depression.

4. Design Lighting Techniques

Artificial light is a design tool that, depending on its handling, can determine the human experience and not to be limited in covering the functional requirements of the space but also to its emergence.

It is the most volatile and adaptable environmental material and it creates emotions in a variety of ways while having a profound effect on the way people perceive and experience their environment. It helps to carry out the activities easily, strengthens the sense of security and comfort and the perception of space with all the small but important details.

Depending on the use of lighting, there are four main categories:

- **decorative lighting or accent lighting**, which is used to bring out architectural elements and details,
- **functional lighting**, which is used for practical purposes and for safe movement within the house (diffuse, route, downlighting, entry, stairs, etc.),
- **working lighting**, which makes it possible to carry out specific tasks (kitchen table, office space, etc.)
- **and safety lighting**, for safe movement in case of power failure and prevention of burglars, thieves, vandals, etc.

Illuminance(lx)	1	2	5	10	20	30	50	75	100	150	200	300	500	750	1000	1500	Ra value
Living room						General lighting					Recreation		Reading				80 or more
Children's room/Study room								General lighting			Play						
Dining room						General lighting						Table		Study/Reading			
Kitchen								General lighting				Sink					
Bedroom	Late at night			General lighting									Reading/Makeup				
Bathroom/Washroom								General lighting			Shave/Makeup/Basin						
Toilet							General lighting										
Corridor/Stairs	Late at night					General lighting			Take off shoes/Display shelf								
Entrance(inside)								General lighting					Mirror				
Gate/Entrance(outer)			Passage			Nameplate/Newspaper slot/Bell button											-

Figure 1. Room activity and illuminance (an example of recommended illuminance levels).

A space can "breathe" from the dynamic of lighting. Small changes of light can have a calming effect on humans. Brightness guides the eye and focus on a particular object. It is used to create a hierarchy and increase understanding of space.

Artificial lighting is the most important factor in creating an atmosphere in any space. A space-based approach that uses light in conjunction with colour, texture, materials and shadows creates a setting that causes people a variety of emotions. It allows the creation of scenes that complement and lead to other readings. It stimulates the senses and causes our imagination to completely transform the space.

5. Study cases

5a. Bloc Architects + Kevin Lloyd Architects, Umhlanga House #8, 2017

Umhlanga House #8 was built in a forest estate in Durban, South Africa. The architects designed a house of high standards, comfortable, intimate and relaxing.

The house is built on a hill, has unlimited views of the forest and tries to frame the landscape with clear horizontal lines.

The factors that led to the organisation of the building were the view, the sunlight and the direction of the wind. The original conception was based on a shell - a box “floating” on the hill to the forest, with verandas on cantilevers, skylights for natural lighting and large glazed surfaces in the spaces so that residents have direct contact with the natural environment.

The house has an externally rugged concrete texture. The largest part of the floor is circumferentially covered by large openings and wooden sliding panels (blinds). There, the wing of the bedroom stands out in the whole structure, is cut off from the central volume and slightly rises to take advantage of the maximum height allowed in the area. In this way, the southern part of the upper level differs from the north in a nearly sculptural way. The central staircase of the house, which with its diagonal geometry serves the vertical movement between the levels, was also placed in this slot.

The rooms were designed to take full advantage of the sun and the view, while small skylights allow natural light, even in the bathrooms, which would otherwise be exclusively dependent on artificial lighting.



Figure 1. The house is circumferentially covered by large openings and wooden sliding panels.

5b. RS Sparch, House in a Garden, 2016
Lighting design: Eirini Skafida

It is a house surrounded by the dense urban fabric of Athens. Exploiting the plot's potential in terms of orientation and vision was a basic pursuit of the design. The house consists of a concrete base and a white metal-structure 'beam', a linear projecting 'bridge' that balances on the base, its folded ends open to the view. Glass panes are placed in depth to provide the necessary sun protection.



Figure 1. House view from outside in the night.

The house, protected from prying eyes with the high perimeter fencing, stands in the surrounding area of the rectangular plot, which acts as an architectural continuum of its interior. Large openings from the ground to the roof, on the inside, guarantee the visual unification of the interior - exterior, while the pool pulling ephemeral reflections of sky and clouds deep into the house.

A glass-enclosed patio introducing indirect natural lighting into the centre of the building volume was designed on the roof of the house.



Figure 1. The natural light is one of the most desirable attributes in a space, both to showcase the design and décor and to create a warm and welcoming environment.

The patio, with its simple design, is a main element of the architectural composition as it was placed on the ceiling of the main dining room. The advantages of having the patio are optimising lighting, while reducing energy consumption during the day, and it is a particularly vital space.

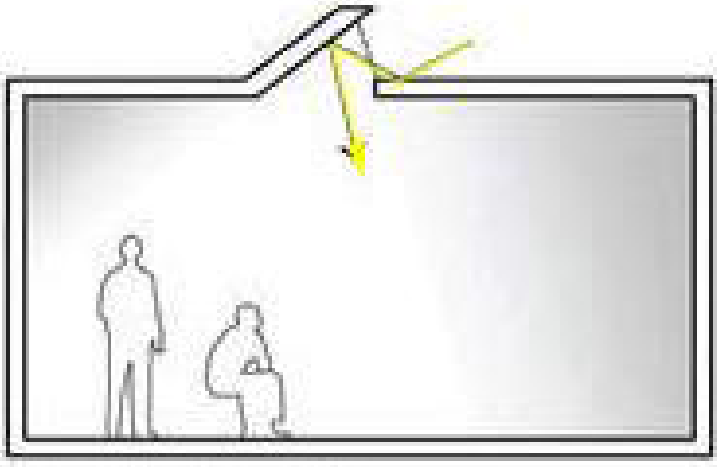


Figure 1. Skylights (provide indirect light) are often used in the daylighting design of residential buildings, mainly because they serve as both an architectural aesthetic feature and a method of introducing natural light into a space.

As far as the way of managing artificial lighting is concerned, it was designed according to the architects' suggestions. Throughout the house, general lighting has been adopted through linear led luminaires placed in the false ceiling where they change intensity according to the mood and the needs of the residents, thus contributing to the particular atmosphere of the house.

More specifically, lighting design has been studied to fully meet the following objectives:

- Visual comfort.
- Visual perspective of the architectural volume of the building.
- Ability to create lighting scenarios.
- Emergence of the artworks in the interior of the building.
- Application study for energy saving.

The proposed lighting solutions strictly followed the simple architectural lines of the building, are integrated into it and become one with the roof, highlighting at the same time the different materials, textures and colours. This is achieved by selecting "trimless" luminaires, with which the luminaire volume is "lost", fully integrated into the ceiling. At the same time, this type of luminaire prevents undesirable glare. Indoor lighting has been distributed to be diffused without intense contrasts and shifts of light and shadow. Great importance was given to energy saving, using state-of-the-art light-emitting diode luminaires, with high light output and excellent illumination quality (CRI 90).

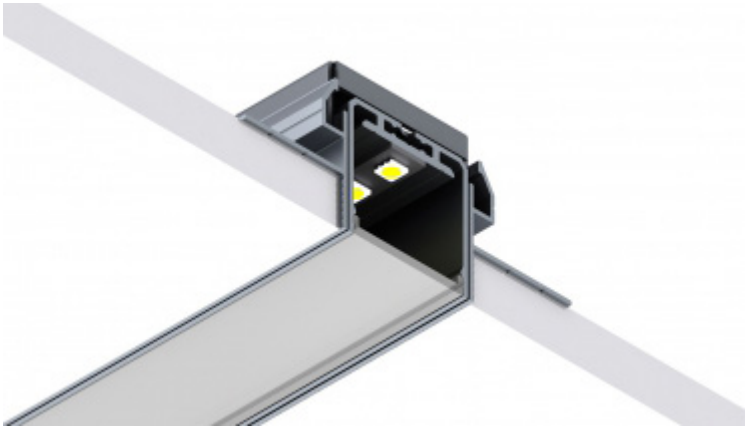


Figure 1. Extruded aluminum luminaires "trimless" create perfectly straight lines of light on the ceiling.

In addition, track mounted spot lights were used to highlight artworks, concealed lighting, table lights and floor lamps to create more lighting options in the house.



Figure 1. House interior view, the combination of natural and artificial lighting contributing to the particular atmosphere of the house.

Conclusions

The light determines our spatial environment. The architect, in collaboration with the lighting designer, uses natural and artificial light to give life to the house's space. The quality of the light effect is decisively influenced by the materials from which the reflecting surface is formed, as the quality of the materials is directly

related to the intensity, colour and shape of the reflected light.

The integration of the lighting design into the central concept of the general design of the house, during the construction phase, works much better in terms of the result produced. The design involves the natural light with the orientation of the building, the creation of a patio or the use of frames in the shell of the structure to manage the amount of light entering the interior.

The same design principle also applies to artificial lighting, since new technologies and its management systems often require their inclusion in the building shell during its construction.

The use of natural or artificial light as a synthetic tool and a guide to the architectural process determines the subsequent human experience and offers the visual quality that users themselves need for health, safety and enjoyment in their house.

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THE EFFECT OF THE PARAMETERS OF TEMPORAL CHANGE IN URBAN AREAS ON AIR POLLUTION: THE CASE OF DIYARBAKIR CITY

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Abstract

Due to the rapid increase in the world population and consequently the continuous migration from rural areas to urban areas, urban populations are constantly increasing. In the increasing urban populations, harmful pollutant factors are formed due to human effects. In this study, as a result of the controlled classification of 10 years' Landsat TM satellite images, the growth of Diyarbakır City Center and the related air pollutant factors were evaluated. According to the results of the study, it has been determined that the structural part of Diyarbakır City Center has grown by 19.9% in the 10-year period and the light green areas have decreased in the same ratio. As a result, despite the growth of the city center, a decrease in air pollutant factors has been determined and it has been observed that these decreases are caused by the fuel type change and meteorological factors.

1. Introduction

The rapid increase in industrialization and the developing business opportunities caused people to migrate from rural to urban areas. As a result of these migrations, urban areas were continuously increasing in terms of population. According to scientific researches, only 30% of the world population in the 1950s was in urban areas, while in 2014 it was estimated to be 54% and in 2050 it was estimated to reach 66% (WHO, 2017). The rapid growth of urban areas and the increase in population density along with industrialization led to the formation of intensive urban forms where the use of fossil fuels has triggered significantly and air quality is low (Kan et al., 2012; Mannucci and Franchini, 2017; Pena and Rollins, 2017; Xu. et al., 2016; Zhang and Cao, 2015)). The use of fossil fuels has been implicated in the negative impacts on air quality according to most scientific research. Due to the increased use of fossil fuels, the release of carbon-di-oxide (CO2), sulfur-di-oxide (SO2) and particulate matter (PM) pollutants from fuel-derived emissions has increased to the atmosphere (Galloway, 1998). Air pollution plays an important role

in the health of people (Brauer et al., 2016; Loizeau et al., 2018). At the same time, air pollution causes people to develop chronic diseases and high health costs due to these diseases (Buoli et al., 2018; Segalowitz, 2008). According to the reports of the World Health Organization, one out of every nine deaths is caused by air pollutants (WHO, 2017).

Air pollutants are suspended in the air in the form of gas and particulate matter. At the same time, these air pollutants interact with gaseous particulate matter and form complex mixtures (Huang et al., 2018; Yu et al., 2013). These complex mixtures are generally sulfur-di-oxide (SO2) and particulate matter (PM), which directly affect human health. Prolonged exposure to these substances causes problems such as respiratory disorders and lung diseases (Burnett et al., 2014; Crouse et al., 2012; Pope III et al., 2011; Yang and Zhang, 2018).

The aim of this study was to determine the effects of increasing urbanization rate on the air quality effect in the 15-year period of Diyarbakır city center.

2. Materiel

The material of the study area is approximately 650 m high above sea level and 37.9250 latitude and 40.2110 longitude Diyarbakır city center (Figure 1).

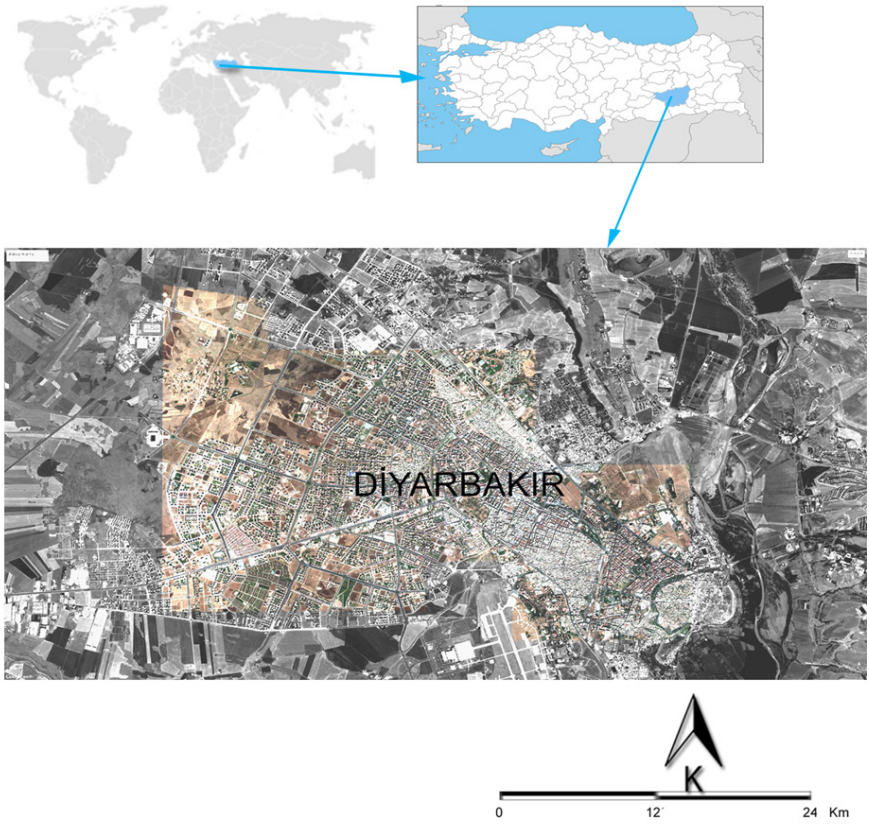


Figure 1. Location of the study area

The study will be used as material in the annual number of motor vehicles in Turkey Statistics Institute (TUIK), meteorological data from the General Directorate of Meteorology, air quality data was obtained from the Ministry of Environment Urbanism.

3. Method

3.1 Obtaining Satellite Images: The satellite images of the study area were obtained from Landsat TM satellite with a band opening of 0.50- 0.90pm. At the same time, the images obtained have 48000x2718 pixels and 30 m terrestrial resolution. Spatial data of 2007, 2015 and 2017 obtained from Landsat TM satellite are arranged according to WGS-84 coordinate system.

3.2 Controlled Classification of Satellite Images: Field classification is defined as the automatic categorization of image pixel values according to the scientific data in the field (Batur and Maktav, 2012; Elachi and Zimmerman, 1988). According to these definitions; Landsat TM satellite images obtained In Arc-GIS 10.2 package program, 35 sampling was performed for each 10 Structural areas ge and ih Open spaces ünde in the Image Classification module with Maximum Likelihood method.

4. Findings And Discussion

According to the 2002 classification obtained from Landsat TM satellite images, open areas within the boundaries of the study area are 16464 (Ha) and the structural areas are 4788 (Ha). At the same time, the data on this year means that the density of the structural area is less than the urban open areas. (Figure 2).

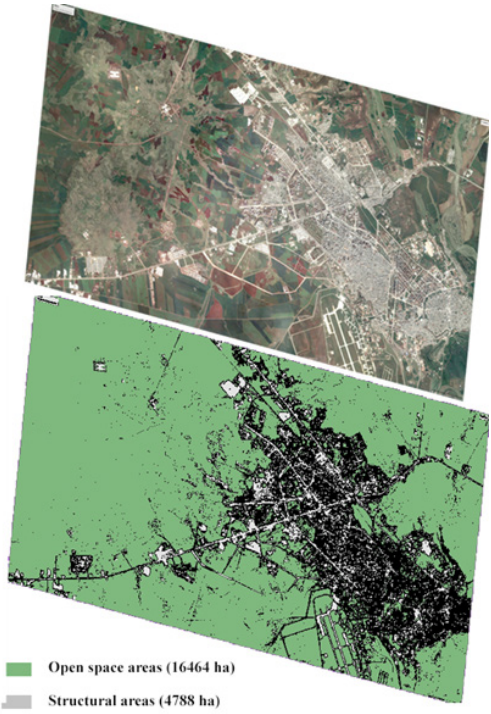


Figure2. Classification of Landsat TM satellite image from 2002

When I classify the Landsat TM satellite image according to the field usage, it is determined that the open areas in urban areas are 13722 (Ha) and the structural areas are 7545 (Ha). When we compare the images between the satellite images of 2002 and 2006; there is a decrease in open space amounts of 2742 (ha) and at the same time it can be mentioned that there is an increase of 2742 (ha) in structural areas which are the opposite of this ratio. (Figure 3).



Figure 3. Classification of Landsat TM satellite image from 2006

As a result of the grouping of 2017 Landsat TM images as controlled 2 classes, it was determined that the open spaces of Diyarabkır City Center were 10884 (ha) and the structural areas were 9704 (ha). As in other years, the data on the 2017 data show that the density of the structural area has increased and a decrease in the amount of open space in the city has been observed. When we examine the data numerically, it is seen that the open areas decreased by 5580 (ha) in the 15-year period and increased by 5580 (ha) in the structural areas. In general, it is possible to mention that Diyarbakır City Center has grown by 33.8% in the 15-year period and the open areas are lost at the same rate (Figure 4).



Figure 4 Classification of Landsat TM satellite image from 2017

When the data sets are analyzed on an annual basis, it is observed that the amount of particulate matter (PM) decreases despite the increase in the amount of human factor, number of motor vehicles and structural areas. As a matter of fact, in most scientific studies, air pollutant factors increase in the increase of these rates (Ahmet et al .; Gordon et al., 2018; Xu et al., 2018). However, the transition of natural gas from the fossil fuel type used in the structural character areas in the study area since 2002 may be a reason for the decrease in particulate matter (PM) and sulfur-di-oxide (SO2) (Table 1).

Tablo 1. Table 1. Data of the study area by years

YEARS	SO_2	PM_{10}	Number Of Vehıcles
2002	134	120	43000
2006	17,4	61,8	64000
2017	12	59	118000

5. Result

Air pollution is one of the main problems of developing countries. Human beings have always been in search of the least amount of pollution damage.

The effects of air quality on light green areas and building density masses

examined in the study area were examined. In Diyarbakir City Center, where the construction has increased by almost 33%, air quality indices are observed to decline. This decline is the main reason that people warming and energy needs to meet to use the change of fuel type has been effective .. The value limits the amount of particulate matter to the European countries and Turkey 40 mg / m³ Diyarbakırr average in City Center 60 mg / m³ seen levels and a few small risks poses.

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EVALUATION OF URBAN PRESERVATION IN HISTORICAL ENVIRONMENT BY VISUAL PERCEPTION: MIDYAT AND SURICI CASES

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Abstract

Historical environments give information about past life, reflect the socio-cultural, economic structures of the communities and the ecological characteristics of the place where it is built. More daytime population in these areas and taking place on a touristic route makes these regions important. The preservation and usage of historical values according to the characteristics of the region is important in terms of transmission to future generations. The community which is aware of the importance of cultural heritage, can be guide with its involvement in making decisions about the city and it makes a significant contribution to the sustainability of the settlement.

In Turkey, applications for the preservation of cultural heritage are made within the framework of various laws and regulations. The preservation and improvement works have big importance for the deserved attention of historical environments. Lack of protective planning approaches in historical environments can negatively affect the development of these areas. This is the basis for the applications that do not conform to traditional structure. Also, preservation that is not provided at the desired level can negatively affect tourism expectations.

As the appearance of the facades increases the attractiveness of the streets, it is an important issue to choose the applications which are suitable for the historical structure and which do not damage the structure. The facade shows the cultural situation of the time the building was built and explains the criteria of order and regulation and the mastery of decoration and gives information about the people living in it and the community they belong to them. At this point, the the people's awareness in the region or in the field about conservation comes to the fore. Facades, which are an indicator of conservation consciousness, can be shaped according to the manner in which the inhabitants are handled.

In this context, in order to measure the awareness of users about the problems and potentials in the historical enviroment, the study has made in Midyat (Mardin) and Suriçi (Diyarbakir) which has a deep-rooted past in Turkey. Images were shown and asked questions about both regions to randomly chosen individuals in the study areas and the students of the 3rd and the 4th year students of the Dicle University Faculty of Architecture, who has been trained in preservation in the architectural education. Midyat and Suriçi regions have been taken as comparative, and the user's visual perceptions related to historical environment have been evaluated. As a result of this evaluation, an assessment of the visual perceptions of the users living in the area and the students of the Faculty of Architecture for urban conservation was made and suggestions, which could be data on any protective interventions for the area, were made.

Introduction

Historical environmets provide information about past lives and represent the socio-cultural, economic structures of societies and the ecological environment where the structure is located. In recent years, intense of interest in historical and cultural heritage has led to the revival of tourism in these areas. Therefore, the necessity of the conservation of historical environments becomes a current issue and it also gives the responsibility of transfering the cultural heritage for the next generations to the persons and institution

There are many historical and cultural values and cultural heritage sites in Turkey, need conservation. However, reasons such as being late in the conservation of these areas, lack of awareness of the user about conservation as well as legal and executive deficiency, cause damage. Cultural wealth provides socio-economic and environmental benefits when they are used by conserving and and maintained to sustain. For this purpose, in our country practices for the protection of cultural heritage are made within the framework of conservation development plans, and various laws and regulations. There are many applications in the conservation or restoration of historical environments, and the street rehabilitation work is frequently used and effective method. The street rehabilitation becomes a current issue as being preferred because it is implemented with less cost, has a public framework and provides a positive visual impact on the area at the first stage.

The street rehabilitation is one of the applications for the conservation of historical areas to ensure the participating in contemporary life that meets the changing needs of society by restoring the devastated or abandoned old buildings and historical environments. Also it provides the completion of various reinforcements, improvement of insufficient ones, removal of incompatible inserts, renewal of living conditions with new annexes in and around the buildings by taking care to adapt to the architectural and historical values (Ahunbay, 2008 ve Ünver, 2017) and allows to handle the whole street.

As in all the components of the street in historical areas, the facades indicate the cultural situation of the building when it was built, explain the order and regulation criteria, show mastery of decoration, and provide information about the inhabitants and the community they belong to (Baytin, 1994 ve Krier 1980; Emir 2008). The historical street texture and façades become obsolete, destroyed and often lose their local characteristics in time. User requirements or improper practices can

cause distortions on the facades. It is tried to recover the original fabric with various applications in the regions undergoing change. At this point, the awareness of the people living in the region or in the area about the protection comes to the fore. The facades, which are an indicator of conservation consciousness, are shaped according to the manner in which people live in the area. Individuals who have sufficient equipment for the conservation of cultural heritage can achieve different results with the rehabilitation works.

Facades in historical areas change in time by reasons such as changing of architectural styles, natural environment data, function, social, cultural and economic structure (increase in housing density, population density, capacity), permitting wide openings and heights of the conveyor system, visual perception (color and texture, movement-related, change of motion intensity) environmental health, human health (materials, height, natural resources) (Emir, 2008). So, the cultural heritage in these areas is damaged and the reasons causes the area to lose its identity.

Changes in the façade can cause problems in terms of appearance, color harmony, compatibility and safety (Aydın, 2013). Also, the color, location and convergence of the commercial plates on the façade cause visual pollution, the sidewalk materials of the units in commercial areas make the pedestrian circulation difficult. Additions and outbuildings and floor increase applied to historical buildings affect the visual appearance of the façade and distort the silhouette.

In Turkey practices related to street rehabilitation are applied by Law No. 2863 of " the Conservation of Cultural and Natural Assets" dated 1983, Law No.3386 of " the Change and Addition of Some Articles to Law No. 2863 of the Conservation of Cultural and Natural Assets" dated 1987, Law No. 5226 of "the Conservation of Cultural and Natural Assets and Change of Various Laws" dated 2004, Law No. 5366 of "The Conservation By Renewing And Use By Conserving of Historical and Cultural Immovable Assets" dated 2005 and "the Cultural Assets Tender Regulation" dated 2013. The first technical specification regarding the principles for preparation and implementation of street rehabilitation projects was prepared in 1996, and updated in 1998, 2005 and 2006 with various revisions (Çelimli, 2016). Rehabilitation works are carried out in the streets in Many historical areas within the framework of these laws. Aim of street rehabilitation or facade renovation work is to increase the attractiveness of the area and to take steps to uncover the potential of cultural heritage by renewing the aging or transformed historical environment.

As the appearance of the facades increases the attractiveness of the streets, it is an important issue to prefer the practices which are compatible with the historical structure and do not harm the structure. The important point here is to determine the approach of the technical team in the planning and implementation phase as well as the protection of the current user in the area, and the perspective of maintaining the protection consciousness and protection.

In this context, this study was conducted in order to measure the user's awareness of the problems and potentials in the historical environment in Midyat (Mardin) and Suriçi (Diyarbakır), which is the site of history and has a long history. The visuals of both regions were shown and questions were asked to the users randomly selected in the area and 3rd and 4th year students of the Dicle University Faculty of Architecture who received training in the field of conservation. Midyat

and Suriçi regions were considered comparatively and visual perceptions of the user on the historical environment have been evaluated. As a result of this evaluation, it was tried to reveal the perspectives of the students of the Faculty of Architecture who were educated in the field about the conservation and users live in area.

Materıals

As a study area, the Şen and Han Streets in Midyat in Mardin and the Gazi Street in Suriçi in Diyarbakır was selected. Suriçi constitutes the old city center of Diyarbakır, has been declared as a protected area in 1988 and it is one of the important settlement areas should be conserved with its cultural assets, traditional housing fabric and city walls. Churches, inns, pavilions, mosques, baths, rich examples of civil architecture are important cultural assets of Suriçi. This region surrounded by walls, is divided into four with the Melik Ahmet, Yeni Kapı and Gazi Main Streets. The Gazi Street forms the traditional trade axis of the city and service sectors such as khans and shops are located on this axis. Suriçi streets which are shaped according to the traditional housing fabric depending on the climatic features are narrow and organic.

By the proclamation of the Republic, a planned period was started in Diyarbakır and development plans covering the inside and outside of the walls were made in various years. The Diyarbakır Suriçi Conservation Development Plan, which was an important step towards the conservation of the city wall, was approved in 1990. However, the continuation of immigration after 1990 in the Suriçi resulted in destruction and structuring which is not compatible with the historical fabric. Due to the problems identified by the Municipal and Council of Conservation, the implementation of the 1990 Development Plan was canceled and the studies on revision of the plan were initiated. The final Conservation Plan was completed and approved in 2012, and in 2015 Diyarbakır Castle and Hevsel Gardens were included in the UNESCO Heritage List. Suriçi region is a visited area which has important attraction for tourists.

According to the data of the Turkish Statistical Institute, the population of the Sur district is 113,447 people. It is a historical area where commercial units are used extensively by tourists. Commercial units in Gazi Street are mostly eating and drinking places, clothing and food stores and jewelers.



Figure 1. Location of Gazi Street



Figure 2-3. Gazi Street

Midyat is one of the districts of Mardin, was established as a cave city and has been dominated by many civilizations throughout history. After 1930 Midyat revived, churches and houses were repaired (Dalkılıç, 2004). The ancient city of Midyat, where the traditional culture produced by the population with different cultures was declared as a protected area in 2000 (Daşdemir, 2009). Midyat consists of two separate settlements are known as Estel and Old Midyat, 3 km away from each other. The new structurin is located in the Estel region. Old mosques, churches, monasteries, traditional dwellings are available in the old town of Midyat. Until the 2000s, the city was developed around these two core neighborhoods, and in the 2000s it accelerated its development along the Mardin-Batman road and north-south direction (Dikçınar Sel ve Yazgan Gül, 2009). "Midyat's traditional urban fabric is dense and cramped. In Midyat, the roads are shaped according to the topography, and the dead streets and narrow streets form the organic urban fabric. There are inns and shops in the area where the commercial life of the city takes place" (Dalkılıç, 2004).

In terms of planning process in Midyat, there are 1/5000 scale Master Development Plan and 1/1000 scale İmplementation Development Plan approved in 2002. However, these plans do not cover urban protected area has traditional fabric in the east and west of the city (Dikçınar Sel ve Yazgan Gül, 2009). The Midyat Conservation Development Plan was approved in 2008. The population of Midyat is 110,548 people. The historical region with and commercial units used intensively by residents and tourists as in Suriçi. There are clothing and food stores and jewelers in Şen and Han Streets in Midyat. The silver jewelery and wines produced in the region are quite popular.



Figure 4. Location of Şen and Han Street





Figure 5. Şen Street Figure 6. Han Street

In this study, the main axes of the historical Midyat and Suriçi regions were evaluated in terms of facade conservation. In this evaluation, it was tried to find out what is the impression of the visual perception in the main streets of the historical fabric. Therefore, it is emphasized that the conservation can be ensured by the conservation consciousness of the individuals live in the area, and that this situation is an important factor.

Method

In addition to observations made in the field, survey studies were conducted to measure the awareness of the user. 32 people were randomly selected in the area in Midyat and 38 people were randomly selected in the area in Suriçi, were surveyed. The number of students surveyed is 66. The results of the survey were evaluated by using SPSS 21.0 program. The photographs of the study area were shown to the user and their sensation and awareness were measured about conservation of the cultural heritage in historical areas. 16 different photographs from Suriçi and 20 photographs from Midyat were shown to the person who were surveyed. The visuals covering the features of the following headings were asked to score from 1 to 5 (1: strongly disagree, 2: disagree, 3: neither agree nor disagree, 4: agree, 5: absolutely agree).

- Visual complexity
- Conservation of historical heritage (structure)
- Whether street fabric is conserved or not (street / structure)
- Discomfort caused by road width and storey height
- Discomfort caused by density, design and forms of commercial buildings
- Qualification of urban spaces and recreation areas
- Vehicle and pedestrian density
- Parking on the road

According to these headings, it is possible to sort the general characteristics of the studied area as in Table 1:

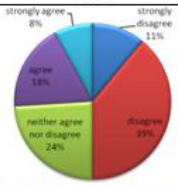
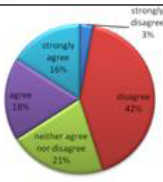
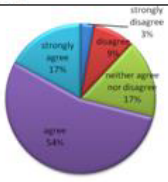
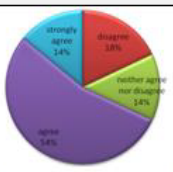
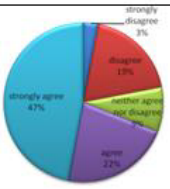
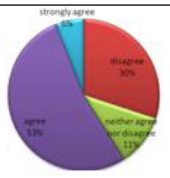
	Suriçi (Gazi Street)	Midyat (Han ve Şen Street))
Visual complexity	Signs on the façades and the materials overflowing in front of the shop due to the presence of commercial buildings create complexity.	Signs on the façades and the materials overflowing in front of the shop due to the presence of commercial buildings create complexity.
Conservation of historical heritage (structure)	Historical buildings on the avenue are in better condition due to the fact that there have been rehabilitation works in previous years.	Most of the historic buildings on the street need maintenance on the facades.
Whether street fabric is conserved or not (street / structure)	Gazi Caddesi linear transportation axis is preserved and the original fabric is damaged with modern buildings built next to historical buildings.	The original fabric began to damage with modern buildings built next to historical buildings.
Discomfort caused by road width and storey height	The number of floors varies between 2-6. The street is not large enough to meet pedestrian and vehicle density.	The number of floors varies between 2-5. Han and Sen Street are closed to vehicle traffic. Especially in Han Street, the materials were sold in front of the shop because of the sale of textile products and the street became narrower.
Discomfort caused by density, design and forms of commercial buildings	There are different types of commercial buildings and historical structure-modern structure disharmony can be seen.	Stone historical buildings, multi-storey modern buildings and modern buildings resembling historical structures are found and there is disharmony.
Qualification of urban spaces and recreation areas	Along the street there is a dense housing fabriv and there are recreation areas in front of Ulucami. There are seating elements along the street.	the pedestrian zone and urban open areas are created on Şen Street has closed to vehicle traffic.
Vehicle and pedestrian density	There are vehicles and pedestrian density due to being a commercial center.	There is no vehicle density on the streets closed to vehicle traffic, but there is a pedestrian density due to being a commercial center.
Parking on the road	There are vehicles parked on the road depending on the inadequacy or distance of the parking areas.	Depending on the inadequacy or distance of the parking areas, vehicles are parked in street alley

Table 1. Properties of Suriçi and Midyat according to the headings examined.

The visuals of both regions were shown and questions were asked to the users live in the area and 3rd and 4th year students of the Dicle University Faculty of Architecture. According to the results of the survey, problems and potentials were determined in regard to visually in Midyat and Suriçi and two study areas were evaluated. The results about the perception of the individuals living in the area and the individuals receiving education were evaluated and recommendations were made.

Findings

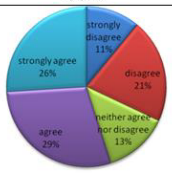
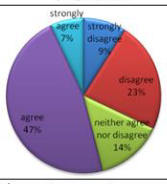
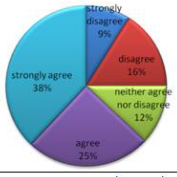
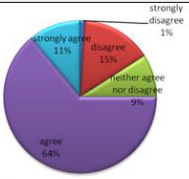
Visual complexity: In the historical regions where commercial units are intense, visual complexity is inevitable unless measures are taken. Within the scope of the study, in order to reveal the opinions of the user and the students in terms of visual confusion, photographs from two different points in the center of the bazaar were shown. For visual confusion the complexity was evaluated in the light of the criteria such as the layout of the shops, awning, signage, air conditioning units, color, etc.

<table>
<tr><th colspan="4">VISUAL COMPLEXITY</th></tr>
<tr><td rowspan="5">DİYARBAKIR (SURİÇİ)</td><td>IMAGE</td><td>USER</td><td>STUDENT</td></tr>
<tr><td>
Gazi Street</td><td></td><td></td></tr>
<tr><td>EVALUATION</td><td>The image is not complex for the user said "disagree" with rate of 39%.</td><td>The image is complex for the student said "agree" with rate of 32%.</td></tr>
<tr><td>
Gazi Street</td><td></td><td></td></tr>
<tr><td>EVALUATION</td><td>The image is not complex for the user said "disagree" with rate of 42%.</td><td>The image is complex for the student said "agree" with rate of 54%.</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td rowspan="5">MARDİN (MİDYAT)</td><td>
Han Street</td><td></td><td></td></tr>
<tr><td>EVALUATION</td><td>Most user chosed options as "disagree", "agree" and "strongly agree" with a rate of 22%.</td><td>The image is complex for the student said "agree" with rate of 54%.</td></tr>
<tr><td>
Han Street</td><td></td><td></td></tr>
</table>

Although the visuals have visual complexity, acording to the users in Suriçi, 1st and 2nd image was not complex, but the students considered that they were complex. The user in Midyat has prefered different options at the same rate for the 1st photograph. While it was complex for some and not for some. Students considered it as complex. The second image has similar feature to the first image, was found to be complex by the user and the student. Although the user's perception of complexity differs, the level of perception of the students on conservation

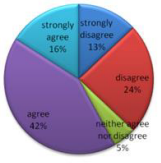
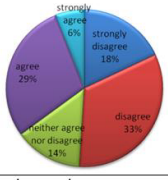
remained the same and they agreed that there were visual complexity.

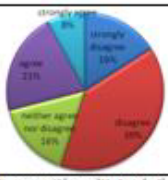
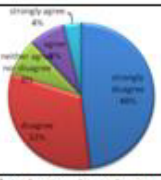
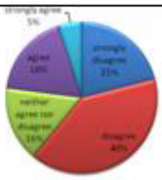
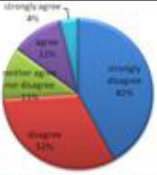
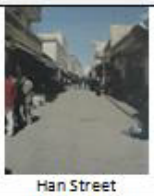
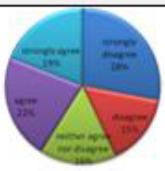
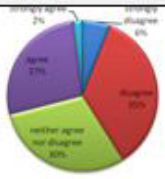
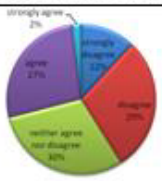
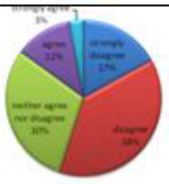
Conservation of historical heritage (structure): The rapid growth of the cities threatens the old city centers. Therefore, the old buildings in the historical areas cannot be adequately conserved. In order to examine the conservation status of the historical heritage, restoration structures were used. The image of Ulucami in Suriçi and image of historical inn was used in Midyat.

CONSERVATION OF HISTORICAL HERITAGE			
	IMAGE	USER	STUDENT
DİYARBAKIR (SURİÇİ)	 Ulucami		
	EVALUATION	The image is conserved according to the user said "agree" with rate of 29%.	The image is conserved according to the student said "agree" with rate of 47%.
MARDİN (MİDYAT)			
	EVALUATION	The image is conserved according to the user said "strongly agree" with rate of 38%.	The image is conserved according to the student said "strongly agree" with rate of 64%.

Images with restoration structures were evaluated as conserved by users and students for both study areas. The individuals living in the area were able to see the traces of the past after the restoration and this has effect in evaluating the visuals as conserved.

Whether street fabric is conserved or not (street / structure): In most of the conservation studies carried out in our country, conservation works on the basis of structure in historical environment are not sufficient. In order to find out whether street texture is conserved or not, the images showing the street-building relationship from Gazi Street and Han and Şen Streets were used. Despite the restoration was applied in Gazi Street, the remarks of users were different.

WHETHER STREET FABRIC IS CONSERVED OR NOT			
	IMAGE	USER	STUDENT
DİYARBAKIR (SURİÇİ)	 Gazi Street		
	EVALUATION	The image Gazi Street that has conserved street fabric according to the user said "agree" with rate of 42%.	The image is not conserved according to the student said "disagree" with rate of 33%.

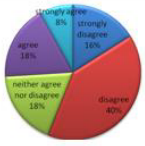
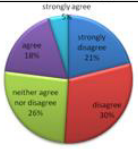
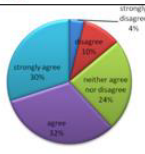
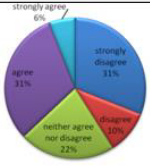
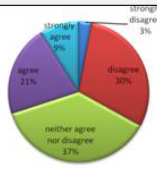
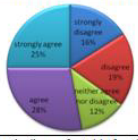
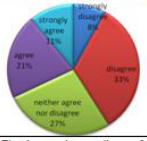
	 Gazi Street		
	EVALUATION	The image with multi rise buildings that is not conserved according to the user said "disagree" with rate of 39%.	The image is not conserved according to the student said "strongly disagree" with rate of 48%.
	 Gazi Street		
	EVALUATION	The image with multi rise and low rise buildings that is not conserved according to the user said "disagree" with rate of 40%.	The image is not conserved according to the student said "strongly disagree" with rate of 42%.
MARDİN (MİDYAT)	 Han Street		
	EVALUATION	The image is not conserved according to the user said "strongly disagree" with rate of 28%.	The image is not conserved according to the student said "disagree" with rate of 35%.
	 Han Street		
	EVALUATION	The image is conserved according to the user said "agree" with rate of 38%.	Most student chosed option as "neither agree nor disagree" with rate of 30%.
	 Şen Street		
	EVALUATION	The image is conserved according to the user said "strongly agree" with rate of 31%.	The image is not conserved according to the student said "disagree" with rate of 38%.

While the user evaluated as conserved the first image with low-rise buildings in Gazi Street, where the restoration was applied, the student considered unconserved. The 2nd and 3rd images with multi-storey buildings were evaluated as unconserved by users and students. In Midyat, the first image, has similar feature other images was evaluated as unconserved by users and students. The second

was unconserved according to users and the student was unstable. The third image has worn facades was evalutaed as conserved by the user and it was unconserved according to the students. The user can see that the previous rehabilitation work is sufficient. However, students with conservation awareness stated that they were not conserved by realizing the ongoing deterioration after the rehabilitation work.

Discomfort caused by road width and storey height: While the increase in the number of floors in the buildings because of increasing population is a solution for housing, the road widths remain constant and cause their use over their carrying capacities. Due to the population increase in historical environments, the structure that is not compatible with historical buildings and original street fabric, is occured. In the investigated streets, the condition of discomfort caused by road width and storey height were questioned and the opinions of the user and the student were put forward.

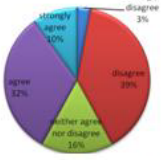
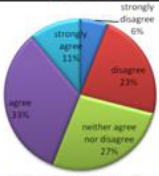
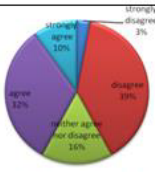
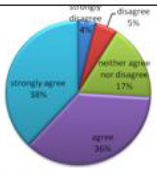
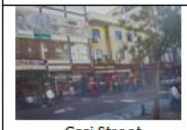
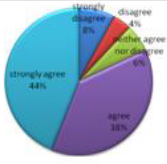
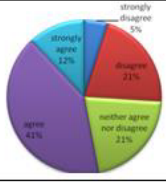
DISCOMFORT CAUSED BY ROAD WIDTH AND STOREY HEIGHT

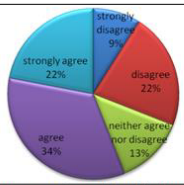
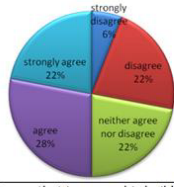
	IMAGE	USER	STUDENT
DİYARBAKIR (SURİÇİ)	 Gazi Street		
	EVALUATION	The image is not discomfortable for the user said "disagree" with rate of 40%.	The image is not discomfortable for the student said "disagree" with rate of 30%.
	 Gazi Street		
	EVALUATION	The image that has multi-storey buildings, is not discomfortable for the user said "disagree" with rate of 34%.	The image is discomfortable for the student said "agree" with rate of 30%.
MARDİN (MİDYAT)	 Şen Street		
	EVALUATION	Most user chosed options as "strongly disagree" and "agree" with rate of 31%.	Most student chosed option as "neither agree nor disagree" with rate of 37%.
	 Şen Street		
	EVALUATION	The image is discomfortable for the user said "agree" with rate of 28 %.	The image is not discomfortable for the student said "disagree" with rate of 33 %.

In suriçi, the 1st image with low-rise structures was evaluated as not discomfort by the users and the students. The 2nd image with multi-storey structures is discomfort for the students, while the user is not discomfort. The first image

of Midyat, which contains low-rise buildings and street, was evaluated as not discomfort by some users and it was discomfort for some users. The students were unstable. The 2nd image was evaluated as discomfort by the users and as not discomfort by the students.

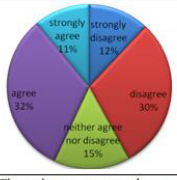
Discomfort caused by density, design and forms of commercial buildings: The increase in the commercial units in the historical environment can lead to the structure which is not compatible with the historical structure in terms of form and design. The awareness of the user and students was measured by examining the condition of discomfort by the density, design and forms of commercial buildings.

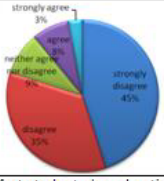
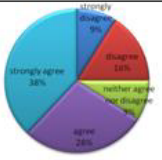
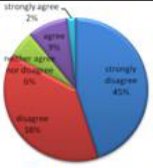
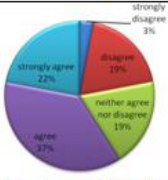
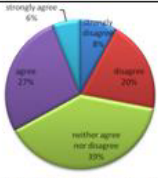
DISCOMFORT CAUSED BY DENSITY, DESIGN AND FORMS OF COMMERCIAL BUILDINGS			
	IMAGE	USER	STUDENT
DİYARBAKIR (SURİÇİ)	 Gazi Street		
	EVALUATION	The image is not discomfortable for the user said "disagree" with rate of 39 %.	The image is discomfortable for the student said "agree" with rate of 33 %.
	 Gazi Street		
	EVALUATION	The image that is seen pedestrians and vehicles, is not discomfortable for the user said "disagree" with rate of 39 %.	The image is discomfortable for the student said " stronly agree" with rate of 38 %.
	 Gazi Street		
	EVALUATION	The image is discomfortable for the user said "agree" with rate of 32 %.	The image is discomfortable for the student said "stronly agree" with rate of 44 %.
MARDİN (MİDYAT)	 Han Street		

	 Han Street		
	EVALUATION	The image is discomfortable for the user said "agree" with rate of 34 %.	The image is discomfortable for the student said "agree" with rate of 36 %.
	 Şen Street		
	EVALUATION	The image that is seen a big building, is discomfortable for the user said "agree" with rate of 28 %.	The image is discomfortable for the student said "agree" with rate of 30 %.

In Suriçi, 1st and 2nd images were evaluated as not discomfort by the users and as discomfort by the students. The 3rd image was evaluated as discomfort by both the users and the students. In Midyat first and second images has similar features. The first image was evaluated as not discomfort by some users and as discomfort by some users. It was discomfort for students. The 2nd and 3rd images were evaluated as discomfort by the users and students.

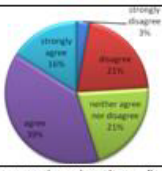
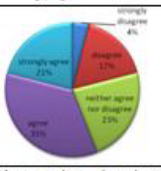
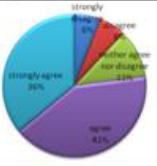
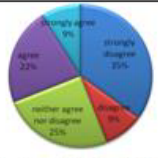
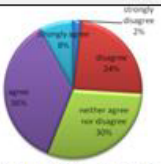
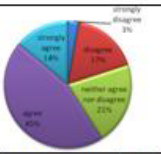
Qualification of urban spaces and recreation areas: People visit the historical area need urban spaces and relaxation areas to relieve their tiredness. However, the factors such as densely structured fabric and the existence of registered asset, restrict the recreation areas. It was tried to reveal the expectations of the users and students by showing the different images in which the urban spaces and recreation areas are present and not present.

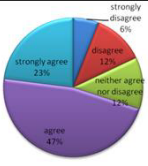
QUALIFICATION OF URBAN SPACES AND RECREATION AREAS			
	IMAGE	**USER**	**STUDENT**
DİYARBAKIR (SURİÇİ)	 Gazi Street		
	EVALUATION	The urban spaces and recreation areas on the image is enough for the user said "agree" with rate of 45 %.	The urban spaces and recreation areas on the image is enough for the student said "agree" with rate of 32 %.
	 Gazi Street		

I	 Gazi Street		
	EVALUATION	Most user chosed option as "disagree" with rate of 32%.	Most student chosed option as "disagree" with rate of 38%.
MARDİN (MİDYAT)	 Şen Street		
	EVALUATION	Most user chosed options as "strongly disagree" and "agree" with rate of 28%.	Most student chosed option as "strongly disagree" with rate of 45%.
	 Şen Street		
	EVALUATION	Most user chosed option as "strongly agree" with rate of 38%.	Most student chosed option as "strongly disagree" with rate of 45%.
	 Across of Şen Street		
	EVALUATION	Most user chosed option as "agree" with rate of 37%.	Most student chosed option as "neither agree nor disagree" with rate of 39%.

The area in front of Ulucami in Suriçi was considered sufficient by the user and the students, while the 2nd and 3rd images were insufficient in terms of urban spaces and rest areas. In Midyat the first image of the urban space and recreation areas were sufficient for some user and insufficient for some of them. The stdents evaluated it was insufficient. The areas in the 2nd image was sufficient for users and insufficient for students. While the third image of urban spaces and recreation areas was sufficient for users, the students were unstable.

Vehicle and pedestrian density: Opening of these areas, which are extensively used by the population, to vehicle traffic may be a problem for pedestrians. A variety of images from area were shown to the user and students to determine the inconvenience of vehicle and pedestrian density.

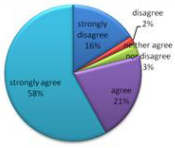
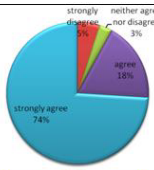
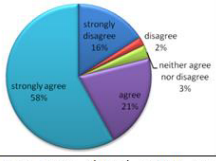
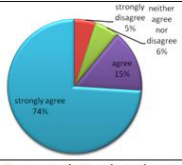
VEHICLE AND PEDESTRIAN DENSITY			
	IMAGE	USER	STUDENT
DİYARBAKIR (SURÇİ)	 Gazi Street		
	EVALUATION	Most user chosed option as "agree" with rate of 45%.	Most student chosed option as "strongly agree" with rate of 36%.
	 Gazi Street		
	EVALUATION	Most user chosed option as "agree" with rate of 39%.	Most student chosed option as "agree" with rate of 35%.
	 Gazi Street		
	EVALUATION	Most user chosed option as "agree" with rate of 39%.	Most student chosed option as "agree" with rate of 41%.
MARDİN (MİDYAT)	 Şen Street		
	EVALUATION	Most user chosed option as "strongly disagree" with rate of 35%.	Most student chosed option as "agree" with rate of 36%.
	 Şen Street		
	EVALUATION	Most user chosed option as "agree" with rate of 28%.	Most student chosed option as "agree" with rate of 45%.

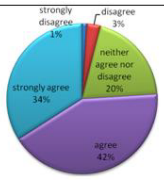
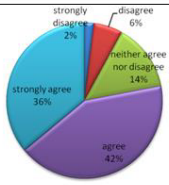
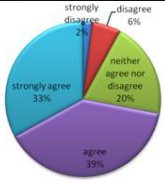
	 Şen Street		
	EVALUATION	Most user chosed option as "neither agree nor disagree" with rate of 31%.	Most student chosed option as "agree" with rate of 47%.

Users and students accepted the presence of vehicle and pedestrian density for the images in Gazi Street. In Midyat, for 1st image the user stated that there was no vehicle and pedestrian density and students stated that it had density. The 2nd

image was evaluated as density of both groups. For the 3rd image, the users were unstable and the students stated that it had density.

Parking on the road: Generally, due to the lack of car park in the around, depend on the majority of vehicles parked on the road, the road width narrows and vehicles and pedestrian crossings may be experienced problems. A variety of images from area were shown to the user and students to determine the inconvenience of parking on the road.

PARKING ON THE ROAD			
	IMAGE	USER	STUDENT
DİYARBAKIR (SURİÇİ)	 Gazi Street		
	EVALUATION	Most user chosed option as "strongly agree" with rate of 63%.	Most student chosed option as "strongly agree" with rate of 76%.
	 Gazi Street		
	EVALUATION	Most user chosed option as "strongly agree" with rate of 58%.	Most student chosed option as "strongly agree" with rate of 74%.
	 Gazi Street		
	EVALUATION	Most user chosed option as "strongly agree" with rate of 58%.	Most student chosed option as "strongly agree" with rate of 74%.

MARDİN (MİDYAT)	 Şen Street		
	EVALUATION	Most user chosed option as "strongly disagree" with rate of 34%.	Most student chosed option as "agree" with rate of 74%.
	 Şen Street		
	EVALUATION	Most user chosed option as "strongly agree" with rate of 34%.	Most student chosed option as "agree" with rate of 42%.
	 Şen Street		
	EVALUATION	Most user chosed option as "agree" with rate of 31%.	Most student chosed option as "agree" with rate of 39%.

The users and students accepted that there was parking on the road in Gazi Street. In Midyat, the user evaluated the 1st image as not having parked on the road, while the students evaluated it had. For the 2nd and 3rd images, both groups indicated that they had parking on the road.

RESULT

Similar problems are encountered in the streets examined in Suriçi and Midyat which has reflections of deep-rooted history. In both of the study areas, there are buildings which have not been adapted with modern structures or not conserved besides the conserved historical buildings. In the facades, neither the conservation works were made nor the practices were adequate. The vehicle and pedestrian density problems are also encountered.

In this study, the perspectives of the living people and the students about conservation were revealed and the current situation was evaluated by images. As a result, students who were educated about conservation answered the questions clearer and correctly.

The users gave a clear and correct answer to the question about the conservation status of the historical heritage in Suriçi and Midyat, while for other images they gave different answers from the students. For the user who knows the previous and current situation of the buildings, more healthy answers were taken to the questions on the basis of structure.

Individuals living in the area can be effective in the sustainability of conservation. Therefore, awareness should be made about historical conservation. The evaluations made by the students of the Department of Architecture, who received

conservation education, also emphasize their conservator approach.

In this context, it would be a correct decision to implement the following recommendations.

- There are visual complexity in commercial buildings in both study areas. It is necessary to carry out the facade renovation works and the obligation and compliance with certain standards should be imposed on the applications.
- There are structures that are conserved on the basis of structures. Restoration works should be started for the buildings which have worn, destruction or deterioration. The building and street fabric should be considered as a whole and facade renovation works should be started.
- Efficient rehabilitation studies should be carried out according to the original street fabric. Necessary precautions should be taken for structures that are not prober to the street fabric. Within the framework of participatory and holistic planning, physical and functional rehabilitation projects should be prepared in accordance with legal regulations.
- A legally effective framework for street rehabilitation should be prepared. The controlling mechanism should be established for the additional or interventions to be carried out in the areas where the rehabilitation was made.
- Due to the fact that high-rise structures disrupt the original fabric and increase the population, arrangements should be made to prevent the increase in the number of floors.
- Since road widths are not enough, alternative roads should be recommended for vehicle traffic, and vehicle parking on road should be limited. By increasing the parking space, vehicles should be directed to these areas.
- Most commercial structures are not aesthetically in terms of density, design and forms. Applications reflecting the original fabric should be made.
- Urban spaces and recreational areas on the street are inadequate. The streets should be pedestrianized at certain points and landscape arrangements supported by urban furniture should be made. The existing ones should be made attractive.
- Most importantly, the awareness-raising and training programs that will ensure the awareness of users, should be organized.

It is an important issue at the decision-making stage to take the ideas of the community in terms of local governments, designers and planners. The study showed that living individuals do not have enough knowledge about conservation.

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THE CONCEPT OF LEGACY AND ITS MANIFESTATIONS IN ARCHITECTURE AND BUILT ENVIRONMENT

MARGO SOCHA

Legacy is an extremely broad and complex concept that spans many academic fields including philosophy, psychology, economics, genetics and social studies. Very broadly defined as anything handed down by our predecessors (Oxford Dictionary of English, 2010), it can refer to money, property, genetic material and childbearing, but also values and knowledge. In this context, legacy can be considered a fundamental aspect of human existence – a mechanism for cultural transmission of values, beliefs and knowledge that allows us to formulate collective memory, social norms, traditions and group identity.

This paper explores various conceptualizations of legacy and how they apply to the built environment. It examines the role of human agency involved in the process of leaving and receiving intellectual inheritance (particularly in the context of heritage industry and urban redevelopment); the issues of inheritance tax and its impact on wealth distribution, land ownership and real estate; as well as various examples of how legacy of past events, people and beliefs manifested itself architecturally and shaped the way our cities and towns look today. Events such as French Revolution, Spring of Nations, Industrial Revolution, world expositions and Olympic Games; people such as Baron Haussmann, Margaret Thatcher and Prince Charles; architectural theories such as modernism and garden cities – they all left a profound and lasting impact on our built environment either through monumental architecture, vernacular architecture or the urban fabric in general.

Finally, this paper also considers the role of legacy in human motivation and how it translates into landowners' decision-making. It is argued that today, housing developments are a frequent manifestation of landowners' determination to leave behind a lasting legacy, which works as an incentive to provide better quality housing. Consequently, institutions such as RICS (Royal Institution of Chartered Surveyors) and the Prince's Foundation have been emphasizing the role of private landowners arguing that, unlike volume house builders, they take on a more long-term and socially conscious view of housing developments and are motivated by factors other than financial gain (such as a welfare of a local community or preservation of area's local character). Therefore, this paper also stresses the importance of further research into the role of legacy motive in improving the quality of housing developments in the UK.

STRUCTURAL VULNERABILITY ASSESSMENT OF JAMEH MOSQUE OF ISFAHAN IN IRAN

ARDAVAN KHOSHFEKARI

Structural Vulnerability assessment of historical buildings is very important to carry them to the future. Iran is a country in terms of historic masterships from several Empires, such as mosques, bathhouses, churches, qanats and bridges. Especially mosques are the common historical structures in Irans cities. Therefore, in the present study, structural vulnerability assessment of Jameh Mosque of Isfahan was carried out.

Jameh Mosque of Isfahan is one of the oldest mosques still standing in Iran, and it was built in the four-iwan architectural style, placing four gates face to face.

An iwan is a vaulted open room. The qibla iwan on the southern side of the mosque was vaulted with muqarnas during the 13th century. Muqarnas are niche-like cells. Construction under the Seljuqs included the addition of two brick domed chambers, for which the mosque is renowned. The south dome was built to house the mihrab in 1086–87 by Nizam al-Mulk, the famous vizier of Malik Shah, and was larger than any dome known at its time.

The mosque is also nearby a historical bazaar where the main historical business stream line is located. Jameh Mosque of Isfahan is one of these different styles in that age. It can be named as a signature historical building representing Islamic minimalist oriented architecture with its unique Iranian plan. this building is considered as a sample building and structural vulnerability assessment was carried out on this building. The mosque was structurally investigated through advanced approaches. In the present study, the building was modelled by using the Finite Element Modelling (FEM) software, SAP2000. Time history analyses were carried out using 10 different ground motion data. Displacements, base shear and stress values were interpreted and the results were displayed graphically and discussed. For probabilistic seismic risk assessment, fragility analyses were also carried out and the fragility curve and surface were sketched for the mosque. Saddle point was determined on the fragility surface.

INTERIOR DESIGN BETWEEN BEAUTY AND UGLINESS

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Abstract

Aesthetics is a specialized science to determine the criteria by which we judge things whether they are beautiful or ugly. It has expanded to include research on ugliness. With the development of the ages and the diversity of ideas and artistic trends, interior spaces and aesthetic standards have become more variable. With the change and the multiplicity of artistic trends the impressions of recipients have changed. Some of them are with these trends and the other are against and therefore came a study to determine the elements of beauty in the works of interior design, as well as the motives that causes a sense of ugliness of the interior spaces.

Hence, the issue of the research is to determine the differences between the philosophy of beauty and the philosophy of ugliness in the interior design, and to identify the most important standards that we can judge the beauty or the ugliness of the interior space through them. And the extent to which the concept of aesthetics is extended to include aesthetics of ugliness in the philosophy of the interior design. What are the reasons for the sense of beauty?, And what are the motives behind sensing ugliness? Is it related to gender? Age group? Or does it depend on well-established concepts that have been shaped by the impact of social and cultural life on the individual? Does the level of science have an impact on determining the degree of attraction or repulsion to interior design works? Therefore, the aim of the research is to identify the criteria that achieve the beauty of internal s pace, and define the concept of ugliness and the standards that lead to it in the internal spaces, and the extension of Aesthetics to include ugliness through surveys and questionnaires.

Keywords: Sense of Beauty and ugliness - Philosophy of aesthetics - Controversy of ugliness - Interior design aesthetics - Interior design ugliness.

Introduction

The scientists disagree about the definitions of beauty and ugliness; therefore, there is not a specific criterion which helps us to describe beauty as well as ugliness. As a result several definitions about beauty were established by the artists and philosophers, also there was a variation in the determination of what exactly is the ugliness and if it is a part of beauty lay inside it, or it is an independent object has its own particular characteristics. (Hussein Haggag, Amany Hendy, Dalia Bakr, 11/2013) Consequently, people's opinion differed when they are assessing the different designs especially in their internal spaces.

As many scholars and philosophers differed in defining the beauty of history throughout history. It was defined by the Greek saints in the absolute values and then it was established in the interior design by different civilizations with different beliefs to be shown clearly in the elements of the interior design that is represented in ratios, balance harmony and unity... etc.

At the beginning of the twentieth century, with the advent of the industrial revolution to the details of life, aesthetic values are declined in various design works, and they soon took the lead again in the last decade of the same century with a clear in a number of art movements and styles ensuring beauty in contrast to the established classical arts in the previous era, free from all restrictions and expressing the subjectivity of the designer , life developments, and mechanization, to crystallize in the ability to abstract, express, add and differ ... etc.

With the succession of art styles in the 21st century and the diversity of ideas that cope with the continuous technological development has become difficult to define the essence of beauty especially with different cultures, different individuals' nature of life and their aspirations as well as their need of interior space. with the emergence of movements and trends calling for the identification of the former aesthetic values and linking them to future aspirations. This research investigates the essence of beauty in interior design and its factors, as well as determining the motives behind the sense of ugliness through the questionnaire study on a random sample and analyzing its views on the determination of the aesthetic factors within internal spaces, the reasons for sensing ugliness and the motives behind it , to be supported by clear characteristics that contribute to increase the connection between human and place. as man stays about 90% of his time in the internal spaces.

The perception of beauty and ugliness within interior spaces

The stage of absorption includes three stages that begin with the **visualization** stage which is a visualization of the internal spaces' charctristics. The eye captures the inner space, and then the information that is received by the eye moves to the brain where the stage of **interpretation** of the meanings and signals begins. What are these signs according to the mental interpretation, which depends on what was stored of memories, situations, forms and meanings.

Then comes the third stage, which is known as the stage of **judgement**, which is related to the previous stage where the mind realizes what the eye imagined and retrieves the meanings and signs of the function and then issued the judgement determining the visualized design being beautiful or ugly.

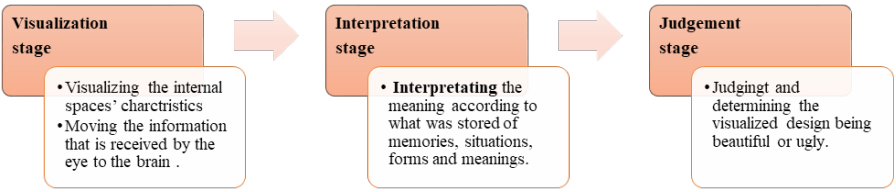


Figure 1. The stages of the perception of beauty and ugliness within interior spaces.

The desirability of interior design or sense of ugliness requires the meeting of several factors within the internal spaces. These factors or influences come together to stimulate the senses of the person who interact with them, which give signals to the mind, which absorbs and analyzes them and then issues a judgment in terms of the design whether it is beautiful or ugly.

The motivation of beautiful and ugly feelings toward interior design

The interior designs are varied, beautiful, medium and ugly. The individual's perception of its beauty is dominated by the personal traits of the individual and his social and cultural background, and the beauty of the inner space itself as a result of creativity designed either through the design idea or one of the distinguished elements of space (vacuum) with a distinctive characteristic of form or function.

Factors and elements that meet to feel human beauty or ugliness in the interior design are determined in the human character and his social and cultural traits, Trendy and contemporary factors, Functional and comfortable interior factors, Environmental and healthy factors and interior elements characteristics (shape factors).

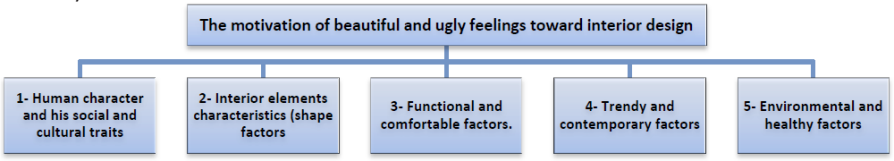


Figure 2. The motivation of beautiful and ugly feelings toward interior design

1- Human character and his social and cultural traits:

The special characteristics of recipient person ,his previous experiences and stored memories, The sense of beauty is subjective (differs from one person to another) . The difference is not only from one person to another , but also there is difference in the individual's standards of beauty during his life stages , so what is considered beautiful for him/her changes across time . There is a change in the individual's characteristics , especially for the gained experiences during these stages.

This could be the most important and main reason behind the different opinions and point of views of the interior designers towards interior design other than other individuals who use space. As their experiences grow during short periods of time, as their familiarity with many designs during their various works gives them experience in recognizing ordinary designs , so it is difficult to provoke their senses to feel beauty except for new, creative and distinctive ideas.

2- Interior elements characteristics (shape factors):

The formal characteristics of the elements of interior design are the first to provoke human senses either negatively or positively so it is one of the factors affecting the sense of beauty or feeling ugliness in the interior spaces and include these factors sizes and shapes, proportion and ratio, and colors used, decorations, inscriptions and he touch either smooth or polished and so on. The consistency of the elements and the contents of the space requires the arrangement and good choice of these characteristics in their meeting together for the interconnection of the general design idea of the internal space.

Simplicity in beauty/Beauty in simplicity: the ease of perception and comprehension are from the preferred and needed things for those who use space or for work places. The perception process may take time that varies according to personal abilities. Individual's perception may also differs in the second time from the first and for places he/she used to visit.

Social and cultural considerations While others prefer that the general features of the interior design be fixed and firmly rooted in details of the past with cultural origins that give different feelings between originality and serenity and perhaps belonging and familiarity with elements and details of interior design.

3- Functional and comfortable factors:

The sense of beauty isn't achieved in the interior design work without achieving the functional aspects and comfort factors in dealing with the elements of internal space and practicing of different human activities.

The creation of the space to receive a specific activity requires the provision of tools of activity / tools necessary for practicing this activity with the provision of natural, environmental, functional and technological conditions appropriate to the quality of the activity , and the meeting of these factors together in accordance with the human nature and activity based on the ideal creation of the interior space and thus , human habitation and his sense of happiness, therefore the sense of beauty as ... said Moreover, Stendhal says: "Beauty is the promise of happiness" (Oregon State University, n.d., P.2)

4- Trendy and contemporary factors:

Other people prefer the contemporaneity of design. Contemporaneity here means for a design to cope with the latest trends (to be trendy) and that is when it follows a color scheme and accessories with its design lines that dominates the global arena which represents the fashion of this year.

Contemporary life requirements impose on the person to seek possession of some characteristics within his residence, office or any place where he settle. Human's requirements and technological needs vary between equipment and appliances , and the technological control of the elements of internal space as a means of assistance to facilitate handling and facilitate the availability of ease and speed of performing activities inside it. The need of marketing is determined in the desire to keep up with and cope with the prevailing fashion and the global trends to make man feel the value of the space and to be proud of its contents.

5- Environmental and healthy factors:

Health issues / issues related to public health and internal air quality, where diseases are caused by poor ventilation and bad air in the internal spaces, due to internal pollution caused by raw materials used in the interior spaces with the design is unable to treat the disadvantages resulting from human activities inside , design treatments and technology used from inside.

The human feeling of safety stems from the provision of his general health requirements and environmental compatibility in the general design of the space and its elements as well as in the selection of raw materials used.

Association to nature: Some people feel the beauty in its association to nature, through the intimacy with human's familiar things, or maybe for its simplicity in its ability to be dealt with.

Nature to human represents physiological and spiritual comfort for its life and its familiar home elements, as human prefers to deal with familiar things , because understanding its details is a simple thing for her/him, as a result he/she can deal with it easily.

The need to return to nature: where this demand emerged after the suffering of man to create isolation in closed spaces away from nature , which he destroyed, and when he is in dire need of it. Returning to nature in its simplicity , serenity and its interconnection with international spaces in a manner that reinforces human activity inside and improves his psychological and health state.

Questionnaire study

And with different opinions of philosophers and thinkers in determining the essence of beauty and ugliness, and with the difficulty of the comprehensiveness (inclusiveness) of some characteristics or elements supporting this feeling Especially in the judgment on the work of interior design, where the integration of different elements within the space impact on individuals in several aspects physically and psychologically. And with the different aspirations of human needs in a variety to contribute to the safety with access to the highest degrees of benefit from the interior spaces and to perform activities at home with high efficiency and without effort to achieve prosperity. This questionnaire aims to measure the reasons and factors that make an individual feel the beauty of a space or the ugliness of another.

By analyzing the sample of the questionnaire, the following conclusion was reached: Number of respondents of the questionnaire samples are 260 persons, 59 of them are males and the rest (216) are females. Divided into age groups 115 under the age 23, 147 from age 23 to age 45, 14 above 45. The capital and the big cities residents are about 100 persons, popular neighborhoods and small cities residents 160 person, Holders of university qualification 200, advanced studies 50, Intermediate qualification 10, and Number of Art learners 150 person while non-Art learners are 110 person. While the number of persons who work or study in the interior design field is 110 persons between 150 persons who work in other fields. There was diversity in the sample's interests. In the first place came Art field, then came science field, religious, sports, literary. and the least was the political interests

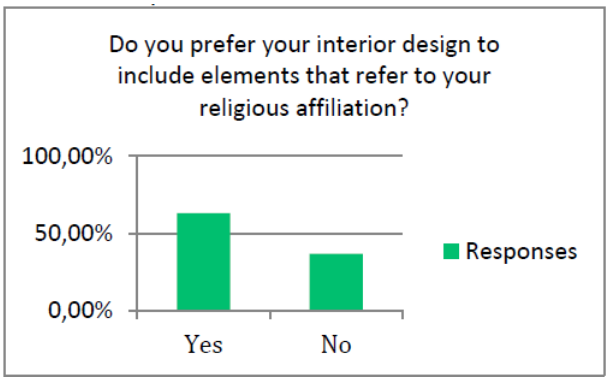


Chart 1. The percentage of people who prefer interior spaces that include elements expressing their religious affiliation exceeded 60%

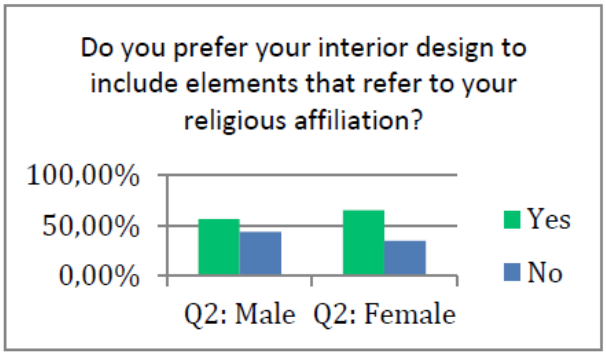


Chart 2. The higher percentage was concentrated in those who do not study art. The percentage of preference is also associated with age groups that study Art, where it became clear that with the increase in age, the percentage of preference decreases in the inclusion of an elements that shows religious identity, the percentage of females reaches about 65% while in males was about 55%.

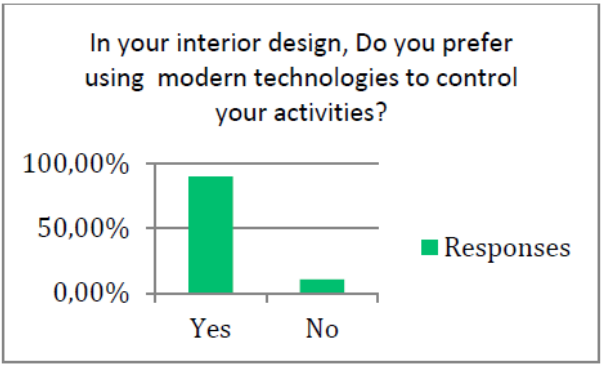


Chart 3. The number of technology users increases to reach 90%

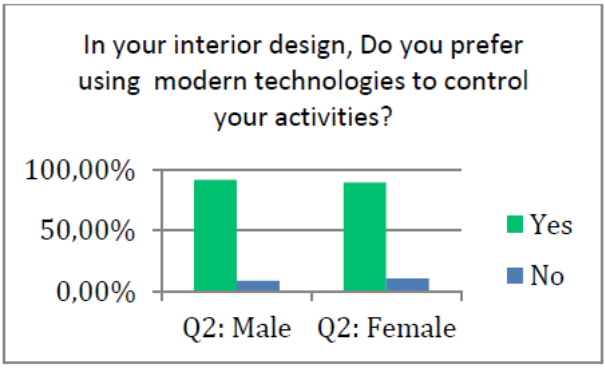


Chart 4. The ratio between males and females is nearly equal.

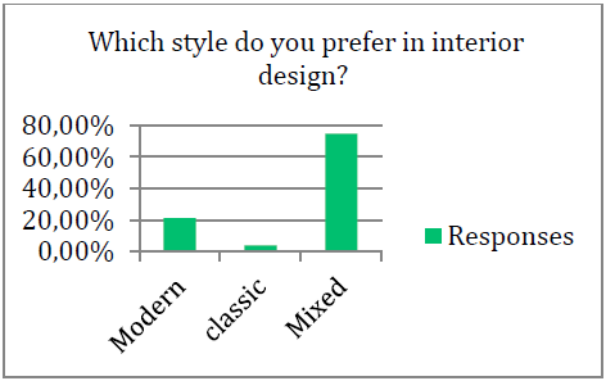


Chart 5. The majority of the sample preferred more than 70% mixing the modern and old styles in the design of the interior spaces while the preference ratio of the modern models was about 20% while the preference of the old models did not exceed 5% of the total sample.

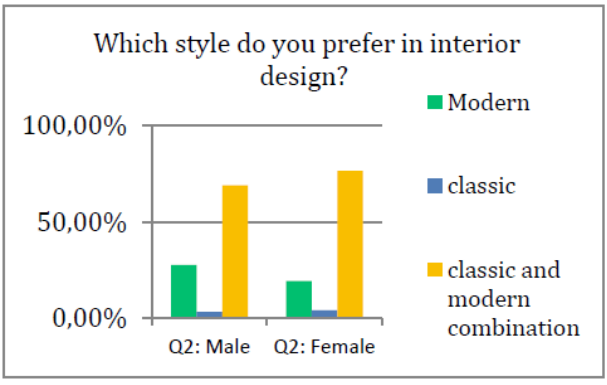


Chart 6. It has been noticed that the number of females preferred to mix between classical and modern styles exceeded the number of males. While the number of males preferred modern styles exceeded the number of females.

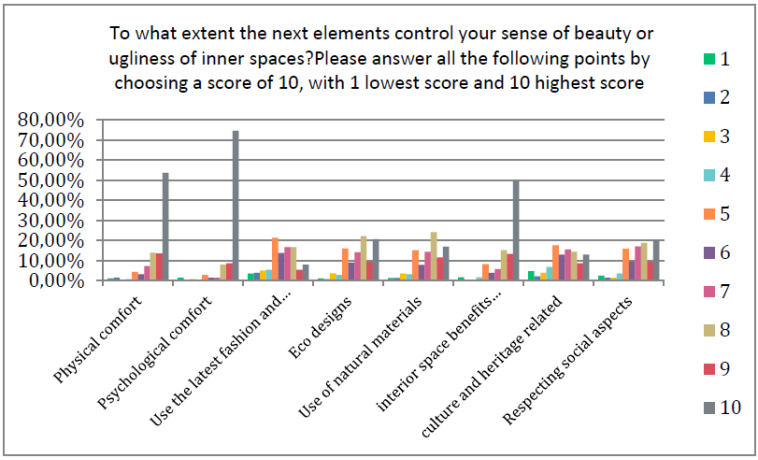
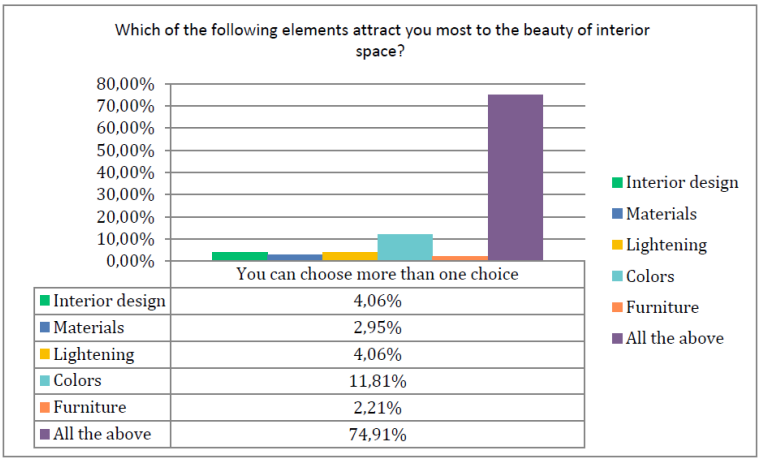


Chart 7. The inquiry about the elements that control the sense of beauty or sense of ugliness in the interior spaces. The majority of opinions confirm that the most important reasons for the sense of beauty or not are the psychological comfort towards the internal designs followed by the physiological comfort.



You can choose more than one choice	
Interior design	4,06%
Materials	2,95%
Lightening	4,06%
Colors	11,81%
Furniture	2,21%
All the above	74,91%

Chart 8. When asking about the elements that contribute the most to the rule of internal space being beautiful or ugly. About 75% of the sample said that they affect the judgment of beauty or ugliness. Then about 12% explained that colors have a strong influence on the judgment of beauty. While the remaining components did not exceed 50%.

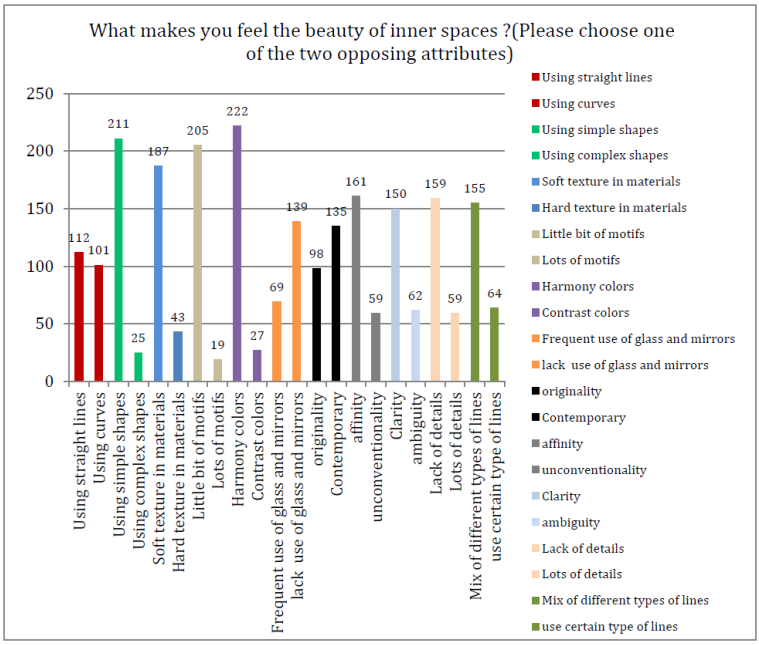


Chart 9. In order to determine the reasons and the driving factors for the attraction to the formal factors of the interior design elements, the higher percentages were in favor of simple and contemporary shapes, soft touches, minimal decoration, color compatibility and harmony, clarity, familiarity with little details and the type of fonts (lines) used.

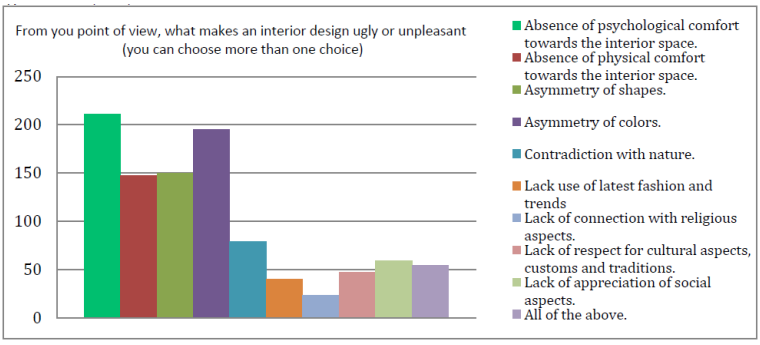


Chart 10. And by asking about the elements that contribute the most to the rule of internal space being beautiful or ugly. About 75% of the sample said that they affect the judgment of beauty or ugliness. Then about 12% explained that colors have a strong influence on the judgment of beauty. While the remaining components did not exceed 50%.

The judgment of the interior design depends only on description, it may be unfair in determining the personal orientations and attitudes towards what is seen beautiful or ugly in the elements of the interior design and its complementation. Therefore, the need to choose the extent of attraction of individuals towards some

of the different designs for interior design works and These designs have been in specific groups that include:

5



1



2



3



4

Photo Group 1. A collection of pictures of dining areas, there are four different shots of the mixture of classical models with contemporary models in the lack of details and the compatibility of light colors. The second picture expresses the classical models with their many details, the bright colors, and gold finishing. third picture came to reflect the recent trends in the design of optical illusion with emphasis on the use of white and black. The fourth picture is the Art Nouveau school in the use of curved lines derived from the movement of plants with the use of wood in most elements of interior design with the same degree of brown color.

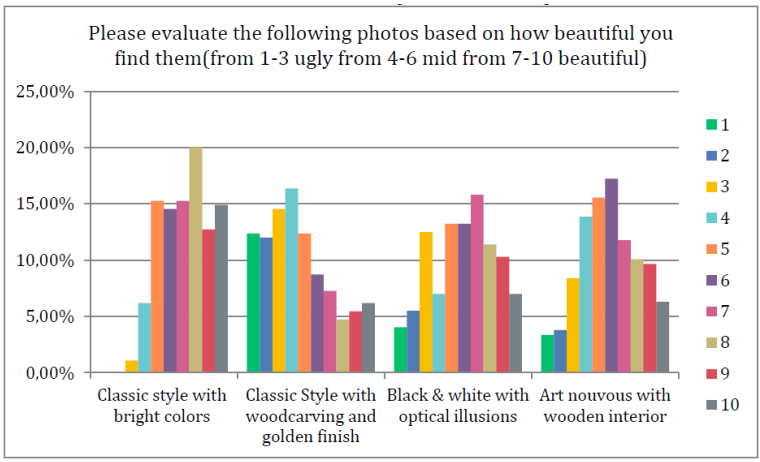
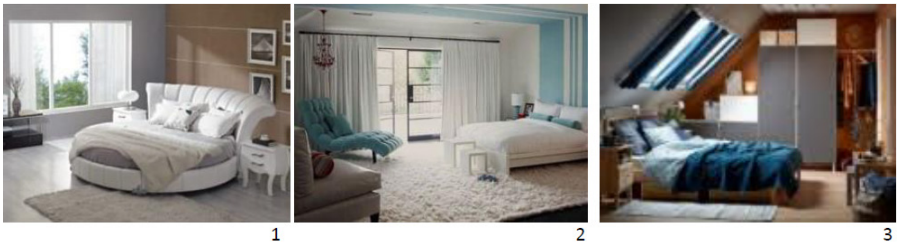


Chart 11. By analyzing the results of the sample towards the first group of images, it became clear that the majority is attracted to the first picture, which combines classical and the modern with simple and light colors. And then followed by the picture No. 3 where the use of white and black with visual deception in the wall facing the table. It was followed by room number 4, which used the Art Nouveau style with wood in the interior design elements and was less impressed by the classic room number 2 with many details and the use of bright colors.



1 2 3

Photo Group 2. A group of sleeping areas is 3 different shots. The first image reflects the use of circular lines with simplicity of details and light colors. The second image shows the combination of straight and curved straight lines in the simplicity of the composition and the compatibility of colors, the third picture shows the use of sloped lines with straight lines in different and cool colors.

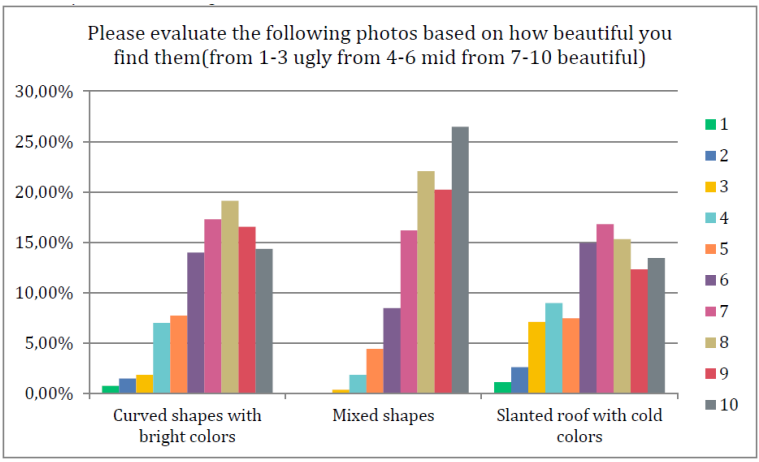


Chart 12. By analyzing the responses of the sample to the second group, the majority of the second picture of the straight-lined bedroom appeared with a chaise lounge with curved lines and light and compatible colors, followed by lines 1 with circular lines with matching colors and finally, the third picture, with the cold colors and the slanted ceiling with straight lines.



1 2

Photo Group 3. There are two images used in it, the first of a room with multi-use furniture to achieve flexibility in the variety of activities that are practiced inside it with bright colors in green shades that connect the space with colors used in nature. The second image is an interior space linked to nature by two glass facades and the colors used inside are compatible with the reflection of the green colored surfaces surrounding the building.

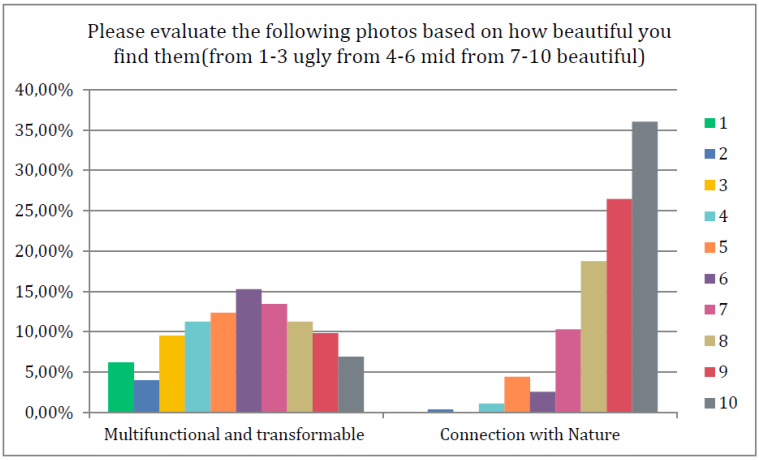


Chart 13. The analysis of the responses to the third group: Explains the attractiveness of the sample No. 2, which was associated with the external nature directly, despite the use of neutral colors at home and the bright colors represented in the natural shades of the green areas surrounding the building.

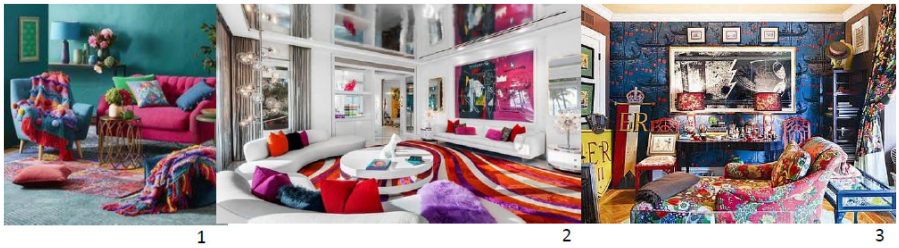


Photo Group 4. consists of three pictures of living spaces that have been mixed in red and blue in different ways. The first picture is multicolored with simple lines and small decorations (ornaments) that appear in the total area of the space. The second picture expresses the integration of different colors and different lines between the curved and straight, while the third picture expresses the use of different colors and different lines as well as different decorations (ornaments) were all used in the same inner space.

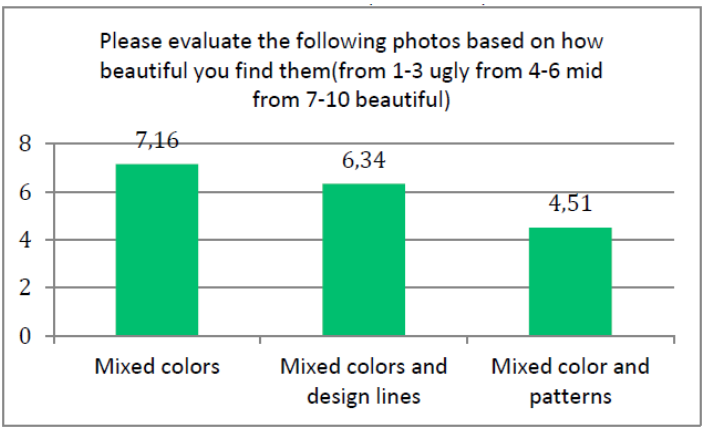


Chart 1. As for the fourth group, the sense of beauty has increased in pictures number 1, where there are many colors in harmony and few decorations, followed by picture 2, where the colors varied with the combination of straight and curved lines and finally the picture No. 3 where the mixture of colors and shapes and decorations is formed.

Conclusion

The decision of the recipient to judge the beauty of the internal vacuum requires the meeting of several factors. Shape factor has come in the forefront of all factors with its lines, sizes, proportions, colors, inscriptions... etc. And it corresponds to the personal attitudes of each individual, then followed by contemporary and compatibility with technological progress without ignoring the interdependence of nature in blending the outer spaces with their green spaces with internal spaces, which achieves the psychological comfort of the person by achieving his aspirations in the optimal use of modern technology and the availability of well-being and comfortable living in the interior spaces.

The beauty of the inner space is also related to the meeting of new and unusual ideas for a human, as the combination of simple design lines. As the new and non-stereotypical expresses the constant human passion for change, exchange and instability.

Especially in judging for the first time, it is like artwork. The concept of beauty has changed in interior spaces in periods of time and successive decades around the globe. However, modern man, especially the youth, have gathered their views on the preference for simplicity in lines and sizes, compatibility in colors and ratios, interdependence of nature. In addition to, keeping up with technology and combining originality with contemporaneity in a simplicity that reduces the daily problems and pressures faced by modern man.

This interior design is not a space that may be characterized by beauty or ugliness and evokes the senses of the human either positively or negatively, momentarily or transiently like other works of art. It is rather a space that embraces the person inside, that person who is driven by his feelings, memories, opinions, thoughts, words… etc. All these things may change with time, therefore if the interior design corresponds with its contents and elements with what the person hide inside himself of emotions and feelings, the design is judged as being beautiful, on the

contrary if the interior design contradicts with the person's essence, so the person would consider it ugly, hate it and refuse to live inside it.

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THE INTERIOR SPACE AS AN ECOSYSTEM

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Abstract:

Human being's existence and integration with the environment leads him/her to continuous interaction so as he/she realizes its effects in a trial to adapt with its changes just as all other livings. As example, the chameleon changes its colour according to the surrounding environment not only for adaptation but also to achieve security for existence. Human is related to the environment (natural or artificial) as a part of the environmental system because it includes everything in the surroundings either affecting or getting affected by them. This is the base of the research's idea that depends on the adaptation process between livings and the surrounding environment through performing some biological processes. From this point, we can consider the interior space as a living organism doing some biological processes to adapt with human's requirements and fulfil his/her needs. Living organism moves, adapts, and does the metabolic processes so that we can consider this is the base of the idea of the appearance of dynamic, kinetic, interactive, adaptive and metabolic interior space which leads to the development of designer's thought. Therefore, the research problem can be stated in the ability of creating interior space capable of fulfilling human's requirements, needs and achieving comfort during performing the biological operations. The research aims to define the abilities of interaction between human and environment through works of interior designs by surveys and analytical studies. Therefore, the research is studying the interior spaces as a living organism and its effect on people's life style and their activities.

Key words: Kinetic Interior Design - Dynamic interior design - Interactive interior design - Adaptive interior design - Metabolism interior design

Introduction:

Ecosystem is full of integrated elements that work together in order to achieve a functional and natural balance. These systems have inspired human being since the start of design thinking; as the designer captures his symbols , elements and the integrated ecosystems, then he/she organizes all these systems in a way achieved balance. (Pedersen Zari, 2007)

The natural balance for the ecosystem is based on response and adaption of living organisms to the surrounded changes. The concept of interior space as an ecosystem considers the interior space as living organisms responds to environmental changes and interacts with human activity. Therefore, interior space requires a type of development, adaption and creative design thinking to fulfil human needs and requirements so that the designer can produce an integration similar to natural integration of ecosystem in order to achieve comfort and access to the self-ascent. Consequently, this leads to study some of living organisms' characteristics in ecosystem.

Studying Characteristics of Living Organisms in an Ecosystem:

Living organisms interacts with the surroundings through significant characteristics that imposes a certain type of behaviour as a respond to surrounding changes, which results a type of relationship between living organisms, and environment. This relation is applied in interior design field as a type of biological simulation, which is known as biomimetic. These characteristics of living organisms can be as below:

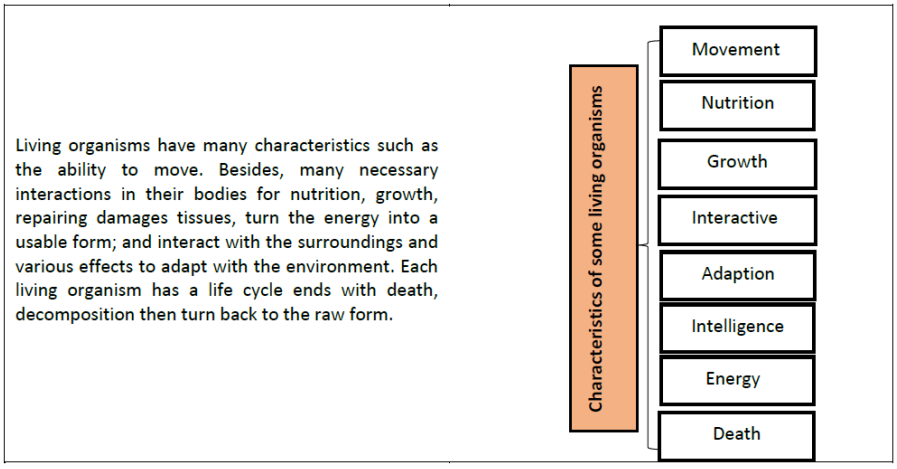


Figure 1. Characteristics of some living organisms

Applying Biomimetic in Interior Space:

We can apply the characteristics of living organisms and their behaviour in nature in some of design trends in interior space that can be laying under the expression of "Biomimetic":

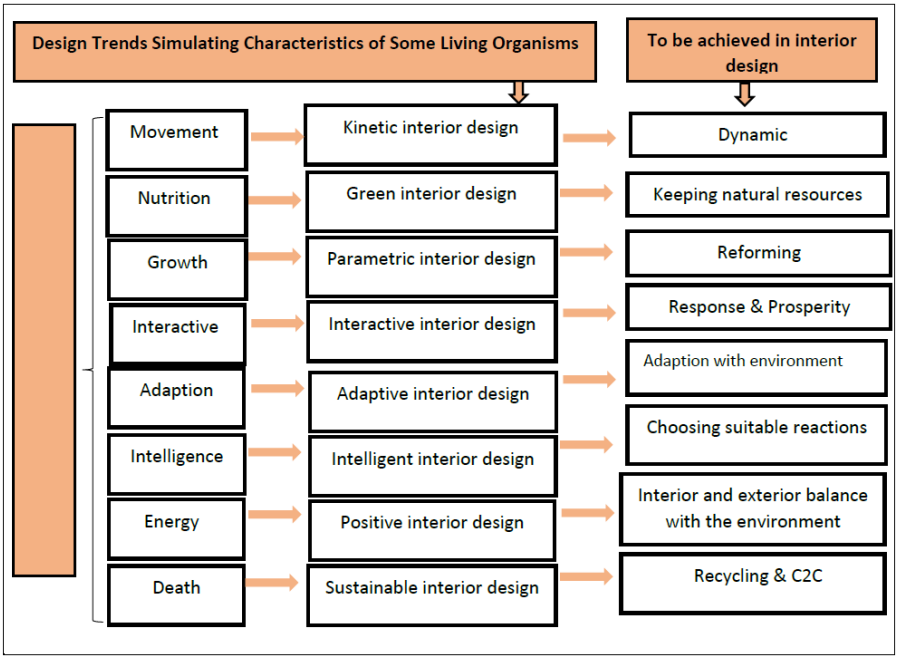


Figure 2. Design trends simulating characteristics of some living organisms

Dynamic interior design achieves dynamic in interior spaces meanwhile green design keeps natural resources and protects environment. Parametric interior design uses nature's law to achieve flexible changeable spaces able to expand. In order to achieve continuity, sustainable interior design appears. For the interaction of interior space with human, interactive interior design appears to respond to changeable human activities. Also, adaptation with various effects related to human behaviour is through adaptive interior design. Sustainable Interior design is the positive spaces, which achieve balance and integration between human being and internal environment. Preserving of both environment and human health is through sustainable interior design.

1: Movement:

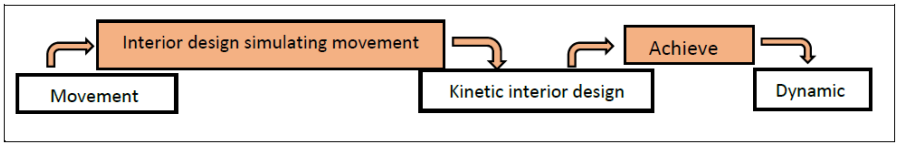


Figure 3. Design trends simulating characteristic of movement in living organisms

Kinetic interior design is known as the design that its components and elements various in both location and movement to adapt with human needs. This kind of design achieved through moving elements of interior design such as walls, floors, ceiling and furniture. This style was appeared in the twenty century by Henry Ritfield, Le Corbusier (Amany ahmed hkedr, 2015, p. 256)

Different movements of kinetic used within interior design including sliding,

folding, rolling. The following example explains sliding as one of the kinetic types.

As shown in figure (4 and 5), sliding partitions are define the needed space, they require less space in stores, and they allow more space for movement. The below figure shows a panel hanged on a sliding mechanism, on the rollers in tracks and it is a clear example of kinetic sliding partition. (Hassanein, 2018)

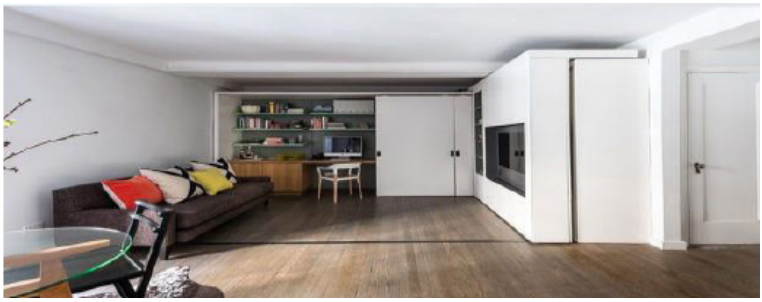


Figure 4. Interior space before sliding



Figure 5. Interior space after sliding

2: Nutrition:

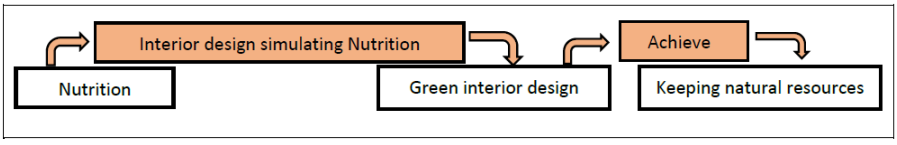


Figure 6. Design trends simulating characteristics of nutrition in living organisms

It is the using of techniques to preserve natural resources as what happens in some living organisms such as plants. They can transfer sunlight into protein, transfer non-organic into organic; and consumes the gained energy. These characteristics in plants can be achieved in interior space by what is called green design that considered one of the most important trends in new environment design thinking related with nature and ecosystem (Okba, 2006, p. 208). Some of green design principles:

- Keeping and saving energy.
- Adaption with climate.
- Respecting location.
- Less usage of resources. (Amany Ragheb, 2015, p. 779)

It is a design aims at respecting environment, cares for environmental friendly building materials, improving interior air quality inside buildings, lighting, colour usage philosophy, sound system, avoiding noise, and architecture character harmonies with environment. (gawad, 2008, pp. 102-105)

For the importance of green design, a model appeared in Dubai city (Green Dubai) caring for green buildings' rules and specifications to protect the environment and its natural resources; in addition to guarantee society's persons health, welfare and protect coming generations. These rules covers all sides of design starting from environmental design for the building, vitality of building, interior spaces, usage of power, compatibility of resources: water and garbage. The most important element in buildings in Dubai is concrete that is essentially formed of cement. Cement is not an environmental friend as producing and using it results the release of carbon dioxide and other poisonous materials in massive quantities. A study has been held showing the damage caused because of cement and processing it using alternative materials that leads to the increase of global warming and its consequences. Besides, the increase of respiratory system diseases such as asthma, pulmonary edema, lung cancer and kidney failure; in addition to other dangerous diseases. According to an international study that refers that cement factories are the second reason for deaths of lung cancer after smoking around the world. They used cement materials that are environmentally friendly such as:

- Fly ash
- Silica Fume
- Blast furnace slag - (GGBFS ground granulated
- Fiberglass (Green Campus, 2019)

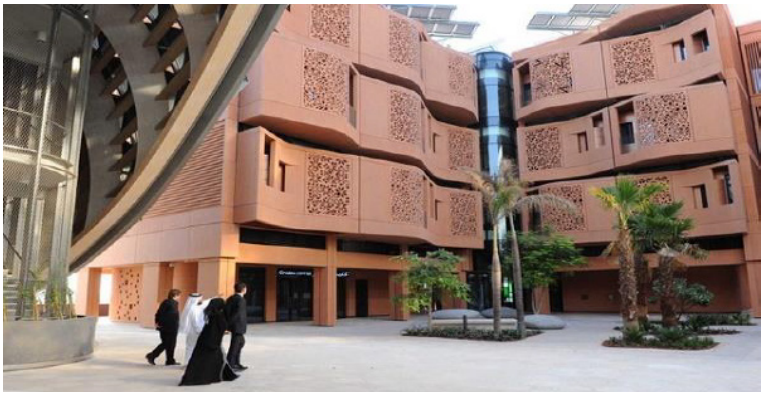


Figure 7. The society of (Masdar city) in Emirates characterized by getting the completely necessary energy from solar station that considered the biggest in middle east and its productivity is 10 Mg/watt and it extends for 22 acres. The extra produced energy sent to the main network in Abu Dhabi.

In this city, biological waste used to get organic fertilizers whereas some of this waste turned to an extra source of energy through burning. Moreover, industrial waste are recycled or reused for other purposes.

3:Growth:

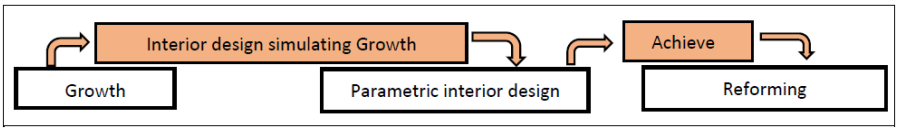


Figure 8. Design trends simulating characteristics of growth in living organisms.

Growth known as an increase in living organisms' mass and volume through increase in cells' number or size so that they can pass a new environmental stage. Growth requires pre preparations in design of organism's skeleton. These preparations are addition, substation and size change such as genetic algorithms that are self- growing models connecting between vital design and modern technology. It is a digital simulation (Lee, 2015) for the laws of regular natural shapes. Moreover, growth and resulting biological organic form can be applied on architecture and interior design. (Abd El Rahman, 2018, p. 245).

One of the systems that depended on growth of living organisms is Linden Mayer system (L-system). This system started as a mathematical theory for the scientist Artistid Lindenmayer about the growth of multi cellular organisms that produces an endless series of thoughts. This theory is used by a lot of current architects and designers in their works such as the architect Karl Chu who depends on growth, accumulation and algorithms in addition to searching for nature (Abd El Rahman, 2018, p. 245). We can also notice growth in parametric architecture as all elements can be merged and turned into logarithmic elements that are easy to be formed or transferred as mentioned by Shomakher (one of the gretest architects in Zaha Hadid's office) in his book about parametric architecture to produce growing designs to emerge with the surrounding environment.



Figure 9. King Abdullah centre for petroleum studies and researches KAPSARC where the designer Zaha Hadid used environmental friendly materials in construction and used the criteria of platinum LEED certificate. The design is based on tangled crystal shapes inspired from the growth of tree leaves.

Recently at the capital Riyad that design was inaugurated. This design is an organic form consisted of cells with hexagonal shapes. Cells has non repeated units, their size and volume are determined by the components of each cell. It is called the collective design i.e the collective design of hexagon cells.

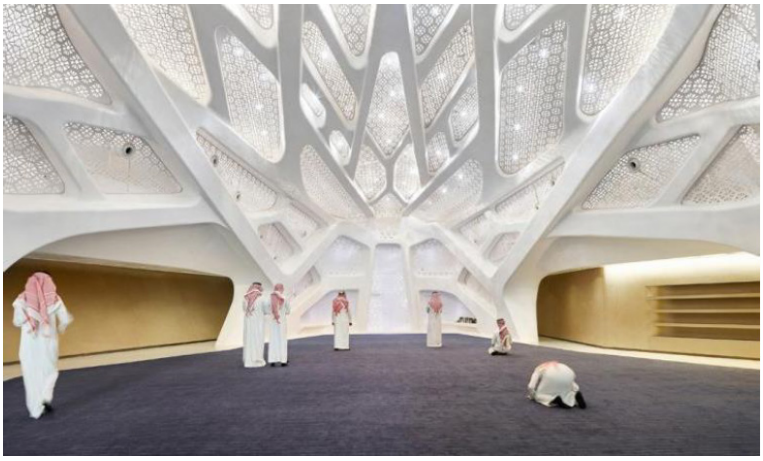


Figure 10. There is a strong connection between forms and mutual relations forming the shape and growth of cells keeping the hexagon shape. One of the details of this project is the design of interior halls opens as they are designed to direct air towards the halls to improve interior climate and to form moderate areas at the middle between exterior climate and interior. (Khail, 2017)



Figure 11. The figure shows the interior space for the building. Design lines shows the growth of design elements such as triangle that changes and suits with design lines in a trial to simulate growth in nature.

4: Interaction:

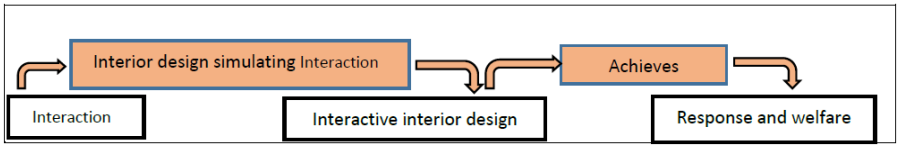


Figure 12. Design trends simulating characteristics of interaction in living organisms

Interactive interior design means that interior space interacts with human being or with surrounding circumstances. In order to understand interior design interaction we should suppose that we can access to a space integrated with both physical and electronic dimensions without cancelling any of them. We can call this interior space the interactive model where interaction is a mutual between all space dimensions in order to respond to changes as living organisms respond to effects

either they are physical or chemical. These effects includes different varieties such as change in light colour, its direction, density, change in temperature, pressure, sound, and chemical form such as soil, air or water.

In complicated organisms such as human being, there are highly specialized cells able to respond to definite types of effects, such as eye cells that respond to light. However, simple organisms do not have such specialized cells.

One of interactive interior design elements is interactive floors. Interactive floors combine between realizing body's movement and its effect on surfaces. Interior floors witness a clear improvement due to mass technological improvement that is reflected on it. Floors are no longer a still horizontal surface but it turned to be an active surface feels the human being, keeps his safety and interacts with him. The main purpose of interactive floors is the direct interaction between them and human. According to that concept, the Ministry of Education in Denmark used this advanced technology through inserting many educational games that can be designed in various sizes in order to support education and to exchange knowledge between students and teachers in an interactive way.

One of the companies in Spain present a system for interactive floors in EXPO 2008 as floors were designed at the entrance of the EXPO and after passing the visitors their steps leave lightning footsteps. That floor system is consisted of more than 1000 sensors from interactive units containing remote sensing and LED lightning system (Salah, 2017). This floor system allows responding to visitors' footsteps through a glass with density 20 mm that forms the surface so it makes a change and turns floor into a nice interactive experience due to the change of floor according to the passers-by.

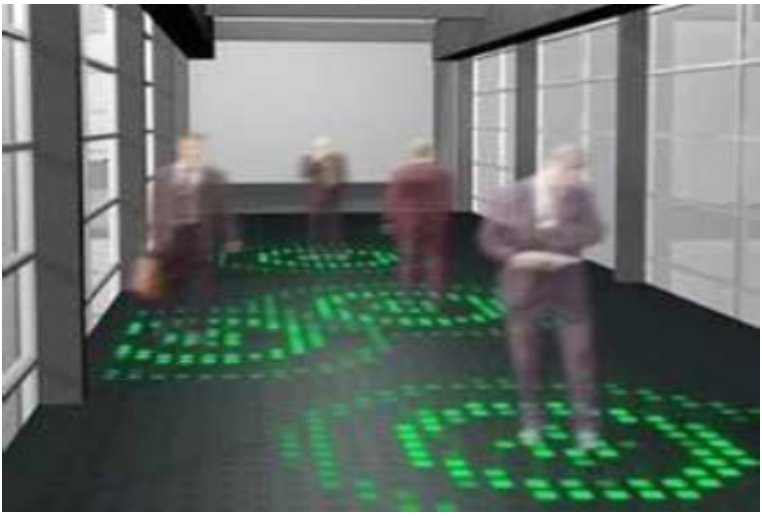


Figure 13. Showing the floor reacting with human during moving inside space. (interactive floor, 2019)



Figure 14. Showing the floor of the EXPO changing according to the steps of visitors in the interior space. (interactive floor, 2019)

5:Adaption:

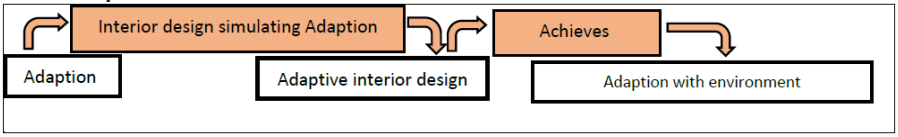


Figure 15. Design trends simulating characteristics of adaption in living organisms

It is a process to form a better relation with the surrounding environment. Interior space has its own characteristics that makes it more suitable to cope with the surrounding environment through strategies such as resistance, deceiving and avoiding. Living organisms to adapt with the environment use all these strategies.

Adaption is a term borrowed from biology science, which means that living organisms try to face natural factors in order to continue life so they have characteristics enabling them to be more adaptable to the surroundings. On the other hand, Human being is the highest and perfect organisms that has the ability to adapt to the surrounding environment as he has awareness and insight that led adaption not to be in instinctive way such as plants and animals but through a mental effort to search for the suitable adaption means in order to face different circumstances. As an example human could overcome harsh environmental conditions by manufacturing air conditioners and heaters to achieve for himself a suitable comfortable climate. As high temperature and freezing impede the continuation of life. From that perspective adaption is a continuous dynamic process where the behaviour of something changes in a response to the circumstances (Hanna, 2017, p. 208). Briefly, it is a change process to form a more convenient relationship with the surrounding environment. Adaptive interior design has the ability to change by the time responding to surrounding circumstances in order to respond to user's needs to improve performance. (Schnädelbach, 2010, p. 532)

That concept was applied in Al Bahar building in Abu Dhabi, it expresses that the

building design is inspired from traditional wood ornament Mashrabya that were decorating old Arabic houses since 14th century. This smart design follows sun and interacts with it through dynamic units about 2098 unit works on adapting interior space with the environment through controlling temperature. Consequently, thermal comfort that may affect human activities.

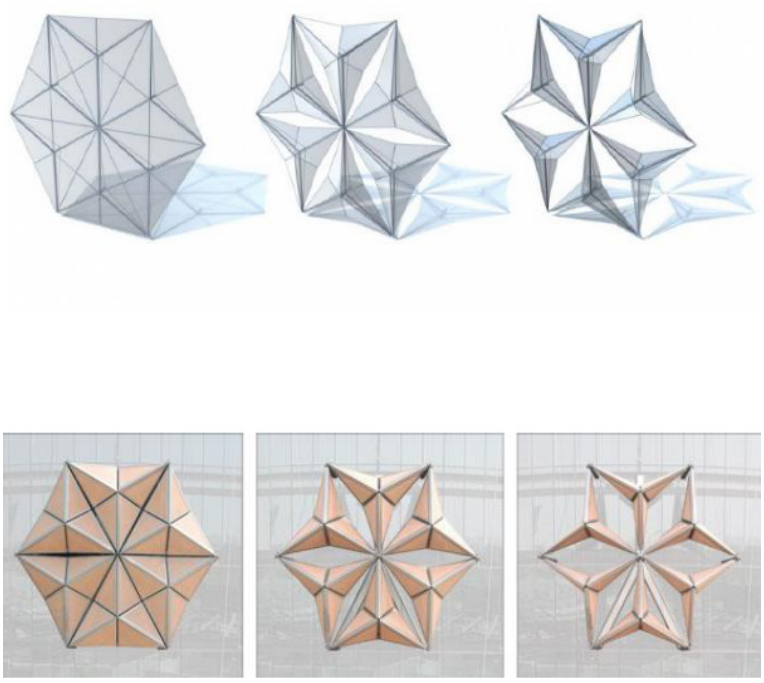


Figure 16. Shows the difference in shadow shape inside the space by the dynamic movement of the design to adapt with sun rays to achieve comfort for humans. (Al Bahar Towers , 2019)



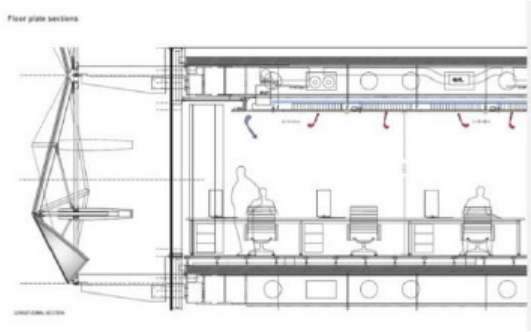


Figure 17 Showing a vertical section for some of the spaces inside the building.

6:Intelligence:

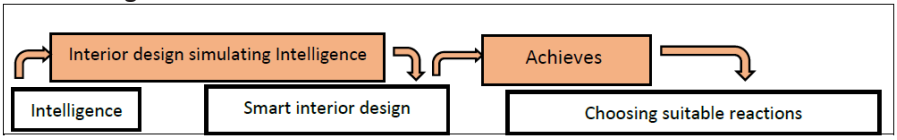


Figure 18. Design trends simulating characteristics of intelligence in living organisms

The most important requirement for intelligent design is the ability to be changeable and take suitable reactions meeting the different needs. Living organisms interact with surrounding environment and adapt with all its changes. These changes affect physical and psychological comfort. As an example; light affects human eye, therefore, eyelids close or open in a specific rate to have a perfect vision. Human skin sweats during exposing to high temperature in order to moisture the skin. Animals adapt with environment through biological interaction with environment; some of them get active at night and have an ideal vision in the least degree of light or giving rays and receiving them to determine distances like

the radar. Others depend on concealing by simulating nature through changing its colour such as iguana (camouflage process). Here the idea of intelligent materials to improve sensing the surroundings and dealing with them in a way serving the designer. (KHalel, 2011)

Intelligent materials and systems are things that feel environmental changes and take actions according to the gained information then affect on surrounding environment. This means they are materials of self-ability to face any emergency to respond to environmental changes. So the intelligent materials react to make changes in their characteristics either mechanic or electric, external form or functional activities. Intelligent materials designed to have the ability to respond in a way fulfilling functional performance. (Ismail, p. 61)

7: Energy:

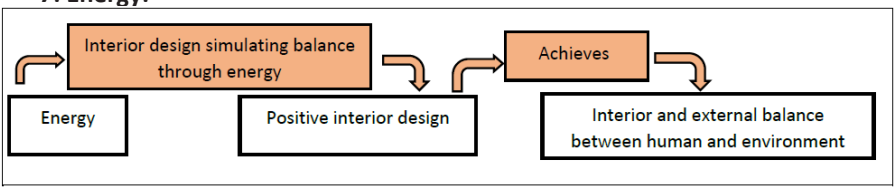


Figure 19. Design trends simulating characteristics of balance through energy between living organisms and environment.

The biological energy in life has different shapes and various levels. It can be divided into universe energy coming from earth, energy inside geometrical shapes and living organisms and energy releasing from materials. (Raafat, 2007)

Positive interior design can be achieved through bio-geometry science that studies the relation between three elements: form – energy – function. One of its important goals is achieving interior and exterior balance with the environment through rebalancing universe energy, earth energy and human energy (hashem, 2016). Besides, their effect on life style and how to improve it. Bio-geometry science uses these shapes, colours, movements and sound to make balance in all levels of energy. It studies the effect of forms and geometric angels on human's biological energy. Finds solutions for negative effects and strengthens positive ones to get rid of pollution that human suffering from in order to achieve a positive interior design. Some of energy studies care for interior design elements especially furniture as it may contains many useful and harmful energies that are affecting human both negatively and positively in both ways direct and indirect. Interior space and its components can affect on human health psychologically and physically which consequently effects on internal human energy. (Taha, 2010)



Figure 20. Reverso group, A chair in right picture and table in left picture. Furniture designed by bio-geometric rules. (Karim, 2019)

Bio-geometry is specialized in making balance between shape, energy and function through laws of resonance. (Attia, 2013, pp. 36-37)

8: Death:

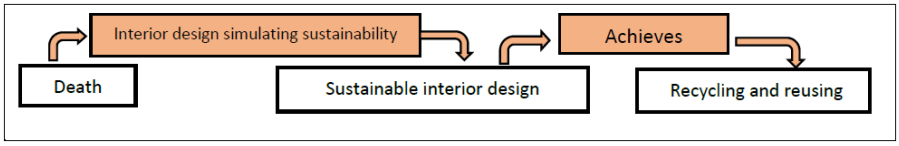


Figure 21. Design trends simulating characteristics of some living organisms

All organisms have a life cycle starts with birth and ends with death then decomposition and turning back to the primary image in order to achieve balance in universe life cycle. This is called recycling and environmental sustainability. Sustainable design aims to realize environmental effects of design, keeping resources and renewing them. Environmental Sustainable Interior Design (ESID) is based on sustainable design principles and strategies to build environment as a whole, namely providing physiologically and psychologically healthy indoor environments. (Hayles, 2015, pp. 100-108)

The term C2C "Cradle to Cradle" is a general concept of sustainability in production process without any loss and recycling of materials through integration between designer and manufacturer.

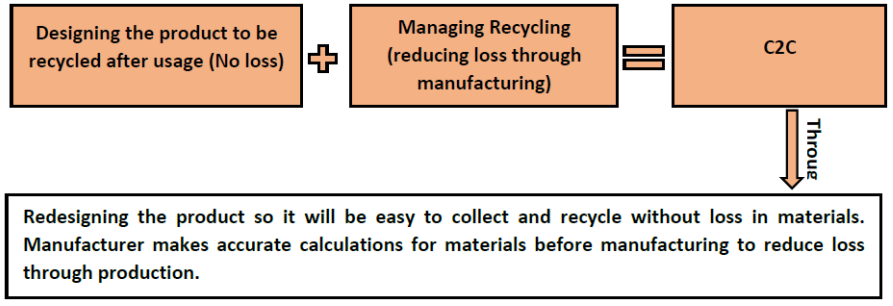


Figure 22. Cradle to Cradle

We can see the idea of recycling in one of the buildings as a project in University compound in SAE:



Figure 23. University compound King Abdullah university for science and technology

University compound project is considered the biggest project in the world to be classified as platinum LEED for buildings that preserve the environment. The area of the project is 5.5 million square feet to cover 27 building. The university got this classification because of employing a lot of clean energy techniques and water recycling. There is a water treatment station that treats all consumed water in the university, therefore water is re pumped after treatment either to university buildings to be reused in irrigation or other activities that do not require drinking water or to outside in an environmental friendly way.

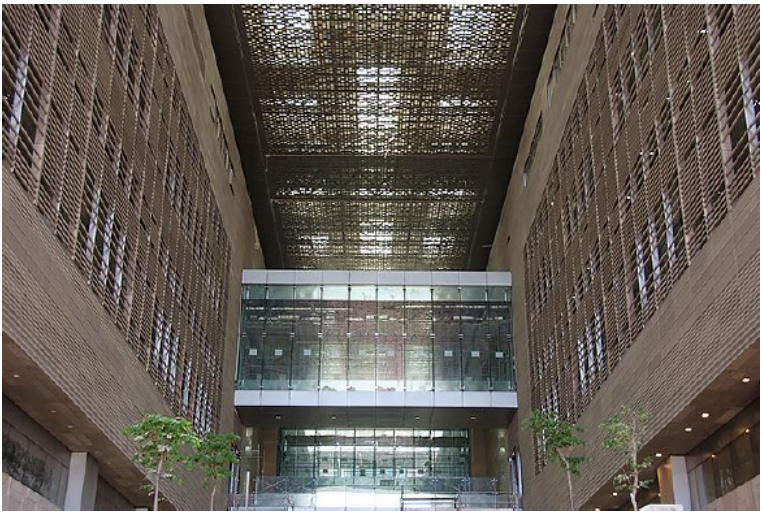


Figure 24. University compound King Abdullah university of science and technology

It also have photoelectric panels in an area more than 16 thousand square feet producing electric energy about 4 Mg/watt. University buildings using day natural light to lighten 75% of the total area with light sensors that automatically stop electric lamps at the presence of enough natural light.

Considering Interior Space as a Living Organisms and Its Relation to Human's Performance and Activities:

Interior space has the characteristics of living organism so it affects human because it connects human health to interior spaces. This connection affects human health, psychological state and consequently his performance. Interior design is one of the stimulant accompany human being in all his activities as firstly human feels it by his senses so it affects his behaviour. These effects could be:

The effect of kinetic interior design on human: Many scientists agree that human always in need for changes and feeling of movement; so he can maintain his intelligence. Coherent thinking happens only with change and variation in reactions and feelings. (Din, 2009) Human needs coordination with continuous change and non-fixed systems around him. Human always feels bored and lazy because he can't live in interior spaces in a fixed way because simply he can't live in a routine but always needs renewal and development to keep his vitality, activity and improve psychological state.

Effect of interactive, adaptive, and smart interior space on human: Interaction between interior space and human through his senses to feel interior design changes and enjoy this interaction in a way makes the human being a part of these changes that consequently affects his health positively by smart adaptation.

Effect of green and sustainable interior space on human: Creating designs harmonies with the environment for human health.

Effect of positive interior space on human: Achieving interior and exterior balance between human and interior space.

Results:

- Studying environmental systems and living organisms' characteristics helps in discovering design solutions for interior space in a way fulfilling human needs.
- Thinking of modern designer has changed to cope up with the rapid changes that characterizes the times we live. This change is reflected in interior spaces so the idea that interior design is a living organism moving, changing, adapting, interacting and doing metabolic process was appeared.
- Kinetic interior space, dynamic, interactive, adaptive, metabolic, green, and sustainable interior space appeared as a reaction of development of designer thinking.
- Biological simulation for living organisms can be applied in interior space design as a developed design style aiming to improve interior environment for human comfort

Recommendations:

- There should be a general attitude by designers to get information and mental values for natural systems and their properties that help in

connecting design process with human physical and psychological needs in the field of interior design and furniture.

- The necessity of applying the concept of interior design as an ecosystem and considering it as a design style able to fulfill human needs.

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ART- ARCHITECTURE OF LE CORBUSIER: A POSSIBLE CUBISM IN ARCHITECTURE

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Abstract

"We all know that art is not truth. Art is a lie that makes us realize truth, at least the truth that is given to us to understand. The artist must know the manner whereby to convince others of truthfulness of his lies."- Pablo Picasso

It is safe and unassuming to accept that Le Corbusier was not just an architect of the Modern period but also an artist on the same lines, of Cubism. The architecture of Le Corbusier (Charles-Edouard Jeanneret) had seen drastic formal variations from his 1920s architecture to 1950s to his later works of 1960s. His architecture started to see a growing influence of his artistic side and its imposition on the works was undeniable. The varying gaps of these periods mark the changes that were subtle in the beginning to reach to a height of his art-architecture of the later works. A search for *order*, *geometry* and a *unifying character* and many such mannerisms chosen by Le Corbusier himself surprisingly stayed the same, but their interpretation changed to such an extent that the architectural object started to look and feel quite different. His earlier works of Villa Savoie (1928-30) or the La Roche House (1923-24) had a presence of formality, and a sense of order, regulated through a strict conscious mind. Whereas his later works such as The Pilgrimage Chapel of Notre Dame du Haut, Ronchamps (1955) is an absolute contrast having an influence of all the works of Cubism art he worked on.

This paper is an enquiry and an understanding of an architecture in terms of Art- particularly Cubism- taking up the Art- architecture of The Pilgrimage Chapel of Notre Dame du Haut and laying out the presence, *illusion, movement* and geometry in the architecture of Le Corbusier as a Cubist Architecture.

What Changed?

The architecture of Le Corbusier can be and has been classified and distinctly separated into three phases; Early works, the fleeting middle and the impressionable latter. Early phase comprising of his wanderings and self-education, the period

of *Journey to The East*, the ancient ruins becoming his guides and teachers of architecture. A clarity towards architecture, an exposure, a vivid approach towards what architecture was as an eternal establishment and so on; The distinctive second phase of voicing his beliefs for the 'new' and the future through his writings against the old thought- it was the famous period of his "New Architecture" and the "five points of architecture", and the famous Villa Savoie- Flora Samuel highlighted the second phase as his collaboration with Paul Dermée and Amédée Ozenfant in the journalistic time of L'Esprit Noveau.; and the latter period slowly defining his charismatic free-spirited architecture. Charles Jencks in his 'The story of Post-Modernism' critiques fleetingly over the shift of Le Corbusier's work and his [Corbusier's] attack on the Modern Movement which in some form or another represented the pre-war beliefs and works of Corbusier himself. His [Le Corbusier's] first attack was in 1961, he called it "superficial Modernism (a formalist gigantism occurring in New York & Paris)". Jencks places the Chapel at Ronchamp customarily into the broad sphere of Post-Modernism. But under the Post-Modern condition the scope of this piece of architecture is diluted, both in style and in its metaphoricalness. But the changes one noticed in his 1955's Pilgrimage Chapel of Notre Dame du Haut were always prevailing in his artistic works, of painting, sculptures, collages, etc. James Thrallsoby writes that "during his years as a purist, he had used painting as an instrument of proclamation and as a tool for visual research."(Thrallsoby, 1948 pp121).As Kandinsky says "A nothing before all beginnings.", the 'nothing'can be connected to the time before the drastic changes in his architecture, can be traced to his art works of 1920s which are a series of curvilinear forms that intersect, overlap and divulge each other called "Acoustic forms". A synthesis of moulded roof, innumerably small openings at random (seemingly so from outside) but well ordered proven from within- is the presence of a constant movement indicated by an insisting direction emphasised by an artist himself. A sense of un-orderliness, or the connections one notices with the name Le Corbusier where one ends up seeking rigidity out of familiarity with his works by hoping to establish a memory, an acceptance through their recognition, but,

> "…In these [the works of architecture, post-war period] the brittle and pristine world of Purism had been broken open to reveal something more archaic, deliberately crude, and rooted in the organic." (Ferrier & Pichon, 1999 pp417)
>
> "The mechanical slaughter of second World War may have gone further to disrupt Le Corbusier's confidence in the machine and its 'progressive' potential." (Ferrier & Pichon, 1999 pp417)
>
> "his architecture… began to change in character from his trademark crisp white boxes with muted coloured interiors into something far more sensuous and tactile, anchored to the ground, both physically and metaphorically… [and became] *beton brut*, exposed brickwork, chunky timber, strong colours, symbolism and geometry being characteristic of Le Corbusier's late works." (Samuel, 2004 pp2)

The possible presence and past of war afflicted Le Corbusier which began within him a search for something far and deep rooted in the past, a search in his unaffected and free expressions of art.

Presence of Art- influence onto the Architecture

" All his [Le Corbusier's] buildings including the rigorous Villa Savoy in Poissy and the baroque Notre-Dame du Haut in Ronchamp and his palaces for Chandigarh and Ahmedabad, stemmed from the rhythms, proportions, and shapes first tried out in his paintings." (Ferrier & Pichon, 1999 pp619)

Le Corbusier insisted that 'music and architecture… being two arts very close in their highest manifestations." And this can be noticed in a lot of his cubist art works. Towards his architecture he stayed strict and believed in the principles he so fondly formulated and memorised, the five points of architecture and the Modulor theory (the author shall not dwell into these well-known and well-studied theoretical works of Le Corbusier, instead shall continue on the topic ordained). But in his later works of the post-war period, especially the one at Ronchamp has an abundant similarity to his paintings.

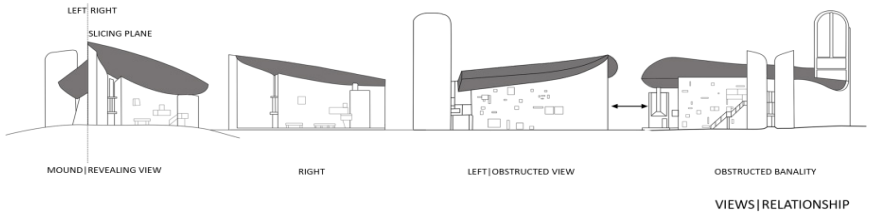


Figure 1. Façade Relations & expectations.

> "Cubism" says Giedion "breaks with Renaissance perspective. It views objects relatively: that is, from several points of view, no one of which has exclusive authority. And in so dissecting objects it sees them simultaneously from all sides- from above and below, from inside and outside. It goes around and into its objects." (Giedion, 2008 pp436)

Giedion expands the extent of visual ability as a transformation in "time" and due to which one tends to see all side at several given points of view, ergo the time spent, at one go.

The Chapel's walls here hint onto a similar experience [of *transparency*] all over [Figure 1- Façade Relations], but to one's surprise the effect is absolutely linear and humble on the North and West facades with an imposing water drain and its metaphorical reference than the dynamic and monumental South and East facades (in sequence). It attempts to retain all the qualities of Cubism through its interpenetrating, hovering and lingering planes and volumes. One unassumingly notices the shift and obstruction of spatial forms; the walls, 'random' window openings, the towers and the unforgettable roof. Since, as an architectural object, its physical formal presence along with its imposing exterior versus the humble yet voluminous interior, it would be appropriate to consider a presence of a specific style of art- Cubism.

The visual path is no more linear, but a curvilinear one, stretching, curving, circumscribing the object whose presence is a blur. The paintings and works of three dimensioned sculptures have been to a certain scale that the viewer is accustomed to, then how does one comprehend a similar on an exponentially larger scale, here

a case of a building? He no longer could isolate and stick to the education obtained from his masters, the monuments and ruins of the ancient Rome, Greece, etc.

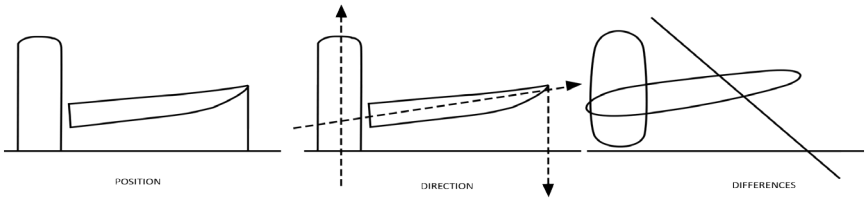


Figure 2. Plastic Forces, from left to right: as static immovable objects; as directional markers; as varied objects on a plane

In the opinion of Jamie Coll his works of *ubu series* (1946) is the inspiration for Ronchamp or Ronchamp is the derivative of the said series of art.

Colin Rowe and Robert Slutzky in their work on *Transparency* have defined the phenomenon through Cubist paintings of early 20th century. They claim,

> "The advancing and retreating planes of cubism, interpenetrating, hovering, often transparent, without anything to fix them in realistic position, are in fundamental contrast to the lines of perspective, which converge to a single focal point." (Rowe& Slutzky, 1997 pp23)

To elaborate the theory laid out by Rowe & Slutzky, the defining characters of Cubism by Gyorgy Kepes helps further in understanding it.

> "If one spatial form obstructs out view of another form, we do not assume that the second ceases to exist because it is hidden. We recognize, as we look at such overlapping figures, that the first or uppermost has two spatial meanings- itself and beneath itself. We experience spatial difference or depth. Representation of overlapping indicates depth. It creates a sense of space. Each figure appears parallel with the picture plane and tends to establish a receding spatial relationship." (Kepes, 1995 pp76)

This is the case of art in a painted or sculpted form, but how does one translate it onto a space of utility? Chapel at Ronchamp has invariably sliding planes, a dominating roof structure which defies gravity and destabilizes the viewer at first sighting, but one notices a clear sense of stabilizing the structure onto the ground by placing the roof on deep cave-like thick walls. In an orchestrating manner the spaces overlap each other in the plan, a definitive non-existence of intolerable Modernity seems too pleasing to Le Corbusier. But the ideas for such fluidity sprung from his works of art. And in his desire to blur the object he reached a possibility for stimuli capacity of the human and he went and highlighted it. Such fluid forms were dominating the canvases and sculptures done by him and he named them 'Acoustic Forms'.

Another trait that can be attributed from Cubism as a form of art to an architectural object is "exploration",

> "The exploration of the spatial nature of the objects by walking- in imagination- around them, and investigating their visible volume made the image more formless. But in this formless conglomeration of the different

> enveloping planes, plastic forces hitherto hidden were revealed. Lines and shapes could now manifest a dynamic spatial quality which before has been submerged in the imitation of one apparent visual aspect." (Kepes, 1995 pp98)

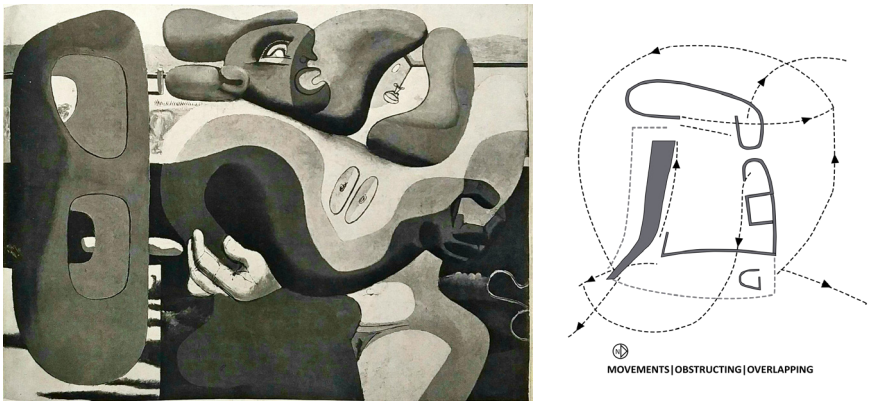


Figure 3. Oil painting (Left), 1935, Le Corbusier. (right) Plan of Chapel at Ronchamp showing the movements of all the lines forming an eventual plan, in line with the painting technique used by Le Corbusier.

Le Corbusier's works of art had clear overlapping and explorative forms in them, ergo he slowly seeped his ideas and freedom found in fluid forms to the spatial forms. As Kepes said "…their visible volumes [make] the image more formless", and through this formlessness and enveloping planes the dynamic nature of the physical entity reveals itself [figure 3].

> "Cubist painters… correctly realized that one fixed-perspective is not sufficient to describe dynamic spatial facts, and they experimented with numerous simultaneous perspective-projections…they reduced the image to its most elementary structure." (Kepes, 1995 pp107)

The analogy which Kepes describes as a sequential search and numerosity of perspective projections [Figure 4- Pause] used by cubists is a 'geometrical phenomenon' in Le Corbusier's words is one that has a capacity to transcend and juggle between the directionality, movement, presence-absence.

Le Corbusier had experimented with a cellophane pattern sheets called 'Zip-a-tone', he it calls a play, that has a resemblance to the way of experiencing the Chapel at Ronchamps.

> "…turn it very slightly from left to right or from right to left…within a second you see a thrilling geometrical phenomenon come to life and develop." (Corbusier, 2011 pp153)

Ever so slightly 'turn' of these cellophane sheets might just be a hint to how he wanted a building to be experienced by taking a walk around it, all the while 'turning it very slightly'. The building of Ronchamp is an experiment he was ready to risk since all his studies hinted towards the ultimate peak of its expression through the three dimensionality of an experiential object- a building. Not just an imaginative experience promised or hinted in a painting but an absolute, concreted presence over and around the pilgrim, a spectator, a visitor.

While there is this dilemma in viewing the building from the famous south side view or the right-left or from left-right. There has always been an exquisite 'pausal' insistence [Figure 4. Pausal Movement], a resistance to the paced movement around and inside the architecture so, a viewing instead by continuous walking around the building, one is supposed to pause to take in the views from several orchestrated spots to take in the marvel of this form. Certain 'spots' or locations demand experiencing the visual field by giving 'time' [chosen as the fourth dimension by Giedion] characteristic of cubism. A tendency of directionality can be experienced by the individual both in the springing formality felt in the visual dominance of both the tall towers [light wells] and the imposing concrete roof curving away from the viewer and the horizontal movement around the form [Figure 4- Horizontal Movement] in a path designated by plastic forces acting as the presence upon the form itself; as directional elements both in visual quality as well as experiential movement around the built; as differences in the elements used to bring together this conglomeration of parts together [Figure 2- Plastic forces]. all the senses are alert creating their own impressions, fragmented impressions, and unifying them into organic wholes.

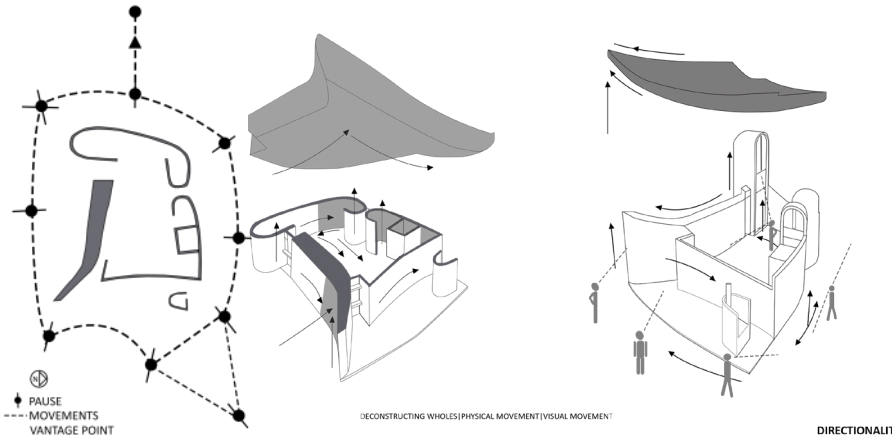


Figure 4. Orchestrated Movement: Pause, horizontal and visual movements (from left to right)

Kepes says

> "Independent if what one "sees" every experiencing of a visual image is a forming; a dynamic process of integration, a 'plastic' experience. The word 'plastic'…[therefore is to] designate the formative quality, the shaping of sensory impressions into unified, organic wholes." (Kepes, 1995 pp15)

The choice of both material and texture to emphasize the idea with a difference in colour imparts another layer of excitement to comprehend. Light coloured outside versus dark concrete finish and controlled filtering of light through the three towers and the varied windows put one in a conflicting yet and eventual acceptance is sought.

Signs & Symbols

In the "Metaphors of Ronchamp", (found in both the books by Charles Jencks on Post Modernism) the exploration of the form can be furthered from just the five variations (in the diagrams the sixth one is a view of the chapel) the student had worked on. It is at the same time an ear (in planform), a vagina (in perspective), an ark(in perspective), a womb (in a cubist art like plan), a sound (refer to the second section on his fluid form paintings and acoustic forms of art), light, chapel, women, palms, a hat (from various sources: Samuel, 2004, Papadaki, 1948, Thrallsoby, 1948); it is a *simultaneous* form- an object of SIMULTANEITY [Figure 5- simultaneity]. Kepes states that "the experience of a plastic image is a form evolved through a process of organization." (Kepes, 1995 pp16). Perhaps the Purist organized mind of Le Corbusier had for long decided upon its eventual direction toward the rejection of the very same principles of machine aesthetics and modernization that he so fondly describes in his "Towards a New Architecture". Against the expectations of the Vox, Le Corbusier went and experimented with bis artistic free-spirited enthusiasm, with a architecture as an outcome.

> "The scheme at Ronchamp was, according to Le Corbusier, the result of 'meticulous research', including the continuous adjustment of a thousand factors…" (Samuel, 2004 pp119)

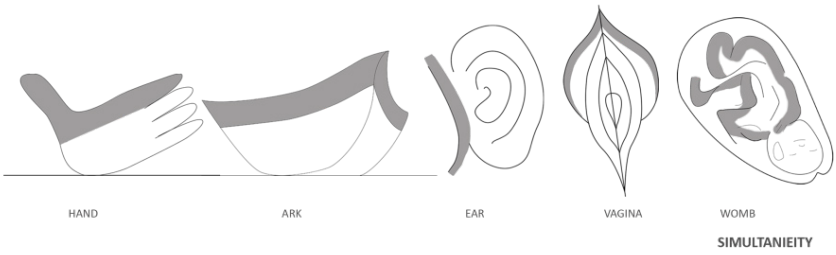


Figure 5. Metaphorical SIMULTANEITY

Plastic forces of a work of art have the characters of positions, direction and their own differences amongst the internal, external forces. At the Chapel of Ronchamp Le Corbusier has achieved all of this effortlessly and created a 'whole' out of opposing and contradicting parts. The forces at play have their preconceived directions but held at the sides with the towers and rooted into the grounded through the seemingly angular (or stable) lines of the walls.

> "The cubists did not seek to reproduce the appearance of objects from one vantage point; they went around them, tried to lay hold of their internal constitution. They sought to extend the scale of feeling…"(Giedion, 2008 pp436)

The direction of the path without signages and help is hinted only through the form in front and its forces in action. The *simultaneity* felt in and around it was juggling between the three-dimensional aspects and the experiential impact of the two-dimensional spaces. It is a dynamic play of not just internal and external forces but also of spatial forces of architecture. Giedion talks about 'time' as the fourth dimension activated and aroused by the cubists in their paintings and works. So, the

presence of such a powerful architecture, one is influenced by all the factors at play.

Events & Phenomenon

In *Modulor 2* Le Corbusier has described in detail objects that evoke sensation.

> "We have reached solid ground. We have come to the most material objects of discussion, which are also the highest objects of sensation." (Corbusier, 2011 pp148)

To him both the aspects of a building are of acute importance spring from the architect's feelings. One that he calls "texturique" [in surface, in depth, in volume] and the other is an event which explodes or simply slowly seeps into the spectator. He calls it "the event" of visual acoustics [figure 6- experiential *Simultaneity*].

> The nature of creation…is entirely different. I say 'the event'… This lyrical consequence is the manifestation, by a palpable object, of a character thenceforth imparted to it by an inventor: this character, this attitude, this stature are all visible at a glance, proceeding from the optical phenomenon… in order to recognize the presence of an acoustical phenomenon in the realm of form it is necessary to be,…, but an artist, a being sensitive to the things of the universe. The ear can 'see' proportions, it is possible to 'hear' the musical of visual proportions." (Corbusier, 2011 pp148)

His continuous search for an overlapping event, a phenomenon throws into an unexpected explanation of a cubist work of architecture. The 'interferences' of superimposed forms and their direct impact on the object experience divulges a thought of cubism in conscious making. He calls the period of cubism as a great one that helped in shaping the sensory capacity of human along with two other art periods, viz., Cezanne's works and Mondrian's works; an effect of sensitivity and concentration with a clarity of spirit might be hints towards his later works of free spirit and exaltation on the human spirit.

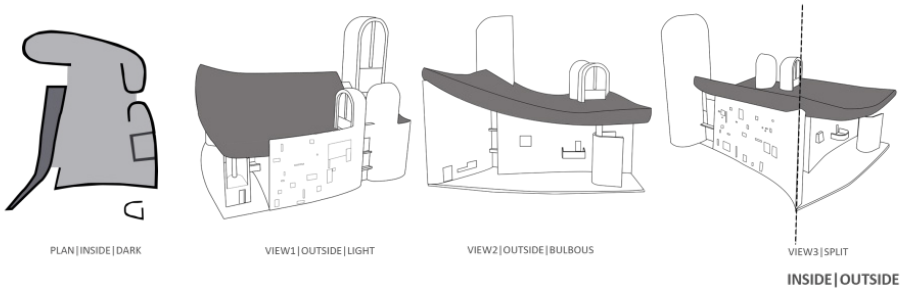


Figure 6. Experiential SIMULTANEITY 2

This well scripted space, volume and form has a charm of an unprecedented idea, a quest for free spirit found in an object of built form one can only conclude that this is a freedom sought in expression, and also a free spirit seeking an architectural experience through presence in one. A post-Modern Cubism. As he himself said,

> "For a finished and successful work holds within it a vast amount of intention, a veritable world, which reveals itself to those who have a right to it: that is to say, to those who deserve it.

Then a fathomless depth gapes open, all walls ae broken-down, every other presence is put to flight, and the miracle if inexpressible space is achieved." -Le Corbusier

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CULTURE AS AN INDISPENSABLE FACTOR IN MODERN DESIGN IDENTITY: THE CASE OF JAPAN

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Abstract

In the varied range of design history, apart from techniques, aesthetics and functionality, the important concept of the national identity of the designed and produced objects, is also carefully considered. Nevertheless, exploring the national identity of design we can frequently discover the changes or variations that may arise therein, through the complexity of the influences design may receive mainly from the intense phenomenon of globalization.

Japan has been perhaps the only country in the world which managed to transform its traditional and isolated rural and craft production physiognomy for centuries, in the few decades spanning from the late nineteenth to the early twentieth century, into the cradle of design culture by retaining its national cultural physiognomy, despite the significant influences it had received from the West. On the other hand, these multiple influences at a technological, scientific, economic, and cultural level, would help the country to neutralize its still remaining local identities and regional loyalties, and to keep its basic nationally cultural characteristics that would render it be universally accepted for its high design standards. Today, many forms of modern Japanese design seem to be reflected in every aspect of the everyday life of not only the Japanese, but of millions of consumers in the world, creating a myth about itself for both the scientific community and the world markets.

This paper aims at researching the meaning of culture in the formation of the national design identity in modern Japan, exploring its indisputably strong cultural and social bonds, which however may come into sharp contrast with the global design and culture trends by which it is still being affected.

Keywords: Modern design, Japan, national identity, culture

Introduction

As a particularly complex, primarily functional and secondarily aesthetic activity, contemporary design is an expression of the combination of high and specialized scientific, technological and sociological knowledge, broad information, multiple techniques and special materials. It usually requires significant research, thought and data analysis, creation of possible solutions, making of a model (prototype) and interactive analysis, redesigning and review of the whole or the details of the object, and finally, technical recording and preparation for production. In order to better understand the importance of industrial design, it is important to define its importance in two areas: ergonomics and aesthetics. By ergonomics we mean the scientific area that deals with the study of interaction between people and other elements of a system. However, with the term aesthetics in design we mean the appearance of a pleasantly shaped form of an industrialized object, but also its essentially visual differentiation from others of similar functionality (Kotea, 2015 p. 11). Ergonomics' basic principle is to put the needs and capabilities of the human user at the center of design. Today, several historians and scientists associated with the broad concept of design point out that one of the most important 'ingredients' of the successful recipe for industrial design is the concept of culture, which combines the knowledge of the arts, habits, the ideas and other manifestations of human intellectual achievements with technological progress and superiority. That is, it literally embraces social behaviors, socio-cultural traces and phenomena, historical substances and events, traditional customs and human reactions, all of which can contribute as raw materials for the formation of the design base (Strickfaden, Heylighen, Rodgers, and Neuckermans, 2005 p.1). It is scientifically proven the fact that the bond between design and culture is extremely strong as both concepts have been closely interrelated and thus are able to interact so as to form new models of social, cultural and functional issues. In many cases, design has become synonymous with the formation of culture itself, which in many cases represents social change in terms of higher standards of living, prosperity, affluence and technological advancement. On the other hand culture can influence design formation in a multifaceted way, giving it through individual ideation and consequently innovation the chance to stand for itself against the hegemony of mass globalization, and promote its special, unique characteristics (Report, 2011 p. 4). This is, in our opinion, the most important element that can make design claim its cultural, and thus, national identity, providing that culture can many times form the national character of a country.

A few peoples in a global scale can take 'pride' in their country in such a strong and decisive way so as to make themselves closely connected with the above associations. And there are few places in the world that national identity can be taken more seriously than Japan (Suga, 2019.) History, homogeneous tradition, deeply rooted social and religious customs, faith and respect to Nature and devotion to hard and systematic work are only a few of the qualities that can constitute the unique concept of 'Japaneseness' in many aspects of creation such as arts, crafts and design. The Land of the Rising Sun has a particularly powerful, yet controversial relationship with Modernism and its technological and aesthetic achievements, as it mainly 'used' them in order to transform itself successfully from a traditional, deeply theocratic and conservative nation into the miraculous moth of

a heavily industrialized country in the first decades of the 20th century. Additionally, it was undoubtedly the first non-Western country which would persistently resist American and European domination. But how has the physiognomy of its design been shaped through history? What are the main factors that made it retain the special characteristics of its culture? And finally has modern Japanese design managed to keep its national identity in jeopardy of all the dangers of wandering globalization in the field of industrial design?

Modernity and the shaping of the Japanese cultural identity in design

Japan came into contact with the term of Modernism, only after it had opened its borders to the West in the mid 1800s and thus received the first American and British ships in its ports in the late 1860s. This was just the beginning of the speedy and steady process of its industrial and consequently social transformation (Bird, 2002 p. 102). Within a few decades the once traditional Japanese society found new models through the Western way of life and thought, and was soon transformed from an isolated feudal, strictly conservative system into a new type of social unit keeping though many of its traditional cultural features, distinct from any other in Asia. Japan's adoption of Western life style was regarded as a part of Westernization. Although this new way of living with tangible and intangible goods gave Japanese people some convenience and an air of new culture, they seemed to always function as before, as they were not able to rebuff their own primordial, deeply rooted lifestyle. On the other hand, the introduction of particular commodities such as photography, the telephone, advertising through posters, airplanes, cars and later T.V., to mention just a few, constituted a large part of modernization as they affected severely the Japanese people's way of behavior, in terms of thinking and acting, by remolding somehow their cultural system into a new form (Hall, 1965 p. 25).

During this time known as Meiji Period or else Restoration Period (1868-1912), under the reign of Emperor Meiji the Great, many changes were gradually made in the areas of mass production, domestic politics, education, defense and general military ideals as well as in the diplomatic relations of the country (Meyer, 1993 p. 98). Within this constantly changing socio-political and ideological framework, industrial development came rather timidly in the beginning with the appearance of light manufacturing and transport infrastructure and a series of several innovative technological initiatives in the agriculture sector, which helped economy thrive in the first only years of the 1870s. Nonetheless, during this decade there was an unprecedented increase in almost every sector of industry, mainly in textiles through raw materials processing such as wool, cotton and silk, which boosted the private initiative (cotton mills establishment, building pilot reeling plants for private factories, incentives for the use of steam power etc). The contribution of specific factors that made Japan one of the strongest industrial and military countries in the world in such a short time proved to be particularly significant. Initially, the large supply of unskilled workforce willing to work and be educated in combination with the value of railways, mainly as a means of transporting raw materials in remote and inaccessible areas, played a major role. However, the cooperation of local businesses with more than 2500 foreign experts on issues such as education, science and several military sections was equally important. In the beginning

of the 20th century, Japan was already the leading Asian country in the textiles manufacturing industry, and had made great advances in shipping, mining, banking and chemical industries, too. This was advocated by the indiscriminate adoption of the basic principles of the Western capitalist system that shaped a new type of a challenging, economic market for the country, strengthening in particular the, already strong, private production sector (Reeve, J., 2005 p. 22).



Figures 1., 2. The introduction of photography, telephone (left) and advertising posters (right) signified the beginning of Japan's modernization in the beginning of the 20th century.

Enjoying its newly-established wealth, it soon developed a powerful army, similar to the European ones, which made it a world-renowned military force. All the above strengthened its imperial aspirations for more wealth and power, something that would soon lead it to destruction during the Second World War (Sigur, H., 2008 p. 53). But, in spite of being totally defeated in the nuclear devastation of 1945, which led to its surrender to the United States and a profound sense of national shame for the inward-looking Japanese society, the country stood for itself and remained a leading industrial country for the decades that followed. That was probably the darkest period for not only the history of the Japanese nation, but for national design itself, as the country was then compelled in order to survive to convert quickly its previous vast industrial production, which also included military goods, to mainly consumer goods for civilians. (Fiell, C. and Fiell, P., 2016 p. 354) In order to do this, Japan had to decide first which types of products were indispensable to be manufactured, and then to learn how to design them, or even how to copy successful products made by foreign manufacturers, especially Americans who at the same time seemed to celebrate another victory over Japanese culture. Thankfully this did

not take a long since Japan found soon its economic power and continued its fast national mass production pace**,** culminating in the 1980s and 1990s when things began to favor again the pluralist cultural tradition of the country with regard to design. It was during this period when the craft-based fields of architecture, interior design, textiles, furniture, ceramics and fashion were gradually linked to a wider range of Japanese traditions which included a Zen-Buddhism inspired aesthetic minimalism that became the world's favorite design approach for the following decades (Sparke, P., 2009 p. 25). However, the American influence did not stop in the 1950s, but it continued to challenge the Japanese lifestyle and consequently design, but in a rather more practical way, that is more with its scientific and technological breakthroughs rather than with its social, cultural, ideological and aesthetic values.

But what were the basic reasons that led Japan to this point of triumph? Had it always been a strictly isolated country with strict social and ethical conformities, austere tradition and tight customs and how can all these be interpreted? Bearing in mind the high concept of cosmocentrism, whose main central matters of discourse are nature, visual images always directly analogous to nature, human body and sexuality and equally the concept of the dense cultural and social consistency, we can understand why the Japanese were distinctively different from any other Asian, let alone European culture (Nonno, T., 2016 pp. 40, 41).

The matter of fact is that Japan had always been a modern country through all these unknown but exciting and advanced cultural features and thus was much admired by the Western countries. What I mean is that by the 1860s, Japan had already shown to the West what Modernity could be. The indisputable concepts of cleanliness, harmony, beauty, precision, discipline, accuracy, abstraction and control that are inextricably woven with Modernity itself were extensively found in Japanese culture (Chavez, A., 2018). This was particularly obvious on their traditional non- mechanic, craft-based goods which were until then produced under human working conditions in contrast to the dominant capitalist mass production practice of the West, which intensified even more the aesthetic and ideological degradation of the European Industrial Establishment. This is why the European frenzy with anything Japanese led to the uplift of European arts and design in the second half of the 19th century.

But it was during the 20th century when Japan with its highly urbanized and deeply sophisticated and educated society with moral and social - highly respected - rules and with leaders amply orientated to sweeping, but controllable changes in the fields of economy and industrial production, managed to form the basis on which western technological achievements would thrive without corroding its cultural physiognomy. This is why by the end of the century it constituted the brightest paradigm in industrial design of a strong national character and economic success worldwide and had an enormous effect on the world design thinking.

Japanese design national identity and globalization

What were the main reasons that made Japan stand up for itself by shaping its design identity according to its cultural background in a way that it would initiate a platform of innovations and miraculous changes after the Second World War? What did the humiliating defeat by the Americans mean for the Japanese national pride

and how the reactions of this dignified people altered the route of the Japanese way of designing goods? Let's have a closer look at it.

The matter of fact is that Americans and their allies who occupied the country thereafter, had as an objective the complete demilitarization of the country. The main scope of the U.S.A. was to exterminate the Japanese economy so that it would never have the opportunity in the future to produce military objects again. In order to achieve this, Americans ordered the dismantling of heavy machinery and its transfer to other Asian allied countries. On top of that, the new Constitution of 1947, in contrast to the Meiji Constitution of 1889, dictated new features that would hurt the Japanese pride and self-confidence. Two of them claimed that the Emperor would be still the symbol of Japan but with no political power and that the Japanese had to totally renunciate from war and rebuff any sort of military forces (Ohno, 1970 p. 155). The concept of national identity started then becoming increasingly imperative, and this had a direct impact on the national design identity which, since the end of the 1940s, had become increasingly important for economic as well as national reasons. If we borrowed Smith's words 'national identity can be seen as providing "a strong 'community of history and destiny' to save people from personal oblivion and restore collective faith", perhaps it would be easier for us to understand why the Japanese felt it necessary to restore their hurt national pride by employing all over again the main characteristics of their culture in order to form a new order of things that would lead them to the High Growth Era of their economy, industry and society of the following decades (Smith, 1991 p. 161). However, before reaching the high point of progress and affluence, Japan continued to be a particularly impoverished nation after the mass destruction it suffered in the Second World War. There were, though some particular factors that played a noteworthy role in the formation of Japanese design identity.

As stated before, the first factor was primarily ideological as it was strongly connected with the importance of the national and cultural identity of the Japanese and which triggered the ardent desire of the locals to feel vigorous and proud again. After 1945, there was a gradual discussion in the Japanese high and middle society circles about the meaning of culture and the importance of restoring the national psychology after the destruction of many important national symbols. This theoretical approach was called *nihonjinron* and was soon found in several types of press such as books and magazines in the form of special articles which aimed at exploring, analyzing and explaining the characteristic features of the Japanese mentality, in a rather propagandistic way, though, as they were directly comparing its superiority to the American and European way of thinking. The main areas of discussion were in the scientific fields of philosophy, anthropology, history, sociology and many more, through the prism of which Japanese culture was distinctively prevalent. According to Dale, by 1970s, these genre texts contributed to 'the recognition of Japanese specificity as a positive model for a uniquely Japanese road towards modernity and its global outreach' as they had first had stimulated the national sentiment of the Japanese and had a catalytic effect on the importance of national identity in any form of design and production (Dale, 1986 p. 213). In fact, *nihonjinron* was not a unique phenomenon of the 20th century nor was it a completely Japanese contrivance as it can found in many other nations in the world which wanted to reflect their cultural nationalism in modern times. Nevertheless,

in Japan it constituted, inter alia, a significant initiative for the formation of modern design identity.

Secondly, design identity would not have been of particular importance if first Japan had not followed a particular policy in its industrial production which would allow it to start exporting its industrial goods. Exporting was proved to be the ideal move as, once it started, it shed light to the particular technological weaknesses of Japanese industry that prevented it from being competitive with the global markets. Japan's leaders had already realized that it was design combined with the technological knowledge that would lead the national industrial production to success. In the 1950s they founded an organization, named 'The Good Design Awards' which would promote effectively national design as it was thought that good design was necessary to the everyday life of people after the War, and that good design would give to anyone a decorous and prosperous life. In the same period some other trade organizations such as the Japan Design Committee and the Japan Industrial Design Association were also established and since then design started to take over. With the significant increase in exports, Japan managed to greatly increase its standard of living while enabling the domestic market to grow dynamically. Here, the power of design in industrial activity must be highlighted, as it constituted the driving force behind its success.

Japanese design might not have been so successful if it had not first acquired its own identity and this is one of the reasons that became popular on both the domestic and the global market. Significant was also the contribution of the Japan Industrial Design Promotion Organization, the institution with a comprehensive promotion mandate for national design, which was established in Tokyo in 1969 (Japan Institute of Design promotion, 2015).



Figure 3. Shigeru Uchida's formidable furniture design, much inspired by the Japanese tradition, early 1980s.

The following years, a new style of forms was developed which seemed to constitute the base for the much desired design stability wanted in a world of constant change. Traditional forms and profoundly cultural Japanese features or concepts started blended uniquely with the innovative issues of the high tech and later digital world leading to the minimal design of objects or interiors which provided an alternative design solution for the West. The matter of fact was though, that in that phase modern materials prevailed to the traditional ones, as industry was still the most significant production source of the country and still dictated an obsession with technology. However, traditional concepts such as *flexibility,*

portability and *quality of everyday life* re-emerged and became inextricably linked with the national design mainly in the fields of car, audio and video equipment. In the less industrial design fields of architecture, interior and furniture design, designers in Japan suggested totally new forms and spaces which reflected significantly the Japanese culture, however in a subtle, but dynamic way. As we can understand, it was not accidental that architecture and interior design had just returned to the front of the stage, showing again that they drew their inspiration from the Japanese culture. For instance, in the 1980s Shigeru Uchida was the creator of many interior , but also furniture design projects all of which were based on Japanese culture, while the architect Tadao Ando combined openly the national architectural ideology, which was closely connected with nature, with Modernist architecture (Frampton, 1985 p. 324). At the same period Issey Miyake, Kenzo and Yohji Yamamoto with their traditional concepts, but also with the use of original materials, textures and colors created goods in the area of fashion design that flooded not only Japan, but also the world markets, opening new paths for the next much promising decade (English, 2011 p. 10).

In the 1990s, when the globalization issue started growing bigger and bigger, product design in Japan was proved to be the most powerful form of any design field and signified a new era for the individual Japanese designers which became even more prominent. It was the time that many of them would work outside the country enjoying full recognition by transmitting the Japanese ideal worldwide, whereas many Western designers, such as Ettore Sottsass, Jasper Morisson and Philippe Starck would visit, live and work in Japan considering it the cradle of the new design era (Sparke, 2009 p. 25).

It is rather strange but the globalization or else the internationalization process seemed to coincide with the enormous boom in the Japanese design area which was, however, fortified enough to bear globalization attacks. Japan had already managed to care for meanings, such as national identity, individuality, regional, racial, ethnic origin which were used as shields to the leveling power of a newly born worldly culture (Edensor, 2002 p. 42).



Figure 4. Kazuhiro Yamanaka's collapsible moon lamp, 1999.

Its designers had accepted the gifts of the West but in a way that allowed them to create a vast spectrum of works that combined different types of sources, such as digital technology and electronic intelligence with traditional materials, methods and techniques that helped Japanese culture remain potent and alive as never before. During the 1990s and early 2000s craft tradition in combination with high technology played a highly important role as gave the chance to new Japanese designers to experiment and thus find new, effective ways of creating. More specifically, designers such as Michio Hanyu, Hiroyuki Tazawa, Kazuo Kawasaki and Kazuhiro Yamanaka were only some of those who promoted the concept of *hybridity*, that is Japanese traditional characteristics combined with the American and European high technology, which implied more creativity and innovation.

In spite of the fact that after the rise of the new millennium many big companies continued to produce high quality designs, individual designers, but also groups of talented artists who refused to be categorized and ignored conventions, produced impeccable works most of which derived from the local tradition bridging, in this way, the glorious past with the exciting present of Japanese design.

Conclusion

Japanese modern design is inseparably linked with the concept of cultural identity and this has always constituted a considerable weapon against the imperialistic aspirations of globalization. However this does not necessarily imply that it can be the result of a unique and only source of origin; on the contrary, it is a mixture based on the combination of diverse cultural, technical and material 'ingredients', many of which belong to different cultures and nations. So, the claim that 'Japanese design' is the outcome of a particular national territory, attitude, sensibility or corporeality of the 'Japanese people', is rather 'defective' and problematic (Adriasola, Teasley & Traganou, 2016 p. 2). Thus we cannot be dogmatic about the absolute homogeneity of Japanese design's national character as it does not constitute the result of a national and cultural parthenogenesis. However, we can confidently claim that, despite all odds and in contrast to the contemporary design of different countries of the world, Japanese design has a distinctive character which reflects the cultural and, in some cases, many of the traditional features of Japan, which make it unique and less vulnerable to the globalization expansionism. This gives Japanese culture, and therefore design, the chance not only to resist to the global design leveling, but also to conquer the western world, possibly for the second time after the 19th century, with its highly esteemed religious, aesthetic and functional values that still constitute essential parts of the contemporary Japanese people's living.

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DESIGN STUDIO'S PLACE IN ARCHITECTURAL EDUCATION: CONCEPTUAL STUDY EVALUATION IN DICLE UNIVERSITY ARCHITECTURE DEPARTMENT AS A STUDIO EXPERIENCE

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Introduction

Architecture education is an ongoing process that is open to debate as a field where many people come across and fight with the intention of becoming a designer. In this process, it is known that studio works are of vital importance for the development of design skills and creativity of architect candidates. However, the development of design and creativity, in terms of methodology, contains unknowns for the student and the instructor. This is because the design studios are the first places where they were introduced to the profession in architectural education. The architect candidates here exchange their ideas with several instructors during the problem solving process and learn how to develop more than one solution to a problem through different perspectives. In addition, the design studios have been repeated over a period of four years; Architecture has a special importance in the education process. In addition, discussing and conceptualizing within the contexts as a preliminary stage of design is an important axis of architectural education. Designing in a architecture studio itself becomes a design subject that produces complex problems, considering the design action as a multi-layered discovery, which often seeks out the question of all possible possibilities of design, rather than in the narrow sense called problem solving. (Fir, Berber, Uz Sonmez). The scope of design; With creative thinking, architecture is an effort to produce an art and in addition to an engineering wonders, a product that can contribute to art and science is discussed in the scale of the emergence of a product. There are important points that guide the designer in architectural designs. These; climate,

geographic features, close socio-cultural structure of the material and technology are considered as the points. When the architect designs in an area, he or she collects as much data as possible from these points and reflects it to the structure in the most effective way possible to design the project in a specific context. Onat emphasizes that the most important clue for designers is "the place" and "physical, socio-cultural" structure of the place. He emphasizes that these characteristics of the place have multifaceted relations with the life of the individuals and that it is very important how these interrelationships within interior spaces and the outer spaces, the outer spaces with the spaces around the outher spaces(Onat 2010). It is a relatively new approach to design and design an architectural project studio according to this understanding (Uz, 2012). In this study, it was examined how architectural students took concepts to create a design problem by creating concepts on creativity. The aim of this study is to draw attention to the problems of motivations in Diyarbakir and to explain how the design process is managed by developing new definitions through conceptual studies and readings. It was examined how the conceptualization of the problem created differences in solving the design problem. In this process, the effects of studio works on the candidates of architects, the basic parameters of project design, "spatial data, characteristics of the place, socio-cultural infrastructure" including the importance of the concept, in the evaluation of the existing environment, it was emphasized the importance of considering "the context-oriented context" and "design way through concepts" in constructing the structure. By drawing on the general framework of the subject, students should question the concept of public space with changing definitions and propose a structure that includes a public program for an area where they discover their spatial potential.

Design Education, Creativity and Conceptual Thinking

In the architectural design phase, there are some factors that have previously been emphasized in the study. Creativity is an important part of the design phase. Over this period of design, the concepts of "design" and "creativity", have evolved, bringing together art and architecture. Nowadays, art is an important source that nourishes architecture from every angle and makes sense of design. Architecture is a multi-disciplinary and comprehensive art that can be handled with a lot of discipline. Designer; In the process of moving from abstract thought to concrete, he blends the subject with his own architectural understanding, and puts a tangible design into account with the help of various methods. In this context, methods that make the design a little bit easier; "learning by doing", "learning by building". With the help of these methods, the students lead their own project adventure by doing it in the studio, living and feeling. The most important place of application of the learning method is the studios. In addition, creative thinking leads students to think, to use data effectively, to interact with the environment and to synthesize the analyzes. In this way, information is constantly developing and transforming. "Creativity; it leads the imagination, ideas, perceptions, accumulations, emotions, design to gain a new dimension with design. (Bekdaş, Yildiz, 2018, p: 325-326). In this context, it was seen that in the design studio, the architect candidates poured the creative ideas of the concepts they created in the contexts (Fig. 1) and gave them a way to design and poured abstract thought into the concrete more comfortably.

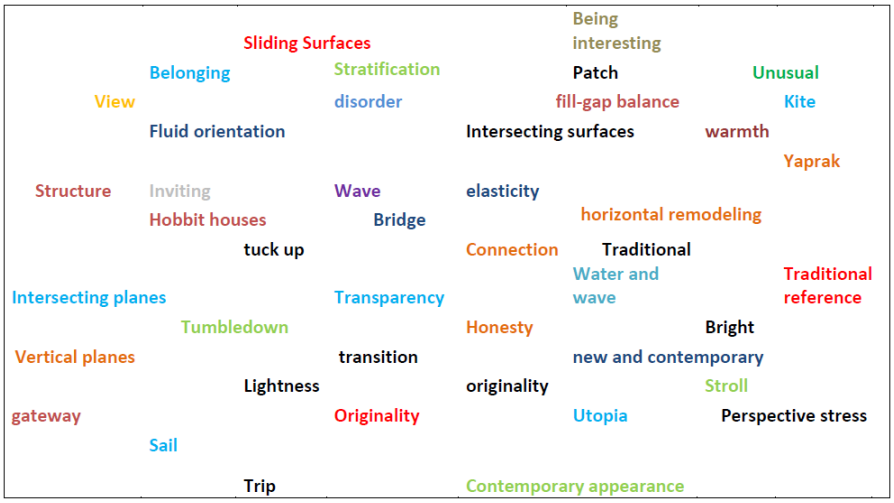


Figure 1: Conceptualization In Design.

Schön [1985] stated that for the first time, architect candidates who met the search for information in architectural design studios first met here with a new language that they had never been familiar with before, and that the primary objective of the subsequent architectural design education was to teach and develop this language. If we consider the education system in Turkey, students of the faculty of memorizing, comes with analytical thinking and concrete structures. However, architecture education is an education system which is possible to develop through abstract and creative thinking, except for the general design criteria, contrary to this educational structure. Therefore, in the first semesters, students experience difficulties in moving from concrete thinking to abstract, from analytical rules to searching for creative solutions. At this stage, the instructors who will remove the architect candidates from this impasse are the instructors.

According to Goldschmidt [1991, 1998], design consists of three stages as "knowledge, interpretation and expression", and these stages become multidimensional with the dynamics and harmony of the interaction between "knowing, interpreting and doing". In design studios, according to Goldschmidt's statement, the teachers of the design studio who will pass on the information, the instructors and architects who will comment, and the person who will put the interpretation into the interpretation are the architects themselves. Within this hierarchy, the design goes through certain processes and evolves to its final form.

Method

In this study, a two-stage study was initiated based on qualitative and quantitative methods in order to determine how and to what extent they reflect the concepts in their studio projects with 32 students who have studied Dicle University architecture third semester. Qualitative evaluation data are discussed within the scope of the paper. In the qualitative evaluation, information gathering, observation, interview and the reflections of the information exchange between the lecturer and the student in the studio studies were discussed.

The study was based on the concept test learning model (Stefani Ledewitz, 1985). Design criteria developed according to this learning model; developing criteria, producing schematic design alternatives, researching alternatives, form experiments and developing design solutions (Özdemir, 2013). It was thought that it would be very comforting to continue to design adventure by starting from the concepts for architect candidates who have difficulties in transforming many abstract ideas in their minds into a concrete expression. In this context, within the scope of the concept test learning model, the studio process which supports creativity within the scope of Architecture Project 3 course in 2018-19 Fall Semester in the Department of Architecture of Dicle University was discussed. During the period, students' designs were tracked, analyzes, observations and sharing were made in the studio and the concepts were reached. The architectural design studio is structured into four main steps (understanding, interpreting, generating knowledge, transforming knowledge) and design problems that allow the study of the same subject from different angles (Table 1). The discussion of the different concepts of design experience with various processes is considered as a strategy that can bring creative thinking to the students (Figure 1). Critical thinking which is an integral part of creativity, multi-faceted approach, producing different solutions to the same problem and approaching the interdisciplinary approach have been the main objectives of the studio structure and process. It aims to contribute to design education by using "conceptual thinking" as a tool, taking into account design and environmental contexts, and gaining the ability to perceive and transfer. In workshops with a study area, it was observed that students were not able to limit the design and use of their own fictions and design.

Table 1: Architectural Project Studio Evaluation Process

<table>
<tr><td colspan="3" rowspan="2">UNDERSTANDING</td><td colspan="13">INTERPRETATION / INFORMATION PRODUCTION</td></tr>
<tr><td colspan="10"></td><td colspan="3">TRANSFORMING INFORMATION</td></tr>
<tr><td colspan="6">Public Space Determination</td><td colspan="7">Conceptualizing</td><td colspan="6">Transition; Abstract Thinking to Concrete Thinking</td></tr>
<tr><td colspan="3">Research with different examples Determination of the Study Area</td><td colspan="3">Environmental Analysis Layers</td><td colspan="5">Abstract Thinking Creating a Theme Stain Studies</td><td colspan="2">Establishing a Relation to a Context</td><td colspan="4">Project Generation Process</td></tr>
<tr><td>1. Week</td><td>2. Week</td><td>3. Week</td><td>4. Week</td><td>5. Week</td><td>6. Week</td><td>7. Week</td><td>8. Week</td><td>9. Week</td><td>10. Week</td><td>11. Week</td><td>12. Week</td><td>13. Week</td><td>14. Week</td><td>15. Week</td><td>16. Week</td></tr>
</table>

Studio Experience with Diversity by the Way of Concepts

Designing a project with concepts is more understandable for the students and the process of designing is easier. It is known that this method supports students in terms of architectural design power and is useful for preparing them for future professional life. From this point of view, the students were asked to investigate the public spaces in different parts of the city in order to determine the area where they would design their own projects. It was emphasized that environmental contexts should be taken into consideration in locating. The students were asked to design a book cafe that would be part of the whole city. Firstly, the concepts thought by the students in the first weeks are discussed in depth. Concepts refer more to existing

environmental characteristics and to responses that are linked through concepts. The reason is that the study area is the new face of the city and the desire to reflect the identity / culture of the city. Then, through conceptual study, the students were asked to think about the contexts associated with the project topics and to determine themes in this context. They were expected to reflect the abstract concepts they have established through these themes on their projects.

In line with these principles, a studio study was conducted with the students of the 3rd semester of the Faculty of Architecture of Dicle University on Book Cafe design. The studio study, which covers a period of 16 weeks, consists of four steps.

• In the first step, in order to *understand* the properties of the site and the needed units of the project, the public space for the project was determined, the subject was discussed in depth with different examples and the necessary environmental analyzes were made in the workspaces. Information was exchanged on the properties of the site (Figure 2).



Figure 2: Environmental Analysis Sheets of Students Prepared in the First Step

• In the second step of the study, in order to *interpret* the obtained data, with a study on the concepts, architect candidates identified a theme for their projects, started to stain studies and began to form their abstract concepts and themes in a concrete way (Figure 3).

• In the third step of the study, in the light of the data obtained and the studies conducted, *information began to be produced*. At this stage, the students are especially critical of the context of the place and the reflections of the analyzes they have made are read through the project and progressed through the spaces and forms compatible with the physical and social environment of the place. In addition, the transformation of abstract ideas into concrete expressions continues to evolve (Figure 3).

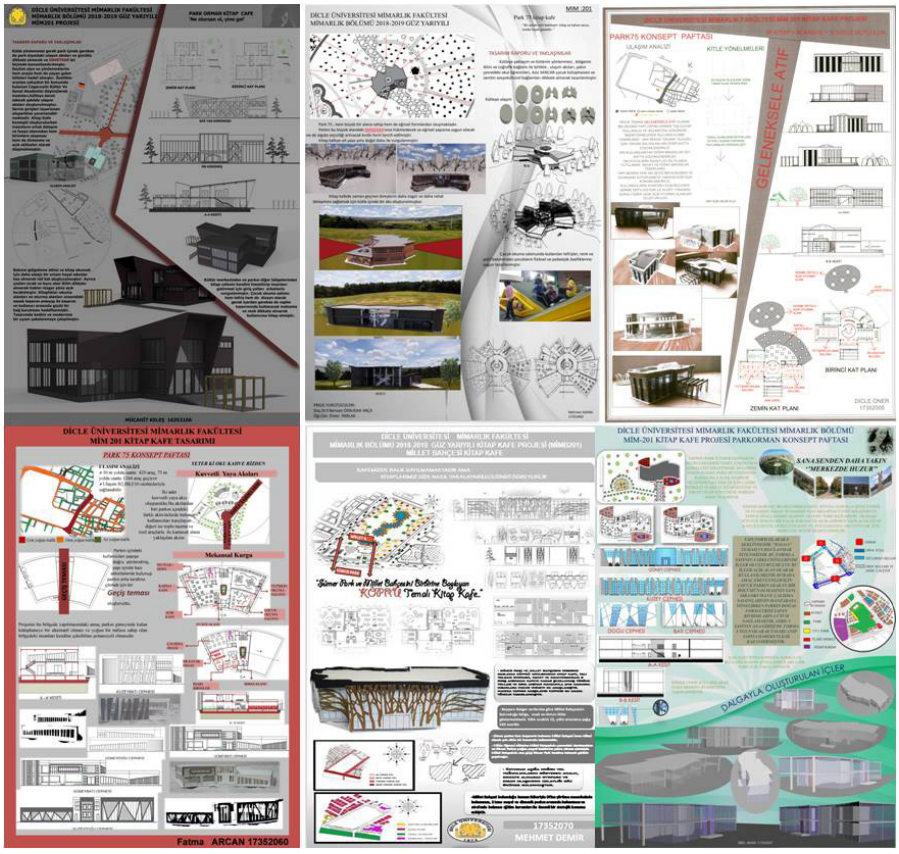


Figure 3: Concept Papers of Students

• In the fourth step of the study, in order to *transform the information*, all the acquired information gained concrete expressions. Following a 16-week studio study, the projects have been created in every detail (Fig. 4-5-6-7-8-9-10).

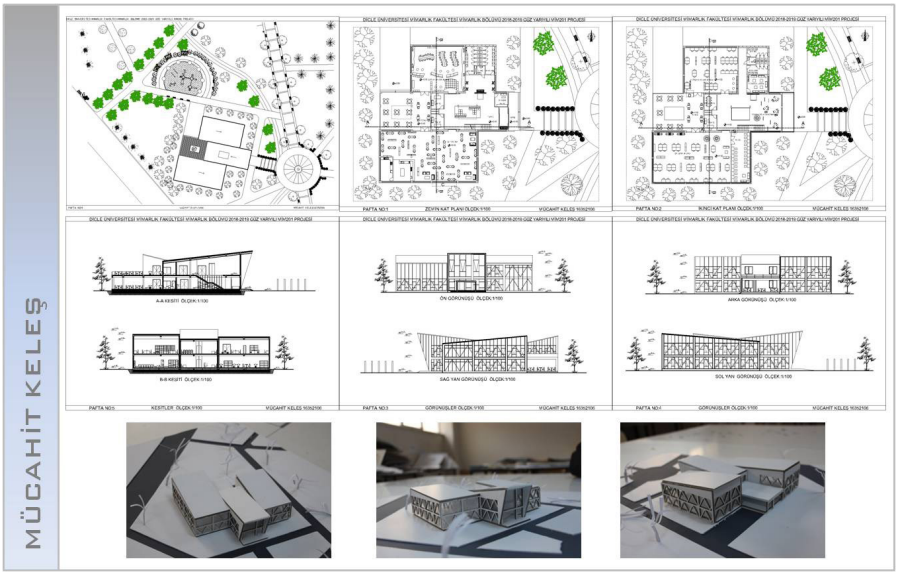


Figure 4: Sample of Individual Project at the End of the Period

The mass orientation is positioned in a *INVITING* manner taking into account the transport axes and noise outside the park. Considering the Cegerxwin Culture and Art Academy located in the project area, transportation axes have been formed in order to invite people to mass (Figure 4).

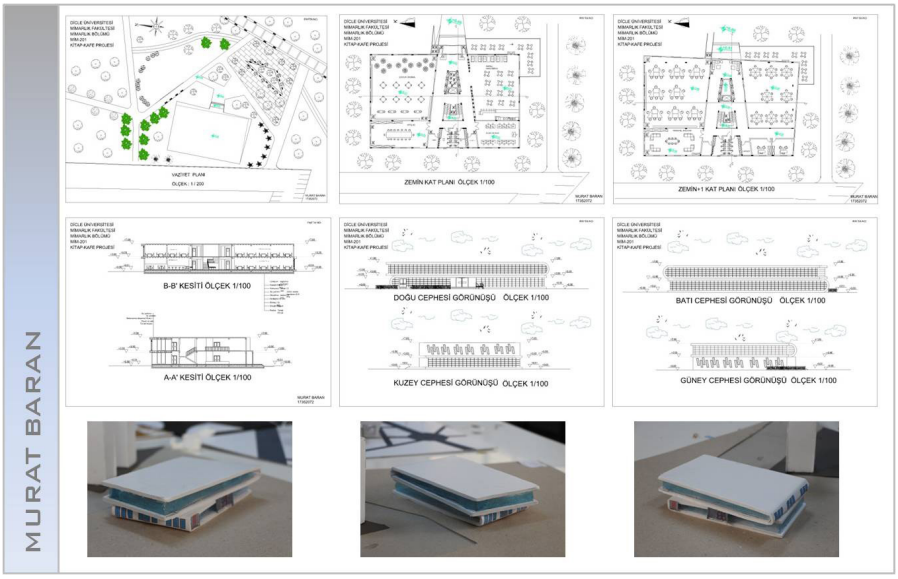


Figure 5: Sample of Individual Project at the End of the Period

Analogical elements are considered when designing the structure. The structure has been likened to the book by its form and it has been adopted the basis of the

SLIDING SURFACES. It was aimed to make the user feel like he was in a book at any time and to influence him both psychologically and aesthetically (Figure 5).

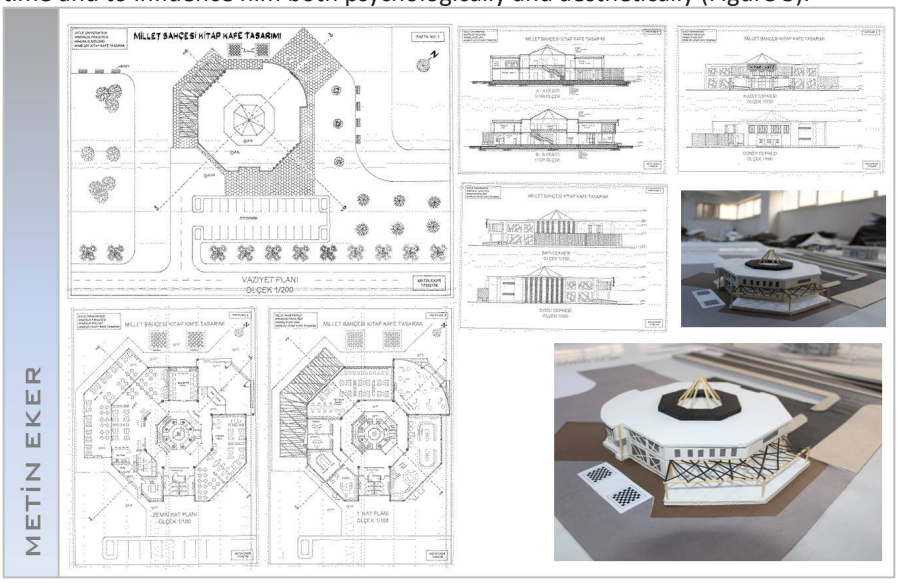


Figure 6: Sample of Individual Project at the End of the Period

The slogan at the entrance to the design; "Yesterday, Today and Tomorrow is the Meeting Point". In this context, with the assumption that the book tells the story of today and prepares the present for the future, the theme of the book's universality and its *ENGAGEMENT* in every sense is discussed (Figure 6).

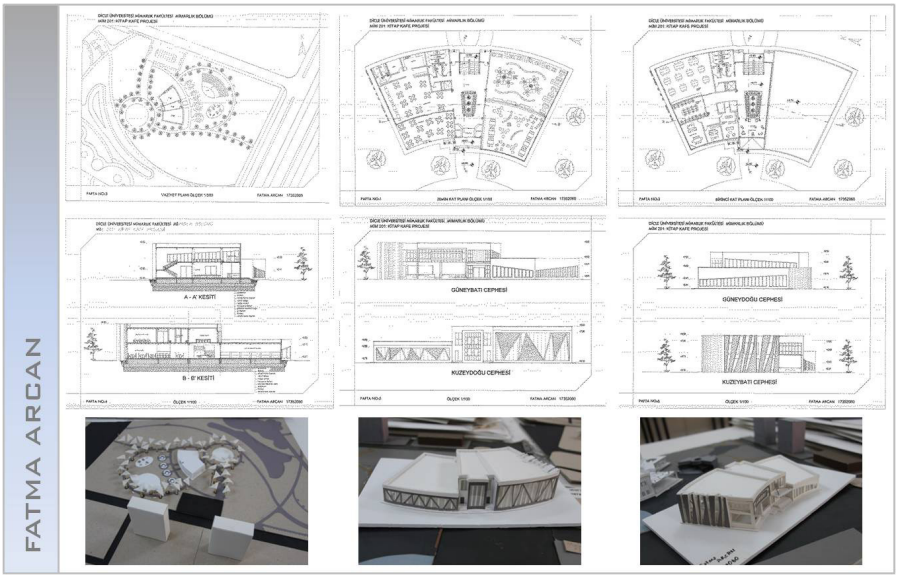


Figure 7: Sample of Individual Project at the End of the Period

Two strong pedestrian axes were created in the project area. One of the axles is the people that meet the people in the park and the other people who approach the building by public transportation. While the project was being designed, the *TRANSİTİON THREAT* which took the users in the park into the building, engaged in various activities and then brought them to the back of the park was discussed (Figure 7).

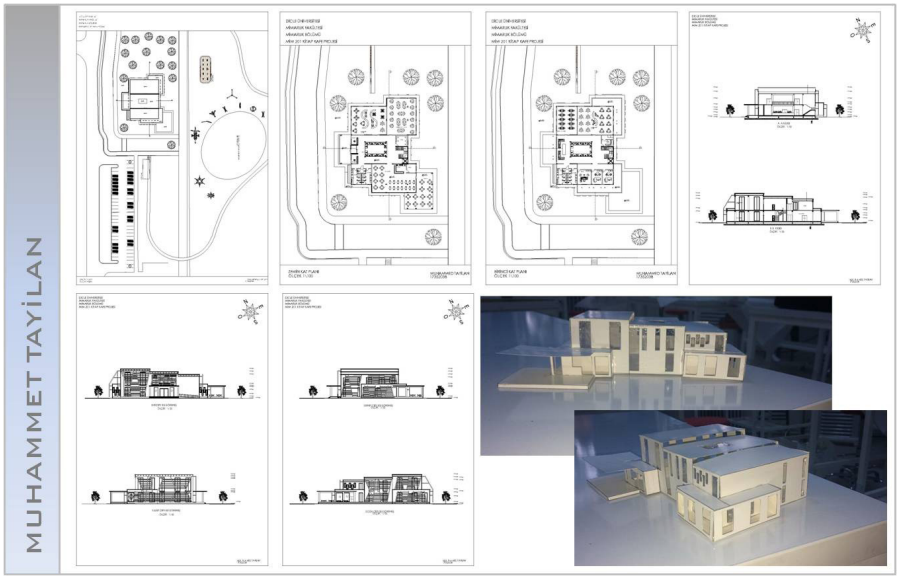


Figure 8: Sample of Individual Project at the End of the Period

In order to facilitate working in the design phase and to produce ergonomic spaces, it was thought that progress would be correct in terms of *MODULAR CONSTRUCTION*. The structure has been worked on different modules with different floor heights as required by the spaces (Figure 8).

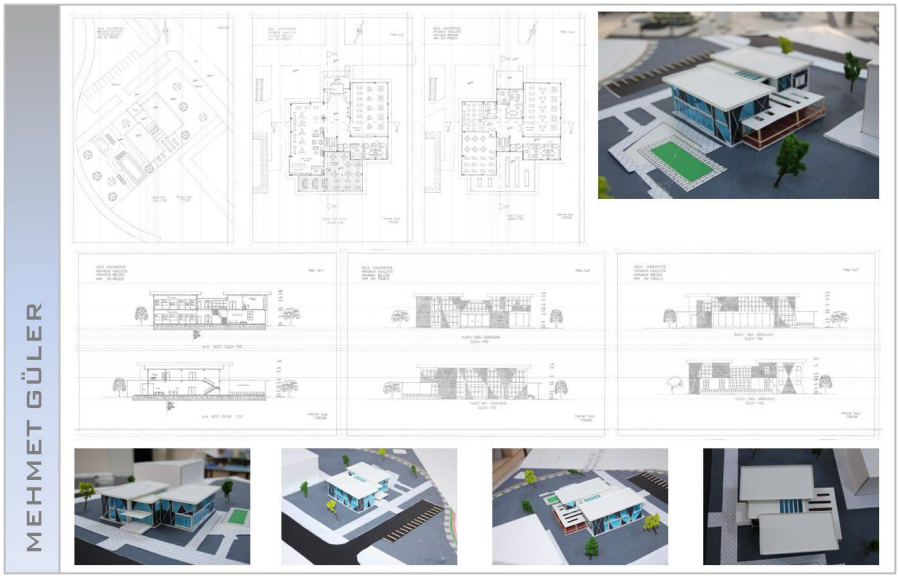


Figure 9: Sample of Individual Project at the End of the Period

In the design phase, the theme of the *SLIDING MASSES* was taken into consideration. Structure; It consists of three separate masses, the main mass with vertical circulation and the side units with large openings (Figure 9).

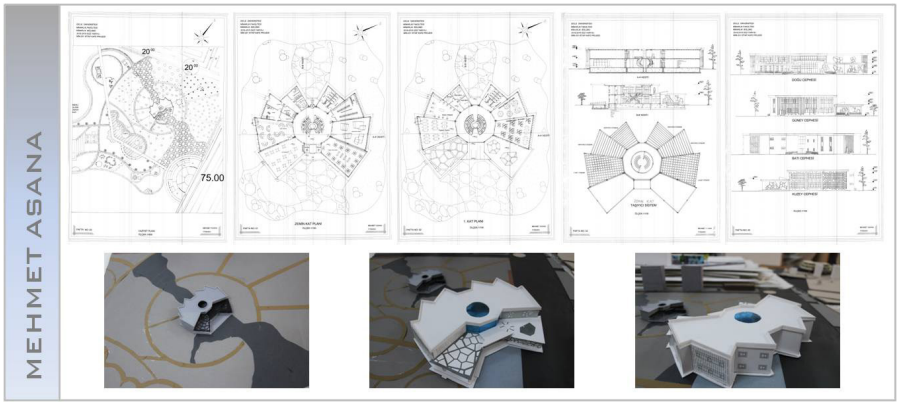


Figure 10: Sample of Individual Project at the End of the Period

Park 75 land is very wide and there is a dense *LANDSCAPE* area around it. While designing the project, a form that dominates all directions is preferred in this large area (Figure 10).

Evaluation and Conclusion

The current architectural environment, together with the interdisciplinary developments and emerging approaches, requires a new terminology in terms of visual and semantic expression tools. In this context, architectural designs are now

seen as a field of concept production.

Architectural design is based on the methodological rules expressed by certain criteria and processes as well as a medium in which a person reveals his creative power (Jormakka, 2010: 7). In this studio study, in line with the existing criteria, a study was conducted based on the creative ideas of architect candidates. In this context, the achievements of the studio work can be listed as follows.

- General information about design approaches is obtained and the value of analysis studies is understood.
- In the first step of the design, by examining the sample projects, he realized the importance of formal analogies, spatial hierarchy and comprehension.
- It was seen that designing with concept shows that; the design gave meaning to each movement of the resulting product.
- In the design, the importance of forming the project with a certain context was emphasized by questioning the relation of each unit considered as spatial and form to the ground.
- The day-to-day development of the projects with the critique of the studio work and the master-to-person relationship was achieved and it was experienced that the harmony between the instructor and the student and the exchange of information could only occur in studio works.
- During studio work, architects pondered not only their own projects, but also problems and solutions to their friends' projects. This situation has greatly affected project development. In time they have the ability to bring criticism to their own projects and projects of their friends.
- In the process of forming forms, they have gained the ability to design with the help of concepts by discussing the issues such as occupancy gap ratios, relationship with the environment, dimensional differences, indoor outdoor segregation.

By assuming the assumption of the conceptual study, the hypothesis of the idea of putting forward the projects that are in direct relation with the environment where the students are going to develop creative thinking skills was accepted in the architectural project 3 studios conducted by the instructors. Thus, the existing built environment and urban context has been reinterpreted and suggestions have been made in line with the concepts produced according to today's design approach. As a result, it has been tried to provide the students with the knowledge and experience in the studio works, to produce the concepts from the contexts and to make designs that are specific to the existing environment with the help of these concepts. In addition, it is seen that the students have a more instructive effect on the students by preparing a concept in a better way to prepare them for their professional life.

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FUTURE SPACES: AN EXPERIMENTAL DESIGN STUDY

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Abstract

One of the reasons of existing the modern world is wondering of the future and asking question about the future. Every question about the future involves a manipulative production process and directs the future's mental design. For example, Journey to the Moon(Le Voyage dans la Lune), directed by George Melie in 1902, has changed universe opinion of the modern individual. Or the novels of Jules Verne, one of the futurist writers of the 19th century, raised questions about how the future could be. When it is considered in the context of architecture, it is a matter of wonder how the space will be formed in a non-existent time frame. In this context, this study is based on the question of how to design a defined architectural space in a future that is defined its time.

The study was carried out in the architectural project 5 course in 2016-2017 fall semester with the third year students of the Department of Architecture of Karadeniz Technical University. The problem of community center design for the 81st century has been defined for the project group consisting of 7 people. First of all, for the design of the space defined, they were asked to produce scenarios in the 81st century about the possible conditions in the world and about the possible physical and biological condition of human beings. In the scenario production process, all kinds of science fiction, fantasy or documentary appertaining to future were set free to take advantage. Then, in accordance with the scenarios they produce, the community center design, which has the defined space, has been started.

First of all, this study examined the possibility of designing on a concrete / non-realistic plane. It was discussed how design students could use actual and virtual knowledge by using architectural tools. In addition to the educational goal of the study, the design goal is to answer the following question: How can design students design a defined space by using up-to-date computer technologies and by creating a scenario that is far away from today's reality? In this context, the aim of the

study is to discuss the architectural product by way of the future and to question whether this product can be designed. The study is important in terms of both design education and producing new question marks about the future of the space.

Key words: Architecture, Design, Future, Design Education, Design of Future.

1. Introduction

The concept of "future" is one of the concepts that human beings always think and produce ideas on. He wonders how a future awaits him, and dreams, predicts, and makes predictions for the answer to this question. He tries to find the ideal one to further improve its conditions in the future. In line with these ideals, the ideas developed for the "future architecture" goes back to the utopias before the nineteenth century. Although many projects developed on the future cannot find the chance to practice most of the time, they have evaluated the existing conditions with alternative perspectives and provided new solutions to the problems.

Today, there is an important transformation in the world. The change and the new concepts we have developed affect each other and cause us to re-comprehend and create the future (Tekeli, 2001).

Architecture also requires predicting the future due to its layering. In the 21st century architecture, many projects have been developed as "future design". These projects reflect the technological developments of the periods in which they are produced and the design concepts that are thought to be effective in the future. The concepts that are effective in the designs related to the architecture of the future, the endless mental change of time and the modern world, have undergone significant changes. The concept of " future architecture" is shaped by both technological and mental formation. Especially technological developments have been the most effective tool in shaping the future. The industrial revolution, which began 200 years ago with the invention of the steam engine, has shaped the future. technology, which has become an indispensable part of modern daily life, has also expanded the boundaries of imagining the future of the individual. This unlimited expansion of thought or imagination, however, is undoubtedly technology.

At the beginnig of 20th century, the concepts of "future and architecture" were evaluated through "mass production"and "machine". Today, when the "future architecture" is mentioned, how technology, which is a part of daily life, will shape the living world, in other words environment-nature-climate planning comes to mind. With the computer technologies which rapidly developing and environmental problems becoming more important in the 21st century briefly the concept of "sustainability" has become important.

The idea of "future architecture" is goes back to the utopias before the 19th century. Nowadays, this concept has become almost tangible with the opportunities offered by the technology. Imagination and technology feed each other. In parallel with technology and other developments, there is an architecture that is constantly renewed.

Nowadays, through the technological developmets, it can be seen that most of the human beings' dreams come true. Especially in the context of the space, it can be seen that the utopian places in the science fiction film produced in the cinema universe developed at the beginning of the 20th century have become a reality. At

this point; the question of how the space is shaped or how it can be formed in a time period that does not exist outside the present comes to mind.

In this context, this study; It is based on the question of how to design a defined architectural space in a defined furure time. In the first phase of the study, the relationship of architecture with the future concept has been examined through main topics such as science fiction / futurism / utopia. In the second stage of the design education, the method of designing a non-existent reality is defined and the related studio samples are analyzed. In the last part of the study, it is evaluated how a subject based on a virtual reality can turn into an architectural product.

2. Architecture and Future

Throughout history, societies' curiosity for the future, their wish to form / shape the future, has been the driving force for future ideas, designs and projects. Expectations and hopes for the future have been transformed into a social ideal and defined as a future utopia.

Utopia has two meanings in Greek; one is the ideal place (eu-topos) and the otherone is the no place (ou-topos) (Fest, 1991). In modern European culture, this concept is included in the book Utopia, which was first published by More in 1516, detailing the ideal state with all institutions, human relations, laws and architecture. The fact that the book has an exemplary qualification for the ideal society for centuries has led to the transformation of its name into a conception (Fest, 1991).

After the nineteenth-century utopias, the most important actors that shaped the future were technology and economy. Technological changes are one of the most important factors in the formation of future space. This change started with enlightenment; As the developing technology answers the unknowns, the belief that there will be no dark, unresolved, unknown in the future world has been strengthened. With the acceleration of technological developments, the expectation of the perfect life of science has increased. Utopias, an alternative to heaven, were considered to be accessible, "non-existent" becoming "good place in utopias. Architecture at this point brought together reality and utopia. Utopias, social and physical life in the happiness of technology, created with the possibilities of technology is believed to be reached with a functioning architecture (Hasol, 2000; Ak, 2006).

Utopias have great importance in architecture and it can be seen that utopias are the windows that opening to the future. Although it may seem impossible to perform in the period they are put forward; The utopias of the times have been the reality of today. Although utopias may not have been realized most of the time, utopias should be thought to be able to direct future applications or find a chance to be realized (İnceoğlu, 2004).

After the industrial revolution in the 19th century, the universe of cinema, which was invented at the beginning of the 20th century, has started to turn into a concrete reality in which utopian or future spaces existed with a virtual reality in mind. The two-dimensional visual universe of science fiction began to display the spaces of the future in a blatantly reality dimension. Especially the revolutionary developments in computer technologies after 1960 managed to bring the reality dimension of the cinema universe from two dimensions to the mental third dimension. The utopian or future space in the writer's mind is in the mind of the

viewer with its third dimension.

The emergence of the term science fiction has been with Hugo Gernsback, an American of Luxembourg, who made inventions in the fields of electricity and radio. Gernsback shared his stories about the future life of Modern Electrics, a technical journal he published in the USA in 1908 with his readers. He used the science-fiction word for the first time in his article in Science Wonder Stories magazine, which he founded in 1929, after collecting stories from other scientific journals and series of stories he published (Güllü, 2016).

Futurism is another thought that concerns the ideas of the early 20th century. The essence of this thought; a longing for the unknown world of the future and the end of technological development is the belief. Architecture according to futurists; It should be with materials that provide the highest flexibility and lightness. Architecture must be a scene where technology is clearly exposed.

Futurism; technological developments, the regular rhythms of the machines, many technologies entering the daily life, triggered the prospect of the future, and in the last days of the second industrial revolution, in 1909, after the Italian Marinetti Manifesto du Futurism, a rapidly spread current (Batur, 1998).

The architectural field of knowledge has always been in relation with the future concept, whether through the ideal world of the 16th century, or through the universe of science fiction cinema after the 19th century industrial revolution, or through futurism, one of the fast-changing art movements of the 20th century. As a consistent result of the time-space integrity, each thought production of the future requires the design of the space, whether it be utopian, futurist or fiction. In this context, the basic question of this study emerges. How can the concrete space for an undefined future be conceived without a concrete reality?

3. Design Education in Architecture

According to Tekeli (2014), the Design Studios takes the lead role in the acquisition of design talent. Besides, it is seen that many different skills are gained by the students. Within the scope of these courses, the student identifies a topic, conducts examinations on the subject with his / her individual research, identifies the problems, provides solution suggestions, presents the results obtained before the jury, receives criticism and advocates design decisions. Unlike many professions' education programs, the student also has a lot of sub-knowledge and skills.

When it is thought that the first step in the construction phase of a project is to design, it is possible to say that the project's major determinant features are created at the design stage. If we have to think of design as a process in itself, the first and most important step of design is defining the problem and determining the concepts (Bilir, 2013). One of the steps used in design studios, in other words project courses, is the conceptual modeling / designing of the identified design problem through basic concepts and concepts (Türkyılmaz, 2010). In this process, the student expresses and shapes a concept (non-physical) in his mind in various ways as formal, graphical, three dimensional.

Vitruvius, Book I, in Chapter I mentions that there are two main points in architectural education. He regards the theoretical and practical knowledge as "the thing which is given a meaning and that give meaning to something" (Vitruvius, 1993). When this definition is evaluated in the context of architectural project

lesson, what is given meaning to itself / the object or the project produced; the person who gives him his meaning can be considered as the student himself. The student of architecture plays a role as an individual who interprets the design object in the design process. In this context, a non-physical concept / image produced in the mind of the designer is formed in the context of the concept produced and it has transformed into a concrete product.

Design is a process that starts in the mind and takes a large part in this process, beyond the work on the project. As in all areas of life, in designing action, the individual needs a preliminary preparation in order to be able to take the first step. This preparation that develops in his mind is realized by conceptual thinking (Bilir, 2013). In the design of architectural representation, there is a displacement between the subject and the object in the process of transforming the inner representations of the designer into external representations (Avcı, 2016). Images take an important place in the action of design. These images are generally non-physical concepts that do not exist in reality and these concepts exist in the form of abstraction in the mind during the design process (Zelanski, P. 1987). Many images in the mind of the designer exist below the level of consciousness of memory. The first design trials of images created in memory are not literally copies of images in memory, but are seen as abstraction approaches that reflect the general characteristics of images. These approaches are the starting points for starting the design action (Turgay, 2010).

Two main cognitive processes are encountered within the framework of the design process. The first is the cognitive processes that can be gathered under the productive processes (or also called fertile processes, because they have creative or derivational features), which are the basis for design. The productive processes are the set of the main operations that have passed to the first period before the design. The second cluster, which can be referred to as the review processes, is the set of momentary processes that make evaluations and comments. These processes, which evaluate the pre-design structures produced by the productive processes within the other limitations of the design, also allow for commenting. The images that first started to form in the mind are not appropriate and sufficient in their own, but they are transferred to the conceptualization through the idea. The point to emphasize here is that the image is not the same as the concept. Neither the concept is only the image, nor the image can be a concept (Turan ve Altaş, 2003).

4. Future Space and Design

The fictionalized future is completely different from the future, the creation and even the idealized future (Eisenmann, 1998, ss. 531-532). There are concepts that express future science and design activities. In general, the prediction, the logical processing of the data, and the imagination emphasize the work based on the principles of interpreting the data as creative (Büyüktopçu, 2017).

The difference between mature advice and images of fantastic speculations is evident since the phenomenon of innovation is heavily responsive to physical and mechanical inventions. But at the beginning of the twentieth century the opposition between them was less pronounced. Prediction involves the need to provide a precise explanation of how something will work or what will happen. The image of

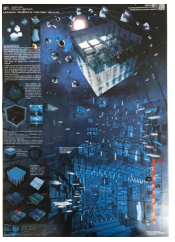
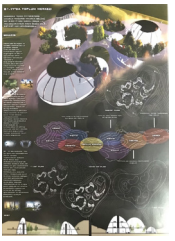
the future is concerned with the question of how that thing will come out instead. The image of the future is concerned with the question of how that thing will come out instead. The image only questions how it will look... The image of the future is in an unique position between oddity and strangeness. The image in this position will allow a scene to reflect what is going to happen and will allow its content to be accessed by the recipient, and requires recognition by the recipient" (Patt, 2010).

Architecture has always been an important part of utopias as a concrete reflection of social life (Sarıgül, 2008). One of the(great ideals of mankind is to predict, imagine and even construct the future. Those who are experts in the fields of science, collide the data of the present with the reflections of the past and try to put forward the predicted future in a rational and consistent manner. Those who worry about design produce the interactively questioned composition of objective data and subjective feelings, the triggering elements of the fictional future. There are concepts that express future science and design activities (Büyüktopçu, 2017).

In this context, this study in which the architectural product is discussed over the future or its designability is questioned, was held at the Karadeniz Technical University Department of Architecture, the architectural project in 5 course in the 2016-2017 fall semester. A community center design problem in the 81st century has been defined to the 7-person project groups. For the design of the defined space in the 81st century, they were asked to produce predictions / scenarios about the possible conditions in the world and the possible physical and biological status of human beings. In the scenario production process, all kinds of science fiction, fantastic or future documentary were made free. Then, in accordance with the scenarios they produce, the community center design, which is the defined space of the project, has been started.

In the first phase of the project, students made a detailed literature review about the relationship of architecture with the future concept, especially conceptual knowledge from utopia, futurism and science fiction cinema fields. In the second stage, they started to write their future scenarios for the 81st century, which was determined by the sci-fi movies. The scenarios started to be produced primarily through the physicality of the world, the possible biological evolution of the human being, the possibility of other life forms in the universe. These scenarios are coherent in a historical timeline, and the result is consistent. After the scenario stage, spatial possibilities are considered in the context of the scenarios. The possible locations of each 81th century scenario, whose mental reality is produced, have been designed. In the table below, the scenarios produced by each of the students who participated in the study in the studio are given in detail and the space designs that can be the result of these scenarios are given in detail.

Table 1. The future concepts and "the community center" designs of the students

Name of Student	*Design (Future) Concepts*	*Design*
Esra AKIN	The student predicted that the human race will evolve as a result of the technological developments that cannot be prevented. The human race is divided into two types. She imagined that one of the races, the mutated in the higher dimension, would use the other race that could not evolve as a source of energy.	
Name of Student	*Design (Future) Concepts*	*Design*
Orhan YILMAZ	The student thought the 81st century as a way of life outside the world. He imagined that according to the future scenario, people would live in multiple-gravity colony cubes in a multidimensional loop in vacuum of space. In this context, he designed the future space based on this scenario. He designed a cube for a non-gravity and extraterrestrial life form. Each point of the cube is gravitational. The body's perception of the ground disappears because the human beings can walk at any point.	
Name of Student	*Design (Future) Concepts*	*Design*
Nur USTAÖMEROĞLU	The student imagined that until the 60th century energy sources of the planet earth would be completely exhausted. As a result, that in order for human beings to survive, the building stones of energy raw materials lost by that century's technology will be produced. She thought that the world would be shaped by the human being again in its first form. In the context of this scenario in the 81st century, the student designed a structure that can change its form according to the current weather conditions.	
Name of Student	*Design (Future) Concepts*	*Design*
Esmanur YAVUZ	The student predicted that as a result of the environmental and climatic changes, the bee race will disappear and as a result there will be great famines. With the development of technology, it was thought that human beings would produce robot bees and these bees, which were produced with artificial intelligence in time, would attack human beings. Based on this scenario, the student designed places where people would live under colonies to escape from bee attack in the 81st century.	
Name of Student	*Design (Future) Concepts*	*Design*
Gönül BERBER	In the 69th century, the student thought that a meteor would hit the world, but there would be life forms of extraterrestrial life in this meteor and these forms of life would attack the human race. As a result of this scenario, she designed places where mankind, who wanted to protect him, could land under the ground and live in colonies under the ground.	

Name of Student	*Design (Future) Concepts*	*Design*
Beyhan ELHAMAN	In the 30th century, the student predicted that a space object with a high temperature and a high level of radiation, which caused the Earth's surface to become slowly uninhabitable. She thought that the human beings would settle in the deep valleys to be as far away from the surface as possible. As a result of this scenario, the student designed the 81th century structures.	
Name of Student	*Design (Future) Concepts*	*Design*
Korhan ÇELEBİ	The artificial intelligence robots produced by today's technologies have in time tried to rebel against human beings and to take over the planet Earth and the world has become uninhabitable. As a result, in the 64th century mankind produced spaceships those giant colonies could live and escape from the world. In this scenario, the student designed spaces where human beings can live in space.	

5. Conclusions

The concept of "Future Design", has changed and has different meanings and qualities according to social, cultural, economic, political and technological conditions. In this study, how the concept of future design can be constructed mentally and how this concept can be used in architectural education is discussed.

In this study, which is a question about how the future can be designed in the context of architecture, first of all, for the production of space for the future, such as social, physical and so on of the future data should be considered. To make a spatial design for the future, it is necessary to change the time mentally, not mathematically. In other words, it is recognized that the action of designing space without imagining the future of the social, scientific or physical change of the future will remain untouched. This situation can be considered as breaking time-space integrity and not calculating the time-dependent changes of space.

When the scenarios produced for the future are produced based on the needs, expectations and problems of the periods in which they are presented, it is seen that the totality of time-space can be broken. In other words, if a future design is done, it is necessary to think of all the conditions of the future firstly and to make architectural solutions suitable for those conditions. In this context, the life forms and future ideals of each period are the first design decisions that should be considered in the "Design of the Future. The concepts that may be effective in the space design of the future should be established within the framework of the technological developments and the possible solutions to the problems.

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CULTURE, CONTEXT & IDENTITY IN CONTEMPORARY ARCHITECTURE: CASE STUDY OF 2 BUILDINGS FROM PORTUGAL

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Abstract:

This paper aims at discussing the topics of; culture, context, and identity in modern architecture. The proposed research will cover two projects in the historically important context of the two major cities of portugal, namely the city of porto and lisbon.

Today, internationally new technological advancements and design solutions in the profession of architecture appear in different qualitative values, for instance the expression of cultural identity against the pressure of internationalism. They have changed the construction industry and the expression of cultural identity against the pressure of international style or architecture to one which drives less from the environment or region it sits in. The questions that arise are, firstly, can the cultural values of a region and its contextual importance, guide the new interventions in that specific territory? And secondly, how do we define the success of contemporary architectural intervention, on the factors of its harmony or contrast with the surrounding context?

The perception of the world varies between cultures, and therefore in every region architects have to come up with original approaches in the interpretation of any architectural space. There are several ways of dealing with a historically significant architectural piece. What remains can simply be saved from destruction, perhaps simply by moving it away from potential danger. On the other hand, it can be restored with any deemed necessary new additions to the existing structure, or by replacing or amending the original components, after careful consideration of the impact they will have on the environment. When addition of a new building is under consideration, architects have to keep into account several factors and there are many international charters and guidelines that establish fundamental rules to

do so.

In lisbon, in the project of 'cruise terminal lisbon', by jlcg architects, the slopes of the alfama look down towards the cruise terminal giving the feeling as if the city converges at this point. This new project ties the city's historical and important fabric with the river. In porto, the 'teleferic de gaia', is a chairlift that provides views of the historical city center, while visitors enjoy the commute between the two destinations.

Over a larger time span, the changes in a built urban fabric or the growth of the region can be planned and designed in progression, or in a timeline. However, while dealing with an area having an extensive historically important context, related decisions have to be made carefully, in order to create a balance between the old and the new and for the change to be understandable. Certain stable centers, streets, landmarks or topographical forms et cetera, can be conserved as anchors while the rest of the environment can be transformed after careful consideration of the impact.

An urban center may grow and develop continuously on one side, while simultaneously decaying on the other, so that it keeps the same association with the overall environment and gradient of relative age, even as it uses up all its parts and constantly moves along in space.

Key words: Identity, history, contextual architecture, new/old, culture, urban plugin

Introduction

Historical cities tend to provide valuable cultural resources. There are many ways in which historical city centres have preserved and captured past remnants, that serve as guidance and allow residents and visitors alike to position themselves in this ever growing, drastically changing and transforming world. Though, agreeing upon the fact that the messages these cities convey might have changed over the course of time however, they still capture the essence of transformation and have survived through the changing times, thereby providing the true cultural identity to such specific regions.

Cities are the most important component of cultural tourism in europe. Visitor influx tends to be concentrated in urban centres, which join unevenly with historic centres. There is an extensive flow of tourists and day trippers who are either inspired or motivated by cultural factors or are interested in historic heritage and/or contemporary culture. This flow, coexists with visitors having broader and more varied purposes. Whatever the purpose of their journey may be, tourists and day trippers usually make intensive use of historic centres, engaging in a series of cultural activities during their visits which overlap with the occupations of both local residents and residents from the rest of the urban sprawl. (Hernández, vaquero & yubero , 2017)

Now, while dealing with an area with great historical and architectural importance, we must primarily understand the term 'history' in english, which has been defined in two contexts: firstly, as the temporal progression of large-scale human events and actions; and secondly, as the discipline or inquiry in which knowledge of the human past is acquired or sought (audi, 1996). Urban areas with

their vast variety, are the product of continuing progressions and developments. As such, they essentially reveal the perception and ideology along with the requirements that have arose in different time periods, while simultaneously taking into account the existing factors for instance, culture, environment and economics. While the resulting fabric generally reflects upon the segment of human creativity and their pool of achievements in different times, one can also ponder over the idea of continuity and movement that gives true identity to a particular region and area. For a region or an urban centre to be considered historic, it is not merely the result of having historical relevance rather it is an extensive process of continuity in appreciation over time. Thus, it can be said that, historic urban areas that have been recognized by the community and also on a national and international level become the absolute regions that need special protection and have to be responsibly monitored and controlled. Any changes under consideration need to be seriously thought about and extensively evaluated beforehand so that they neither devalue nor weaken the character or aspects of the recognized qualities of that urban centre.

1.1 Culture

"Culture" is derived from the term "cultivation," indicating that one has "grown" through knowledge, practice or experience. To be cultured can also mean that one is familiar in the arts, or that one has developed with the experience. The encyclopaedia of philosophy definition states that, culture is "the whole way of life; material, intellectual and spiritual, of any given society." In the webster's new international dictionary, culture is defined as, "the complex of distinctive attainments, beliefs, traditions which establish the background of a racial, religious, or social group." Culture, should therefore be perceived as involving more than just the values and needs of a group of people. It also includes the overall society and the aspect of their way of life. It can be said that, culture is concerned with more than just a collection of standards, morals and values; it is rather a complete structure or compound of unique accomplishments, achievements, attainments and traditions. It should be interpreted as a system of unified opinions, theories, beliefs, concepts and values. In light of a cultural system, individual measurable connections between different components of culture become less significant to the meanings, concepts, definitions, characteristics, metaphors, symbols, and description within the overall system.

Culture is a set of beliefs, knowledge, education, customs and values that societies have developed based upon their respective beliefs and in the process, it aims at achieving a development defined and explained to him by its world look (naghizadeh, 2000). The impact of culture in different areas of life, including art, architecture and urban planning and development, and ways of life is undeniable (madadpoor, 2000).

Architecture and culture interconnect in various ways that, envelope the scopes and boundaries of anthropology, psychology, aesthetic and sociology.

Architecture and culture	Architecture	Scope of Culture
Functional	As a result of social components interaction	Sociology
Conceptual	As an artistic product that includes an end elevation of the mind	Aesthetic
Functional Conceptual	As a matter of human's life and includes an effective on actions	Anthropology
Perceptual	As a result of mental attitude to the surrounding built environment	Psychology

Table 1. The model of the relationship between culture and architecture (shayan, 2011)

The explanations by shayan about the relationship between architecture and culture explain that architecture is one of the most representative parts of the cultural identity of a region or an area. Architecture also ties up the linkages between several different arts, activities, the way of living, growth and evolution of a society. The question is that, can architecture be directly connected with the culture of a nation or is it a reflection of its culture? Architecture is the portray of a nation's culture integrated with all aspects of human life and has a profound impact on it. Architecture is the result of the culture of the society (parvizi, 2009)

1.2 Identity

Architectural identity of a particular local culture represents, a living land scape with common sense of place that is produced by the community's accumulated efforts over time, to contain meanings and way of life that form the national architectural identity. (Vale, 1992) identity is grounded and defined on the fact as to how someone or something communicates, connects or coveys a certain message. Architectural identity can be classified under the following categories; historical and urban context, human impact, function, aesthetics and representation. The primary form of communication is the aesthetical appearance of a building or a group of buildings. Naturally, how a building is perceived and looks, symbolizes and determine its characteristics. In architecture, form and function both have equal importance. Architecture dealing with practical and functional approaches is also a design-based art. Visual aesthetics of the building are also crucial along with their relationship with the overall context.

1.3 Contextual architecture

Contextual architecture emphasizes on land orientation and a link between environment, space and shapes, along with the understanding of the context. In fact, it represents and projects the message that architectural context is transferred into it. As a result of which, the building will be a small fraction of the surrounding environment. In this architecture, each building is designed and implemented on the context of social, cultural, historical and physical climate and the specific conditions of the site and building. (Tabarsa & naseri, 2017) contextualism is just one of the architectural and cultural approaches, particularly with modern architecture in

mind. It interacts with culture and cultural context and emphasizes on climate of a particular region. In regional orientation, an architect tries to adapt himself with features that are not necessarily adapted remarkably to direct project environment but instead are a function of the regional or national extracted characteristics (pirayesh & nikou 2014).

In order to produce contextual architecture, it is necessary to be aware of all the characteristics of the specific site along with its immediate and broader context. Architecture that draws its roots from the region, its culture, urban patterns, historical importance, along with climatic, environmental, visual and perceptual approaches can be considered as contextual architecture.

1.4 Tourism

Iconic architecture assists in the identification of a place, city or precinct. Structural, functional and aesthetic aspects of architecture, particularly those that represent unique features, attract tourists. (Scerri, edwards & folley, 2016) tourism in portugal is increasing at a high rate, due to several phenomena, including: increasing promotion of cultural heritage, agreeable climate, low cost flights, living cost lower than european average, as well as the increasing risks of competitive tourist destinations, such as the north of africa and turkey. (Ramos & almeida, 2016). In the case of portugal, tourism is very important for the economy. According to the report of the national institute of statistics in portugal (ine, 2016) data from the world tourism organization shows that, the number of international tourist arrivals in portugal in 2015 has practically reached the population of portugal, which is 10.4 Million inhabitants. More than half of those came from europe, but the higher rate of increase (5.7%) Refers to tourists coming from asia and pacific, followed by the american continent (5.0%). The yearly rate of increase has reached 9.7% From 2014 to 2015, which is more than double of the average growth in europe, that was 4.7%, And is also higher than 4.4% Growth rate worldwide in the same period. The international tourist arrivals' yearly rate of growth in 2010 was approximately 6 832 000, however, in 2011 the number increased to 7 412 000, with an increase of 8.5% In year 2012 it rose to 7 685 000 , then an increase of 3.7% Was observed by 2013. The visits reached up to 8 301 000 with an increase of 8.0% In the year 2014, it climbed to 9 277 000 an increase of 11.7%. By the year 2015 the number of tourists who visited portugal was 10 176 000, an increase of 9.7% (Unwto, 2016).

About a quarter of foreign investment in portugal is motivated by tourism trade. These figures provide an overall picture of the importance of tourism for portugal. Both the increasing number of tourists and the sector's strategic importance have led portuguese economic and political agents to pay special attention to this sector by taking active measures towards its sustainability (andraz and rodrigues, 2016).

2.Facility for tourists

The selected case studies, are of buildings build into the historically important urban centres, the main users of which are tourists. In the following text, the detailed study of the historical significance and design proposals is provided.

On the inauguration of the lisbon cruise terminal, on 10th november 2017, the portuguese prime minister antonio costa stated that, "the creation of this new cruise terminal boosts our chances of increasing our tourism sector even more.

As you know, tourism plays an important role in our economic activity. Tourism accounts for 7 percent of our gdp and 18 percent of portuguese export." (Afp news, 2017)

On the web site of the chairlift it is stated: "with the support of the gaia municipal council, it is seen not only as tourist equipment but also as a sustainable means of transport, which links the upper board of the d. Luís bridge and the city quay of gaia." (Tdg ,2019) not only that, on trip advisor there are over 1400 recommendations from visitors recommending to use the facility to enjoy the views of both the cites.

2.1 Lisbon cruise terminal

Description of region, context and design proposal

Lisbon, the capital city of portugal is the 11th most populous area in eu. From its city land area of 84.8 Km2, with an estimated population of 547,733, it extends further than its administrative boundary up to 958 km2, to which the number of inhabitants reaches 2.45 Million (cox, 2013).

With lisbon, having the second largest container port in the "europe's atlantic coast", it is considered as one of the major economic centres in europe. Based on euromonitor international's top city destinations ranking, it is the sixth most visited city in southern europe, with its international airport serving about 13 million passengers per year (bremner, 2008).

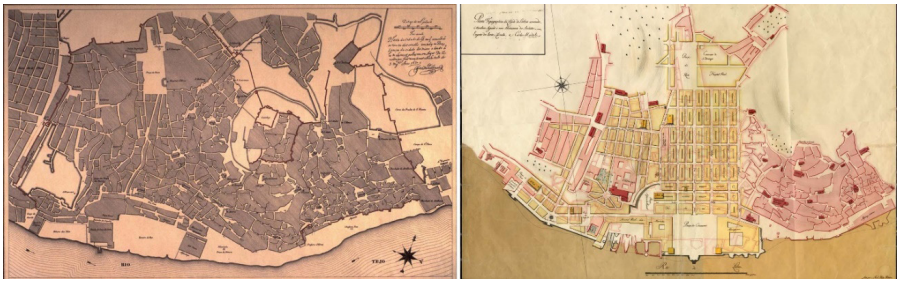


Figure 1: pictures showing the plan of lisbon before and after the earthquake (1758 lisboa, 2010)

Lisbon is located on the atlantic coast. However, when we analyze the art, music, literature and the history of the city, we can notice that its roots are clearly linked to the mediterranean sea. The cultural palimpsest presents in the urban structure and its inheritance comes from various different great civilizations, that at some point ruled this region. (Sánchez, 2016). Lisbon had a constant development as an important port-city along its history. During roman times, it was named olissipo and it was integrated into the province of lusitania. In the middle ages, it was controlled by the caliphate of cordoba until it was reconquered by the christians in 1147 and it became the capital of portugal in 1255.

During the eighteenth century, the fate of the portuguese capital changed dramatically. Due to the decline of portugal as an overseas empire, other port-cities took the leading role that once , lisbon used to have. The biggest catastrophy that struck the portuguese lands was on 1st november 1755, when a natural disaster

changed the structure of the city. (Sanchez,2003).

Earthquake with the epicenter in the atlantic ocean, close to the portuguese coast took place. The consequences of the earthquake combined with a tsunami and a fire caused mass destruction along with the death of many. After the calamity, the city was forced to develop a reconstruction plan for the downtown, which happened to be the most affected area. The head figure during the whole process was, marquês de pombal, the powerful prime minister designated by the king d. José i. There were several schemes for the redevelopment of the city centre, the majority of them directed following the ideals of time i.E. Building more rational, healthier and logical cities. Which were then the principles followed by carlos mardel and eugenio dos santos, the engineers responsible for the project. (Pardal,2003).

The nineteenth century signals the start of a long period of separation between the city and the tagus. With the interruption of the "amphibian" and organic relationship, a consequence of progressive industrialization of the bank and the formation of various untransposable obstacles, such as railway lines or the delimitation of the port area. On april 9, 1887, after several projects, the final plans for the improvements to the port of lisbon, which were under the responsibility of joão joaquim de matos and adolfo loureiro, were put in place by the french entrepreneur pierre hildernet hersent, who was entrusted the exploration of the port for 20 years. In 1907, through the carta lei of march 11, the port of lisbon became definitively the property of the state, and the first autonomous board of directors was appointed. (**Baixinho**, 2015)

At the same time, new industrial districts were emerging, driven by the industrialization of the banks, both to the west (alcântara) and to the east (santa apólonia, xabregas, beato). A new phase of great port works began in the late 1930s and culminated in 1946, with further territorial advances of the city on the river, especially in the eastern area.

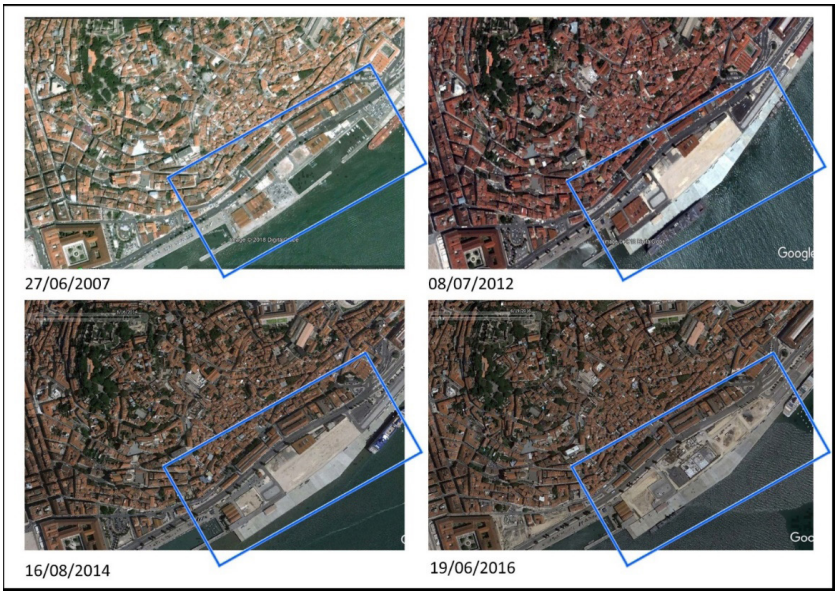


Figure 2: google earth images of the cruise terminal site

At the beginning of the 50s, the division of almost 18 km of the bank was already, essentially the one we know today. The undulating and flexible margin of sand and swamp that prevailed until the mid-nineteenth century, gave rise to the current fixed and straight margin with its walls and port docks. Since then, the main transformations of the relationship between the river and the city are no longer of a morphological nature but instead they are essentially becoming functional. (Costa, 2008)

From the 1980s onwards, the riverfront has been the subject. The cornerstone of the urban redevelopment. River symbolizes the city of the future. The recent redevelopments of the port area have also let to the restoration and conversion of former warehouses along with the redevelopment of the docks, as a leisure and entertainment area. (Tostões, 2004).

The break up between city and port - even before the great earthquake there were plans for the regularization of the waterfront, in order to improve the port infrastructure. During the nineteenth century, the waterfront was one of the main issues in lisbon. Besides, the needs for an improvement in the docking conditions, there were several public health problems that were caused by the lack of souring and the rejects that was thrown directly to the river. Several authors have identified different proposals for the redevelopment of the riverfront. Another novelty was the presence of new green spaces and in some cases, like the plan from thomé gamon in 1870, the riverside boulevard, a public space inexistent until that moment (barata, 2009). Finally, the legal figure of the port authority was created in 1887, and the port became an autonomous place. This new institution was developed simultaneously with the first general plan for the port of lisbon, which structured an industrial development mainly in the centre and western part of town. The east part followed an unstructured growing process, initially small industries, but later on larger industrial complexes, that functioned almost autonomously (costa, 2006).

"Dynamic spaces of action and interaction par excellence, port areas are constantly subject to redevelopment "in the sense of responding to several situations of obsolescence and renovation", representing potential for the consolidation of the city but also for social and technological innovation" (ferreira vm, castro a., 1999, Pp. 30-31)

According to timothy sieber (1999, 64):

«*The restructuring of the waterfronts is a 'phenomenon of societies', in the phase of advanced capitalism, which began in the period after the second world war with the emergence of companies transporting goods and containers, and which gave origin to all these port cities, during the years 1950 and 1960, an increasing abandonment of the vast and endless kilometres of urban waterfronts.* "



Figure 3. Drawings and images of lisbon cruise terminal (archdaily, 2019)

While taking a walk onto the riverfront av. Ribeira das naus, from cais do sodre to santa apalonia, one can see the unobstructed views of the tagus river and also view alamada and barreiro regions across the river.

Towards the ending of the slope of alfama and castle of lisbon, one can view the new cruise terminal.

Over time, port areas have been central locations in cities, marking their territorial and commercial development.

The building of cruise terminal constructed on the terreiro do trigo dock, is plain and has a solid form towards the riverside as seen in the figure 3 image c. The building responds to the heights contextually. The proposal by ' jlcg architects', was the most compact one among all entries. The covered area of the project is 12,440 sq meters.

It can be seen in figure 2, the google earth image collage, where the initial image of the dock, landfilling and then the construction of the cruise terminal building can be seen. The ever developing and changing water front where now the cruise terminal sits with its humble proportions and suitable volumes.

"One of the key points of this proposal is the maintenance of the existing dock's structure, reaffirming its memory by keeping the void space and recovering the surrounding stone walls."(Cliento,2010).

While taking a walk into the streets of alfama, one can see the new terminal framed between the gabled roofs of the buildings with its minimal form and minimal facade. With a small footprint, it also looks compatible with the surrounding structures and does not overpower the context with is a presence. As seen in figure 3 image c and d.

Lisbon cruise terminal, sits on an ideal site in lisbon. In the surrounding

neighbourhood, one can see the alfama and castle on the hill, as visible in the figure one, the before and after earthquake map of lisbon, the less affected areas and the pombalian architecture of post-earthquake planned city center.

From the touristic point of view, the ideal location of the cruise terminal, the proximity to major historical sites, the views and the simple volume of the terminal gives it a very subtle character.

From the front façade, perhaps due to its minimal finishes, the structure almost seems like hanging in the air, with the façade coming near the ground towards the center. It then rises while going towards the edges.

The lisbon cruise terminal, witnesses the evolution of the historical town centre and inserts itself as the modern addition while respecting the surrounding buildings.

2.2 Porto, teleferico de gaia

Description of region, context and design proposal

Porto is the second largest city in portugal after lisbon. The city has a population of 237,591, and the metropolitan area that extends beyond the city has a population of 1.9 Million in the area of 2,395 sq km. (Campos, 2013)

Cultural and natural heritage is part of the priceless and irreplaceable things that belong not only to each individual country but to the whole of humanity itself. The loss of any of these things, either through degradation or disappearance, constitutes an impoverishment of the heritage that belongs to all peoples of the world.

On december 5th, 1996, in the city of mérida, unesco decided to include the historic centre of oporto on the list of world heritage. The historic centre of porto, is the oldest area (the area that was in the interior of medieval wall) of the town, making it part of the itinerary of the great cultural assets of humanity, thus focussing the attention of national and international authorities. (Icomos,2018)



Identification of the heritage property and its protection limits: Red line - perimeter of the property in the UNESCO World Heritage List (51 ha) which Portuguese legislation considers a National Monument; Blue line - buffer zone (186 ha - without national legal protection).



Figure 4. Img 1.Identification of heritage property
img 2. Occupational map (icomos,2018)

The historic centre of oporto, luiz i bridge and monastery of serra do pilar, are constructed along the hills overseeing the mouth of the douro river in northern

portugal, which is an exceptional urban landscape with a 2,000-year history. The romans gave it the name portus, or port, in the 1st century bc. Military, commercial, agricultural and demographic benefits came together in this place. Its constant growth linked to the sea can be seen in its many and varied monuments. Ranging from the cathedral with its romanesque choir to the neoclassical stock exchange and the typically portuguese manueline-style church of santa clara. The urban fabric of the historic centre of oporto and its many historic buildings bear remarkable testimony to the development over the past thousand years of a european city, that looks outward to the sea for its cultural and commercial links. Archaeological excavations have revealed human occupation at the mouth of the douro river since the 8th century bc, when there was a phoenician trading settlement there. By the 5th century, the town had become a very important administrative and trading center. In the succeeding centuries, it was subjected to attacks and pillage by successive groups, including swabians, visigoths, normans, and moors. By the early 11th century, however, it was firmly established as part of the castilian realm. Expansion came in the 14th century, with the construction of massive stone town walls to protect its two urban nuclei: the original medieval town and the hitherto extramural harbor area. The historic centre of oporto, is located within the line of these fernandine walls (named after dom fernando, in whose reign they were completed in 1376), together with some smaller areas that retain their medieval characteristics. This area conserves to a large extent, oporto's medieval town plan and urban fabric, along with some later monumental insertions as well as the two remaining sections of the fernandine walls. (Unesco,1996)

In the figure 4, image 1, shows the identification of the heritage property registered and protected by the unesco world heritage list. Image 2, shows the occupational map in which it is visible that luiz i bridge, monastery of serra do pilar and the historical city centre with all the major and important buildings of great historical value. The location of the upper station is across the monastery and the design is fitted into the context almost extending the garden of moro, providing a platform; an urban balcony giving all the important views of river and the city of porto across the river.

In the historical town of porto, there are many important religious buildings such as the cathedral with its romanesque core, that dates back to the 12th century and several fine churches in various styles. The historic center also has a number of outstanding public buildings, including the são joão theatre (1796-1798; 1911-1918) and the former prison "cadeia da relação" (1765-1796). Among the important later structures are, palácio da bolsa (1842-1910) and são bento railway station (1900-1916). This rich and varied architecture eloquently expresses the cultural values of succeeding periods – romanesque, gothic, renaissance, baroque, neoclassical, and modern. The active social and institutional tissue of the town ensures its survival as a living historic center.

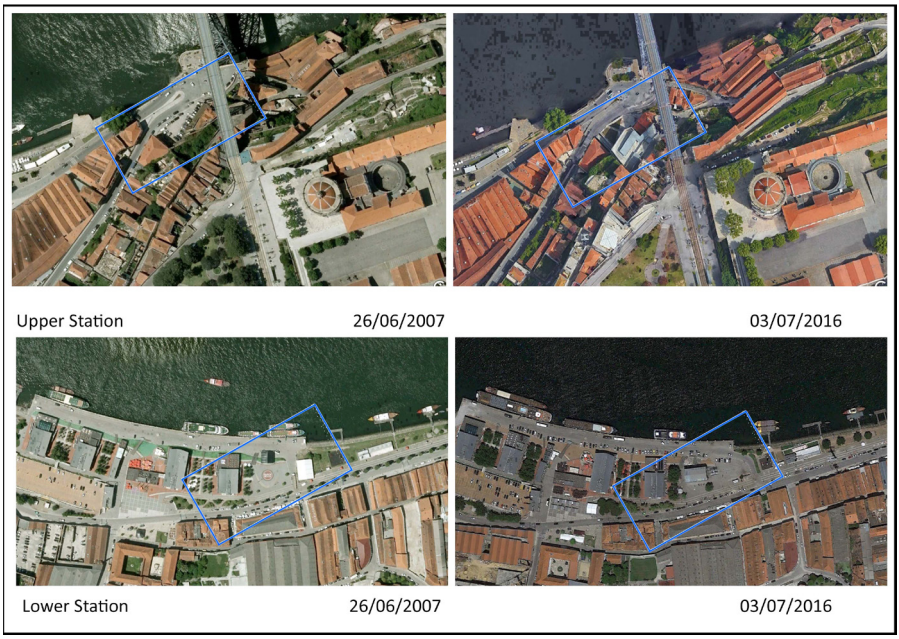


Figure 5. Google earth images showing the site without and with upper station and lower station

The project by architect francisco vieira de campos and cristina guedes, the upper station is implanted in the garden of the moro, as seen in figure 5, where the site before and after the development of the upper station of the chair lift is shown. It sits across the monastery of serra do pilar, towards the right hand while crossing the luiz i bridge to reach gaia.

In figure 6; image roof plan of the upper station, the ramps are used to connect the street to the deck level where the moro garden seems to extend. The roof of the upper station acts as the urban balcony providing the views of the city. We are interested in the challenge of intervening in a landscape as impressive as the new serra do pilar - gaia caiso axis while at the same time reconciling it with complexity and technological development of a cable car, considering the energy of the place and tourism, linking the wine cellars of porto which are around the lower station. The top station with a strong historical component of the bridge and the serra do pilar.

The new structure has been added to the landscape and the context, with complex technical requirements of power station but it sits within the context humbly, respecting the surrounding context. With a minimal design approach, keeping the design language appropriate and respecting the surrounding buildings it incorporates itself into the existing context very well.

The upper station conceals itself in the existing retaining wall and aims to have a neutral and abstract character without language, almost timeless. The project seeks to reconcile the orthogonality of the house with the obliquity of the axis of the cable car, contrasting the monumental character of the construction on the escarpment with the domestic scale of the adjacent dwellings.

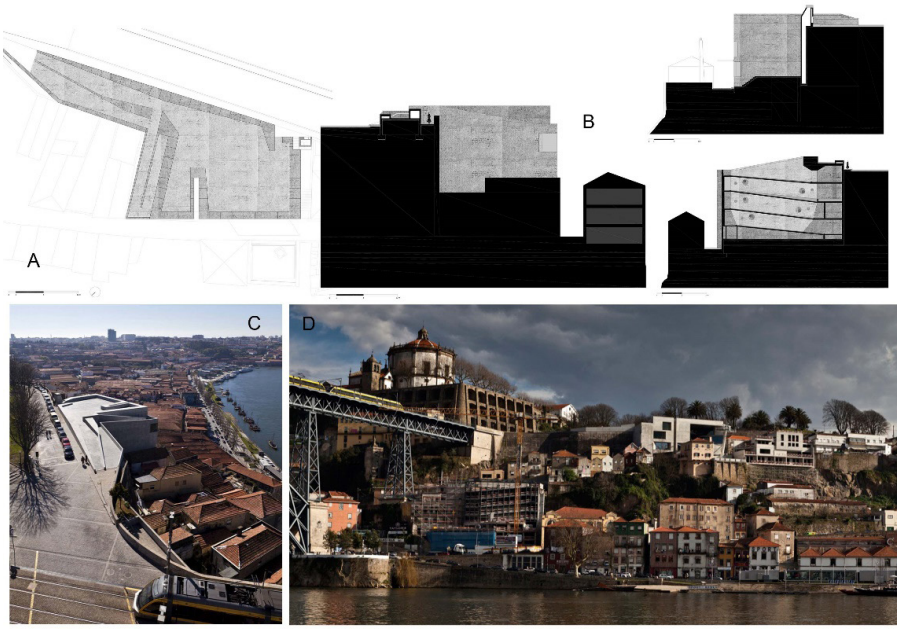


Figure 6. Drawings and images of teleferico de gaia (archdaily, 2012)

The project has a built area of 2931 sq meters and covers the distance of 562 meters from the upper station to the lower station, next to muncipal markert in cais de gaia.

The upper station fits into the retaining wall of the moro garden. The project fits in very subtlly, yet it can be distinguished easily and the play of openings corresponding the functional and structural requirements have been addressed in a manner so that the functional requriements of machinery and equipment have been integrated and become an important part, with out emphasizing or having a different look.

3. Evaluation of the case studies under international charters and guidelines:

The methodology used to evaluate the case studies, is by considering the terms of the international charters and guidelines on heritage and conservation.

In 1931 and 1933 athens charters, which are considered to be the initial charters on preservation, heritage and culture to all the major charters, have been consulted. Among other points, the highlighted ideas are, the protection of the surrounding areas of the historical site and the recommendations of not using past styles of buildings for new structures. The most recent charter, 2017 delhi declaration on the heritage and democracy, was also read and considered. It gives the guidelines to preserve heritage, cultural identity and management of historical resources. The common points are viewed and highlited, that are shared by most important international charters, namely, that of 1931 & 1933, venice charter 1964, budapest resolution 1972, kazimierz resolution 1974, burracharter 1999, vienna memorandum 2005 and delhi declaration 2017.

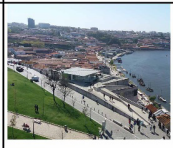
The highlighted points are as follows, 1.Respecting the authenticity and integrity

of the historical fabric, 2. Harmonious integration of the new building into the context, 3. Avoiding the initiation of the existing building and the historical style, 4. The new building should be distinguishable from the context, 5. Keeping a balance between the composition of old and new, 6. In harmony with the old surrounding, 7. The new building should not devalue the heritage and the built environment of the historical context and finally, 8. Appropriation in terms of mass, scale, color, texture, materials, and proportions.

The two selected case studies were analyzed under these 8 defined points. These set points have been examined by ten practicing architects and fellow colleagues from research institutes of portugal and pakistan.

To review the buildings, participants were given the visual references of image collages and drawings, including site plans with context and google earth images.

Participants were asked to analyse the 2 projects, on the evaluation sheet, where the set points were mentioned and the score was given by the participant based on the success factor as per their perception.

	Lisbon Cruise Terminal	Teleferico De Gaia
		
Resecting the authenticity and integrity of the historical fabric	7	8.5
Harmonious Integration with the whole	6.5	8
Avoiding Immitation	10	10
Distinguishable from Context	10	10
Balance in composition of Old and New	7	8
In harmony with the close surroundings	6	7
Should not devalue heritage buildings	8	8.5
appropriate interms of mass, scale, colour, texture, materi-al , and proportion	8	7

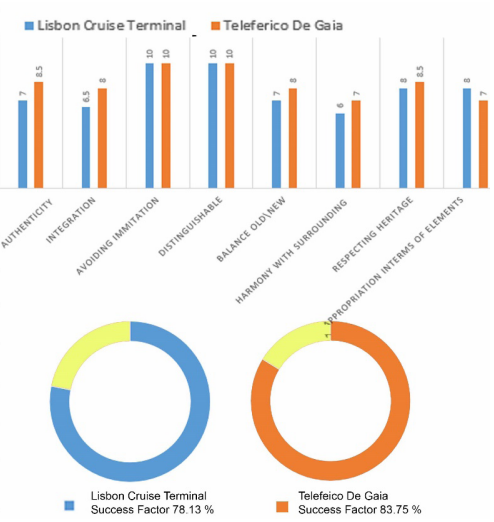


Figure 7. Evaluation of the selected case studies and comparison charts

The success of the project has been calculated by taking the mean of these evaluations. As seen in the figure 7 all the categories have been compared and the results are presented in charts to understand and compare the evaluated case studies. The success rate of the lisbon cruise terminal is 78.13% While teleferico de gaia scored 83.75%. Both these buildings have the maximum success in being distinguishable from the context and avoiding imitation.

The lisbon cruise terminal project and teleferico da gaia, respect the authenticity of the historical fabric while also being harmoniously integrated into the historical fabric and becoming a part of the overall composition. Lisbon cruise terminal has a simple volume, having a smaller footprint and height that responds to the surrounding buildings while the project also re-establishes the memory of the space, restoring the retaining walls of the old dock making a tidal tank as part of the project. Teleferico de gaia. The upper station, fits harmoniously into the retaining

wall of the moro garden. It seems to extend the morro garden and provides an urban balcony for the visitors to appreciate the panoramic views of porto and gaia.

4. Conclusion

Every region has a particular set of qualities, that give special character and identity to that specific area. In this paper, while analyzing the two contemporary buildings, in the context of two important historical cities of portugal that have many significant historical references of many centuries in its built environment; the importance of culture, context and identity have been discussed along with the relationship of architecture with culture and identity.

Tourism is playing an important part in the economy of portugal and the two buildings discussed in this paper are providing for the commuting community. These two specific projects are important as, they are plugged right into the historical neighborhoods with an important timeline and history.

The brief introduction of the cities followed by the importance of the particular site and then the projects have been discussed. It is necessary to understand all the aspects of cultural and historical importance before designing a project. The historical areas need particular attention and care, and the new project that is plugged into this fabric needs to consider all the important factors. Also, it must fulfil the criteria and rules of local and international heritage communities.

To conclude, the two projects of lisbon cruise terminal, lisbon and teleferico de gaia in gaia, porto have been discussed and analyzed under the international charters and guidelines, the projects were evaluated under 8 points that have been recommended and are in common between the international charters and guidelines.

As per results, the integration of the new buildings into the context has been quite successful and the projects blend with the context and create a valuable dialogue, keeping the architectural identity intact, giving due importance to the historical fabric. Both the projects are appropriate in terms of, their architectural language, their consideration of the built environment and surrounding context. The project of lisbon cruise terminal and teleferico de gaia, use the minimal approach and contemporary design language, thereby fitting well into the existing urban fabric and creating a successful dialogue with the rich urban historical context.

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HARMONOGRAPHY RECONSIDERED: MATHEMATICS IN ARCHITECTURAL EDUCATION

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(Track 04 – Education and Curriculum Models)

Abstract

Harmonography is a mid-nineteenth century scientific invention fusing mathematics, physics and music with art and form creation. The invention of the harmonograph was attributed to a mathematician from the University of Glasgow, professor Hugh Blackburn (in 1840s). The device is a gravitational and a manual one; once the two pendulums are given a separate and an initial motion, together they create harmonic spirals until they stop due to frictional force. One pendulum holding a pen and the other a plate with a sheet of paper attached to it, so as to coherently perform a choreography, draw successive and vanishing curves until they stop. The harmonograph used to be an entertaining device for the Victorian people who admired –so to say– the ghost in the machine, a simple but also a complicated scientific tool which was so skillful and precise that even the most talented artist could scarcely imitate the perfection of the harmonized, instantly drawn spiralography.

Pendulums by nature follow a spiraled path and harmonographs are no other; they draw many patterns like unisons, ellipsoid lissajous curves, circular spirals, shells and many other forms of harmonics. When it has two pendulums it is a lateral harmonograph and a three pendulum one is a rotary harmonograph, which combines the two to control the pen and the third holds the paper plate.

The inherent quality of the drawings is fascinating even for our digital age. The introduction of many versions of pendulum devices like the sand pendulum, the two-hooked pendulum, the harmonographs, the swinging plate and pendular swinging plate, vertical double pendulum, or even the pendulus which is a vertical and circular device that draws complicated and chaotic rays by nature, may have fruitful results within the architectural studio. The variety that these different devices create is almost immeasurable because no drawing can be repeated.

In fall semester of 2018-19, in our studio for potential architecture (pomi), together with 12 students we did not only create the devices and made them work properly, we also tried to find out ways to regenerate harmonographic drawings into three dimensional representations to imagine the body indulging and penetrating their complexity. This agenda was twofold, consisting the recreation of almost obscured but simple scientific drawing devices on one hand, and rethinking their

spatial and mathematical potentials by imaginative techniques which gave way to instrumentalize software programs like fusion, online mathematical modeling applications and conventional modeling techniques, on the other.

The introduction of the harmonograph into a twenty-first century architectural studio has its own advantages: The first being the pleasures and difficulties of crafting a musical, scientific if not architectural, drawing device. The second is the lure of this activity as soon as the imaginative, three-dimensional and unique drawings appear almost like magic on paper. Playing with a harmonograph, warns Anthony Ashton (2003), the writer of the only book about the Harmonograph, is a time-consuming and seducing activity; but can also prove to be, still a worthwhile effort to discover the relations of mathematics, music, science and architecture in a mixed venture.

To my surprise, the harmonograph is not only an object of rarity as a commodity or as a toy, it is totally *terra incognita* for architects and designers aswell –even in a so-called era of neo-baroque, of folding architecture and of parametric design, very few people have heard about them. The recreation of these devices, the reconsideration of their unique potentials linking the mathematical quality of space, also the topological character of the mesmerizing drawings done by the harmonograph, is a new and vibrant area of study in and for the architectural studio.

Keywords: harmonography, pendulum, architectural design studio, diagram.

The Zero Degree of Diagram: On Harmonography

In the foreword of *Harmonograph* (2003) Anthony Ashton describes how he met with the science of the nineteenth century that combines physics with music and craft with the diagram. At the time of curiosity with Harmonography, he borrowed *Harmonic Vibrations* (Goold and Benham: 1909) from the library; on the other hand he chased after his publisher to get his own copy. Ashton found the shop at Wigmore Street. It was a small publishing house in London, but it just sold projectors. Ashton went in, he showed the book to the old man, and he asked if they have this book; the old man looked at Ashton as if he saw a ghost. Then he went to the back without saying anything. Some time later, he came up with a dusty paperback book in his hand.

"What do you want for this?" asks Ashton. "It is yours. This was the last copy we got. This place is closing down tomorrow." The author was obviously lucky twice. When he left, he says he promised himself one day to write a book about harmonography. Even by this tricky Borgesian prelude the reader is ready to be swallowed into the book.

His drifting and indescribably charming work *Harmonograph* (2003) is adorned with retro visuals, focuses heavily on technical details and in doing so it emits a playful warmth. The work is the only book written on the subject and is only 58 pages long. Ashton refers to some forerunners of the field: *Harmonic Vibrations and Vibration Figures* (Goold and Benham: 1909), *Science and Music* (Jeans: 1937), *Index to the Geometric Chuck* (Bazley: 1875).

It is possible to see harmonography as a direct diagrammatic representation or the zero degree of the diagram. Simple pendulums draw lissajous figures, attributed to the nineteenth century French mathematician Jules Antoine Lissajous (1822–

1880). More complicated pendulumic devices can draw further; lots of different figures like shells, stars, unisons, etc. Complex forms can emerge when the release of more than one pendulum is shared.

There is a geometric collaboration between pendulum oscillation and monochord vibrations. When we study the harmonics of a single-wire instrument (monochord), we unintentionally approach the area of pendulographic representation. The tonic of the tensioned wire (1:1), the octave (2 1), the quintet (3:2) and the quartet (4:3) is initially found by the ear, but also through a geometric process by pressing to the middle, the two-third, etc. of the wire. The 12-tone sound system is also a geometric order. Once the pendulums are released, the pencil attached to them performs the topological motion series, which gradually slows down on the oscillating or fixed table. These repetitive layers, which consist of spiral series, finally appear as three-dimensional representations on paper. The pendulums of the fine-tuned harmonograph have weights that can be shifted up and down. Thanks to the weights, the harmonograph is affected less by the frictional force and runs for a longer time. When the positions of these weights on the pendulum are changed, the pendulums are released in different vibrations, just like the octave, the quartet, quintet, etc. of the monochord.

I find the question meaningful of how we can prompt harmonography to the third dimension with today's digital possibilities and manual manipulations and think it is worth researching in terms of architecture. The harmonograph itself is a gravitational diagram and this diagram produces a series of curves that do not correspond to a certain spatiality or meaning, volume or function. Although it produces the ceaseless diagrams for the designs that will depart from it (the machine that produces the machines; the machinic diagram) is both blind and muted, whereas the phenomenon produces the probabilities and forms the horizon of the visible and the sayable. It is this blind productivity that brings the harmonography to the threshold of the conceptual machinic diagram for architecture.

Harmonography has its roots within the phenomena of music. A close relative of this field of study is sound: Ernst Florens Friedrich Chladni (1756-1827) was an eighteenth century physicist and musician. When the sound vibrations are given to particles on a metal plate, the resonating particles are formed around the vibrating lines and around the lines dividing the surface. Chladni thus found patterns of diagrams known by his name. Harmonography is a forgotten nineteenth century mathematical drawing entertainment, which used to attract masses who were gathering to see the performance of the ghost in the machine, the harmonograph.

The Pendul-Art Set: The Mythological Origins of my Harmonographic Childhood

The Pendul-art set is lucidly a vintage game set from the 1970's, designed to entertain the family with its swinging plate and its pen attached to it. From that day onwards, it has never been purchased, although it was awarded in 1970 with best scientific toy of the year in Belgium. (For more details visit: https://www.ebay.com/itm/Vintage-1970-Magic-Rainbow-PEN-DUL-ART-Pendulart-Geometric-Art-Set-R18044. 16.11.2018) My father bought it from Berlin in the late 1970's after he graduated from Chemistry Engineering.

After playing with it for years in the 1980's, I lost it and completely forgot it.

Years later, in 2004 I wrote an article on this machine which described the working principle in detail (as well as illustrating its mechanical parts). I did not have the faintest idea that this was a field of interest and the name 'harmonography' came to my attention only as late as 2018. That's why I gave the device another name: "The Curver / Eğirmen" (Şentürk: 2004).

I've watched its swing and its ability to draw unusual topological patterns for years with an endless curiosity. It wasn't bigger than an ordinary desk lamp attached to the desk with a vise. Its oscillating tray was no bigger than an A4 sheet.

In the fall semester of 2018-19 in Pomi (Studio for Potential Architecture), almost twenty-five years after the loss of the instrument, and almost fifteen years after I wrote an essay on it, I gave the text to the students as an initial reading.

It is said that in 1840's the mathematician Hugh Blackburn (1823-1909), a professor of the University of Glasgow, invented the harmonograph. In the nineteenth century, people gathered around the device and watched its magic, the ghost in the machine, with amazement. These days, it is only found in museums of Science and Technology History; one of the hundreds of devices invented and forgotten in the nineteenth century.

From Pendul-art Toy to Real Harmonography

Roza undertook a difficult role to rebuild the object that I remembered very well at the earlier weeks of the semester. In the third attempt we have achieved a prototype that worked flawlessly and it was a process that took almost a month. We dared to produce all the other devices thanks to this one, which consisted of a pencil arm with a movable articulating arm that touched a mid-size swing that is weighted in the middle. (Figure 1)

Another device was a more stable harmonograph with its own wooden frame. Due to the first model's poor swinging capacity, Burak and Melike enlarged it and made lots of little hook suspensions for the second prototype. In this way they could hang the tray on the above grid. The tray was bigger than an A4 sheet this time and was 35 x 35 cm. The obligatory hanging from its four corners had thus disappeared. Thanks to these variables, they were able to make asymmetrical suspensions. This had become an important possibility of imbalance, allowing for unexpected forms. In their third model, they increased the dimensions of the table to 50 x 50 cm. and made it possible to obtain much larger drawings. (Figure 2)



Figure 1. Roza's third model of the basic harmonographic device from the Pendul-Art toy.



Figure 2. Burak and Melike designed three different prototypes to obtain larger and more sophisticated harmonograph drawings.

"Sand Pendulum" – Experimenting with Intricate Curvilinear Installation Spaces out of a Cosmic Imagery

In the fall semester of 2018-19, 12 of Architectural Studio 201 students became the Pomi members. Our first goal was to build as many types of harmonographic or autonomous, manual drawing devices as possible. The second goal was to make them work in an impeccable manner to gain delicate and pure drawings. Our third goal was to reconsider harmonography and redefine it within the architectural studio in a critical way. Our final goal was to combine all the material within a standard representation sheet utilizing photoshop. The final stage was quite a complicated, stressful and tiresome one that necessitated laborious work, not only for the students that were encountering most of the software (photoshop, fusion,

autocad) for the first time in a major task, but for me and my colleagues aswell. In spite of all difficulties and struggles, the results were quite good. I will try to summarize the individual design processes briefly. The limitations of this paper unfortunately does not allow me to convey the design processes of each of my students in detail; so I will prioritize the creation of different devices.

Ceren began with a standard sand pendulum –a simpler version of a gravitational oscillation device. This invention was based on a glass (friction reducing) tank carrying sand (or any granular material) with an opening looking downwards, working by the flow of the material to leave sand traces along its movement, until the swing fades out. The sand particles are made visible with a broad, horizontal wooden board painted in black and laid on the floor. Sand can be reused in numerous experiments by sweeping the figure after recording it. It is important to calculate the involvement of the swing and the amount of the sand to diagrammatize the whole gravitational process. Despite its simple set-up, the movement must have a complex relationship with the swinging tank that slowly leaves its gall –notwithstanding that this complexity is hardly distinguishable.

Matematicians describe the magical diagrams of a pendulum in an accurate way; the motion of a single pendulum along an x-axis. As a parametric equation is: '$x(t) = \sin (p + f\, t)\, e^{-d\, t}$'. T is for time, p is for phase factor, d is for the damping term.

After experimenting several times with her non-frictional sand pendulum, she built a bigger version of the device to attain more vivid tracery. Compared to the first 1 to 1 m. former prototype, the second one proved to be more ambitious. The second prototype was again a wooden frame but this time a 2 to 2 m. cubical one, and added to that, it had a quite complex system of weights attached to its sand tank so as to perform in a more dis-harmonic way.

She mounted a 9 square grid wire device where identical, hooked metallic weights could be hung at will. By observing the differentiating figures she made a set of experiments but still due to the thick sand lines and repetitive overlapping, these differences were not decisive over the subsequent design process.

The planar lines of her fusion designs were gathered from her own sand harmonography photographs and were extruded splines; initially inspired from Richard Serra's gigantic steel plates as gesture forms.

A Vertical Double-Pendulum (Synergistic) – A Fragile Device

Ahmet discovered another alternative for a classical harmonograph –he chose to remodel the vertical version of a double-swing harmonograph which later gave way for another discovery: The Pendulus, a circular yet chaotic, vertical version of autonomous drawing devices, which I will deal with later.

The vertical harmonograph, having two independent pendulums along the same axis which contribute to a stylus, are said to comply to the principle of superposition and the equation reads: '$x(t) = e^{-d_1\, t} \sin (t\, f_1 + p_1) + e^{-d_2\, t} \sin(t\, f_2 + p_2)$'.

The vertical harmonographic device manifested its unorthodox yet fragile identity; it worked so immoderately that one could hardly attain purposive specimens for later design processes. Furthermore, Ahmet felt quite uncomfortable with his unrepresentative results; for him, most of the drawings resembled one another so he completely abandoned this experiment.

In his later fusion/3d modeling phase, this made him go after a beaten track;

so he chose more reliable harmonographic drawings as a basis for the creation of three-dimensional models. I remember him creating an initial, quite flat, almost two dimensional, slicer-made, laser-cut model, which was almost like a slightly sloping terrain in 1/100 scale. This model had such a unique, unrepeatable, pure beauty. He worked on gaining a parallel spatial effect in his subsequent work.

The Three-Pendulum (Rotary) Harmonograph

The 2018-19 fall semester was like a hurdle race for Pomi; not only for the students but for me as well. Although building a harmonograph may not seem at first glance like rocket science, and considering that anyone can acquire the practical knowledge on almost any topic in an age of *youtube*, it is still not that simple. Because seeing and grasping is one thing, building and realizing, another. It is no secret that one faces countless hindrances in practice.

This was also true for Asena and Fulya, who had to cooperate in the hard task to create a proper model of a three-pendulum harmonograph. Their first model had serious detail problems due to their plaster cast weights. This adversely affected their prototype by slowing and terminating the device quickly. In their second undertaking, regular steel disks and finely detailed, circular sectioned aluminum pen holding rods helped the device work finer; yet the frictional force was never surpassed and this often made the drawings out-of-control. Yet the couple was very ambitious in imitating the whole detailing, handcrafting and measurement process.

It can be said that the three-pendulum harmonograph is the most sophisticated autonomous, harmonic drawing devise of all. Simultaneously released pendulums converge to create a complex motion and this unrepeatable rhythm can create prodigious diagrams. The mechanism is simple, though: Two flat oscillating pendulums are integrated to hold a pen or a stilus. The third pendulum is rotary and atop has a plate to carry the paper. The stylus and the plate work like a manual record player, like a gramophone needle and a record in its most primitive sense. One can even hear the rhythmic rustle during the drawing process.

The Double-Hooked Paint Pendulum –A Prototype for More Complex Devices

If one double-hangs a pendulum, instead of hanging it simply from the ceiling with one hook, one can attain a complex swinging behavior. Derya devised this experimental, container-carrying pendulum and created very detailed yet large size sheets. Acquiring the continuity of the flow of paint can be difficult to predict. If the resonation, speed of the oscillation and the thickness of the flow are managed, the result will be encouraging. By the diminishing movement and the decrescent amplitude, repetitive patterns emerge to create pictorial depth and this generates the three dimensional effect of the harmonograph drawings.

Experimenting with even more complex hangings and letting further external forces effect the system of movement, one can create almost endless experimental drawings.

Yet the harmonograph always tends to be a blind diagrammer, who in turn wants to wander on a flat, smooth surface without stumbling on an obstacle. What if it were possible to imagine a harmonograph that could detect the obstacles on its path and react them? A jumping-over or vaulting harmonography would definitely be a less blind device. Or an outward reaction, bounce or hopping? Or a

harmonography that would react to an obstacle as an accelerator and interpret this force as shifting impulse? Or a harmonography that would switch from one figure to another each and every time it hits an obstacle? (Switching from a unison to a lissajous, then to a horizontal eight, etc.) This line of thought was a forerunner to bring us to a three-dimensional, interactive harmonography that would lead us to the shores of the body, and hopefully to architectural space: A "Harmono-corpo-graphy"; a body-conscious harmonography.

The Two-Pendulum (Lateral) Harmonograph

The two-pendulum harmonograph is a combination of perpendicular oscillating devices combined on a narrow table. Arkan and Melek had to built the prototype twice to have a properly working model. (Figure 3)

According to the parametric equation and the rule of superposition, the double swing harmonograph complies with the following formulas: '$x(t) = e^{-d_1 t} \sin(t f_1 + p_1) + e^{-d_2 t} \sin(t f_2 + p_2)$" and "$y(t) = e^{-d_3 t} \sin(t f_3 + p_3) + e^{-d_4 t} \sin(t f_4 + p_4)$'.

Arkan was very productive in the whole studio process; especially in the process of producing three-dimensional models from harmonographic drawings. Arkan produced several types of forms and created lots of prototypes for each of them; they were mostly referring to the auditory specificity of the harmonographic drawings. He called the closed formations ears. His amphitheatre-like, flat topographic formations were another category of architectural formations; they were open and had the potential to spatially communicate each other.

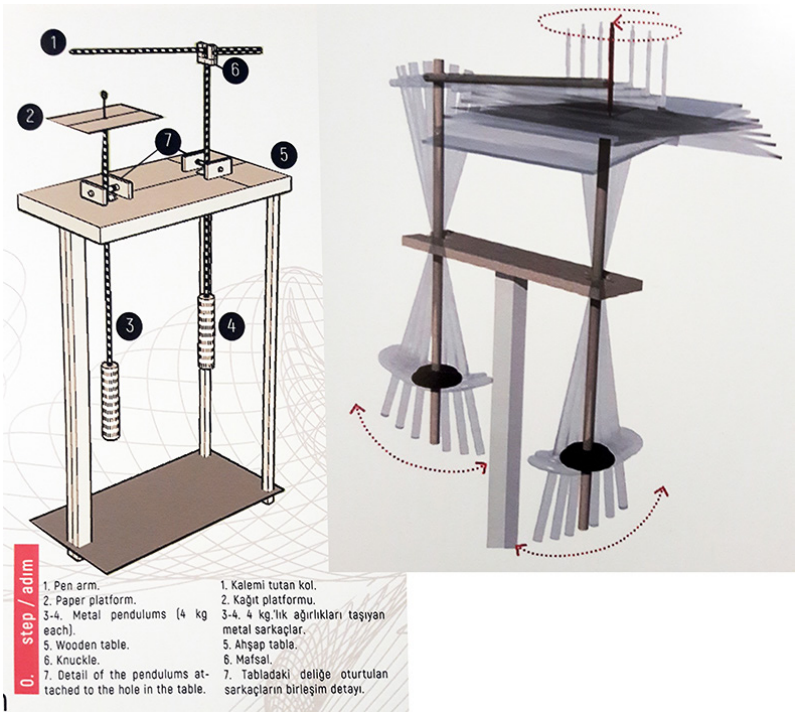


Figure 3. Arkan and Melek produced the Two-Pendulum Harmonograph twice to gain a properly working prototype.

The Schaub Harmonograph

The invention of the young Canadian spin art artist Callen Schaub (1991-) combines the pendulums, the harmonography and the centrifuge with large amounts of liquid acrylic paint fusing on a canvas. Spin art is the process of pouring paint on canvas by screwing it on a drum and rotating it at various speeds. Schaub created his own spinning device based on the mechanism of a bicycle. It is the art form of a physical process that is based on the centrifugal force's mixing capacity of paint. Schaub's works with simple gravitational devices is groundbreaking. The most common use of centrifugation in shape formation is the ceramic wheel. Softened ceramic dough is handled on a manual or motorized wheel.

Schaub obtains dynamic shapes by pouring various colors poured on a wooden swing back onto the spinning canvas with instant gestures. These are highly diagrammatic works; paint shows pure distributions under the influence of various force vectors: The harmonography of paint. Schaub can be said to have released the repertoire of the figure, which is fixed by the pen. In the studio, we baptised the double swing harmonograph as "Schaub-type pendulograph" which consists of an oscillating tray placed under the paint tank pendulum. This double oscillation has an equal complication with harmonic drawings. By adding the second pendulum motion, to the motion of simple pendulums finely plating the paint, the process can be complicated to its extremes, by increasing the variables (more than one pendulum, more than one connection thread, etc.) and the diagrams of these oscillations: A new zero-degree-diagram experimentation millieu.

Dicle worked on this exciting device by prototyping his own in our atrium at the department of architecture in Bademlik, from wooden rods and bolts. He produced powerful expressionist examples after devising his harmonograph. The final version was a cubic one and had a square swinging plate of 1 to 1 meters. To overcome the difficulty in acquiring precise drawings, it is important to use the right type of paint and that proved to be cellulosic dye.

The Pendulus: A Chaotic Device

The pendulus is a circular and vertical tool, although it has a similar name to the pendulum. Besides, its modus operandi is of a different nature: After given a rotary move, it tries to create symmetrical shapes but in an instant these shapes are deformed by its chaotic nature. It is almost impossible to mount a pen onto this rotating device, so Sümeyye chose to adopt another technique: She made an archive of long exposure photography after adding a tiny led bulb on the end of the rotating arm of the pendulus. What makes the pendulus chaotic, is the second arm that connects to the movable joint at the centripetal arm. Sometimes two or three mobile joints are added to the centripetal arm. Their acrobatic movements seems to have attracted the attention of the audience more than the diagrams drawn by these devices.

The archive of long exposure pendulus photos is inspiring in itself; invisible forms can be seen in this way. Based on these circular photographs, Sümeyye designed cylindrical three-dimensional forms; she combined these cylinders and designed a large exhibition space.

Harmonography Reconsidered: From Harmonography to Harmonogenesis

The precursory experiments on three dimensional harmonography had a few stages. The first stage focused on a rather mathematical reframing of given harmonographic drawings that were remodeled within an almost Cartesian representational framework. This resulted in a uniformity of ruled-surface-like cardboard and wire models.

The second step: Students were asked to reframe the harmonographic drawings within a three dimensional volume instead of a flat one. That would help shift our sight and diagrammatize them within a scaled spatiality.

Their exercises can be group as such: Firstly, layered and rather flat versions that imitated the spiral-graphic character of the drawings. Second group of works were basic wire-constructions that tended to restructure the topology; and the third were shell-like structures that picked the folding points and different surface characters of the drawings. This made clear that the experiments would congest in a polarity between shells and Sendai Mediatheque-like or topological Klein bottle-like wire constructions –so we abandoned that path.

Emre, an intern student came up with a solution: The free-version of the fusion autodesk software would be practical to employ. Furthermore its modus operandi could not be more appropriate to our 21st century, digitally conditioned minds. The philosophical foundations of the program seemed quite witty to me, due to the simple reason that, one could not create paradoxical forms easier elsewhere. The form creation process was almost based on a topological impossibility, so this looked very relevant to the paradoxical nature of our venture itself: To create a three dimensionality out of an almost non-dimensional drawing.

Within a week, all the twelve Pomi students were using the fusion software fluently and this seemed like the proof of Emre's anticipation. However, the experiment was under the treat of the software itself, because it could risk it to become a formalism per se, that is to say, a modeling for the software's sake. A mere formalism, another sterile, unscaled experimentation. I do not think that we could overcome this danger within such a limited time in Pomi. Not only the theme, the milieu was quite new to us all.

Returning to the concrete reality of the handcrafted model could be an escape from the digital trap. So I decided to utilize the slicer for laser-cutting layered 3D models to sculpt them. After all of the Pomi members acquired various laser-cut cardboard models, their photography allowed to create further scaled representations of these unique formations that carried traces of harmonography.

Concluding Remarks

In an age of parametric design, the possibilities of harmonography is of course not limited to the above.

Without hesitation, these magic tools, which are almost unknown to architects, are not only evaluated according to their capacity to produce unique drawings; they also carry many new and pending possibilities in terms of design aswell. And it seems possible to me to call this process as harmonogenesis.

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PUBLIC WASH-HOUSES IN PORTUGAL: SPACES OF AGGREGATION AND SANITARY AID. THE CASE OF STUDY OF THE CITY OF AVEIRO

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Abstract

This paper investigates the typology of the Portuguese public wash-houses that represents a very important sanitary aid and a space of social aggregation. More particularly, the most common features of such a typology will be outlined: architectural configuration, materials and technology, constructive characteristics, hydraulic equipment, historical evolution. These simple but highly functional little buildings are spread across the whole country and had been extremely important for the population since the middle age. In the last two centuries, new wash-houses were built, also following the scientific advances and the novel health requirements that spread in Europe between the XIX and XX centuries. Some European cases will be introduced for comparative reasons. With time, they were enlarged, rebuilt, restored, and many new were built. Finally, the wash-houses of the area of Aveiro will be discussed in deep. There, as commonly happens in other locations in Portugal, these buildings are still used by the old people to wash their clothes.

The study of such an architectural typology will be extremely interesting for all the scholars - historian of construction, technologist, restorer, and urban planner - approaching the vast theme of sanitary construction where materials and technologies are strictly related to human health, sanitary requirements, innovation in medical science. Nowadays, public wash-houses represent an image of the past that must be preserved with all the possible attention and care to avoid incongruous works on a so "simple" and "intuitive" building that joins together architecture, engineering, and medical science.

Introduction

Providing drinkable water to humans and animals has always been a primary issue for all the communities, especially in all those places where natural water was highly contaminated (i.e. malaria or other infectious disease) or was particularly short (i.e. dryness). Also the simple act of washing clothes might have become a problem if rivers or lakes were not in proximity.

Fountains or simple water tanks were the first used aids with the multi-functional purpose of providing water to humans and animals and allowing the clothes' washing. In Portugal, a systematic construction of such a structures dates back to the middle age when various fountains were built in urban and suburban areas with the triple aim. During centuries, such a constructions were enlarged and restored to separate the various functions: drinking water should have preserved the purity at most, clothes' washing may have foresees also reused water, water for animals might have been as purer as possible but without any particular measure. Lately, from the XIX century, the new studies and discoveries in medicine, biology, and infectious diseases produced a great impact not only in people life, but also in construction. The development of enhanced microscopes and technologies of enlargements, and the novel methodologies of investigation, clarified that the diffusion of diseases was not due to "spiritual" or immaterial objects but to the presence of bacteria and, later, viruses and polluting agents, that were transported by the running water. Medical science improved enormously and, with it, a series of related disciplines such as the hygiene. Consequently, all the human lives were highly affected and the "hygienist" engineer, as a new professional figure, spread out with the aim of designing "health" buildings according to the novel hygienic standards, typologies and functions, materials and technologies. In this scenario, the public wash-house became a proper individual typology that played an extremely important role in guarantying the personal and public hygiene and preventing the diffusion of epidemics throughout the urban environment. Hygienist engineer studied and developed simple but effective constructive and architectural principles useful to improve the health quality approach. Among those simplicity, cleanliness, aeration, low cost, and – most of all – gratuitousness to all the people. At the same time, wash-houses might have assured a sort of urban decor without denying their refined appearance. They became the first aid – along with the public baths – to guarantee the people's health and prevent the spread of infectious germs.

The novel social hygienic standards in Europe in the XIX-XX centuries

Across Europe, public health and social hygiene became a central theme of debate from the beginning of the XIX century. New discoveries, advances in science and technology, re-discussion of old theories and believes resulted in many direct consequences in the people life and, consequently, in the way to make public buildings healthier. In particular, the novel hygienic approach to life was applied to construction and doctors, hygienists, and engineers started to strictly collaborate to achieve the best social result in the name of the binomial health-construction. In this scenario, the "hygienist" engineering - an emerging branch of engineering – took birth to push civil engineering and architecture towards high standards of hygiene. Accordingly, new typologies were "invented" – or better "re-invented" – in relation to the novel scientific inputs and social requirements.

Jointly, new architectural and functional distributions, supported by novel materials and construction technologies, entered the construction industry (Campisi, 2004; Campisi, 2010; Campisi, 2013).

In Europe, an increasing interest towards public hygiene, especially in the working-class neighbourhoods, imposed the obligation to guarantee to all the inhabitants, especially the poor, a cheap, or even free, use of public wash-houses. In England, for instance, the first plant was built in 1842 in Liverpool to fight the continuous cholera epidemics. That, along with the adoption of new prophylactic measures, improved significantly the quality of life (Mathieu, w.d.). This innovative was also provided with a large public bath and a swimming pool, recalling the ancient architectures. These factors led the population to more easily accept the new health standards and, consequently, use such a structure in the frame of these novel hygienic standards. Moreover, the simple activity of cloths-washing was sometimes integrated in the typical functions of the thermal baths, well established in the UK mentality. In London, for example, two buildings, that combined public baths with wash-houses, were established following the sanitary laws of 1844 and 1846. Also in Germany and France new hygienic buildings were set up. An innovative solution was the construction of comfortable stand stations, to let women stay stand while washing – and not bent over low shelves – along with the possibility to heat the cold waters by means of a fire place-chimney to prevent chilblains and other "winter problems" (Donghi, 1905-35).

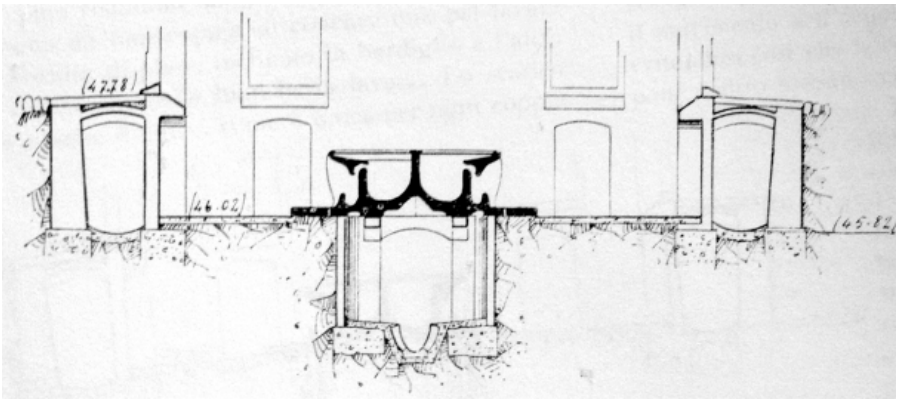


Figure 1. Section of the tanks in an Italian wash-house plant, Borgo Crocetta in Turin (Speluzzi, 1932).

At the beginning of these process, one of the fundamental question was whether equipping each city with a single but large washing establishment or with small buildings located in the various neighbourhoods. This second option, in a certain way, was more viable as a smaller and easy-to-build building, *lean and light, well ventilated* (Pagliani, 1901), would have required limited economic commitments for the municipalities. Moreover, at the beginning of the XX century, hygienist engineers started to experiment novel formal and functional configurations, mainly at the opposite to the old style characterized by a few large monumental constructions. From this point of view - needless to say - iron, glass and even wood were great allies of the technical designers. At the same time, the conviction that

public health also depended on the direct relationship between the physical people well-being and the health conditions of the place in which they lived was very well consolidated: *[…]the hygienic postulates tend, in fact, to state that the unhealthy environments are more easily undermined and invaded by the disease agents […]* (Pagliani, 1901).

In many European countries, a new class of "health engineering" was introduced in the Schools of Engineering and Architecture. That was a [...] *new and important discipline that may contribute to the health education of the Nation and represents the most balanced and fruitful combination of the modern science with the needs of the practical life of every civil society* [...] (Ruata, 1916). At the same time, government inspections were undertook to evaluate and monitor the state of health of the various public waters.



Figure 2. Water analyses in the city of Lisbon in 1912, fountain of Porcalhota (Howell Pato, 2011).

Following the "modern" architectural instances, these new sanitary constructions, instead of being anonymous or – at the opposite – monumental, would have shown some signs of elegance and décor. An example of that is the wash-house built in Turin in 1895 where nice friezes of animals and aquatic plants were realized (Abba, 1904). This plant was characterized by a large wash room that was well lighted and well ventilated following the idea that these factors would have improved the environmental qualities. Moreover, the hygienist engineers believed that the action of the ventilation through the windows was better achieved avoiding direct drafts: in this line the *vasistas* window was commonly used. The wash room was equipped with three groups of tanks, made of cement, in order to be *impermeable and amazingly smooth*; during the washing the women would have stood on a wooden frame so that the falling water may would have gone away, and the washed and rinsed clothes could be comfortably placed on an external wooden stand to dry. The floor, made of concrete and equipped with grooving canals, had

a slope towards the centre to quickly dispose the water; the walls were coated by a waterproof paint up to 1 m and simply plastered in the remaining height; the large windows were equipped with adjustable systems of inclination to facilitate the change of air. The construction also had a vast courtyard, used to hang up the wet clothes, and an annex building used as public bath.

At the Exhibition of Medicine and Hygiene in Rome (1892), the engineer C. Gabellini displayed a cement model of a wash-house made of separate washing tanks, originally designed by the Prof. L. Pagliani, a hygienist doctor. Characterized by a rectangular plan, the building had a main central large tank, that contained the water coming from the city aqueduct, and a series of smaller tanks for the laundress; in addition to the collective space, a small washroom contained a tank provided with an acid solution that would have sterilised the contaminated clothes, avoiding possible infections to the same laundress and eliminating the possibility of spreading infectious agents through the running waters. The building facades had large windows located at a height of 1.8 m to place linen shelves along the internal walls (Pagliani, 1901). Indeed Pagliani observed that an accurate disposal of the public wash-houses' drainage waters was of fundamental importance to avoid serious infections' propagation, especially if nearby to springs of drinkable water or to farmed fields. At that time, the studies on bacteria and infections' propagation were highly addressed across the scientific community as displayed in, i.e., the volume of G. Thudichum on the bacteriological treatment of sewage, published in English in 1899 and translated into French by F. Launay in 1901, that reported interesting industrial applications that municipalities were suggested to perform for the waste water disposal (Launay, 1901; Peserico, 1901).



Figure 3. Public wash-house in Turin (Abba, 1904).

Numerous studies were performed to study the most suitable materials to be used in such a wet environments to avoid infections and their spread. Another issue was the facility to clean and sterilize. In 1893 the hygienist C. Canovetti, engineer at the Central Paris School, designed a public wash-house for the city of Brescia where the internal walls were covered by white majolica tiles to facilitate their cleaning from the continuous splashes of the dirty water mixed with soap and ash, used by the laundress during the washings. The bitumen was one of the most popular material of that time for its waterproof properties as, *i.e.*, the bituminous leather carton (*carton cuir*). The number of Building Shows, hold across the whole continent, were fundamental to promote and spread innovative materials, such as the linoleum and the *holz cement*. The need for aseptic, safe, and fire-proof finishing lead to the, so-called, shiny pavements (*Torgament*, *Xylolith*, etc.) or the soundproof and waterproof floors made of mosaic rubber elements. For wall

covering, the "special" plaster Heliolith by Möller was highly promoted for its polishing and washable easiness, as well as for the ability to imitate the natural stones. Furthermore, many studies were performed to test these new materials' durability against chemical disinfectants and physical agents such as hot water, sun exposure, nocturnal humidity, frost and thaw. Moreover, it was carefully verified if the simple action of washing could efficiently and completely eliminate the germs (in particular the Piocianum and Tubercular bacillus) from a painted wall, as a fundamental practical and economic instance. If, from one side, the "disinfection" of the building materials was aimed at eradicating pathogenic germs, on the other hand it was of upmost importance not damaging the surfaces themselves.

In many XX century manuals and treaties of sanitary engineering the treatment of water was often associated with the uses in architecture. The wash-houses were usually included in the "public services", as well as bathrooms, markets, slaughterhouses, schools, hospitals, theatres, etc.. The wash-house produced many sewage that contained cleaning substances, disinfectants, powders, and dirt which had to be suitably removed, recovered, purified, and/or eliminated. Many monographs of "sanitary technique" of that time reported precise indications about *the water suitable for washing* that should have presented a quite low hardness, and the consumption of water per kg of dry laundry was considered equal to 30-35 kg; cold running water had to be associated with hot water heated by special boilers (Speluzzi, 1932).

The increasing urban drift towards the urban or industrial centres, produced the necessity to establish special committees with the specific aim of studying and proposing the construction of public baths with annexed wash-houses for the working-class health. Thus, the basic rules of hygiene and personal cleanliness were guaranteed at low fares. Worth of mentioning was the plant built in the Crocetta village (Turin) for its functional plan, with separate bathrooms, for men and women, equipped with toilets and showers. The annexed wash-house had a plane rooftop and a floor level located 2 m under the street to assure a suboptimal light distribution from the top. The concrete floor was built directly on the pavement, to assure an adequate insulation from the ground and avoid the cracking typical of the large concrete floors. The washing tanks were made of marble, without corners to avoid stagnant water or deposits of dirt, or of concrete, and their layout was staggered to prevent the facing laundress splash at each other while washing (Montalenti, 1912). The best organized structures, especially the pay-to-use ones, were supplied with *leaching machines*, washing machines, and dryers. Usually the tanks (of about 200 lt) were placed at a distance of 1.5-2 mt between the various rows, and separated by a wall of 1.5-2.00 mt that guaranteed privacy and avoided any exchange of clothes.

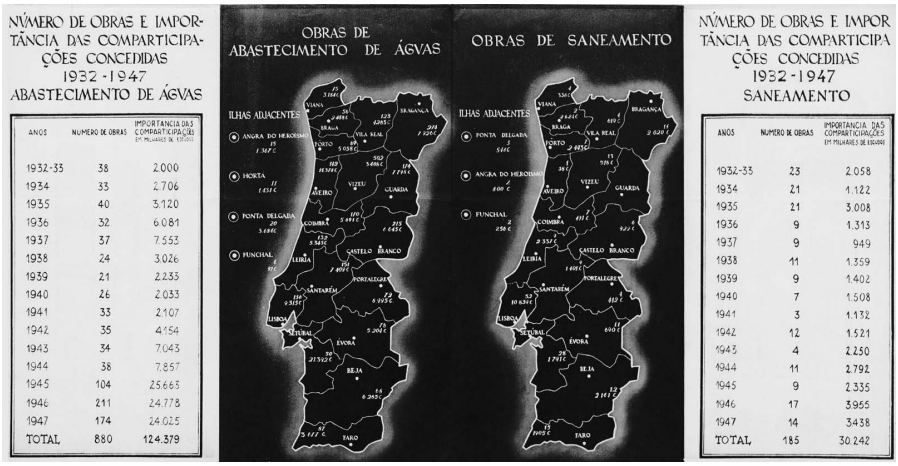
Social hygiene in Portugal and the public wash-houses program

At the end of the XIX century, also in Portugal such an interest towards the social hygiene and improvement of the public health conditions vigorously spread. The government decrees of January 1837 and December 1868 were issued with the intention of reforming the Portuguese public health services. Later, in the major cities of the country, Lisbon and Porto, some public initiatives were undertaken to improve the quality of the waters and the general public health service, as reported

in the *Boletins de Saúde e Higiene da Cidade de Lisboa* (trad. Bulletin of health and hygiene of the city of Lisbon), from 1894, and the *Boletins Mensais de Estatística Sanitária do Porto* (trad. Monthly bulletins of health statistics of Porto), from 1893. In 1889 and 1901 among the Government of the Reign (*Ministério do Reino*) two new Offices were instituted: the General Directorate for Health and Public Welfare (*Direcção-General de Saúde e Beneficência Pública*) and the High Council for Health and Public Hygiene (*Conselho Superior de Saúde e Higiene Pública*). Such a new organic map of the public welfare administration saw, as a prominent element, the figure of Ricardo Jorge who was the first General Inspector of the Reign Health Services and Director of the Central Institute of Hygiene (1902-29), Official and General Director of Public Health (1926-28), eminent member of the Faculty of Medicine of Lisbon, and Portuguese delegate of the International Office of Public Hygiene (established in 1907). In the Institute of Hygiene transversal classes of medicine and sanitary engineering were held on suggestion of the Ministry of Public Works, Commerce and Industry that began a campaign of awareness and technical training of architects and technicians. Moreover, a capillary campaign of investments was undertaken leading to census of all the public waters and health structures, the analyses and monitoring of the waters healthiness, and the construction of new public health plants (Alegre, 2000; Caetano, 1994, Oliveira Marques, 2003).

Among those plants, a strong effort was given to the construction of new public wash-houses that were often associated to clear and fresh water springs, public fountains, and annexed trough. Their construction, rehabilitation, and enlargement continued till the 1950s, maybe following a normative impulse of the dictatorial regime of Salazar that introduced the most contemporary materials, especially the cement, in the well-established traditional typologies and materials. The first pursued hygienic-sanitary instance was obviating to the lack of a domestic sanitary water plumbing that could serve the houses in the cities. In such a way, people were prevented from washing their clothes into the rivers or canals, polluting the natural waters and with poor hygienic prophylaxis (Baptista, 1987; Gonçalves Ferreira, 1990).

In the new constructions, of different sizes and usually made of compact stone or brick and hydraulic lime mortar, the local communities of laundress gathered to wash the clothes in the tanks. Usually, the building was equipped with two separated basins, one used to wash and the other to rinse, whose walls were furnished with rub-slabs made of compact granite stone to better clean the fabrics (Fig. 4). The wash-water, transported in large terracotta pots or conveyed into drainage water pipes, was then reused for irrigation or domestic uses (Howell Pato, 2011; Lencastre, 2003). These buildings, for the exclusive use of women, represented in the Portuguese life a real opportunity of socializing and conviviality. Indeed, it was not uncommon, passing near these structures, hearing an excited chatter or even songs and silly laughter.



ANOS	NUMERO DE OBRAS	IMPORTANCIA DAS COMPARTICIPAÇÕES EM MILHARES DE ESCUDOS
1932-33	38	2.000
1934	33	2.706
1935	40	3.120
1936	32	6.081
1937	37	7.553
1938	24	3.026
1939	21	2.233
1940	26	2.033
1941	33	2.107
1942	35	4.154
1943	34	7.043
1944	38	7.857
1945	104	25.663
1946	211	24.778
1947	174	24.025
TOTAL	880	124.379

ANOS	NUMERO DE OBRAS	IMPORTANCIA DAS COMPARTICIPAÇÕES EM MILHARES DE ESCUDOS
1932-33	23	2.058
1934	21	1.122
1935	21	3.008
1936	9	1.313
1937	9	949
1938	11	1.359
1939	9	1.402
1940	7	1.508
1941	3	1.132
1942	12	1.521
1943	4	2.250
1944	11	2.792
1945	9	2.335
1946	17	3.955
1947	14	3.438
TOTAL	185	30.242

Figure 4. Advertising of the works of sanitary treatments of the Portuguese waters (Howell Pato, 2011).

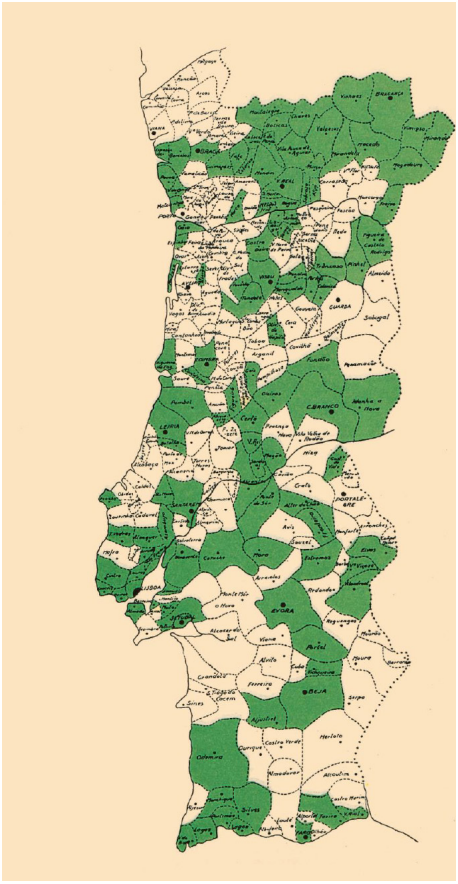


Figure 5. Areas where the Council for Sanitary Waters had intervened, after the local analyses and dispositions (1935). (Howell Pato, 2011).



Figure 6. Women washing (from left): early XX century (Gonçalves, 2015), decorative majolica panel, and today in Aveiro (Google).

If it was easy taking the dirty but dry clothes to wash, on the contrary it was much more difficult for the women bringing them back home when wet. Therefore, the largest public wash-houses were also equipped with an adequate external space with drying racks. Such a structures were easily and fast made by planting poles in a free area near the main building and stringing ropes. In the smaller buildings, or in the suburban areas, ropes were suspended from the branches or trunks of the neighbouring trees.

The location of a wash-house was fundamental for its correct and continuous operation. Therefore they were usually built close to rivers or canals, in well sunny and airy areas (Silva Correia, 1955). At the beginning their use was mainly occasional or tied to the family needs, but with time it was intensified with a more rational and "professional" practice. Moreover, washing clothes became a real job for all those women who used to wash, dry, and iron for a fee. Such a practice slowly became a proper public employment, then payed by the municipalities. In some cases, a proper warehouse for soaped cloths that had to sit a few days was arranged, for the most difficult dirt (Jorge, 1855). From the early twentieth century, the Executive Commissions of various towns allocated many funding to better canalise and/or dispose the water, enlarge the structures and grant safe health conditions to people and places. In 1932, the Portuguese Ministry of Commerce and Communication granted a substantial subsidy ("aid for rural improvement") to all those who wished to build of a tenement used as a wash-house. Some compulsory requirements regarded mainly the masonry, that had to be solid and bound with hydraulic mortar, the rooftop, that needed to be solid but light, the use of durable, waterproof, anti-wear, and anti-slip materials (Health National Institute).

Portuguese wash-houses typological features: the case of the city of Aveiro

The detailed study of the many surviving wash-houses in Portugal, and more particularly in the area of Aveiro, let to deduce the main typological, functional and constructive characters of this architectures: from the typological and architectural point of view, the wash-house is easily recognizable for its quadrangular shape, generally quite elongated. The tanks are - in the oldest cases - two distinct and large containers to which the water flows through a pipe-tube; in the most recent cases a series of separate little tanks, equipped with a tap, is observed. The most recent constructions are the most interesting as they express the novel hygienic-sanitary discoveries and developments of that time.



Figure 7. A typical structure denoting a wash-house, generally located in a central square.

The wash-house was generally built close to a spring of pure water, well-marked by the presence of a public fountain - frequently denoted by formal elements that contributed to the urban decor - from which the community could take drinkable water. In the earliest cases, behind or adjacent the fountain, it was associated a drinking trough for animals (Gonçalves Ferreira, 1990). The fountain was usually located in a higher position, while on a lower level, in order to exploit the falling water with canals and terracing, sloping floors or stairs, the collective wash-house was built on a special paved platform to grant stability.



Figure 8. Some wash-houses detected in the area of Aveiro. From left to right. First row: Dr. A. Souto st/Canas st.; Buragal st.; Direita de Aradas st.. Second row: Mateda st.; Cabeco st.; Cruzeiro da Feira square. Third row: Valinho st.; Areias de Vilar st.; Direita de Aradas (ruins). Fourth row: Pega st.; Lavadoiros st.; Sr. Das Barrocas st.

The proper wash-house could be covered by a light wooden roof supported by isolated parallelepiped pillars-plinth (stone pillars, wooden or iron beams). In some cases, stone arches are observed (to simulate other typical architectures of the time, such as markets and fish ponds). The two large basins, one for soaping and one for rinsing, are located in this single open and ventilated space: the tanks edges are inclined towards the inside of the basin and are designed to constitute a continuous or discontinuous stricter, with channels/slots/rifling useful to collect the water and facilitate the washing action, thus preventing soap and dirt from leaking into the large tank. Sometimes, along the perimeter walls, some stone seats were also located.

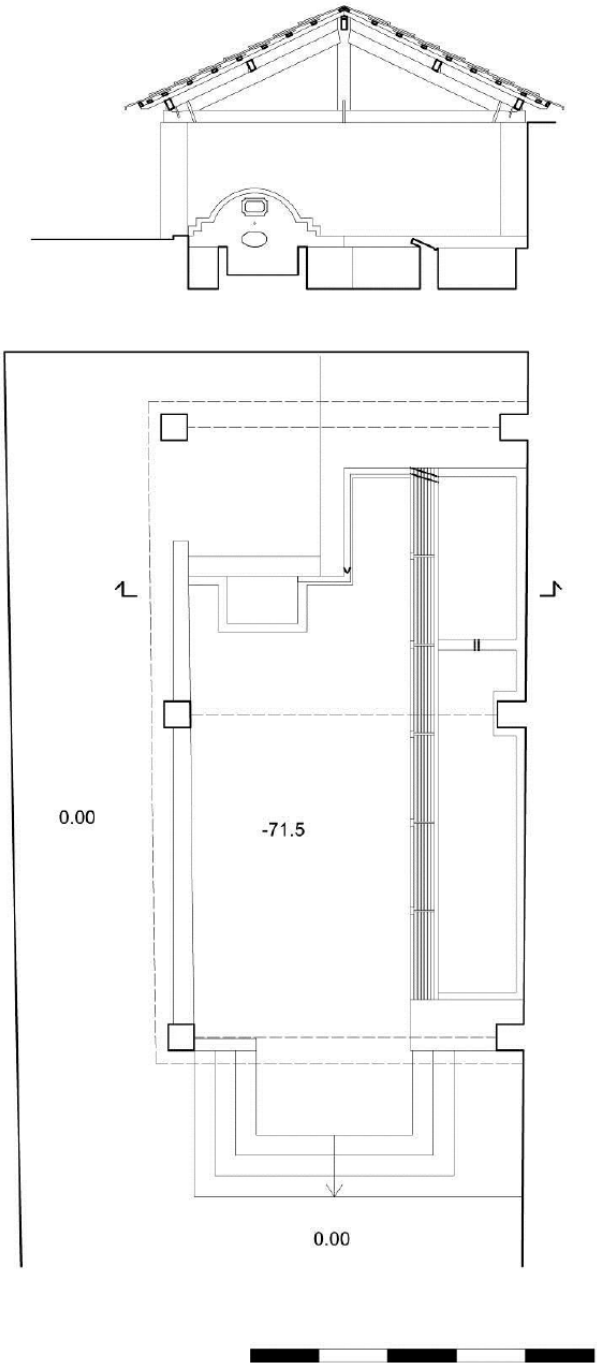


Figure 9. Plan and cross section of the wash-houses "Fonte da Pega" in Aveiro.



Fig. 10. Wash-houses materials and technologies. Canal of adduction to the tank in Cruzeiro da Feira wash-house in Aveiro (top left); drainage canal in the Oliverinha wash-house (top right); rifling slabs in concrete in the Aveiro Pega wash-house (bottom left); smooth slabs and soap shelf in San Bernardo (bottom right).



Fig. 11. Wash-houses structures: Top (old building made of masonry/mix concrete and wooden rooftop): Aveiro Penã (left); Oliverinha (centre); San Bernardo (right). Bottom (contemporary structures made of reinforced concrete or steel): San Bernardo Buragal (left); Vilar (centre); Aveiro Gloria (right).

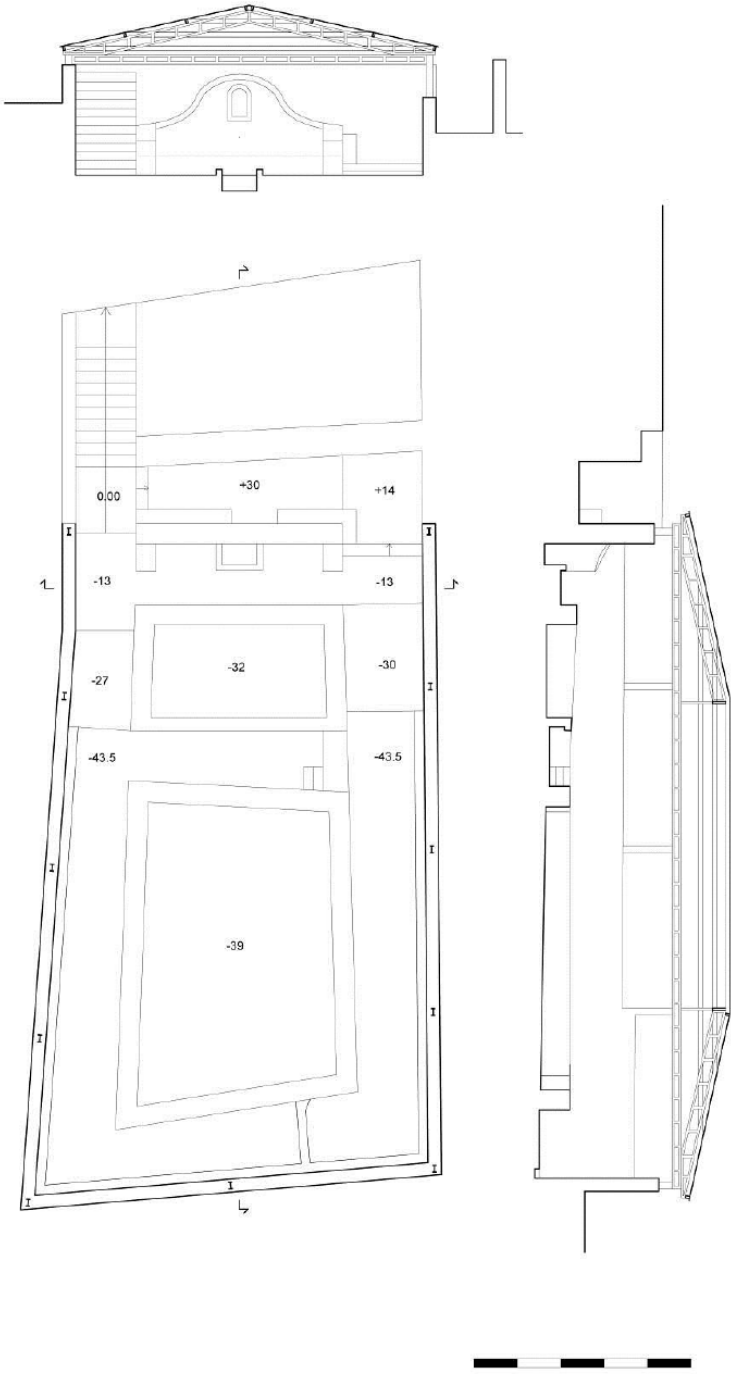


Fig. 12. Wash-houses in Lavadoiros st., plan and sections.

The local compact granite was generally used, when not substituted by cementicious materials. It was easily shaped and chiseled to obtain smooth, rough, or rifling surfaces. With time, and following the technological advances in construction, granite was slowly substituted by concrete, with a faster, easier, and cheaper production. Floors were usually made of compact stone, and paved with quadrangular stone, even hexagons or octagons. Roofing, with or without pitched roof, were often simple awnings made of wooden elements that were usually painted with lime milk to disinfect and protect the wood, while the covering was realized by Portuguese tiles. In the most recent examples, tiles are substituted by corrugated metal sheets and wood by steel trusses. If present, the plaster coating was usually made of lime mortar, then substituted by cementicious plaster, well recognizable by its grey colour (Gonçalves Ferreira, 1990).

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Figures 7-8-10-11 are taken by the authors. Geometrical survey was made by the authors.

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REVIEWING THE EXPERIENCE OF APPLYING PEER FEEDBACK IN DESIGN EDUCATION

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Abstract

One of the controversial issues in design education is the students' assessment, while instructors are basically in charge of providing constructive feedback, there is an increasing tendency toward engaging students in the assessment processes. Peer feedback is a formative assessment method aiming at encouraging students to interact and participate in giving feedback about their colleagues' work. The purpose of this paper is to review the experience of applying peer feedback and to evaluate its impact. The context in which peer feedback was applied is a lighting design course for female students in Saudi Arabia. The research adopts an analytical methodology and is structured into four sections, the literature review and theoretical background, the documentation of the peer feedback experience and its survey, the findings, and the discussion. The results of this study will provide insights into the perceptions of students about peer feedback and the observations of the instructor, in addition, challenges and potentials will be discussed.

Keywords: Peer feedback; constructive feedback; design education; critique; design jury

Introduction

Generally, assessment is one of the most controversial issues in higher education, particularly, in design education assessment is crucial. The critique is one of the common practices of assessment, in which students expect to receive constructive feedback on their work to develop their ideas. Although instructors and professionals are basically in charge of providing this feedback, recently, there has been an increasing tendency toward engaging students in the assessment processes. Assessment skills and critical thinking in education are important factors that raise the students' abilities and accelerate their development and learning.

In fact, critique sessions in design education commonly include some challenges and problems. Some students do not engage in class discussions nor benefit from

the time consumed during criticizing their peers' work. Some students do not concentrate during presentations to realize prevailing mistakes in their peers' projects. Students commonly do not listen to the instructors' feedback given to peers, but only feedback to their own work. Afterward, some students are dissatisfied with their grades, as they cannot realize their academic level against their peers, and consequently they believe that they were not graded fairly. Therefore, the initiative of incorporating peer feedback through the experience described in this research was due to the aforementioned challenges. The context of the experience is a lighting design course for female students in a university at Saudi Arabia. Peer feedback is not commonly used in that context, so the experience in this research represents individual experimentation of the author who is the instructor of those students.

There were some concerns related to the context of the experience, are students motivated to practice peer feedback? Will it increase their readiness to interact during their peers' presentations? Does it help students to identify the prevailing mistakes? Will it encourage them to analyze projects and deduce positive and negative points? Will they be able to give or write constructive feedback? Does peer feedback help students to understand the evaluation process and its criteria? And finally, will it enhance their time management and attitudes during presentations? This research will provide insights into the responses to the concerns through introducing the students' perceptions of peer feedback and the observations of the instructor.

The purpose of this research is to review the experience of peer feedback and to evaluate its impact. The research adopts an analytical methodology, and is structured into four sections, the first is a literature review and theoretical background, the second contains the documentation of the peer feedback experience and the students' survey, the third presents the quantitative findings, and the fourth section is the discussion. The topic of peer review and feedback in education has been studied heavily, however, studies on female students in Arab contexts are limited. The results of this study would be of importance to instructors in similar contexts.

1. Peer feedback: An overview

This section introduces an overview of the topic, it explains the assessment process in higher education, it provides background about peer feedback in general and in design education in particular, and finally, discusses the potentials and limitations of incorporating peer feedback.

1.1 The assessment process in higher education

Assessment in higher education has four purposes, firstly, to provide feedback to students to promote their learning progress and improve their overall performances. Secondly, to evaluate the students' acquainted knowledge, developed skills, and enhanced abilities. Thirdly, to transform the students' performance into marks and grades. Fourthly, to certify and declare that he student has attained a proper level of accomplishment suitable for practicing the profession (Fry et al., 2009). The Egyptian National Quality Assurance and Accreditation Committee (NQAAC) defines the student assessment as:

"A set of processes, including examinations and other activities concluded by

the institution to measure the achievement of the intended learning outcomes of a course / programme. Assessments also provide the means by which students are ranked according to their achievements. The students are well informed on the criteria by which they are assessed and given appropriate structured feedback that supports their continuing learning." (NQAAC, 2004)

There are two types of practices in assessment; formative and summative. Formative assessment enables students to know about their progress and gives them feedback about their performances, whereas summative assessment contributes to a grade or mark, it is recommended that summative assessment also includes a formative component (Fry et al., 2009). A vital element of assessment is incorporating feedback to improve and accelerate students' learning. Feedback is the commentary that will reinforce the students' capabilities to self-regulate their performances (Richardson et al., 2007). Thus, formative assessment helps to monitor students' learning and to identify their strengths and weaknesses. It is necessary for students to be provided with effective feedback because it drives and improves their learning, and the engagement of formative assessment improves the academic outcomes (Moore and Teather,2013).

Nowadays, there is an emphasis on the involvement of students in the educational process. Assessing and giving feedback that have been seen as exclusive duties of instructors limit the diversity of perspectives that students are exposed to, and are questionable as the students are not allowed to develop the self-regulation skills needed for professional life and careers (Mulder et al. 2014). James et al. reported that one of the constant concerns in higher education is that many students believe that they do not receive feedback on their progress (James et.al, 2009). Assessment which is centered around the instructor who holds all the power hinders the possibilities for the students to actively engage in their own learning, to hold their learning responsibilities, and to practice a collaborative model of learning (Spiller, 2012).

1.2 What is Peer feedback

In research communities peer review is already well known to researchers, it is a process of subjecting an author's research to the inspection of others who are considered to be experts in the same field of this research, and therefore allowing the journal editors to make informed publication decisions about research (Publons, 2018). Generally, it is believed that peer review helps in improving the quality of research published in journals (Ware 2008), and for researchers, it helps them in return to improve the quality of their own research. In education, peer feedback and review are widely used in the teaching of writing as the most frequent use of peer assessment (Gehringer, 2017). Many pieces of literature documented experiences in implementing peer review to improve the quality of the students' writings (Ljubojević, 2014; Tahrir, 2012; Zhoa 2007), and this means that peer review is influential to develop their creativity. The active participation of students in planning the assessment process and its criteria and then making judgments will better prepare them for the type of learning in which they will engage throughout their lives (Boud and Falchikov, 2006). Students should be given chances to participate more positively in the assessment process, formative peer assessment empowers students as self-regulated learners, (Mulder et al. 2014).

The terms peer review, peer feedback, peer assessment, and peer evaluation

are used interchangeably, they refer to peer centered activities that vary depending on the objectives sought. These terms essentially involve students critiquing other students on the quality of their work. In some instances, the practice of peer feedback will include the assigning of a grade, such as in peer assessment and peer evaluation. While review and feedback tend to involve the provision of feedback on students work but without grading (Ono, 2017). For the purpose of this research, the term peer feedback will be used to refer to the experience in hand, since students were required to give formative feedback on their peers' work without giving marks.

For about three decades, peer review has been used to evaluate a wide range of students' works such as written works, oral presentations, art products, architectural designs, programming, and musical performances (Pearce at al., 2009). Peer feedback could be anonymous or blinded to enhance the honesty in reviews and to provide fairer comments (Ono, 2017; Razmov and Vlasseva, 2004; Wilson et al., 2015), or face-to-face, which is relatively rare in most higher education programs (Hurst and Nespoli, 2015; Patri, 2002), however, it is frequently used in design education as the students are usually engaged into discussions. In addition, there are several methods of submitting the students' feedback, as they could be written and submitted manually, recorded in digital templates, or completed online to facilitate the management of the review process.

1.3 Peer Feedback in design education

In fact, interaction is essential in the educational design studio, where students interact together and with their instructors. Conventionally, the design studio is a rich learning environment that encourages communication, through all the practices involved, designing, discussing, critiquing, hanging projects for pin-ups, presenting projects, and giving and receiving feedback from instructors and jurors. In architecture, the studio is an important community setting for learning in architectural design and feedback is a complex act involved (McClean and Hourigan, 2013).

There are various techniques of evaluation in architecture and design education. One of these techniques is the pin-up critique where students orally present their work and receive comments, in interim pin-ups feedback is the goal rather than evaluation, and comments should be constructive (Gunday Gul and Afacan, 2018). Another dominant technique is the jury, it is more formal than the pin-up, it acts as a medium for interactions between instructors, students, experts, and also peers, while students are required to present their work they get feedback from instructors and experienced practitioners, this technique has been central to architectural training since the foundation of the ateliers at the Ecole des Beaux-Arts in Paris (Shaffer, 2003).

Some problems with the practice involve the stressful nature and the subjectivity involved. Some criticism had been directed to the jury, as it commonly lacks the dialogue between evaluators and the presenting students, whereas juries should involve a pedagogic role and enhance dialogue and discussion (AIAS, 2002). There is rare literature to assist instructors on how to increase their competencies in delivering educationally successful critiques, instructors seem to follow fixed conventions without examining the underlying pedagogy (Moore and Teather,2013;

Scagnetti (2017) argue that little has been written on how instructors might enhance the quality of their critiques and interactions with students, and that students themselves perceive instructors' feedback as one of the least satisfactory aspects of higher education, hence, developing and improving effective feedback methods and techniques is important to achieve the desired learning outcomes (Scagnetti, 2017).

Schon and Simon have discussed the iterative nature of design, where design problems are revisited repeatedly in a generative process. In the proposed solution, the designer chooses to address an issue, then the strengths and weaknesses of this solution are analyzed, this occurs often in a public setting in the form of feedback from others. Afterward, the designer will be able to refine the solution, and then a new solution goes through the same sequence, and so the process continues until the analysis of one of the iterations becomes a satisfactory way to resolve the issue (Schon; Simon, cited in Shaffer, 2003). Feedback is a key aspect in design education, students need feedback to develop and refine their ideas, they need to be trained to use their critical thinking skills to be used continuously during the design process they perform. Peer review is rare in some disciplines, but the practice of allowing students and instructors to participate in evaluating and critiquing the designs of peers has been a long-standing practice in the discipline of architecture (Hurst and Nespoli, 2005).

In a study about the pedagogy of architectural design, Oh et al. (2013) emphasized the importance of effective feedback, instructors are required to vary the critiquing types according to the different stages of the design process, and to the academic levels of students, so during the primary stages of design analysis it is useful to implement peer discussions so that each student can monitor his/her work within the levels of peers (Oh et.al. 2013).They also suggested that peer feedback in design studios, may occur as informal discussions among the students or as group critiques, in both cases the students discuss their ideas with peers, and the instructors show them how to critique appropriately (Oh et.al. 2013). So students view alternative approaches to the same design project, it enables them to contribute in discussions, and it supports collaborative learning and encourages them to value peers' opinions.

Utaberta et al (2013) explained the process of peer feedback sessions, students need to understand the evaluation process and its criteria, then peers give feedback verbally or through written comments given to the individual student through nameless sheets (Utaberta et al., 2013). The practice of incorporating peer feedback in design generally and in design education particularly is not recent, however, it seems uncommon due to the lack of a scientific background, so more research is needed to investigate its best practices to increase its reliability and applicability in design education.

1.4 Potentials of incorporating peer feedback

Peer feedback is beneficial for students to receive broader criticism about their design projects, not only from their instructors, but also from their peers. Actually, peers are capable of giving reliable feedback that could be almost equally valuable to the instructor's feedback (Mulder, et al. 2014), and they perform vital roles in constructing individual knowledge through the breadth of perspectives involved in peer feedback (McClean and Hourigan, 2013).

Through practicing peer feedback, students will develop their critical thinking and higher-order cognitive skills (McClean and Hourigan, 2013; Mulder et al., 2014; Nilson, 2002) because they are required to analyze each other's work and provide constructive criticism. And since peer feedback is related closely to self-assessment, it accordingly enhances the learning experience of the students, and this can be achieved by allowing them to take active roles, and to be aware of the positive points of their own work, and on the other hand areas that require attention (McClean and Hourigan, 2013; Mulder et al. 2014,). Moreover, peer feedback allows for benchmarking the students' performances in comparison to their peers, and accordingly helps them to increase the quality of their work, this is actually because of the self-reflection that may follow the critique sessions (Mulder, et al. 2014).

In addition, peer feedback has some reflections on attitudes of the students. They feel less stress when conducting peer review, as the process differs from the formal review given by the instructor, advice given by peers are easier to be understood, and through peer review, more discussion is made among peers (Tahrir, 2012). Peer feedback enhances communication skills and fosters the collaborative abilities and team working (Nilson 2002). Therefore, peer review cultivates a wide range of skills involved in the process of giving and receiving criticism, these skills are essential in the professional workplace after university education. (Mulder, et al. 2014)

On the other hand, for instructors, there are some benefits of applying peer feedback. Due to the increased numbers of students in higher education and consequently increase in class sizes, peer feedback may be considered a time saver for instructors; because it increases their abilities to provide students with the essential feedback, and helps them to achieve effective teaching and learning through giving the students useful and timely feedback (Mulder, et al. 2014). If peers can be involved in the task of critiques, teachers' time could be utilized more productively on issues related to improving their teaching techniques (Patri, 2002).

1.5 Limitations of incorporating peer feedback

Despite the benefits of peer feedback, some studies (Ertmer et al., 2007; Mulder et al., 2014; Nilson, 2002; Pearce, 2009; Richardson et al., 2007; Tahrir, 2012;) showed some drawbacks. From the viewpoints of instructors, the reliability of peer feedback is a questionable issue (Pearce, 2009). Students are more likely to give comments about form rather than content, and the quality of their feedback differs according to their levels, so consideration of the levels should be given to expect different student abilities (Tahrir, 2012). The reliability of peer assessment is low (Nilson, 2002). Bias versus fairness are other issues to be reported (Pearce, 2009). Peer assessments in oral presentations are biased and are more compassionate compared to the instructor's judgments (Nilson, 2002). The process needs to be monitored by the instructors to ensure there is not potential abuse of peer power (Richardson et al., 2007). Finally, students have a tendency to either inflate or deflate their evaluations (Ertmer et al., 2007).

On the other hand, from the perceptions of the students, they are not confident in the efficiency of the peer review process and might be dissatisfied, a study about their perceptions reported that they had to exert great effort into analyzing and judging their peers' work, however, they received less attention from their peers (Mulder et al., 2014). Students refuse to take the responsibility of assessing their peers if they see

it will substitute the instructor's feedback, others think that evaluation should remain the responsibility of the instructor (Mulder, et al., 2014). Furthermore, students may perceive peer feedback as invalid, they may refuse to accept negative feedback (Ertmer et al., 2007). Richardson et al. (2007) argue that the validity of the feedback is also a challenge, instructors need to know that peer assessment is not a naturally acquired skill, thus students need to be trained to be familiar with the process. Finally, poor performing students do not accept peer feedback as accurate (Richardson et al., 2007).

2. The experience of peer feedback

This section explains the experience of applying peer feedback, it introduces the course overview, the procedures, the data gathering tool and methodology of analysis, the participants profiles, and the limitations of the study.

2.1 Course overview

This study was conducted in an undergraduate lighting design course for sophomores, at Princess Noura Bint Abdurahman University (PNU) in the Kingdom of Saudi Arabia, which is considered the largest women university in the world. This course was a three-credit one that introduced an overview of lighting design concepts in architecture and interior design, its principles, applications, theories and technologies through a project-based pedagogy. The reasons for selecting this course for applying peer feedback is the challenge involved, as this course required the students' engagement in the scientific and technical knowledge about lighting requirements, while required considering the artistic and aesthetical factors in their proposed designs. Additionally, some of the course learning outcomes seemed to accept the incorporation of peer feedback, for example it aimed at teaching the students how to determine the lighting needs of a space, analyze the space, decide the best lighting design, and criticize lighting design. Moreover, the course specification mentioned that students should show acceptance of and participation in constructive criticism of design work, which encouraged the author to adopt peer feedback.

2.2 Peer feedback procedures

At the beginning of the course, the instructor explained to the students the objectives of peer feedback and how is will be used regularly throughout the course during pin-ups and juries, with the exception of some desk critiques. Criteria of assessment were announced in the assignments and projects briefs; students were asked to follow these criteria to guide them when analyzing and reviewing their peers' work, but they were not required to give summative assessment by grading. The students were given a template to fill, it contained the personal information, the presenter's name, positive points, negative points, and suggestions for improvement, they were asked to give feedback. During the peer feedback sessions, each student started presenting her project and in the same time her peers were required to write down at least two positive and two negative points about her work, and then provide suggestions. the instructor postponed giving feedback to allow the students the chances to write down what they think by their own, then after submitting their templates discussion was open. The peer feedback in this design course was practiced through discussing the comments so reviewers and

reviewees know each other's opinions.

2.3 Methods of reviewing the experience

This research adopts an analytical methodology, it provides insights into the responses to the concerns of peer feedback experience that were discussed in the introduction. Using a questionnaire and quantitative analysis it introduces the students' perceptions of peer feedback in the findings section. In the discussion section the research demonstrates the implications of the quantitative findings together with the observations of the instructor. Additionally, to judge the efficiency of this experience, the learning outcomes of a group of previous classes who did not practice feedback were used to provide the comparison of before and after the experience. The data gathering tool used was a paper-based questionnaire that aimed at evaluating the experience of incorporating peer feedback and to explore the students' perceptions about it. The paper-based questionnaire facilitated receiving the responses for students immediately when it was answered after the class time. The study was undertaken in five semesters between years 2016 to 2018 for a number of 5 classes. A pilot study was preliminarily applied to the first group to check the wording, to obtain some comments, and to test the information. The first responses showed interest in the questionnaire, and understanding to its questions, no refinements were applied to questions.

The questionnaire was in Arabic and consisted of 16 multiple choice questions (MCQs) that enabled obtaining quantitative results, and the answers of the questions were introduced in a four-point Likert Scale; strongly agree, agree, disagree, and strongly disagree, as this four-point scale forced the respondents to make clear choices. According to Garland (1991) the purpose of a rating scale is to let respondents express the direction and strength of their opinions about the topic studied, hence a scale without a midpoint would be preferable, on a condition that it does not affect the validity or reliability of the responses. Moreover, Worcester and Burns concluded that a four-point scale without a midpoint appeared to push the respondents towards the positive ends of the scale. (Worcester; Burns, cited in Garland, 1991). Therefore, the reason for omitting the midpoint (neutral) on the scale was to obtain more reliable results on students' choices, since they might tend to choose neutral and avoid deciding which might consequently affect the results of the questionnaire. The four-point scale values and statistical limits that were used to calculate the mean of the responses are shown in Table 1.

Answer	Strongly Agree	Agree	Disagree	Strongly Disagree
Value	4	3	2	1
Statistical limits	3.5-4.0	2.5-3.49	1.5-2.49	1-1.49

Table 1. Likert Scale values and statistical limits

2.4 Participants Profiles

Since PNU is a women university the sample was all female students, and the majority of them did not practice feedback before the experience in this study, so to

them peer feedback was a novelty. The questionnaire was distributed at the ends of the semesters to five classes with a total of 75 students. Although the contribution in peer feedback sessions was mandatory since they were within the course activities, returning the questionnaire was optional. Accordingly, only sixty-seven valid questionnaires were received and included in this study, with a response rate (89.3%).

2.5 Limitations

There are a number of limitations to this study, such as the relatively limited number of students who were subject to the survey, also the study did not consider the effect of the different personal styles, characteristics and abilities of the students. In addition, the tight scope of time which is one academic semester with a scope of 15 weeks is a concern. The study focused on the experience in general, it did not aim to provide detailed examination to the specific feedback given by students to their peers.

3. Findings

This section analyzes the responses of the students and presents the findings of the survey. Each of the following points deals with an issue of the questionnaire, the options of answers are shown as well as their responses.

3.1 General course review

Questions 1, 2, 3, and 4 explored the students' opinions about the course in general. In question one all the students agreed that objectives of peer feedback were explained, almost all of them (n= 62, 92.5%) strongly agreed, and a minority (n = 5, 7.5%) agreed as shown in Figure 1, the mean of the responses is (3.9), which correspond to 'Strongly Agree' according to the analysis of the Likert Scale. In question 2 the majority of students (n = 58, 86.6%) strongly agreed that this course helped them to develop self-learning skills, a minority of them (n = 9, 13.4%) also agreed as shown in Figure 2, the mean of the responses is (3.9), which corresponds to 'Strongly Agree'.

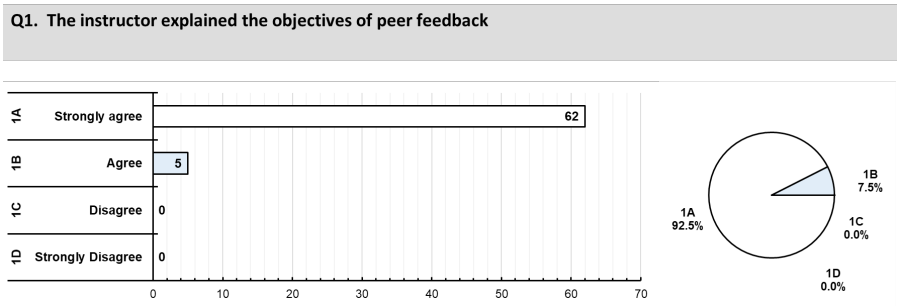


Figure 1. Analysis of the responses to Question 1



Figure 2. Analysis of the responses to Question 2

The third question explored the students' opinions about the level of engagement in classwork, the majority of students (n = 61, 91.0%) strongly agreed, the minority (n= 5, 7.5%) agreed, while one student did not agree (1.5%) as shown in Figure 3, the mean of the responses is (3.9), which corresponds to 'Strongly Agree'. Question 4 required the students to mention if their criticism abilities have developed through this course, more than half of the students (n = 39, 58.2%) strongly agreed, and more than one third of the students agreed (n= 25, 37.3%), while few students did not agree (n=3, 4.5%) as shown in Figure 4, the mean of the responses is (3.5), which corresponds to 'Strongly Agree'.

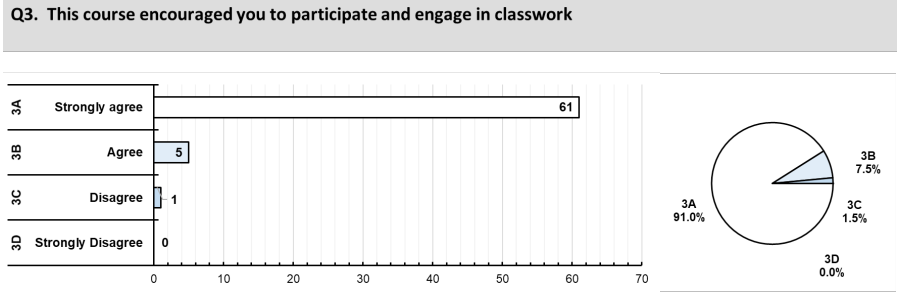


Figure 3. Analysis of the responses to Question 3

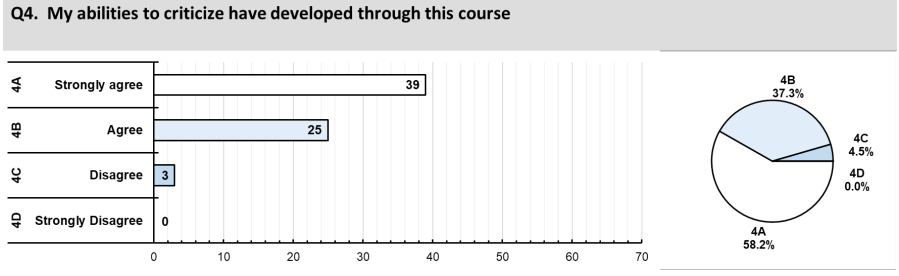


Figure 4. Analysis of the responses to Question 4

3.2 Students' familiarity with peer feedback

Question 5 on the survey was about students' prior experience in peer feedback, Figure 5 displays the analysis of this question. One third of the respondents (n=21, 31.3%) previously practiced peer feedback so they disagreed, almost half of the

students strongly agreed (n = 32, 47.8%), and a minority agreed (n=14, 20.9%), the mean of the responses is (3.2), which corresponds to 'Agree'.

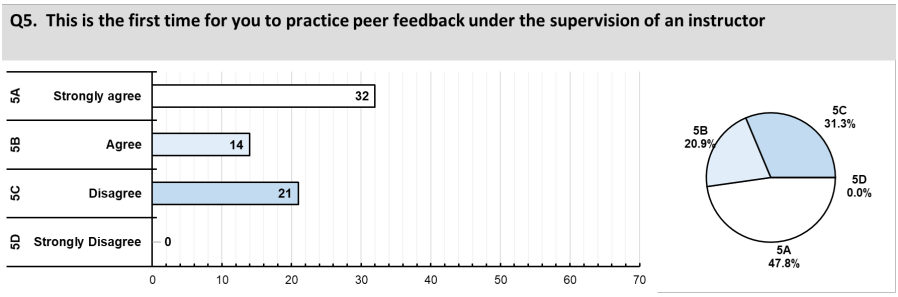


Figure 5. Analysis of the responses to Question 5

3.3 Students' preferences regarding peer feedback

In the sixth question students were asked if they preferred to get feedback from the instructor only, about one third agreed (n=21, 31.3%), and one quarter strongly agreed (n=18, 26.9%), while about one third strongly disagreed (n=20, 29.9%), the remaining students disagreed (n=8, 11.9%), the mean of the responses is (2.6), which corresponds to 'Agree'. Question 7 was a similar question exploring if students preferred to get feedback from both their instructors and peers, more than half of them strongly agreed (n=37, 55.2%), and more than one third selected agree (n=25, 37.3%), whereas a minority disagreed (n=5, 7.5%), the mean of the responses is (3.5), which corresponds to 'Agree'. In the eighth question, the students were asked to express if they are not interested to practice peer feedback again in the future, almost a half of the responses were 'strongly disagree' (n=31, 46.3%), one fifth of them disagreed (n=20, 29.9%), while 10 responses (14.9%) were 'agree', and the least proportion of responses were for strongly agree (n=6, 9.0%), the mean of the responses is (2.2), which corresponds to 'Disagree'. the analysis of the responses to questions 6,7,8 are shown in Figure 6, Figure 7, and Figure 8 respectively.

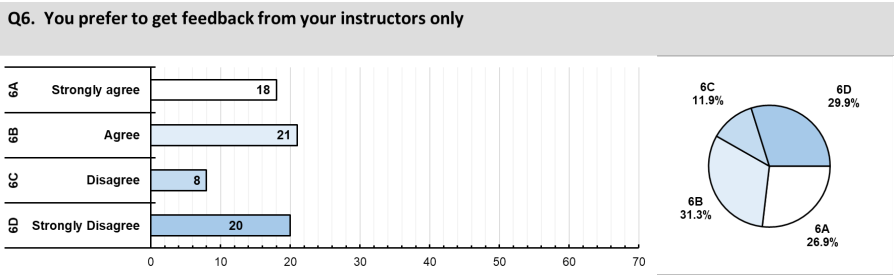


Figure 6. Analysis of the responses to Question 6

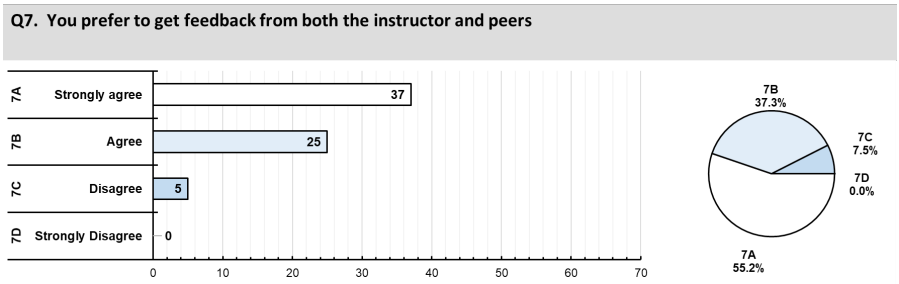


Figure 7. Analysis of the responses to Question 7

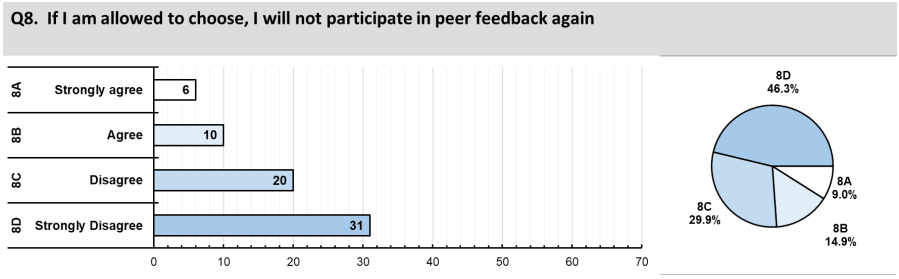


Figure 8. Analysis of the responses to Question 8

3.4 Benefits of peer feedback

In responses to question 9, the majority of students (n=41, 61.2%) strongly agreed that peer feedback helped them to understand the nature of the course and its evaluation criteria, one third also agreed (n=20, 29.9%), on the other hand few students strongly disagreed (n=4, 6.0%), and two of them disagreed (3.0%), these findings are shown in Figure 9, the mean of the responses is (3.5), which corresponds to 'Agree'. In addition, question 10 asked the students if they were able to benefit from the time during juries, almost half of them strongly agreed (n=33, 49.3%), almost one third agreed (n=22, 32.8%), fewer students disagreed strongly (n=10, 14.9%) and two students disagreed (3.0%), the responses to this question are shown in Figure 10, the mean of the responses is (3.2), which corresponds to 'Agree'.

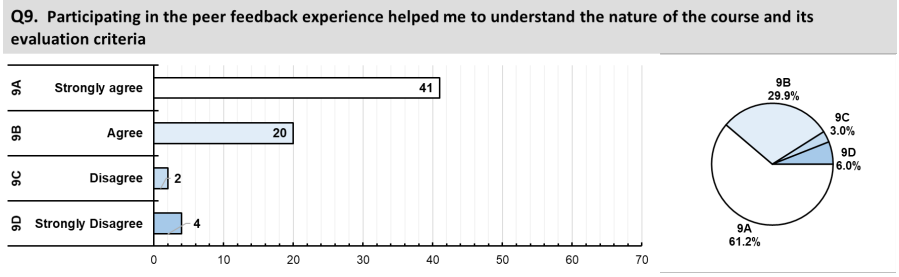


Figure 9. Analysis of the responses to Question 9

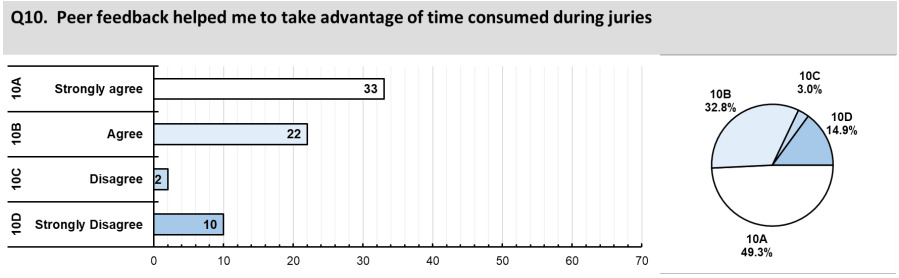


Figure 10. Analysis of the responses to Question 10

Question 11 explored the students' perception of the impact of peer feedback on their abilities to develop their own ideas, the highest majority (n=48, 71.6%) strongly agreed, also one quarter agreed (n=17, 25.4%), but only two students disagreed (n=2, 3.0%), analysis of responses to this question is shown in Figure 11, the mean of the responses is (3.7), which corresponds to 'Strongly Agree'. Question 12 investigated the students' opinions on the role of peer feedback in helping them to recognize prevailing mistakes, no one disagreed to this benefit, the highest majority (n=56, 83.6%) strongly agreed, and (n=11, 16.4%) agreed, the question and its responses are displayed in Figure 12, the mean of the responses is (3.8), which corresponds to 'Strongly Agree'.

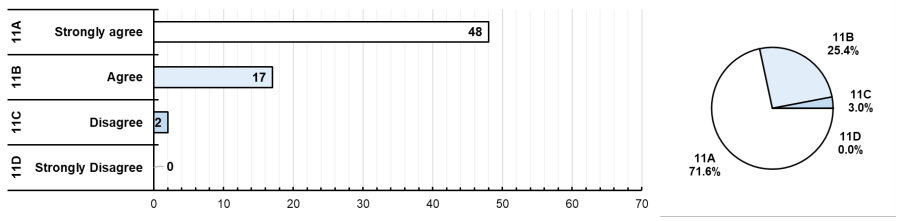


Figure 11. Analysis of the responses to Question 11

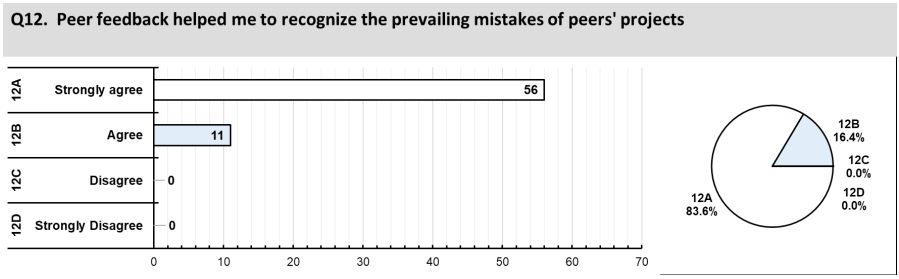


Figure 12. Analysis of the responses to Question 12

3.5 Perceptions about the technique of peer feedback

Questions 13, 14, 15, and 16 investigated students' views about the technique of peer feedback. Question 13 showed that the majority of students (n=42, 62.7%) strongly agreed to comment on positive points, about one third of them agreed

(n=22, 32.8%), while three students disagreed (4.5%), the mean of the responses is (3.6), which corresponds to 'Strongly Agree'. In question 14 students were asked a reverse question to see if they preferred to comment on negative points, findings showed that less than one quarter of the students strongly agreed (n=15, 22.4%), also another quarter agreed (n=15, 22.4%), while more students selected the two other options, as (n=18, 26.9%) strongly agreed, and the highest portion of responses selected strongly disagreed (n=19, 28.4%), the mean of the responses is (3.4), which corresponds to 'Disagree', Figures 13 and Figure 14 display those questions and the breakdown of their responses.

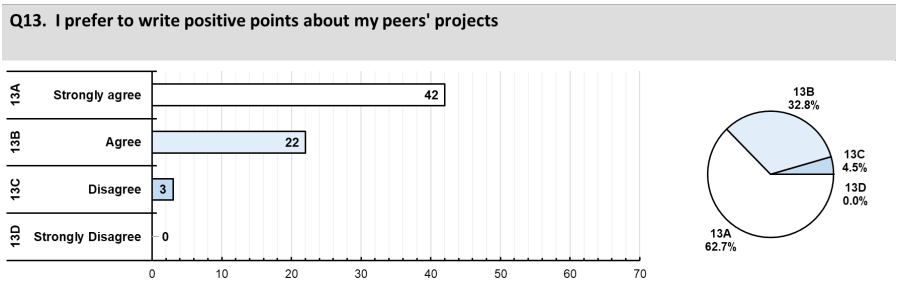


Figure 13. Analysis of the responses to Question 13

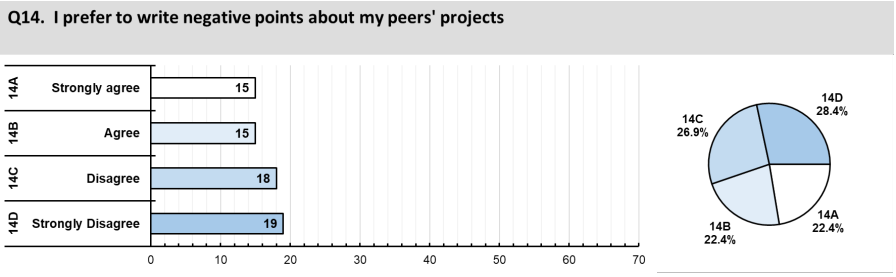


Figure 14. Analysis of the responses to Question 14

The fifteenth question investigated the students' opinions about the easiness of giving comments and proposing ideas to their peers, less than half of them (n=30, 44.8%) strongly agreed, one fourth of the students (n=17, 25.4%) agreed, equal numbers of students selected both disagree and strongly disagree (n=10, 14.9%) as shown in Figure 15, the mean of the responses is (3.0), which corresponds to 'Agree'. Finally, in the sixteenth question students were asked to provide their preference of giving written or oral feedback, almost the majority strongly agreed on oral peer feedback, (n=47, 70.1%), almost one fourth agreed (n=16, 23.9%), and only four students disagreed (6%) as shown in Figure 16, the mean of the responses is (3.6), which reflects 'Strongly Agree'.

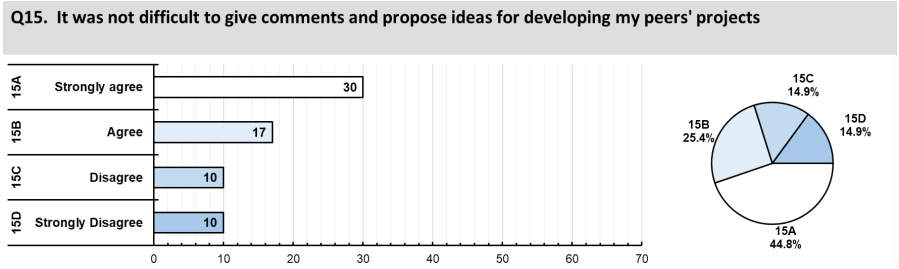


Figure 15. Analysis of the responses to Question 15

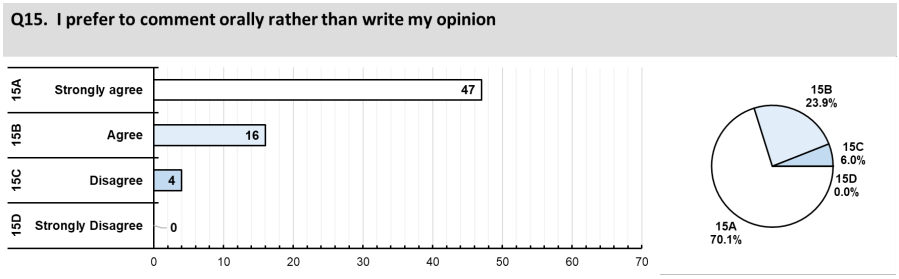


Figure 16. Analysis of the responses to Question 16

4. Discussion

This section discusses the implications of the findings and incorporates the instructor's observations and comments on the peer feedback experience, discussion also responds to the concerns in adopting peer feedback in the context of Arab female students. All of the students affirmed that the objectives of peer feedback were explained to them. Richardson et al. ensured the importance of guidance in peer feedback (Richardson et al., 2007), so the instructor monitored the sessions of peer feedback. The highest majority of students reported that they did not have prior experience in peer feedback, yet their attitudes toward feedback were generally positive. This research did not intend to compare their performances with those who practiced peer feedback previously. The primary course assignments incorporated peer feedback, the environment had to encourage students and to enhance their confidence, so that they get some training before beginning their projects.

4.1 Students' motivations to practice peer feedback

In the beginning of adopting peer feedback sessions, some students were worried to provide feedbacks, as they were concerned that it may affect the instructor's evaluation and grades, but later these worries gradually disappeared when they realized that their opinions will not affect the grades of their peers. The majority of the students reported that it was not difficult for them to give comments and propose ideas to their peers. In general, all students were keen to follow the rules and give feedbacks, while some of them considered this experience interesting. Findings showed that about one quarter of them reported that if they had the option to decide they won't practice peer feedback in the future, consideration should be taken to this finding since peer review is not used in the university which

is the context of this study. Perhaps, peer feedback in a female student community, and within small classes made no barriers or embarrassments, as students were cooperative and enthusiastic. Compared to previous groups of students those who practiced peer feedback experienced energetic project presentations.

4.2 Interaction among students during presentations

Findings revealed that the highest majority of students assured that peer feedback encouraged them to interact and engage in classwork, the instructor observed that communication among them raised to comprise the whole class, while in previous groups only smaller groups of friends communicated. Although when asked if they preferred to get feedback from the instructor more than half of them agreed, the highest majority preferred to have feedback from the instructor and peers, which augments the impact of the experience. Unlike, the monotonous setting of the instructor as the sole commenter peer feedback inserted energy into class discussions during presentations. Hence, peer feedback increased the students' concentration and project centered discussions. While students were required to write their feedback and discuss it orally, the majority of them preferred oral discussions more than written feedback.

4.3 Identifying the prevailing mistakes

One of the challenges that faced the instructor is to give the same amount of feedback to all students fairly, particularly in the early design stages, when the students' mistakes are more frequent, and accordingly feedback is essential. The findings revealed that all students agreed that peer feedback helped them to identify prevailing mistakes, and hence they had to check if they also made any or the same mistakes. Most of them were able to avoid these mistakes compared to previous classes. Hence, peer feedback helped to save effort and time and to accelerate the students' learning processes.

4.4 Analyzing projects and deducing positive and negative points

Encouraging students to perceive a wide range of approaches to the same design problem as well as to give commentary on positive and negative points enhanced their abilities to criticize. As a result, self-analysis and self-reflection are expected to be enhanced (Mulder, et al. 2014; Scagnetti, 2017), the findings showed that almost all of them reported that peer feedback helped them to develop their own ideas, but practically, it has been noticed that only some of them did develop ideas according to peer feedback. In fact, students were inclined to write positive points more than negative ones, this was noticed in their templates, and some students did not write negative points. Findings demonstrated that almost all of the students agreed to write positive points only, while more than half of them disagreed to write negative points. In addition, many comments were about presentation techniques and styles, this is in line with a previous study that reported the tendency of reviews is toward the form more than the content (Tahrir, 2012).

4.5 Providing constructive feedback

According to the revised Bloom's Taxonomy, which classified the cognitive abilities, the ability to create is the highest one followed by the ability to evaluate

and then the ability to analyze (Anderson & Krathwohl, 2001). Actually, feedback sessions call most of the students' abilities, as they are requested to analyze the projects of their peers, evaluate these projects, and if possible, propose suggestions for development. Accordingly, the responses of the students during these sessions were varying, as most of them were able to analyze, fewer were able to evaluate, while the fewest portion of them was able to propose ideas to improve the projects of their peers. Although it was difficult to some students to propose suggestions for development, this requirement encouraged them search for alternatives and enhanced their abilities to be fluent and flexible in generating design ideas. Moreover, the students were encouraged to communicate their proposals orally, and they handled this task successfully.

4.6 Understanding evaluation process and its criteria

In comparison to the previous classes that did not practice peer feedback, it has been noticed that the students subject of this study were less complaining about their grades, and their understanding of the evaluation criteria increased. The survey showed that a high majority of them agreed that peer feedback helped them to understand the nature of the course and its evaluation process. As a result, the students were able to expect and estimate their academic ranking compared to their peers. A high portion of the students reported that their abilities to criticize has raised through practicing peer feedback, however this finding could not be confirmed, since the content of their feedback should be thoroughly analyzed and compared to their levels.

4.7 Students' attitudes during juries

In the previous classes and during juries, it was noticed that the students were undisciplined and distracted, and much time was consumed uselessly. Nevertheless, in classes that practiced peer feedback, it has been observed clearly that the students were able to take advantage of time during juries, as they were required to listen and concentrate to the presentations and have positive attitudes during these presentations. In addition, the survey revealed that many students agreed that they had better time management during juries when they are requested to provide peer feedback. Presentation skills also has been developed through the experience, in comparison to the previous classes who conventionally direct their presentations to the jury members, the students of the classes subject to this study presented more efficiently and tried to grasp the attention of all students, therefore, their presentations were more efficient since they gave significant attention to their presentation styles.

Conclusion

This research intended to review the experience of incorporating peer feedback in a lighting design course at a women university in Saudi Arabia, and to evaluate its impact. The research used an analytical methodology, it explored the students' perceptions of the experience using a questionnaire, the responses were analyzed using quantitative methods, and the observations of the instructor about the experience were also documented.

Through the experience handled in this study, incorporating peer feedback

was accepted by the students and they were enthusiastic and motivated. This result could be related to a number of reasons, its novelty to most of them, their expectations to benefit from broader feedback, the environment of confidence within the studio due to encouragement provided to them, the presence of female only students which made discussing feedback to occur with no embarrassments, and the simplicity of the feedback template used.

A number of benefits were recorded. In regard to cognitive skills, peer feedback evolved valuable discussions among the students and their instructor. It helped in avoiding their prevailing mistakes, and thus, saving time and effort. It helped students to develop their analytical skills which led to deeper understanding of the design problem, and this understanding accelerated the rates of developing design ideas. The benefits of this experience were not only limited to the benefits of receiving feedbacks but also extended to the benefits of giving feedbacks. Students' involvement in peer feedback enabled them to deduce the strengths and weaknesses of their projects, as well as of their peers' ones. Finally, peer feedback led to students' persuasion of their grades. In regard to the communication skills, students' behavior during juries has improved significantly, and the findings revealed that there is a preference for the oral feedback more than the written feedback.

Despite the time and efforts spent in preparing peer feedback sessions, the rejection by some students, and the skepticism of others, it is worth trying. On the other hand, the experience faced some challenges. The worry of students in the beginning to give feedbacks, which required encouragement to support their confidence. The incapability of some students to provide constructive feedback, as they generally tended to comment on the form of the projects rather than their contents. And finally, the tendency of some students to focus on the positive aspects rather than the negative ones. These challenges call for more training for students to develop critical skills, which might be the scope of dedicated courses that target to develop these skills.

Last but not least, peer feedback is inherent and rooted in architecture and design education, however, it is not yet commonly adopted, and it occurs as individual attempts depending on the instructor's perspective to implement it within design courses. Hence, further applications of peer feedback and research are recommended.

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SPATIAL ADAPTABILITY AS A NEW APPROACH FOR SUSTAINABLE ARCHITECTURAL DESIGN: CASE STUDY OF (BATTERSEA POWER STATION IN LONDON & MINSHENG ART MUSEUM IN CHINA)

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Abstract

As a result of technological development and the emergence of new buildings types and the change in types, activities and required uses, a need for other activities and uses may appear at the site that occupied by some of existing buildings, that's because of relocation the uses of the existing building to other regions, ceasing of the uses of the existing building, a need for another activity at the site that occupied by the existing building, or changing the uses due to a new urban design project, which led to increase the need for reusing the existing buildings within an adaptable process.

Adaptable reuse is concerning about changing the function of the existing building to a new required function, instead of demolishing the existing building and rebuilding another one for the new use, while maintaining the structure and originality of the existing building as much as possible, in order to benefit from the existing building which is considered a part of the real estate wealth.

Sustainability is one of the major current international trends, where most directions take positive steps to meet the requirements of sustainability which includes maintaining the available resources and its environmental, social and economic aspects.

The research concerns about the ideas of adaptability in reusing buildings with changing its activities while maintaining its structure to achieve sustainability, through studying the sustainability approaches which maintaining resources, recycling process and reusing of materials which are important factors in achieving

sustainability, and also maintaining the building structure through a well thought out strategy leads to sustainability achievement. The research included a theoretical study on adaptability, principles of adaptability, flexibility, case studies and an analytical study of some adaptable reusing case studies (Battersea power station in London and Minsheng art museum in China) whose functions had been modified to other uses, the study identified the most important design elements of adaptability that had applied in these case studies.

The research aims to provide an architectural design strategy to obtain sustainability through spatial adaptability for building reuse.

Keywords: Adaptability, adaptive reuse, buildings reuse, architectural design, sustainable design.

Research problem

The absence of a clear strategy to integrate and strengthen the relationship between the adaptability of buildings reuse with sustainability despite the increasing need to change the uses and functions of some buildings.

Research goal

The research aim to provide an architectural design strategy to achieve sustainable adaptive reuse in buildings.

Research methodology

The research methodology is based on two approaches: theoretical and applied studies. The theoretical component seeks to identify the concepts and role of design for spatial adaptability of buildings and the principles to achieve sustainability. This is followed by applied and analytical studies of two international case studies that provide examples of strategies that could be applicable to achieve sustainability by spatial adaptability for the existing buildings and for the buildings in a design phase. Then the paper concluded the strategy by spatial adaptability to be a successful approach to achieve environmentally, economic and social sustainable development.

1. Introduction

With modern developments and rapid change and development processes in life that require continuous development and change, which may lead to a contradict with the buildings which have permanent functions, uses and spaces for a long time, that led to the need and possibility of changing the functions of some buildings to turn buildings into flexible containers for functions, as it may require changing the purpose and function after a period of time (Acharya, 2013).

2. Motives and obstcles for reusing buildings :

There are many motives for developing and reusing buildings to change its functions also there're some obstacles as shown in the following table:

Motives	Obstacles
Easier to make changes	Perceived additional costs
Cheaper to changes	Short-term business models
Easier to sell a building	Lack of price signals
Fewer vacancies /rental voids	Valuation practices
Less disruption to building users	Discounting of future costs
Reduction in material waste	Compromised first use
Protect the built asset	Disconnect between funder / beneficiary
Good design / planning	Other design considerations are more important
Uncertainly about the future	Lack of cycle costing
Long-term ownership	Difficult to prove benefits
Previous experiences	No legal obligation

Table 1. Motives and obstacles for the reusing buildings, Reference: (Schmidt, 2016).

3. The difference between reuse and restoration

The reuse process is different from the restoration process as the reuse process is intended to change the use and function of the building to meet the needs of the users, while the restoration and preservation works to preserve the existing building and restore to its original state (Clarck, 2008).

4. Spatial adaptability

Spatial adaptability definition, according to Schmidt, is related to the ability to adjust in proportion to the new situation (Schmidt, 2016). Building reusing and adaptability is a tool to reduce the amount for constructing a new building and enhancing the reuse capabilities, which extends the valuable life of building that enhancing the capabilities to sustainability (Schmidt, 2016).

Adaptability can be defined as the future has no limits and changes will happen necessarily, but it must happen through a design framework to allow these changes efficiently (Kronenburg,2007). Adaptability in buildings can be achieved by creating the architectural design to adapt with the different functions to accommodate users' requirements. And also Kronenburg considers adaptability is an important element to make sustainable architecture (Kronenburg,2007).

4.1 Spatial Adaptability Typologies

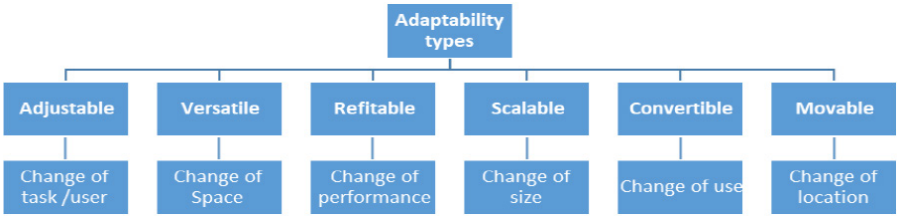


Figure1. Adaptability typologies, Reference : (Schmidt, 2016)

Adaptability has different types as shown in figure(1) like adjustable, versatile, refitable ,scalable, movable and convertible which means the change of use to accommodate the new requirements without changing the building structure

(Davison et al., 2006). The Convertible type had been applied in many buildings uses which had been changed to accommodate other functions such as the office building in England, which was built in the 1960s and later changed to a residential building (Davison et al, 2006).

4.2 Types of Spatial Adaptability for Reusing Building:

4.2.1 Spatial adaptability for the existing buildings

This method of spatial adaptability is changing the uses of the existing building while maintaining its structural, and creating appropriate design solutions for the new uses with considering the structural of the existing building. This adaptability may include minor additions to the existing building to achieve the requirements of the new uses.

4.2.2 Spatial future adaptability through architectural design considerations

In this spatial adaptability, the architectural design is considering the possibility of changing the function of the basic building in the future, the design will give the building the ability to change its functions or uses while keeping the building structure, in case of there's a need to change after a period of time. In this case, the architectural design requires a kind of design flexibility that allows changing the building functions and uses while fulfilling the design requirements of the building after adaptation.

4.3 Multispace Concept for Spatial Adaptable Reuse

Spatial adaptable reuse can be adjusted through the architectural design by Multispace concept which is an architectural design that allows change of use without any changes to the building structure. The cost of modification will be lower by changing the building functions, uses and activities without changing its structure. This provides an immediate response to market requirements according to the desirable function this concept according to Davison (3DReid, 2008)**.** Several parameters must be identified for buildings to be adaptable with functional changes like: floor plan depth, internal clear height, slab thickness, structural system, fire safety design, vertical circulation, number and dimensions of elevators, cladding specifications and building Proximity which contains natural lighting, preferred orientation, building proportions and relationship with surrounding roads (Davison, 2006).

Parameter	*Ground Floor Condition*	*Upper Floor Condition*
Proximity of blocks	Determined by fire regs	18-21m min between habitable rooms
Plan depth	13.5m (preferably 15m) to 45m	15 to 21m
Internal ceiling height	3.5m single storey; 5-7m double storey	~2.7m
Ceiling zone	0-500m	0-500mm
Floor zone	Preferably 100 to 350mm	Preferably 100-350mm
Structural slab and spans	Min 7.5m span 260mm slab @9x9m; 330mm slab 12x9m	Min span; max 12m span 260mm slab @ 9x9m; 330mm slab @12x9m
Fire design occupancy	1 person/5sqm	1 person/6sqm
Travel distances for fire	30m 2-way (12m 1-way)	30m 2-way (12m 1-way)
No. and size of lifts	N/A	Design for mixed use as worst case and offices as worst case for single use
Cladding spec.	Maximise glazing within fire, noise and cost constraints	40-100% glazing, NR 20-30; 1.5m module & option for opening casements

Table 2 . Summary of adaptable building requirements according to Davison, Reference: (Davison, 2006)

4.4 Spatial Adaptability Through Some Design Parameters

According to Schmidt, there're some design parameters that enable to adaptable change of use between different functions like classrooms, offices, retail shops or residential use as the following table (Schmidt, 2016).

	School	Office	Retail	Residential
Room area	60-90 m2	Column grid 7.5,9 m, 12m	Flexible	Flexible
Room height	3m	3m	3.5m	2.4m
Minimum plan depth	12-15 m	13.5 m	15 m	8-11 m
Maximum plan depth	21 m	21 m	45 m	15-21 m
Glass area	40%	No specific guidance	Increase for shop fronts	Decrease for privacy
Natural ventilation	8L /S per person	12-16 L/person	5 L /person	Purge rate of 4ach
Daylight				
Occupancy hours	9-5 52 weeks a year	9-5 52 weeks a year	9-5 52 weeks a year	365 days a year
Room occupancy	29 persons	29 persons	variable	variable

Table 3. design parameters across different uses, Reference: (Schmidt, 2016).

4.5 The Importance Of Flexibility To Spatial Adaptability

Flexibility means the building is adaptable over the time and has the ability to accommodate with different changes (Lawson, 2005).According to Forty, the flexibility concept is related to change time, size, place and purpose of uses (Forty, 2000).The Kronenburg opinion for the flexibility that it needs an arrangement including the design requirements of the present with the capability of change for the future needs (Kronenburg,2007). It means that the building activities can be changed to other activities in line with the building life cycle.

The importance of architectural design flexibility is to allow spatial adaptability and to change the function of the building in future when needed because the good flexibility is allowing proper adaptive reuse and achieving the design requirements of the new uses. This flexibility is including consideration of a larger live load to accommodate with future uses, selecting appropriate structural grid which reducing the number of internal columns and enlarging spans between them, considering the location of columns that allow for other uses (Gosling, 2010), selecting carefully the location of vertical circulation which includes staircases and lifts ,enabling the possibility to add an extension to the building from one direction or from two directions, selecting the suitable location of shaft and ducts of HVAC system that can accommodate with other uses, selecting the proper clear height to be suitable for different uses and considering the facades' design that allowing changing uses (Schmidt, 2016).

5. Sustainability and spatial adaptable reusing buildings

Buildings are considered not sustainable which are used for a short period of time, and after that time there's a less or no need for these buildings' functions or uses. In order to the building to be sustainable (socially, economically and environmentally compatible), there's must be a possibility to change and develop

the functions or uses of the building over the time to adapt with the possible changes (Kornwitz ,2016).

5.1 Dimensions Of Spatial Adaptability To Support Sustainability

Adaptable reusing of buildings leads to sustainability within a certain strategy, a sustainable building in order to continue for long period of time must be capable of change and development of its functions and uses (Estaji, 2017). The adaptive reuse capabilities can achieve different aspects of sustainability which includes social, economic and environmental aspects that by through a certain framework or strategy as the following:

5.1.1 Environmental Sustainability

Environmental benefits are clearly shown when reusing buildings through a spatial adaptability. Adaptive reuse process consumes less energy and materials than if the building was demolished and a new building rebuilt .Although a number of reuse projects had included some construction, but the total required energy will be much lower than the energy for constructing of a new building (Robinson, 2016).

Energy is consumed in the production and processing of new materials, transferring of materials to construction sites, and operating to build a new building. Reducing the use of new raw materials reduces the production of toxic substances and pollutants to the environment, thus providing a healthier environment (Clarck, 2008). Adaptive reuse can reduce some environmental problems by changing the uses of some buildings which may result in some environmental problems within the framework of a new urban design project through sustainable solutions. As an example, Nonda Katsalidis had kept the old structures and converted grain silos which made some environmental problems to the surrounding area into residential apartments. The adaptable reuse can reduce some of the environmental problems caused by the modification of uses as a result of new urban design project through the sustainable solutions to change the functions of some buildings like residential, industrial ,commercial or public buildings to accordance with the new urban design (Robinson, 2016).

5.1.2 Social Sustainability

The process of adaptive reuse of buildings supports the community environment as it meets the needs of the population, community and society of required uses and activities, an old residential building may be converted to an office building, other office building may be reused to retail for the needs of the community (Clarck, 2008). And also some sustainable solutions can reduce the need for population to move from area to another area by providing the required uses through changing the uses of some existing buildings instead of demolishing (Robinson, 2016).The adaptable reuse can be used not only for changing uses but also for a building is of community importance, in case of this building represents a certain importance to the community ,with the reuse adaptation, it is possible to build complementary structures surrounding this building in harmony with the environment and existing building (Robinson, 2016).

5.1.3 Economic Sustainability

The adaptability for reused buildings uses less energy in the reuse process than if it is rebuilt. In addition, some of the materials in the old building can be recycled and reused; therefore the reused building is less in cost (Robinson, 2016).

6. Benifits of sustainable adaptable reusing buildings

Spatial adaptable reusing buildings can meet the changeable owners' needs, takes less time than if the building has been demolished and rebuilt, provides the possibility of introducing new building technology and new materials through adaptability operations, accommodates the changing users' needs, accommodates any changes in building use due to a new urban design project and allows the continuity of the building for a long period of time (Gosling, 2008), and also it's less energy consumption, less negative impact on the environment, less pollution to the environment, less consumption of natural resources, more considering for the environmental aspects, more healthy for individuals, and more quality of the internal environment.

7. International case studies

7.1. Battersea Power Station, Nine Elms, Battersea, London

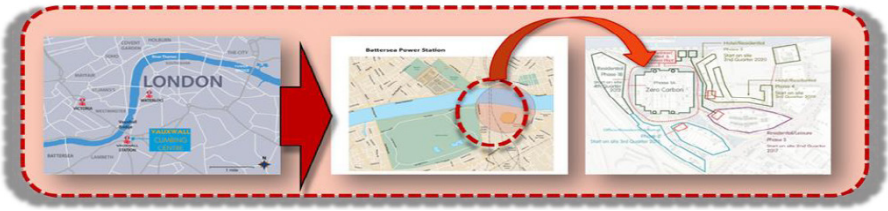


Figure 2. The site of Battersea Power Station, Nine, Battersea, London, Reference: (Rory, 2007).

Battersea Power Station is one of the landmarks in London and one of the largest brick buildings in the world, It's a station, a vital part of gas network in London with Art Deco interior design built in 1930 on the bank of the River Thames, in, Battersea.(Rory ,2007) It consists of two individual power stations, A Power Station and B Power Station each of them consists of a long boiler house with a chimney at each end (4 chimneys), The station generated electricity to the district and the city.

7.1.1. Closure of the station

According to changing from coal toward oil for electricity, the generating capacity of the station had decreased. In 2008 the building was described as a very bad building by Heritage. After the closure of the station there were a lot of redevelopment plans to redevelop the station .the competition for the development was won by David Roche who proposed an indoor theme park that Includes residential homes, shops, offices and an event space (Hatcher, 2010).

7.1.2. Vision

The vision of redevelopment of the Power Station is to emphasize the identity and originality of the station with minimal changes externally, the main goal is to

create a self-sufficient community to achieve environmentally, economic and social sustainable development through offering a zero-carbon master plant to adaptive the reuse of the power station itself.(James, 2008).

7.1.3. Redevelopment of Battersea Power Station

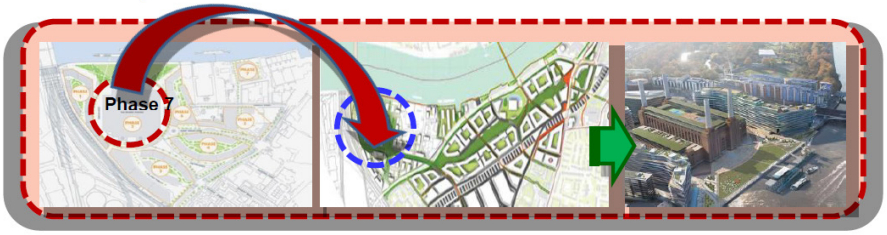


Figure 3. Proposed Phase Two ,the Power Station, Reference: (Wallace, 2011).

There are seven phases according to the suggested redevelopment master plan; The Power Station is Phase Two. The proposed master plan will include a great atrium at the southern entrance to make views to the offices which facing the internal façade. Also there are three levels of shops, In halls A and B, four levels of residential will be designed on the west and east sides of the Power Station, also three levels of residential will be designed on top of the building. (Wallace, 2011).Above the shops in the Boiler House, a triple height of leisure level includes a cinema, cafe and restaurant. Above this leisure space, there will be six storeys of offices and also two levels of residential homes on the roof.

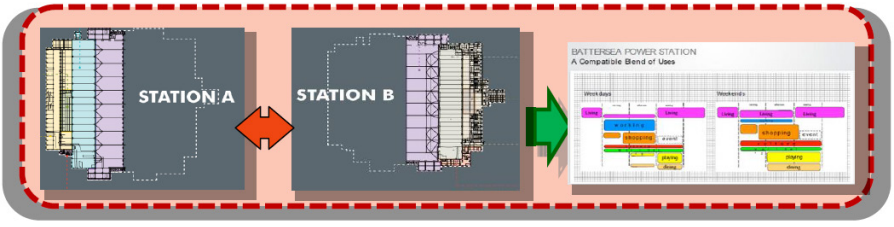


Figure 4. Proposed Phase Two the Power Station ,Reference :(Wallace, 2011).

The biggest renter will be Apple Company, about 1,400 staff will move into five floors of the former boiler house. Architect Frank Gehry and Norman Foster joined to the project to design a residential 'High Street' from the planned Northern Line Extension to the Battersea power station. The redeveloped master plan of Battersea Power Station aims to achieve environmentally ,economic and social sustainable development through some strategies in the design process (unique identity ,energy strategy ,landscape design, Community Engagement Strategy and upgrading transport links) in addition to restore the Power Station its own identity and originality.(Peter ,2016)

7.1.4. Redevelopment Design Strategies:

7.1.4.1. Unique Identity

The designer succeeded to emphasize the identity and originality of the old building (Battersea power station, London) with minimal changes externally, through the following:

-The Chimneys

The four chimneys are one of landmarks of the London skyline, which were made of reinforced concrete according to the high chloride content in the chimneys there are a lot of cracks in some places and also there is a split between layers which form the structure of the chimneys and the steel reinforcements are damaged. The redevelopment program aims to rebuild the four chimneys using the same techniques and materials with the same dimensions as the originals. Also they will have the same color as before (Roland, 2013).The only difference between the new and old chimneys is the change of internal steel reinforcement so there is less difference to the existing chimneys. There is a penthouse situated around one of the four chimneys.



Figure 5. Final coat of paint in the exact color of originals that painted to ensure their identical:(Roland, 2013).

There are two panoramic lifts offering 360 degree panoramas of London and rise 60 meters above the base of the chimney to the fifth floor Sky Lobby to provide an amazing view of Battersea power station and the city.

-The restoration of Art Deco

The redevelopment of the power station also includes the restoration of the art deco of the interior and exteriors of the project along with the rebuilt of the chimneys.(Floyd,2008) Also the elevations of the new shops respect the art deco tiles. Italian marble was used in turbine hall, and iron in the staircases.

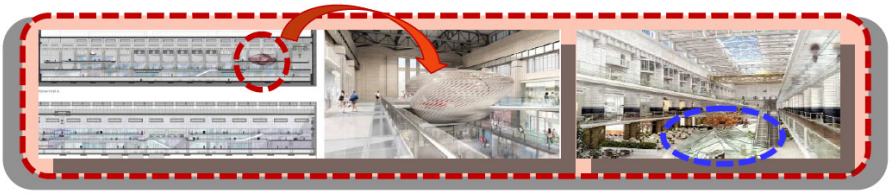


Figure 6. The idea of "floating in the space" of the structure, Reference :(Floyd, 2008).

To respect the original design the idea of "floating in the space" of the structure in Turbine Hall to emphasize the big scale of the building. The lozenge-shaped auditorium also seems to float and visible to the river entrance at ground level. Control Room A will be restored to form a space for events programme like fashion shows, cultural events. According to the old design, the space in Turbine Hall had no natural light so it is suggested to reuse the existing vents as light tubes to insert daylight to the space. This is also to respect the originally of the building. (Hudson, 2011).

7.1.4.2. Energy Strategy

The redevelopment of Battersea power station proposed a practical and aspirant energy strategy for inside and outside without change from the original design. The developers take sustainability issues in their consideration through introducing a framework of the design process includes a sustainable Energy Strategy Master plan which give the priority to reduce energy demand, give more consideration of recycling and centralized waste, and assists the development of a low carbon district heating network, this project could decrease 18000 tons of co2 per year.

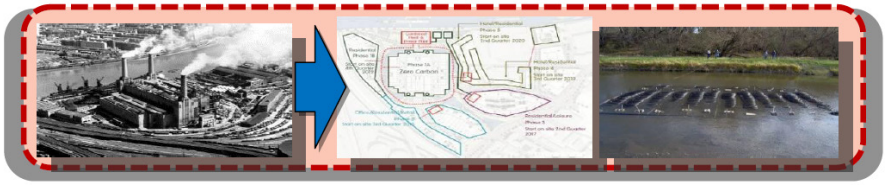


Figure 7. The redevelopment of Battersea Power Station**,** Reference: (Floyd, 2008).

The proposed energy Centre at Battersea Power Station generates 30MW of electricity, this will provide power and heat to about200000m2 of non-residential areas and 4000 m2 of residential areas; it will combine with other energy efficiency systems to make the station zero carbon.

Water source technology plays a vital part in supplying energy requirements, so according to the location of the power station on the banks of the River Thames, use of heat pumps consider one of the energy sources which aim to supply heat to around new homes, offices, shops and leisure facilities at the station to protect the natural environment, and creates flexible communities which can produce sustainable power systems (Francisco, 2008).

7.1.4.3 Landscape design



Figure 8. Landscape design front of the Power Station, Reference*:* (Lowe, 2008).

The redevelopment master plan support landscape design principles, the design gives flexibility to the space and creates a good regulation to the power station. The park will form a flexible space for use in all seasons; it has been the platform for many entertainment activities including recreational activities, sitting areas in the garden, theatre events and a piazza at the southern entrance.

- Gardens and water features

According to the redevelopment of Battersea power station, three roof gardens are created with innovative sculpture and planting to emphasize the original use of the structure, indicated to the three elements: fire, water and air. Also the use of water features in the ellipse around the power station with garden terraces support landscape design principles. (Lowe, 2008)

- **Furniture materials in landscape**

- Using large pieces of steel and timber in the landscaping areas for the piazza to reflect the materiality of the building. Also recycled brick and steel used in the concrete pavers.
- The seats and steps designed in a colored black concrete as a reference to the coal which used before to generate the electricity in the station.
- Movable chairs were used to allow flexibility to the public to make their own spaces in the gardens

7.1.4.4 Community Forum strategy

The Battersea Power Station Community Forum strategy based on: Consultation events and involvement of the community in design and landscaping through hosting representatives from residents, local community, teachers, councilors, and charity workers. Meetings were be held at The offices at power station four times a year, redeveloped master plans were viewed to them to find out first the meaning of the station to them and their needs to redevelop the station (Thompson, 2006).

7.1.4.5. Upgrading Transport Links

Transport improvement at the station will include, a new tube station, called Battersea Power Station was opened to connect Battersea to the center of London to move visitors and workers to the station in less than 15 minutes, another link (a new bridge) across the Thames will link the area of Nine Elms. There will also be a new river bus, new bus services and a network of cycle lanes and footpaths to create direct and fast links to the city (Halcrow, 2012).

7.1.5 Shaping London's New District

From the previous The redevelopment of Battersea Power Station consider one of London's most iconic buildings , because of transforming Batter sea from a semi industrial zone into an ultra-modern residential and business building with internationally architects to create landmark buildings in the area.

7.2. Minsheng Contemporary Art, China designed by architect Zhu Pei

The Panasonic factory in China was renovated to the largest public contemporary art museum in china which designed by architect Zhu Pei. The main goal of the

redevelopment of the old factory is to blend the rough industrial characteristics of the old factory with open surfaces.

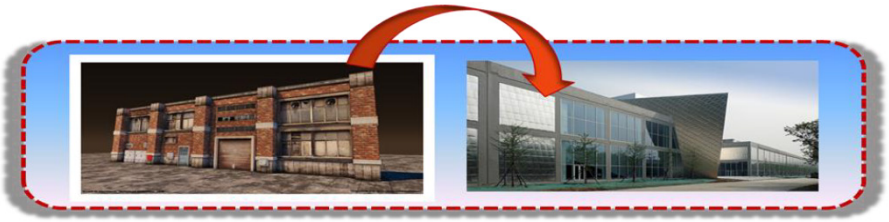


Figure 9. the redevelopment of the old factory to Art museum, Reference :(Sha, et al., 2014).

7.2.1. Transformable Design Strategies at Minsheng Contemporary Art Museum

7.2.1.1. Design

The lobby in the Art Museum considers the hub which provides access to three different galleries like courtyard space and bookshop. There are also some spaces in the ground floor such as artist's studio, auditorium, restaurant, cafeteria, film shop and storage most of these spaces are accessed from a corridor in the courtyard (Sha et al ,2014).

Expansion and Flexibility

- The Art Museum has a variety of spaces in dimensions and sizes such as: small box, middle box, big box, courtyard space, and black box which include multi-function achievement ,conferences and exhibition spaces). each space has designed as an organic extension of the double-height reception .
- Also to connect the past with the present the designer exposed the original concrete beams in the museum (Willett ,2012).
- The aesthetic aspects of the angles in the exterior surfaces continue inside the entrance space, where sloping openings intersect with slanted ceilings.



Figure 10 . Interior shots of the Art museum ,Reference :(Kun, 2012).

- **puzzle-like compositions :** The designer redeveloped the façade as a cluster of geometric cubes which surround the entrance to the spectacular multi-storey lobby (Kun, 2012).
- **Unique Identity :**The designer combined the industrial characteristics of the old factory like its simplicity and reality of the industrial buildings to

match the style of the Art Museum.

- **Adaptability :**The designer carved out the entrance lobbies as two full height spaces To molder the expansive length on the outside and inside the museum, the museum has two entrances the main one was designed as an angled cube projecting the horizontal old factory structure and clad it with an inexpensive material (aluminum sheeting) which specified for air ducts reduced the thickness to 0.02 inches like paper thin to make a contrast between fragile beauty and toughness of the old building , and the secondary entrance topped with a slopped light scoop to appear like a volcano *(*Hilal, 2011).
- **Diversity of spaces, replacing single space pattern of "white cube":** Diversity considers a special feature of contemporary art. In addition to the 5 meters clear height space of traditional art museum, the museum has different spaces like big box, middle box, small box, and black box and central courtyard with an exhibition platform on the rooftop.

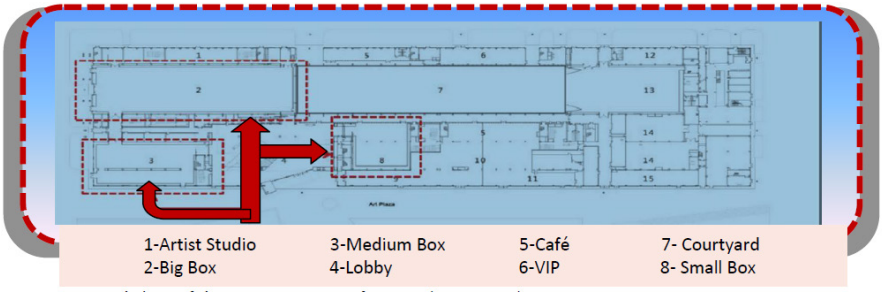


Figure 11. Ground Floor of the Art museum, Reference :(Kun, 2012).

7.2.1.2. Structure

- **Flexibility :**The factory was transformed into a flexible exhibition spaces to keep the industrial character of the original building. The stair was made from precast pieces fabricated on site instead of poured concrete and rises to the second floor and then rotates 45 degrees to the third. The architect designed the stairs as a social hub where people can sit, hang out or watch art works (Pitts, 2013).
- **The roof structure :**Above the lobby there is a glazed roof that allows daylight through angled louvers.
- -The designer removed the roof from the north side to carve out a long courtyard to accommodate a lot of art works. Also two overhead beams were added to install the heavy art pieces when needed.
- -the steel truss roof was raised to 45 feet high "big box".
- Reliability and Safety : The designer incorporated an angled block as a main entrance to reduce the large size of the factory building and covered it in a quilt made of paper thin aluminum.
- **Material :** The designer chooses the aluminum material which has the appearance of quilted silk jacket of the kind often worn by people in northern China. Under the sunshine, the diffuse reflection can make the architecture more light and merge with its environment.

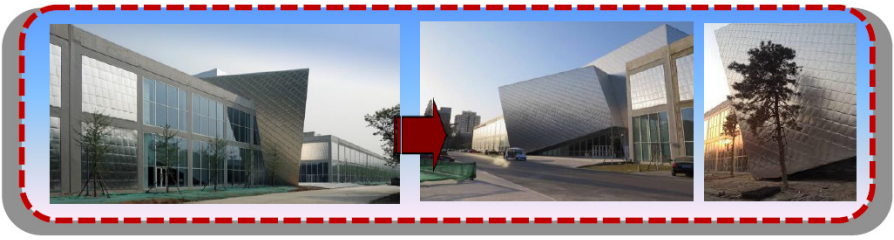


Figure 12. Using the aluminum material in the elevation of the Art museum, Reference :(Pitts, 2013).

- **Construction modules**
  Via encouragements of modules' construction and aseptic white cube aesthetics, the designer researches on the "internal order" behind today's super artificial world. Several modules comprise of one functional block; then several blocks operate as a system; several systems form a matrix. Each formation has its own "rhythm", where self-formation, destruction and reformation take place in an ultimate accelerated velocity, (Day, 2012).
- **Community forum strategy (publicity)**
  The interaction and participation of the public is the most important strategy in the redevelopment of the museum, a lot of events engaging local residents, scholars, local architects, libraries, bookshops, and colleges. The Community Participation Program will continue through the first phase of the museum till its completion.
- **Land scape design**
  Installation park front of the museum to merge the museum with open exhibition spaces, there is another exhibition platform on its rooftop, all of them to achieve flexibility of the spaces, to encourage artists' imagination and innovation in creating their art works. Also the designer intends to recreate the concept of infinity by painting landscape with empty spaces.



Figure 13. Redevelopment of landscape front of the Art museum, Reference: (Mackinnon, 2010).

Minsheng Art Museum achieves flexibility, Diversity of spaces, unique identity, adaptability and

modernity in the design process redevelopment. It's an abstract architectural style constructed with some box exhibition spaces, blending the abstraction, contemporary visual effect and the free spirit of the art imagination together (MacKinnon, Mark, 2010).

8. Design strategies for spatial adaptability reuse to achieve sustainability

The previous analysis of the two sustainable case studies as spatial adaptability (redevelopment of Battersea power station, London to an indoor theme park Include residential homes, shops, offices and an event space and renovation of The Panasonic factory into the largest public contemporary art museum in china) reveals that spatial adaptability for reusing old building can be a successful approach to achieve environmentally, economic and social sustainable development ,which means emphasize the identity and originality of the old building with minimal changes externally through some strategies at the level of redesign for adaptability and implementing the construction . Figure (14) shows a structural diagram for the analyzed strategies for Spatial Adaptable reuse for the existing buildings and future buildings as a new approach for sustainable architectural design to preserve national buildings for future generations.

9. Conclusions

- Spatial adaptability can achieve sustainability through a well-defined strategy.
- Spatial adaptability can be achieved by changing the uses of existing buildings, and also it can be starts at the early stages of the architectural design process by considering flexibility requirements in the architectural design to obtain future adaptability when needed.
- Spatial adaptability allows the development of buildings to accommodate with new situations with new functions.
- Spatial adaptability can reduce the consumption of materials that may be used in the construction of a new building, it can decrease the used raw materials, and also it can reduce the energy that may consumed to construct the new structure, and also it enables the use of recyclable materials in adaptability process, thereby reducing the pollution and waste which are resulting from the demolition and reconstruction.
- Spatial adaptability is a mean of preserving the real estate wealth by reusing instead of demolishing and rebuilding.

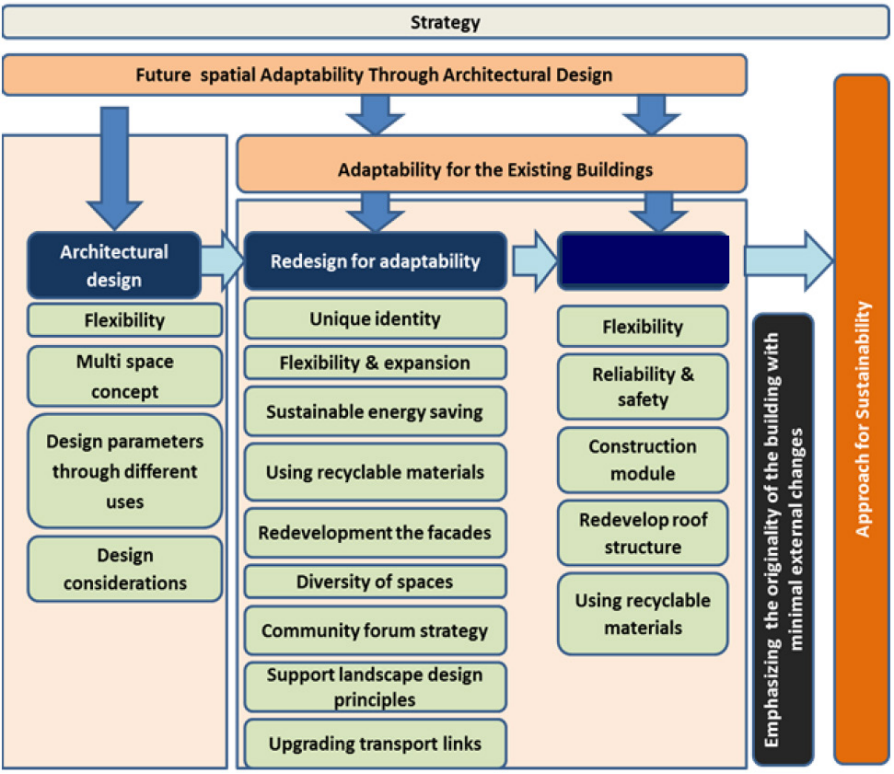


Figure 14. Strategy for Spatial Adaptable reuse as a new approach for sustainable architectural design.

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