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RESEARCH ARTICLES/*ARAŞTIRMA MAKALELERI*

Research Article

Architectural Porosity: Reading the Change of Inhabitation in Urban Heritage Area

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Abstract

This paper explores the idea of architectural porosity, which intends to see the material and socio-spatial porosity of the built material as a conceptual framework of architectural inquiry that can be utilised to unfold architectural phenomena in different contexts. Therefore, this paper is exploratory, and the exploration intends to unfold architectural phenomena in the context of a revitalised urban heritage area. Urban heritage areas are prone to changes through regeneration or revitalisation projects. The changes result not only in physical change but within the social, economic, and cultural aspects. By addressing the dynamic, complex, and interrelated changes in the urban heritage context, the exploration in this paper is guided by an overarching question: What will architectural porosity unfold in terms of the change of inhabitation in a revitalised urban heritage area? This question will be explored by utilising the idea of assemblage thinking as a qualitative methodological approach to read an empirical case of Semarang Old Town, Indonesia, as a revitalised urban heritage area. The exploration shows that architectural porosity unfolds the relation and entanglement between material and socio-spatial porosities in the change of inhabitation in Semarang Old Town. Furthermore, architectural porosity, as architectural inquiry, could be one of the ways of approaching urban heritage context that unfolds the possibility of incorporating natural ecological cycles of plants, decay, and informal inhabitation, which are usually denied by the conventional revitalisation practice, as alternative voices in the discussion of urban heritage revitalisation.

Keywords: Architectural Porosity, Material Porosity, Socio-spatial Porosity, Urban Heritage, Wall.

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Araştırma Makalesi

Mimari Gözeneklilik: Kentsel Miras Alanındaki Yerleşim Değişiminin Okunması

Diandra Saginatari[1], Jonathan Hale[2], Tim Collett[3]

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Özet

Bu makale, yapı malzemelerinin maddi ve sosyo-mekansal gözenekliliğini, mimari olayları farklı bağlamlarda açığa çıkarmak için kullanılabilecek bir kavramsal çerçeve olarak ele alarak mimari gözeneklilik fikrini araştırmaktadır. Bu nedenle, makale keşifsel bir nitelik taşımakta ve araştırma canlandırılmış bir kentsel miras alanı bağlamında mimari olayları açığa çıkarmayı amaçlamaktadır. Kentsel miras alanları, yenilenme veya canlandırma projeleri aracılığıyla değişimlere açıktır. Bu değişiklikler, yalnızca fiziksel değişikliklerle sınırlı kalmayıp, sosyal, ekonomik ve kültürel boyutlarda da kendini göstermektedir. Kentsel miras bağlamında dinamik, karmaşık ve iç içe geçmiş değişiklikleri ele alarak, bu makaledeki keşif şu genel soru etrafında şekillenmektedir: Mimari gözeneklilik, canlandırılmış bir kentsel miras alanında yaşamın değişimi açısından neleri ortaya çıkaracak? Bu soru, niteliksel bir metodolojik yaklaşım olan montaj düşüncesi fikrinden yararlanılarak araştırılacaktır. Araştırma, Endonezya'nın Semarang Eski Kenti'ni, yeniden canlandırılmış bir kentsel miras alanı olarak ampirik bir örnek olarak ele alacaktır. Bu yöntem, Eski Kent'in sosyo-mekansal ve maddi özelliklerini detaylı bir şekilde incelemeyi sağlayacaktır. Keşifler, Semarang Eski Şehir'deki yaşamın değişiminde maddi ve sosyo-mekansal gözeneklilikler arasındaki ilişkiyi ve iç içe geçmişi ortaya koymaktadır. Ayrıca, mimari gözeneklilik, kentsel miras bağlamında yaklaşım yollarından biri olarak, genellikle geleneksel canlandırma uygulamaları tarafından dışlanan bitkilerin doğal ekolojik döngülerini, çürümeyi ve gayri resmi yerleşimi içeren, kentsel mirasın canlandırılması tartışmalarında alternatif sesler sunma potansiyelini taşımaktadır.

Anahtar Kelimeler: Duvar, Kentsel Miras, Malzeme Porozitesi, Mimari Gözeneklilik, Sosyo-mekânsal Gözenekliliği.

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INTRODUCTION

"*As porous as this stone is the architecture. Building and action interpenetrate in the courtyards, arcades, and stairways. In everything they preserve the scope to become a theatre of new unforeseen constellations*" (W. Benjamin & Lacis, 1979, p. 169).

Porosity is a familiar concept in architectural and urban discourse, and many of the discussions refer to the idea of porosity proposed by Walter Benjamin and Asja Lacis's essay Naples (originally published in 1925). Benjamin and Lacis began with this metaphorical sense of porosity that linked the quality of stone buildings to the city's atmospheric quality and livelihood. It shows porosity as a multi-scalar phenomenon which considers the micro material phenomenon, such as the porosity of the masonry wall, and the macro socio-spatial phenomenon, such as the everyday inhabitation of the people in the city. Benjamin and Lacis's porosity "extends the concept of porosity beyond the realms of the natural and the built environments and project it onto the social fabric of the city, as well as the character and psychology of the inhabitants" (Glynn, 2020, p. 67) as they mentioned the "indolence of the Southern artisan" alongside the physical structure of the city such as courtyards, arcades, and stairways as part of Naple's porosity (W. Benjamin & Lacis, 1979, p. 169).

This paper takes inspiration from this material and socio-spatial phenomena of porosity to propose and explore the idea of architectural porosity as a conceptual framework of architectural inquiry that can be utilised to unfold the architectural phenomena in different contexts. The nature of this paper is, therefore, exploratory, and the context chosen for this exploration is a revitalised urban heritage area. This paper views architectural phenomena as the ones that consist of the built material, the contexts (both environmental and social), and the practice of human inhabitation. The idea of architectural porosity intends to see the material and socio-spatial porosity of the built material as the starting point of the architectural inquiry. Material porosity refers to how materially porous the built material is, which will be observed based on the material condition and its ability to adsorb and contain traces of the environment, such as water stains and moss growth. Socio-spatial porosity refers to how the built material gives a perceivable space for human inhabitation, which will be observed based on the trace of inhabitation on and around the built material, such as typical local grocery store façade which becomes the extension space to display the produces, encroaching the pedestrian yet creating a buyer-seller encounter space. After indicating the material and socio-spatial porosity of the built material, architectural porosity will attempt to see the link and relation between the two porosities as part of the assemblage of the architectural phenomena.

As "a mixed of social/material collectives" (Harrison, 2013, p. 33), the context of heritage and heritage practice, in general, seem to be suitable as the context of this exploration as it shares the view that heritage is not just about material practice. The more particular context of this exploration is the urban heritage, which discourses revolve around the idea of heritage-led urban regeneration that addresses the different approaches in which the regeneration projects are conducted (Ashworth & Tunbridge, 2017; Fouseki & Nicolau, 2018; Pendlebury & Porfyriou, 2017) and how such project could lead to gentrification (Arkaraprasertkul, 2019; Hayes, 2020). The regeneration, revitalisation or rehabilitation of urban heritage areas results in tangible physical change. However, it has to be acknowledged that change is not only physical but also a change in socio-political, economic, and cultural aspects (Eckardt & AlSadaty, 2023).

By addressing the dynamic, complex, and interrelated changes in the urban heritage context, the exploration in this paper is guided by an overarching question: What will architectural porosity unfold in terms of the change of inhabitation in a revitalised urban heritage area? This question will be explored in an empirical case study of a revitalised urban heritage area of Semarang Old Town, Semarang, Indonesia. Semarang Old Town is a colonial urban heritage area that consists of mostly Dutch architecture-style buildings (Dewi et al., 2020, p. 2). The façade and walls of the buildings shape the streetscape of Semarang Old Town. Since 2016/2017, Semarang Old Town has been under a major revitalisation project. The streets of Semarang Old Town have been revitalised with newly paved pedestrians, vintage lampposts, benches, and an English phone booth, showing improvements in infrastructure and beautification. Some of the buildings in the area are also revitalised to become new 'hype' cafés and restaurants but some are abandoned and in a state of ruin. The revitalisation project evidently involves the removal of the previously existing informal structures and economy, indicating the changing socioeconomic situation toward gentrification. However, as part of the urban scene, informal practice persists, especially in the economy-generating touristy areas like Semarang Old Town.

The different practices of formal and informal inhabitation in Semarang Old Town will be the main thing to be unfolded through the architectural porosity. As previously mentioned, architectural porosity requires a built material as the object of the observation. In this exploration, the object of the observation is a heritage building façade or wall. The façade or wall of heritage buildings in Semarang Old Town are urban surfaces that have both material and socio-spatial exitance. Urban Surfaces "are fascinating because they are specific physical loci, yet afford readings and interpretations that expand far beyond their material existence" (Andron, 2018, p. 8). Therefore, the façade or walls of heritage buildings are suitable as the built material object for this exploration of architectural porosity.

This paper utilises the idea of assemblage thinking as a qualitative methodological approach to explore architectural porosity as an architectural inquiry to read urban heritage context. It refers to assemblage thinking as one that acknowledges the relation between social and material agencies in an urban setting (McFarlane, 2011, p. 206), is multi-scalar and is a valuable framework for understanding formal and informal relationships as assemblage consists of connections and flows (Dovey, 2012, p. 353). The idea of assemblage is also shared with the heritage discourse. Heritage is an assemblage, a result of "an active process of assembling a series of objects, places and practices" and the process of heritage involves agency, which is not considered as a singular entity but in relation to others in the form of assemblages that consists of both human and non-human entities, such as plants, animal, the environment and the material, which he referred to Bruno Latour's actor-network framework and Deleuze and Guattari's assemblage theory (Harrison, 2013, p. 4). Assemblage thinking is a beneficial approach for architectural porosity, which aims to unfold relations and assemblage of the material and socio-spatial aspects of the built material in context. The primary source of data is based on the fieldwork to Semarang Old Town in 2022, especially the visual documentation of the walls. However, to see the change of inhabitation due to the revitalisation, this exploration requires 'historical' visual documentation of the area, which is obtained from Google Street View (GSV) with different timestamps: before, during, and after. It begins by situating the wall examples as part of the urban fabric of Semarang Old Town. Then, based on visual observation, the walls will

be narrated based on the material and socio-spatial porosity, aiming to see the assemblage of the change in inhabitation from different timestamps.

In the following two sections, this paper will briefly discuss the idea of a wall, an architectural element that becomes part of the urban fabric, as a porous ground for inhabitation as the object of exploration and the relation between heritage, informality, and porosity as the more specific context for the exploration. The following section is dedicated to the cases where the three wall examples will be narrated. Then, the next section is the discussion, where the wall narratives are discussed based on the architectural porosity that highlights the material and socio-spatial porosity. The last section is the conclusion and the takeaway from the exploration.

WALL AS POROUS GROUND

Porosity is a familiar concept in architectural and urban discourse. Etymologically speaking, the term roots back to the Greek word porós, which refers to the river's shallow part where one can cross (Dona, 2018, p. 166), and it also refers to a passage or opening (Erben, 2018, p. 29). Porosity relates to pores, interstices, minute openings, and voids among solids. However, a pore is not just a given lacuna; it has a relational function to the environment that connects two contexts (Erben, 2018, p. 29). In urban discourse, as discussed previously, many discussions on porosity refers to the idea of porosity proposed by Walter Benjamin and Asja Lacis's essay *Naples* that was originally published in 1925 (W. Benjamin & Lacis, 1979), which suggested that porosity as a concept viewed as the material condition of masonry surface and as urban socio-spatial characteristics. The material and socio-spatial aspects of porosity in Naples are shaped by the urban fabric, which includes buildings and architectural elements. The discussion on porosity in urban discourse also involves terms such as interpenetration, ambiguous zone, in-between space, threshold and coexistence (Wolfrum, 2018, p. 16) and also discusses the idea of accessibility between public and private (Goodwin, 2011, p. 46).

This discussion of porosity in urban discourse is where the idea of architectural porosity begins. It lies in the view of an architectural phenomenon as an assemblage of the built material of the architecture, the context (socio and environmental) and the inhabitation. Architectural porosity aims to see the porosity of the built material in context, not only its material porosity but also its socio-spatial porosity, and later see if there are any relations between the two porosities. Achieving the aim of exploring architectural porosity requires a built material as the object of the exploration and for this paper it will be building walls that shape the urban heritage streetscape.

Situating wall as part of architectural porosity exploration came with two reasons. The first reason relates to the matter of scale. Even though this paper specifically takes off from Benjamin and Lacis's porosity, which is more within the urban scale, porosity is an interdisciplinary term used in some material-based scientific disciplines, such as material science or earth science, and observed in a microscopic material scale (for example is in the work of Sassoni & Franzoni (2014) and Ganzhorn et al (2019)). As architectural porosity intends to see the relation between material and socio-spatial scales, building walls as an architectural element is considered the appropriate scale for observation as it allows to observe both the material and the socio-spatial scale of inhabitation on and around the wall. Material porosity is observed through material condition and inhabitation, for example, moss growing on the wall next to a leaky pipe. Socio-spatial porosity is observed through any objects attached to or existing

around the wall, for example, some chairs and tables from a food seller on the pedestrian walk. In other words, the wall ties the two porosities together on a human scale.

The second reason relates to how a wall, as an architectural gesture for humans inhabiting the world, has both material and socio-spatial existence. As a material entity, the wall is considered the essential element of architecture that creates an envelope. In the case of a façade, it acts as a representation of identity and is political (Zaera-Polo, 2008, p. 195). A wall is a materialised boundary that excludes and includes at the same time and is bodily experienced, such as walking along or through the wall (Unwin, 2000, pp. 25, 27). In the urban context, the wall could also be considered a spatial element that creates social relations (Brighenti & Kärrholm, 2018, p. 2) which signifies its socio-spatial presence and even a site of urban biodiversity (Francis, 2011, p. 43).

This paper mainly looks at the walls of heritage buildings that shape the streetscape of the urban heritage area of Semarang Old Town, which includes the façade or side walls of a building. These walls exist as a vertical boundary to the pedestrian ways, with no fences between the pedestrian way and the walls. Therefore, these walls directly face the public urban environment. The idea of wall and wall space ownership might be challenged in this circumstance. Wall ownership is also challenged because a wall always consists of two different surfaces, in this case, the interior and exterior surfaces, which both have different effects (A. Benjamin, 2006, p. 5) as they face two different realms. As part of the building structure, these walls belong to the building, and the interior side of the wall shapes the interior space. However, as the exterior side of the wall faces the public realm of the urban environment and can be publicly accessed, such as when it can be touched, leaned to, and walked along in very close proximity to the body, it could be perceived as a vacant space. This perception reflects Gehl's concept of the 'edge effect' (Gehl, 2010, p. 137), where, for example, in an urban situation, depending on the condition and the location of the wall, the wall gives a space to pause or stop. It shows how the wall is more than just a vertical boundary; it becomes a perceivable space to be claimed within an urban setting.

In particular, a wall becomes part of the public street space and the pedestrian way, which could also be considered one of the urban commons (Susser & Tonnelat, 2013, p. 111) that the public can claim. Sometimes, the claim on the wall space, which covers the vertical surface and some space in front of it, is not all formal and legal. Urban graffiti, for example, views urban walls as a visible surface for inscription (Brighenti, 2009, p. 67), which is usually considered vandalism. Another example is the informal sidewalk settlements, which usually claim a blank wall and a sidewalk edge to build domestic space (Dovey & King, 2011, p. 16) or informal markets nestled against the thick wall of Aix-en-Provence wall as "thick wall can invite to dwell" (Sennett, 2019, p. 221). Furthermore, the wall space claim is not just by humans but by non-humans, too. The non-human claim refers to a rather material phenomenon, such as weathering, which subtracts the material in time (Mostafavi & Leatherbarrow, 1993, p. 6) and bio-colonisation, which relates to how the material can give space for living organisms (Cruz & Beckett, 2016, p. 52), which sometimes results with moss or even higher plants growing on urban walls.

Based on the previous discussion, urban walls can be viewed as porous ground. The 'ground' here is both literal for the case of bio-colonisation and metaphorical for the case of human inhabitation. However, in both ways, the wall as a porous ground encapsulates how the wall gives space for various types of inhabitation

to exist and grow. Wall as porous ground means seeing it as Sennett's idea of a border, which, based on him, is an active zone of engagement and exchange (Sennett, 2017, p. 590), a porous space of engagement and exchange. Furthermore, since this paper specifically discusses building walls that shape the urban heritage fabric, the idea of a wall as a space of exchange does not only relate to the idea of inside and outside, which usually happens through literal pores of the wall, such as door and window. It also relates to the material and socio-spatial existence of the wall, such as the material condition of the wall, the heritage and revitalisation status of the wall, and what kind of inhabitation exists on and around the wall that might range from plants growing on the wall to informal settlement attaching its structure to the wall. The attachment to the wall arguably extends the thickness as well, from the wall with the literal material thickness to the one with the socio-spatial thickness (Saginatari et al., 2021, p. 349). To see the relation and assemblage between these existences and to see different thicknesses of the wall means to see the wall through the idea of architectural porosity.

POROSITY, INFORMALITY AND HERITAGE

This paper takes an empirical example of an urban heritage site in Indonesia called Semarang Old Town (De Oude Stad) which dates back to the 17th century, around the beginning of the Dutch colonial era. It was a fortified city that century later after the fort was demolished due to demographic development, it became the centre of the government, military and business as well as the centre for trade and industry (Yuliati et al., 2020). This position of Semarang Old Town reflects on the buildings within the area that are dominated by administrative buildings, warehouses and offices. The livelihood of Semarang Old Town was closely related to the Dutch colonial position within the global situation. Since World War II, Semarang Old Town activities have declined until independence. After the independence, the Indonesian government took over many foreign companies and assets, especially the Dutch, which resulted in massive bankruptcy and abandonment of the area (Purwanto, 2005, p. 33), leaving Semarang Old Town a ruin.

Figure 1. Main Road of Semarang Old Town in 1915 (Paradeplein te Semarang, Circa 1915, KITLV 84094, Public Domain, Source Link: http://hdl.handle.net/1887.1/item:908051)

Ruin or vacant lots areas, especially in the city, are perceived as negative spaces with limited or no economic and social potential (Dawdy, 2010, p. 776). However, in some cases, ruins and vacant lots could offer spaces for urban activities, mostly informal, including social, economic and ecological, such as providing shelter for people experiencing homelessness, playgrounds for children, vandals, and skateboarders, as well as can be a garden for livestock rising (Dawdy, 2010,

p. 776). This situation happened to Semarang Old Town as well. Many informal inhabitations occurred for around 50 years as the area was mostly abandoned. This informal inhabitation includes informal practices such as trading, hawking, begging, and the informal construction of settlements (Dovey, 2012, p. 354), which usually infiltrates abandoned and leftover spaces in the city (Dovey & King, 2011, p. 13). In Semarang Old Town, this was shown by the existence of many informal shelters, whether dwellings or hawkers, attached to the side walls or even façade walls of buildings. Sometimes, informal inhabitation infiltrated the building and building plot if the building could be accessed. This abandonment and informal inhabitation also triggered inappropriate activities in the area, such as prostitution. Another type of 'informal' inhabitation in Semarang Old Town is how nature, a non-human organism such as plants, grows on the fabric of Semarang Old Town. Plants started inhabiting buildings, and some claimed some buildings and building plots.

Informal inhabitations, both by human and non-human organisms, are considered an 'out of place' phenomenon, which was introduced by Mary Douglas in 1966. Her discussion on "dirt as a matter of out of place" suggested that dirt is not necessarily only related to pathology or hygiene but is about ordered relation; dirt is a rejected element of the ordered system (Douglas, 2005, p. 44). The idea of dirt is not simply about things being dirty because sometimes they are not, but they are considered inappropriate or unwanted in some situations. This concept reflects the existence of informal inhabitation, particularly in the eyes of the city municipals and authorities. Informal inhabitation in the city, for example, street vendors, could be considered an 'out of place' phenomenon (Yatmo, 2008, p. 468). Even plants growing on building walls could be considered weeds, "plants out of place" (Gissen, 2009, p. 150). Both occurrences tend to be treated the same way; they should be removed or relocated to where the authorities consider the appropriate place. In the case of the urban heritage site of Semarang Old Town, this kind of removal is done through a revitalisation project of the area. This revitalisation project might be inevitable as Semarang Old Town has a significant historical value for the city and the nation. The revitalisation initiative began around the 1990s, but since 2016/2017, it has been very significant.

On the national level, Indonesia's heritage law is based on Law Number 11 of 2010 on Heritage and in 2022, the Indonesian government released Government Regulation Number 1 of 2022. They contain national regulations and definitions of heritage preservation and conservation actions that are meant to be the reference for the local government and municipal to make a regional regulation for their province or city. In the case of Semarang Old Town, the direct regulation applied is the Environmental Planning Plan in Semarang Local Government Regulation Number 2 of 2020. Revitalisation aims to reactivate the area through architectural conservation and inserting new functions to increase economic, social, tourism, and cultural activities based on this local regulation. In addition to this is the vision of the local government for Semarang Old Town to be a UNESCO World Heritage Site (WHS), which currently Semarang Old Town is on the tentative list. A UNESCO WHS project tends to apply strict demarcation and purification of space (Nakamura, 2014, p. 272) and diverts people away from everyday life (Tabunan, 2022, p. 13). It aims for a pristine historical object or environment that encapsulates a specific or chosen period of history, arguably not acknowledging the evolution of the object or environment through time and changes of context that include the environment, socio-culture, economy and politics.

The aim and vision above are manifested in the revitalisation project since 2016/2017. The local government upgraded the area's infrastructure with the national government budget. The revitalisation includes paving the streets and pedestrians, making water retention ponds to prevent flooding, arranging the traffic flows in the area, and finding and encouraging the building owners to revitalise their heritage buildings. In Semarang Old Town's case, most buildings are owned by private individuals, companies, or state companies, but not the government. Therefore, the government cannot directly revitalise most buildings, leaving buildings in different states; some are revitalised, painted, and white, and some are still in ruins. However, the local government managed to 'clean up' most of the informal inhabitations that occupied the walls and the street of the area by removing all informal structures, relocating some of the economic activities to the nearest market and beautifying the streets and pedestrians with street furniture such as lamps, benches, bins, and charging stations.

Like weeds that will grow wherever the resources are available, informal inhabitation always finds a way to exist as part of the urban scene. The existence of informal inhabitation in the urban scene is due to the porosity of the urban fabric itself, which offers "the space of opportunities and improvisation" (Viganò, 2018, p. 50). Semarang Old Town, whose urban fabric is under revitalisation, still has some unrevitalised buildings whose walls offer spaces for informal inhabitation.

NARRATING WALL ASSEMBLAGE

This paper utilises the idea of assemblage thinking as qualitative methodolgical approach to explore architectural porosity as architectural inquiry to read urban heritage context. The observation towards both material and socio-spatial porosities is conducted by looking at traces of informal inhabitation, which involves looking at organisms and objects on and around the wall. Therefore, to read the relation between material and socio-spatial porosities, this paper will narrate the wall assemblage. The idea is to view urban as a "narrative text" which tells stories through "its tangible and intangible features" such as historical traces, public space and buildings, colours, and characteristics, which makes "narrative texts an object (or a set of objects) that communicates one or more narrative contents" (Di Mascio, 2018, p. 1119).

This paper takes three walls from three different buildings in Semarang Old Town to be narrated (Figure.2). The wall assemblage narrative will be based on direct visual observation conducted in 2022 and visual documentation available in Google Street View (GSV). The GSV photos can supply historical images with time stamps. As GSV captures a natural moment of the built environment, it could be used as data to see the everyday situation and building condition (Campkin & Ross, 2012, p. 148). This paper will look at three different time stamps which are before revitalisation (the year 2015 and before, depending on the availability from GSV), during early revitalisation (around the year 2016-2019, depending on the availability from GSV), and during the later stage or after revitalisation (the year of 2020 and after, depending on the availability from GSV). The visual materials are visually analysed to see the conditions of informal inhabitation on and around the walls from different time stamps, highlighting objects, organisms and possible past events naturally captured by GSV. They will be narrated through the timeline of before, during, and after revitalisation. The three wall narratives are as follow.

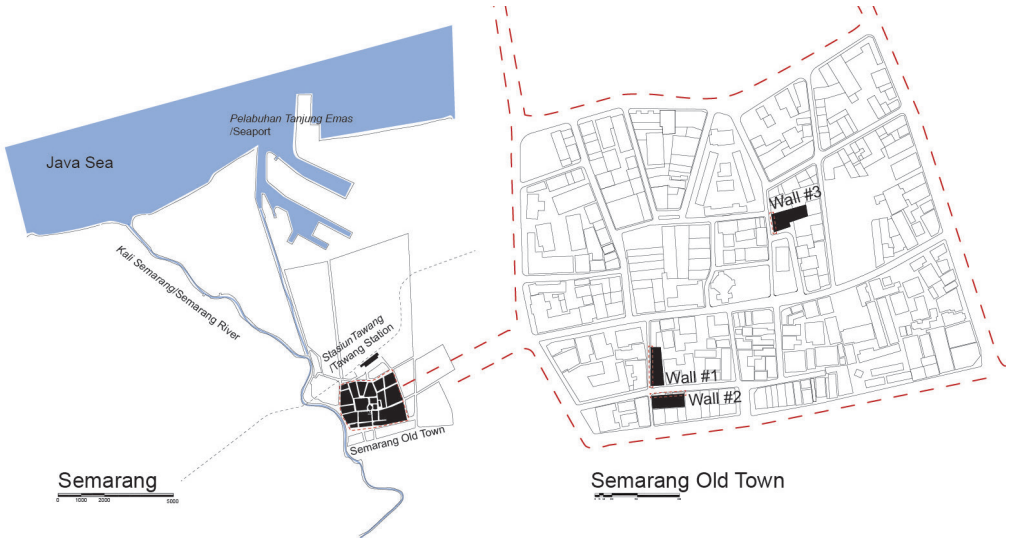

Figure 2. Map of Semarang and Semarang Old Town, showing the case study walls' locations (Author, 2024)

Wall #1: *Rumah Akar*

Rumah Akar is a side wall facing Roda II Street, Semarang Old Town. It belongs to a building that used to be an office for a warehouse, bank, customs, expedition, and delivery company (Yuliati et al., 2020, p.455). It is a masonry wall with several wooden windows and doors. The wall also has what used to be a window, but now they have covered it with bricks and plaster. During the observation in 2022, the building was abandoned, under ruination and decaying, as the building owner is unknown, resulting in the building plot and walls being taken over by plants. The weather erodes the material layers, exposing the bricks and inviting plants to grow on them. This condition is where this particular wall gets its name of *Rumah Akar* (literally means Root House when translated to English): a big tree, along with other small trees, grows on the wall and becomes a landmark (Figure.3). This wall could be considered literal ground as it is evident that plants already interweaved with the wall, creeping in and out of the building plot through and alongside the wall. This tree is the first informal inhabitation on the wall.

Figure 3. The wall of *Rumah Akar* (Author, 2022)

Before the revitalisation (GSV time stamp: 2015), this wall gave space for the chicken market (which also be the arena for the illegal cock fighting that began around the 70s) and food sellers (Figure.4). It was perceived as a vacant surface due to the wall's material condition and the building's abandonment. Objects like chicken coops were nestled against this wall—some tents of the food sellers were attached to it, too. Together with the trees, this inhabitation claimed the wall's space and thickened the wall's thickness. During the revitalisation period (GSV time stamp: 2017), it was evident that the chicken market and food seller were gone and then relocated to the closest local market. The revitalisation project cannot remove the trees. The Semarang Local Government does not have a right to do anything, even revitalising the building, as all rights and responsibility lie in the hands of the owner. The Semarang Local Government,

through the Semarang Old Town Management Board, was actively searching for building owners and encouraging them to revitalise their buildings to match the revitalisation in the area. Besides, the Semarang Local Government sees the big tree on the wall as a potential tourist spot, which sells the olden atmosphere of the old tree on the wall.

Figure 4. Diagram of changes around Rumah Akar before, during and after revitalisation (Author in reference to GSV looking toward Roda II Street (timestamps: 2015, 2016, 2022), 2024)

As a result of the revitalisation (GSV time stamp: 2022), Roda II Street turned into a pedestrian walkway inaccessible to vehicles. The Semarang Local Government added street furniture, such as benches, across the *Rumah Akar* so people could sit and look at it. The meaning of the wall shifted from available vertical spaces for informal inhabitation to a landmark, a sculptural object that people want to see, experience, and take a picture with. The Semarang Local Government also added wall lamps and bins in the area. This kind of gesture of furnishing the street creates some 'urban living room' which is a production of social space, one of which is by strategically adding domestic touches to public space (Merwood-Salisbury and Coxhead (2018) in Warakanyaka, 2021, p. 96). *Rumah Akar* has become one of the most visited spots in Semarang Old Town, where people can find seats to enjoy the view of the big trees, enjoy the breeze, and even sometimes take a nap (Figure.5).

Wall #2: Soesman Kantoor

Soesman Kantoor is located on Kepodang Street, Semarang Old Town (just around the corner from *Rumah Akar*). The wall is the façade of the Soesman Kantoor building, which used to function as offices for some export and import companies (Yuliati et al., 2020, p. 451). Its terrace has columns, narrow arches, and wooden windows and doors. During the observation in 2022, the building was owned by three owners. The condition of the part of the building depends on the owner's will and financial situation for revitalisation. It results in Soesman Kantoor's consisting of a painted (revitalised part) and a decaying (unrevitalised part) façade (Figure.6).

Figure 5. Activities around *Rumah Akar* after revitalisation (Author's documentation, 2022)

Figure 6. The Façade of Soesman Kantoor (Author, 2022)

Before the revitalisation (GSV time stamp: 2015), the façade of Soesman Kantoor, just like Rumah Akar, was inhabited by the chicken market and food sellers. Tents, chicken coops, and additional structures made out of corrugated metal were attached to this façade and inhabited the thickness of the terrace. At that time, the building was abandoned and decaying. Some small pants were growing here and there on the façade. At some point, some part of the roof collapsed. During the revitalisation project (GSV time stamp 2017), this façade was cleaned from informal inhabitants as the chicken market was relocated. The previous food seller also moved away, leaving a sign on the wall with the information on the new location. However, the revitalisation of the building has not yet happened (Figure 7).

In 2018/2019, around two-thirds of the building was revitalised. It became a rentable multipurpose space for exhibitions or other community activities. As the area's revitalisation continued to Kepodang Street, the Semarang Local Government made space for pedestrians on Kepodang Street, narrowing the vehicle space. They put poles and chains as the pedestrian and street boundary. They also added lamps, benches, and bins along the street. During the observation in 2022, some of the revitalised parts of Soesman Kantoor became a bubble tea café owned by a Taiwanese businessman who rented

the space to the owner. This side of the façade is painted white and decorated with writings, objects, and a promotional banner inviting people to come in. Here, the wall becomes a surface for identity and a communication medium for the inside space. They open the door and windows during operating hours for air circulation and give visual access to the inside. Revitalised parts of Soesman Kantoor show a typical revitalisation situation where the building is revitalised and given a new programme. The building, which was abandoned, inaccessible and whose façade was previously inhabited by informal inhabitation, becomes a space accessible for people to buy some drinks and enjoy the time.

Figure 7. Diagram of changes around Soesman Kantoor before, during and after revitalisation (Author in reference to GSV of Kepodang Street (timestamps: 2015, 2017, 2022), 2024)

As for the unrevitalised part of the building, since 2018, it has been inhabited by a relatively informal inhabitation in the form of *Angkringan*. *Angkringan* is derived from the Javanese word *nangkring*, which means sitting relaxed (Yudhistira et al., 2018). It is a small shop selling food and drinks, which in some cases are traditional foods and drinks, but sometimes it also sells instant drinks, snacks, and instant noodles. *Angkringan* is one of the common types of informal economy in Indonesian cities. It has its place in the Indonesian community as they sell food and drinks cheaply, and whoever visits usually stays for a long time to chat and enjoy the time (Yudhistira et al., 2018). It is usually mobile or temporarily inhabits the pedestrian area, and most appear at night; it becomes "a separate nightlife for the community, especially the middle-lower class" (Yudhistira et al., 2018, p. 39).

In Soesman Kantoor's case, the *angkringan* owner is not the building's owner. He used to have a mobile *angkringan* with the cart, which he pushed around Semarang Old Town. However, then, he was given a job to guard the building; therefore, he was permitted by the owner of the building to open his *angkringan* there because the owner of the building was not yet able to revitalise the building. The *angkringan* inhabits the decaying building with spatial and material appropriation. It uses the wall and the window as product displays, and most

activity happens on the terrace. It also uses the wall to add a tarp tent to cover the terrace when it rains as the roof of the balcony above the terrace collapses, which makes water pass through the balcony floor to the terrace. At night, the *angkringan* sometimes lay out matt for the pedestrians across the street to have more space. The *angkringan* becomes a base camp for local workers, such as the local online motorcycle hire, forming a community that usually spends time together in their spare time.

Wall #3: Semarang Contemporary Art Gallery

Semarang Contemporary Art Gallery is located on Taman Srigunting Street. The wall is a side wall of the building, facing Taman Srigunting Street toward Garuda Street. It has big wooden windows. The building used to belong to an insurance company. Before it was a gallery, the building was used for many functions, such as a warehouse, motorcycle dealer and office (Yuliati et al., 2020, p. 343). The building is one of the earliest to be revitalised in the area, as it was revitalised in 2008. The previously empty and decaying building, with some trees growing on its walls, is revitalised into a white-painted box, a typical white space of an art gallery (Figure.8). It was filled with cultural programmes, and it became one of the available interior spaces to visit within the area.

Figure 8. The side wall of Semarang Contemporary Art Gallery and its gallery interior

While the inside wall of the building was turned into white surfaces where local artists display their artworks before the revitalisation (GSV time stamp: 2015), the outside surface of the side wall of Semarang Contemporary Gallery, which faces Taman Srigunting Street, became the background of a street antique market, which called *Pasar Seni* or art market in translation by *Paguyuban Pedagang Barang Seni* or art seller community in Semarang. They sold antique, old stuff and art, from homewares, bikes, car parts, paintings, old coins, and many more, in tents on the side of the street. The tents, however, were the freestanding ones. They are not attached to the wall. Arguably, this is because Semarang Contemporary Art Gallery is revitalised and occupied, which means it is under protection and constant maintenance from the owner. In GSV before revitalisation, it was noticed that there was around half a meter of planting space right in front of the wall, making space between the tents of the market and the wall. Therefore, the side wall of Semarang Contemporary Art Gallery remained sterile, unlike the vacant, unrevitalised wall across it where the seller could hang some objects.

Pasar Seni is one of the most visited touristy streets in Semarang Old Town. They were still there even during the revitalisation (GSV time stamp: 2018). However, it was only a short time until they were relocated in 2019 to one of the revitalised buildings in the area managed by the Semarang Local Government called Semarang Creative Hub. During the direct observation in 2022, the street antique market was relocated, and in front of the side wall of Semarang Contemporary

Art Gallery, which faces Taman Srigunting Street, was furnished by streetlamps, and there is a gate toward Garuda Street. The planting space was gone, and the sides of Taman Srigunting Street have now become a parking space, primarily for motorcycles but sometimes for cars too, and no longer a visited street in the area (Figure.9).

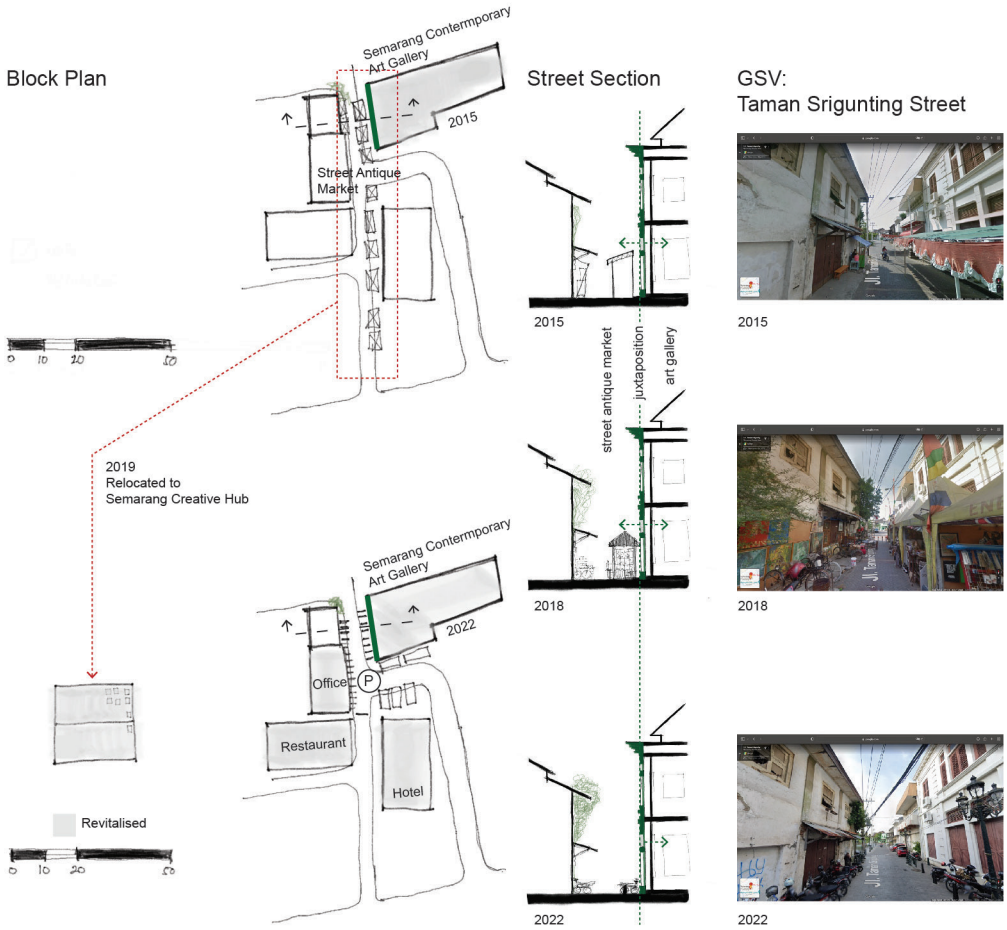

Figure 9. Diagram of changes around Semarang Contemporary Art Gallery before, during and after revitalisation (Author in reference to GSV of Kepodang Street (timestamps: 2015, 2018, 2022), 2024)

DISCUSSION: BACK TO ARCHITECTURAL POROSITY

The three wall assemblage narratives attempt to tell the story of the wall by looking at both material existence, which is represented through the story of the material condition such as decaying or painted, that relates to the revitalisation status, and the socio-spatial existence of the wall, which represented through the story of any inhabitation taken place on and around the wall. Now the narratives will be discussed from the point of view of architectural porosity, which seeks to see the relation between material porosity and socio-spatial porosity, and what change of inhabitations, particularly in the frame of formal/informal inhabitation, occur due to revitalisation.

On natural inhabitation

In the case of Wall #1, *Rumah Akar*, the big tree on the wall is a result of, first, the material porosity of the wall, which is shown through the deteriorating and decaying material condition of the wall that turns the wall to become a growing medium for plants. Second, the continued existence of the big tree is due to the lost ownership and abandoned status of the wall. This tree's existence shows how humans play a role in the fate of a building; where when humans abandon the building, meaning that the building is open to absorb time and environment,

and when humans restore it, it might be functional for humans again (Lisci et al., 2003, p. 2). As the building of *Rumah Akar* is abandoned, the plants take over the plot, and the big tree grows and weaves itself in and out of the wall, seeping in and out the window. The big tree cracks open the wall and is part of the wall itself.

Due to this lost ownership and abandoned status of the building, the Semarang Local Government cannot do anything about it other than try to maintain and ensure the wall's stability and appreciate it as one of the visited tourist spots for Semarang Old Town. As previously mentioned, the Semarang Local Government revitalised the street with new pavements and furnished it with benches, lamps, and bins to create a place for people to stay and enjoy the ambience that the big tree and the wall give. This situation reflects the idea of socio-spatial porosity, where the status of the wall gives the space in front of it value and potential and is taken advantage of by Semarang Local Government for the community. Both the material porosity and the socio-spatial porosity extend the thickness of the wall, the literal material thickness, which is now thicker due to the thickness of the tree, as well as the socio-spatial thickness which radiates to the street and becomes part of the one of the 'urban living room' in Semarang Old Town (see Street Section in Figure.4).

The discussion on plants growing on heritage walls is always a challenge; one is the dilemma of choosing to protect the heritage fabric or the biodiversity (Celesti-Grapow & Ricotta, 2021, p. 1201). In the case of *Rumah Akar*, the existing building could be considered one of the less iconic heritage buildings in the area; it has a historical value as part of the area but is not particularly iconic. The big tree growing on one of its walls arguably adds a more iconic value to the wall. This situation shows the potential of acknowledging heritage fabric as part of and as a potential for urban biodiversity as a place-making practice in an urban heritage context.

On paint and decay

In the case of Wall #2, Soesman Kantor, the façade showcases two different practices of inhabitation, a café and an *angkringan*. The café side of Soesman Kantoor is properly revitalised; it is evident through the material condition of that side of Soesman Kantoor, which is painted white. Some parts seem to be purposely exposed brick, which seems to be an attempt to show the old material of the building. The *angkringan* side of Soesman Kantoor is unrevitalised and decaying. The paint is peeled off, which accidentally shows the building's different layers of old material, watermarks everywhere, moss and small plants growing on the wall. Arguably, the *angkringan* side seems to have the material porosity, as other organisms inhabit the wall. It is not that the café side does not have material porosity because a painted masonry wall is porous by nature. However, as a material existence, it is under the owner's control and constantly under maintenance to keep the building as envisioned as the result of revitalisation. The differentiation of material porosity here is undoubtedly related to the building state itself, revitalised/unrevitalised.

As shown in Figure,10, the café side of the building is revitalised and the interior space becomes accessible. The doors and windows are open at the opening time of the café. The façade becomes the communication medium to invite people to the inside. The wall is socio-spatially porous because of this; the building is functioning, so people can access the building through the literal pore on the wall, doors for going inside or outside, and windows for looking inside and outside. It is a different socio-spatial porosity on the *angkringan* side. On the *angkringan* side, because the building is unrelvitalised and evidently in

bad condition, the activity of the *angkringan* is mainly attached to and remains outside the façade, on the terrace or even pedestrian way sometimes. They use the inside wall of the façade as a small kitchen where they prepare food and drinks. They display their products on the window, and the other window does not fully function. The door does function as access, but not for everybody. They also nailed a tarp tent to cover the terrace part when it rains to the façade. They rely on the façade as a literal structure and space to attach to. The façade is not just a physical boundary that separates inside and outside but the inhabited space of the *angkringan* itself.

Figure 10. Different material and spatial practices in Soesman Kantoor. Left photo is showing the angkringan and the right photo is showing the café (Author's documentation, 2022)

While the café seems to showcase the typical revitalisation project, where it removes all the unwanted things, restores the material condition, and inserts a new programme, the *angkringan* side shows the idea of *counterpreservation,* a 'revitalisation' that celebrates utilises decay as a form of activism and resistance towards the typical preservation project which usually leads to the socioeconomic changes such as gentrification (Sandler, 2016, p. 24). Even though the case of *angkringan* in Soesman Kantoor is not a form of activism, it still shows possible inhabitation, which arguably is utilising and activating the previously abandoned building that is more grass root and accessible until the middle-lower economy community.

On juxtaposition

The case of Wall #3, Semarang Contemporary Art Gallery, also shows a typical revitalisation project. However, the building was revitalised before the selected GSV timestamp, so even before the revitalisation of the area, the building was already revitalised. Based on the observation in 2022, the material is relatively in good condition and well maintained even though some small plants are growing in some corners of the wall and some water stains near some pipes. These signs of weathering could imply material porosity of the wall, but it will never show more material porosity as the owner will constantly maintain it.

The side wall of Semarang Contemporary Art Gallery, which consists of big wooden windows, is a materialised boundary that separates the interior space from the outside. Due to its function as a gallery, which needs a white space to display artwork, there is a white panel on the inside side of the wall. Therefore, the windows are not visible from the inside, making them non-functional as they cannot be opened and do not provide any connection, such as a visual connection, with the street. The only connection is through the ventilation above

the windows, which allows air to flow in. The wall does not show socio-spatial porosity in this way. However, before the revitalisation, the exitance of *Pasar Seni,* even though they did not literally touch the building, suggested that the wall is socio-spatially porous as it becomes the background of the market and allows them to exist in close distance with the wall for some years.

Figure 11. Left photo is showing the new location of Pasar Seni (Author's documentation, 2022); Right photos are showing the location of Pasar Seni before relocation (GSV 2018) and the condition after the after relocation where the space becomes parking spot (Author's documentation, 2022)

At one point, such as in 2018, when *Pasar Seni* was still in front of the side wall of Semarang Contemporary Art Gallery, there was a juxtaposition between formal and informal inhabitation there (see Street Section in Figure.9). *Pasar Seni* involved a relatively informal activity. They displayed antiques and arts in their tents, and they flood the street up to the decaying wall across. Arguably, it was like a gallery of objects as well. It juxtaposes with the Semarang Contemporary Art Gallery as a proper art gallery. Two of them show different practices, materiality, and social status. The side wall of Semarang Contemporary Art Gallery seems to represent a more institutionalised interior space of the building, overlooking and untouched by *Pasar Seni* that is occupying the edge of the street with its tents and utilises the decaying, available and claimable wall across to display their objects. This juxtaposition shows the diversity of practice in the area, and both offer different visiting experiences. However, since the street antique market was relocated to a newly revitalised indoor space, even though it was not literally a white space gallery, the experience is an indoor experience once more (Figure.11). And now, the space that once was a rather vibrant street market become a parking space claimed by the office located close to the gallery as well as to cater the visitor.

CONCLUSION

Through the relationship and entanglement of material and socio-spatial porosities, architectural porosity reveals the change of inhabitation in Semarang Old Town. As a formal gesture from the authorities, revitalisation usually results in formal inhabitation, which means having official permission to use it for a specific function. Material-wise, revitalised buildings will have restored materials, usually involving white paint, and will be under constant maintenance. Arguably, this

material condition has less material porosity because even though the material itself is porous by nature, the building owner will not allow the material to be more porous to absorb time, weathering, and other organisms. Socio-spatial-wise, revitalised buildings have a revitalised interior space that, after revitalisation, is available to access. The building walls, especially the façade, become an identity, a medium for communication, promotion, and an invitation to visit the interior. The wall is a vertical boundary with controlled access and exchange between inside and outside; some prevent this exchange.

The unrevitalised building, in contrast, seems to invite a relatively informal inhabitation, which refers to an unplanned inhabitation, which not all are authorised by the authorities but manages to exist, such as when trees grow on buildings and when an informal activity is attached to the wall. Material-wise, unrevitalised buildings will have decaying and deteriorating materials, such as peeled paint exposing the bricks, and some of the material might already collapse. Arguably, this material condition has more material porosity, especially when it allows other organisms to grow on the wall material. Socio-spatial-wise, an unrevitalised building has no accessible interior to visit and inhabit, and the wall or the façade does not necessarily have an opening for access to the inside of the building. However, the wall itself is sometimes available for inhabitation, for a tree to grow and for informal activity to attach. Both these material and socio-spatial porosities extend the thickness of the wall from material thickness to socio-spatial thickness. Based on the different material and socio-spatial porosities of the walls before and after revitalisation, there seems to be an eradication of the previous quality of porosity of unrevitalised walls that tends to invite informal inhabitation.

Furthermore, by looking at the material and socio-spatial porosity of the wall, architectural porosity could unfold the different scenarios of inhabitations and their relation to the revitalisation practice. For example, the existence of trees on walls is the entanglement between material and socio-spatial porosities of the wall, and such existence could be a potential for a place-making practice in urban heritage settings. Another example is the angkringan, a form of everyday inhabitation of the local community, which could be something to be encouraged to exist as part of Semarang Old Town. The diversity of indoor and outdoor inhabitation in urban heritage settings, like in the gallery and *Pasar Seni* case, should also be considered. Therefore, revitalisation is not conducted in only one way. Heritage could be viewed as a "chain of connectivity" which involves no distinction or prioritising one more than the other between nature/culture or human/non-human to keep the past for the future (Harrison, 2013, p. 5). Architectural porosity, as architectural inquiry, could be one of the ways of approaching urban heritage context that unfolds the possibility of incorporating natural ecological cycles of plants, decay, and informal inhabitation, which are usually denied by the conventional revitalisation practice, as alternative voices in the discussion of urban heritage revitalisation.

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Conflict of Interest

No conflict of interest was declared by the authors.

Authors' Contributions

The authors contributed equally to the study.

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Ethics Committee Approval

As part of PhD study of Diandra Saginatari in University of Nottingham, the study has the Faculty of Engineering Ethics Committee approval.

REFERENCES

Andron, S. (2018). To Occupy, to Inscribe, to Thicken: Spatial politics and the right to the surface. In A. Philippopoulos-Mihalopoulos & A. M. Brighenti (Eds.), *Surface & Material*. http://www.losquaderno.net/?p=1835

Arkaraprasertkul, N. (2019). Gentrifying heritage: How historic preservation drives gentrification in urban Shanghai. *International Journal of Heritage Studies*, *25*(9), 882–896. https://doi.org/10.1080/13527258.2018.1460732

Ashworth, G. J., & Tunbridge, J. E. (2017). Multiple approaches to heritage in urban regeneration: The case of City Gate, Valletta. *Journal of Urban Design*, *22*(4), 494–501. https://doi.org/10.1080/13574809.2015.1133230

Benjamin, A. (2006). Surface effects: Borromini, Semper, Loos. *The Journal of Architecture*, *11*(1), 1–36. https://doi.org/10.1080/13602360600636099

Benjamin, W., & Lacis, A. (1979). Naples. In E. Jephcott & K. Shorter (Trans.), *One-Way Street and Other Writings* (pp. 167–176).

Brighenti, A. M. (Ed.). (2009). Walled Urbs to Urban Walls –and Return? On the social life of walls. In *The wall and the city*. Professional dreamers.

Brighenti, A. M., & Kärrholm, M. (2018). *Urban Walls: Political and Cultural Meanings of Vertical Structures and Surfaces* (A. M. Brighenti & M. Kärrholm, Eds.; 1st ed.). Routledge. https://doi.org/10.4324/9780203730225

Campkin, B., & Ross, R. (2012). Negotiating the City Through Google Street View. In A. Higgott & T. Wray (Eds.), *Camera constructs: Photography, architecture and the modern city*. Ashgate Pub. Co.

Celesti-Grapow, L., & Ricotta, C. (2021). Plant invasion as an emerging challenge for the conservation of heritage sites: The spread of ornamental trees on ancient monuments in Rome, Italy. *Biological Invasions*, *23*(4), 1191–1206. https://doi.org/10.1007/s10530-020-02429-9

Cruz, M., & Beckett, R. (2016). Bioreceptive design: A novel approach to biodigital materiality. *Architectural Research Quarterly*, *20*(01), 51–64. https://doi.org/10.1017/S1359135516000130

Dawdy, S. L. (2010). Clockpunk Anthropology and the Ruins of Modernity. *Current Anthropology*, *51*(6), 761–793. https://doi.org/10.1086/657626

Dewi, S. P., Susanti, R., & Wungo, G. L. (2020). Spatial impact of the Semarang old town revitalization: The emergence of formal and informal space. *IOP COnference Series: Earth and Environmental Science*, *592*, 1–16. https://doi.org/doi:10.1088/1755-1315/592/1/012015

Di Mascio, D. (2018, October 23). Narrative Urban Environments: A First Theoretical and Methodological Approach. *Confluence of Architecture in the Age of Super Connectivity*. The 12th International Symposium on Architectural Interchages in Asia, Pyeongchnag Alpensia, Gangwon, Korea.

Dona, S. (2018). Cities in Suspension. In S. Wolfrum, H. Stengel, F. Kurbasik, N. Kling, S. Dona, I. Mumm, & C. Zöhrer (Eds.), *Porous city: From metaphor to urban agenda*. Birkhäuser.

Douglas, M. (2005). *Purity and danger: An analysis of concept of pollution and taboo*. Routledge.

Dovey, K. (2012). Informal urbanism and complex adaptive assemblage. *International Development Planning Review*, *34*(4), 349–368. https://doi.org/10.3828/idpr.2012.23

Dovey, K., & King, R. (2011). Forms of Informality: Morphology and Visibility of Informal Settlements. *Built Environment*, *37*(1), 11–29. https://doi.org/10.2148/benv.37.1.11

Eckardt, F., & AlSadaty, A. (2023). Urban Heritage in Transformation: Physical and Non-Physical Dimensions of Changing Contexts. *Urban Planning*, *8*(1), 1–4. https://doi.org/10.17645/up.v8i1.6633

Erben, D. (2018). Porous—Notes on the Architectural History of the Term. In S. Wolfrum, H. Stengel, F. Kurbasik, N. Kling, S. Dona, I. Mumm, & C. Zöhrer (Eds.), *Porous city: From metaphor to urban agenda*. Birkhäuser.

Fouseki, K., & Nicolau, M. (2018). Urban Heritage Dynamics in 'Heritage-Led Regeneration': Towards a Sustainable Lifestyles Approach. *The Historic Environment: Policy & Practice*, *9*(3–4), 229–248. https://doi.org/10.1080/17567505.2018.1539554

Francis, R. A. (2011). Wall ecology: A frontier for urban biodiversity and ecological engineering. *Progress in Physical Geography*, *35*(1), 43–63. https://doi.org/10.1177/0309133310385166

Ganzhorn, A. C., Pilorgé, H., & Reynard, B. (2019). Porosity of metamorphic rocks and fluid migration within subduction interfaces. *Earth and Planetary Science Letters*, *522*, 107–117. https://doi.org/10.1016/j.epsl.2019.06.030

Gehl, J. (2010). *Cities for people*. Island Press.

Gissen, D. (2009). *Subnature: Architecture's other environments: atmospheres, matter, life* (1st ed). Princeton Architectural Press.

Glynn, R. (2020). Porosity and its Discontents: Approaching Naples in Critical Theory. *Cultural Critique*, *107*(1), 63–98. https://doi.org/10.1353/cul.2020.0012

Goodwin, R. (2011). *Porosity: The architecture of invagination*. RMIT Univ. Press.

Harrison, R. (2013). *Heritage: Critical approaches*. Routledge.

Hayes, M. (2020). The coloniality of UNESCO's heritage urban landscapes: Heritage process and transnational gentrification in Cuenca, Ecuador. *Urban Studies*, *57*(15), 3060–3077. https://doi.org/10.1177/0042098019888441

Lisci, M., Monte, M., & Pacini, E. (2003). Lichens and higher plants on stone: A review. *International Biodeterioration & Biodegradation*, *51*(1), 1–17. https://doi.org/10.1016/S0964-8305(02)00071-9

McFarlane, C. (2011). Assemblage and critical urbanism. *City*, *15*(2), 204–224. https://doi.org/10.1080/13604813.2011.568715

Mostafavi, M., & Leatherbarrow, D. (1993). *On weathering: The life of buildings in time*. MIT Press.

Nakamura, C. (2014). Mumbai's quiet histories: Critical intersections of the urban poor, historical struggles, and heritage spaces. *Journal of Social Archaeology*, *14*(3), 271–295. https://doi.org/10.1177/1469605314539419

Pendlebury, J., & Porfyriou, H. (2017). Heritage, urban regeneration and place-making. *Journal of Urban Design*, *22*(4), 429–432. https://doi.org/10.1080/13574809.2017.1326712

Purwanto, L. M. F. (2005). KOTA KOLONIAL LAMA SEMARANG (Tinjauan Umum Sejarah Perkembangan Arsitektur Kota). *Dimensi: Journal or Architeture and Built Environment*, *33*(1).

Saginatari, D. P., Hale, J., & Collett, T. (2021). THE POLITICS OF POROSITY: FROM MATERIALITY TO SOCIALITY. *The 8th International Concference of Archietcture and Built Environment with AWARDs S.ARCH 2021 PROCEEDING*, 339–350.

Sandler, D. (2016). *Counterpreservation: Architectural Decay in Berlin since 1989*. Cornell University Press and Cornell University Library.

Sassoni, E., & Franzoni, E. (2014). Influence of porosity on artificial deterioration of marble and limestone by heating. *Applied Physics A*, *115*(3), 809–816. https://doi.org/10.1007/s00339-013-7863-4

Sennett, R. (2017). The Public Realm. In S. Hall & R. Burdett (Eds.), *The SAGE Handbook of the 21st Century City*. SAGE Publications Ltd. https://doi.org/10.4135/9781526402059

Sennett, R. (2019). *Building and dwelling: Ethics for the city*. Penguin books.

Susser, I., & Tonnelat, S. (2013). Transformative cities: The three urban commons. *Focaal*, *2013*(66), 105–121. https://doi.org/10.3167/fcl.2013.660110

Tabunan, M. L. (2022). Heritage on the Ground: A Thirdspace Reading of Calle Crisologo, Vigan City, Philippines. *Heritage & Society*, 1–20. https://doi.org/10.1080/2159032X.2022.2126233

Unwin, S. (2000). *An architecture notebook: Wall*. Routledge.

Viganò, P. (2018). Porosity: Why This Figure is Still Useful. In S. Wolfrum, H. Stengel, F. Kurbasik, N. Kling, S. Dona, I. Mumm, & C. Zöhrer (Eds.), *Porous city: From metaphor to urban agenda*. Birkhäuser.

Warakanyaka, A. A. A. S. (2021). Tracing London's urban living room. *ARSNET*, *1*(2). https://doi.org/10.7454/arsnet.v1i2.24

Wolfrum, S. (2018). Porosity—Porous City. In S. Wolfrum, H. Stengel, F. Kurbasik, N. Kling, S. Dona, I. Mumm, & C. Zöhrer (Eds.), *Porous city: From metaphor to urban agenda*. Birkhäuser.

Yatmo, Y. A. (2008). Street Vendors as 'Out of Place' Urban Elements. *Journal of Urban Design*, *13*(3), 387–402. https://doi.org/10.1080/13574800802320889

Yudhistira, B., Haryani, T. N., & Nurcahyono, O. H. (2018). Angkringan Development as a Traditional Culinary Identity. *Enhancing Small Medium Enterprise Competitiveness Based on Creative Economy in Innovation Disruptions*, 38–43.

Yuliati, D., Susilowati, E., & Suliyati, T. (2020). *Riwayat Kota Lama Semarang dan keunggulannya sebagai warisan dunia* (Cetakan kedua). Sinar Hidoep.

Zaera-Polo, A. (2008). The Politics of The Envelope. *Log*, *Fall 2008*(13/14), 193–207.

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Research Article

Mimetic Teaching Strategy in Design Education: Relationship Between Students' Learning Style And Creativity

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Abstract

This research explores the connection between changes in students' learning styles and the components of creativity in a design studio setting that utilizes mimetic teaching strategies. The study assumes that the change in learning styles is related to the level of creativity exhibited in the design process and final product. The theoretical framework of this study, which focuses on the learning strategy of 13 students taking the second-year architectural design project course in the architecture department throughout the semester, is formed by Rhodes' 4Ps (Person, Press, Process, and Product). Accordingly, the skill of reasoning (person) by Sloman and Pahl & Beitz (associative-variant / hybrid-adaptable / metaphorical-original); resource utilization in the design process (press) by Casakin, Akalın and Özkan & Akalın (within domains –hybrid- between domains); design process (process) by Rittel (linear/non-linear) and the created product (product) by Gentner and Markman and Welling (application-analogy-combination-abstraction) were analysed based on the theoretical framework. The study found that students who experienced different learning styles throughout the semester utilized a non-linear design process to reach the original design, using metaphorical reasoning. On the other hand, students who used associative reasoning with a linear process struggled to analyse abstract and undefined design problems, resulting in variations of already solved designs. To overcome this, learners should be guided to find examples that promote metaphorical reasoning, activate their connection to the context, and encourage alternative thinking. Encouraging the use of metaphorical reasoning as a tool for creative restructuring and reinterpretation facilitates the development of original and adaptable designs.

Keywords: Architectural Design Studio, Creativity, Learning Style, Metaphorical Reasoning, Mimetic Approach.

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Araştırma Makalesi

Tasarım Eğitiminde Mimetik Öğretim Stratejisi: Öğrencilerin Öğrenme Stili ve Yaratıcılıkları Arasındaki İlişki

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Özet

Bu araştırma, mimetik öğretim stratejilerinin kullanıldığı bir tasarım stüdyosu ortamında öğrencilerin öğrenme stillerindeki değişiklikler ile yaratıcılığın bileşenleri arasındaki bağlantıyı araştırmaktadır. Çalışma, öğrenme stillerindeki değişimin tasarım sürecinde ve nihai üründe sergilenen yaratıcılık düzeyiyle ilişkili olduğunu varsaymaktadır. Mimarlık bölümü ikinci sınıf mimari tasarım projesi dersini alan 13 öğrencinin dönem boyunca öğrenme stratejilerine odaklanan bu çalışmanın kuramsal çerçevesini Rhodes'un 4P'si (Person, Press, Process, and Product) oluşturmaktadır. Buna göre, Sloman ve Pahl & Beitz tarafından akıl yürütme becerisi (kişi) (çağrışımsal-varyant / karma-uyarlanabilir / metaforik-orijinal); Casakin, Akalın ve Özkan & Akalın tarafından tasarım sürecinde kaynak kullanımı (ortam) (alan içi - alanlar arası- karma); Rittel'in tasarım süreci (süreç) (lineer/lineer olmayan) ve Gentner & Markman ve Welling'in yaratılan ürün (ürün) (aplikasyon-analoji- kombinasyon-soyutlama) kuramsal çerçevesi temel alınarak analiz edilmiştir. Çalışma, dönem boyunca farklı öğrenme stillerini deneyimleyen öğrencilerin metaforik akıl yürütmeyi kullanarak özgün tasarıma ulaşmak için doğrusal olmayan bir tasarım süreci kullandıklarını ortaya koymuştur. Öte yandan, doğrusal bir süreçle çağrışımsal akıl yürütmeyi kullanan öğrenciler soyut ve tanımlanmamış tasarım problemlerini analiz etmekte zorlanmış, bu da daha önce çözülmüş tasarımların varyasyonlarıyla sonuçlanmıştır. Bu durumu aşmak için, öğrencilerin, metaforik akıl yürütmeyi teşvik eden, bağlamla bağlantılarını harekete geçiren ve alternatif düşünmeyi teşvik eden örnekler bulmalarına rehberlik edilmelidir. Metaforik akıl yürütmenin, yaratıcı yeniden yapılandırma ve yeniden yorumlama için bir araç olarak kullanımını teşvik etmek, özgün ve ayarlanabilir tasarımların geliştirilmesini kolaylaştırır.

Anahtar Kelimeler: Metaforik Akıl Yürütme, Mimari Tasarım Stüdyosu, Mimetik Yaklaşım, Öğrenme Stili, Yaratıcılık.

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INTRODUCTION

Architectural Design Education and Creativity

Architecture is a discipline that creates healthy, livable, and aesthetic spaces for users by utilizing the natural environment to meet users' needs and desires within certain criteria. As in other design-based disciplines, the importance of theoretical and applied studio courses that impart design skills and creativity to students is significant in architectural education. The aim of the instructor teaching design courses is to instill in students the ability for creative and critical thinking (Dizdar, 2015, p. 276-283; Milovanović et al., 2020, p. 8-21). Design education concerns the teaching methods or strategies through which students are trained to acquire knowledge and skills related to design (Park and Kim, 2021, p. 91-109; Choi and Kim, 2017, p. 29-41). The process of design education progresses with oscillation between reality and fantasy, reflecting students' future practices after leaving school and thus serving as a pre-training function for their future professional lives (Dinç Kalaycı, 2018; Murphy et al., 2012, p. 530-556). Therefore, creating an educational platform that encourages students to think creatively is essential (Choi, Kim, and Cho, 2013, p. 119-138; Salama, 2005; Wong and Sui, 2012, p. 437-450; Khakzand and Azimi, 2015, p. 67-75). Since creativity is a key concept when evaluating a designer or design solution, the main question to be answered is how the knowledge that fosters creative design can be taught using clear guidelines (Christiaans and Venselaar, 2005, p. 217-236). Design studios should focus on approaches that bring out creativity, illuminate problems, generate different and unusual solutions, foster imagination and develop original thinking skills. Little is known about how the designer's (novice) knowledge base affects the quality or creativity of the design (Choi et al., 2013, p. 119-138; Dizdar, 2015, p. 276-283; Frascara, 2020, p. 106-117; Christiaans and Venselaar, 2005, p. 217-236).

According to Piaget's constructivist theory, knowledge is acquired through interaction with the world, people, and objects (Ackermann, 2001, p. 438-449). The knowledge structures of the modern world are fundamentally different from those known in the old world systems (Wallerstein, 2013, p. 24). Recognizing the ambiguity of knowledge in the modern world, we must also acknowledge that the knowledge involved in the design process is ambiguous, and the pieces of knowledge grasped by the designer vary according to the situation of the problem found and their own prior knowledge. Prior knowledge is not only something to be taken into account but also an important element that guides and integrates learning experiences in design courses. Students enter the studio environment with conceptual misconceptions, existing knowledge, and different pieces of information. Therefore, their ways of looking at the built environment, approaches to studio projects, or problem-solving tasks in design require the application and improvement of their previous skills and abilities. Therefore, designers should always be aware that new knowledge is built upon existing knowledge (Khorshidifard, 2011).

Knowledge has always been a key factor in productivity. However, knowledge alone may not be sufficient to solve the constantly evolving problems in the world. What is more important is how an individual, when faced with problems, selects and consolidate knowledge for combination and manipulation. This ability to combine is often referred to as creativity and is associated with the ability to generate new ideas from precedents. Based on the mutual relationship between teaching and learning, this dialogue enables students to think differently by manipulating all kinds of design knowledge and motivates them to think mimetically (Wong and Sui, 2012, p. 437-450; González-Pérez and Ramírez-Montoya, 2022, p. 26-31; Aydınlı and Avcı, 2010, p. 92). Mimetic representations

as a learning strategy are thoughts and concepts that serve the designer's reasoning. The instructional strategy developed to enhance this thinking will also increase students' repertoire and contribute to the development of their creativity (Aydınlı and Avcı, 2010, p. 97; Goldschmidt and Tatsa, 2005, p. 593-611; Kowaltowski et al., 2010, p. 453-476; Bottelli, 2010, p. 456).

Design educators acknowledge that the ability to design largely depends on the pedagogical model used in design studios and that these environments need to be combined with specific tactics and strategies to facilitate critical learning practices (Casakin, 2011, p. 29-38; Newton and Pak, 2015, p. 128). Therefore, students should learn to understand the process and strategies that lead to the most efficient solution when solving a design problem (Christiaans and Venselaar, 2005, p. 217-236). As a teaching strategy, mimesis is a form of imitation that refers to specific similarities or patterns of similarity but implies a critical moment. Mimesis forms the basis of the process of revealing and concealing references during metaphorical reasoning because it is concerned with illuminating similarities and differences. The original value of the study lies in the exploration of the learner's architectural representation through mimesis as a teaching strategy during the design task process, the resolution of this tool through discursive imaging technique, and the observation of the impact of this interpretive resolution on the learning style change and creativity of the learner.

BACKGROUND

Learning Style and Learning Strategy

Students are not "objective" entities independent of a range of problems they identify themselves. At the same time, it is evident that during the most intense phase of design, some problems take on a dominant status—such is the revealing and concealing nature of mimetics. The characteristics and constraints of the current solution can become guiding new criteria. This helps to create a redefined problem domain, and thus, a new design space. We call this phenomenon discovery (Coyne et al., 1994, p. 113-125; Maher et al., 1996, p. 4). In other words, knowledge is produced as a result of design. The knowledge acquired during the design process is a by product of the process and can be used for future designs (Gero, 2000, p. 183-196). Individuals use their learning styles and learning strategies to acquire new knowledge and perform learning tasks. Learning styles are a mental preference pathway for individuals to various problems encountered. Learning strategies encompass the mental and behavioral tactics that learners can employ during the learning process.

In architectural education, reasoning through mimetics is seen as a key way to familiarize students with certain aspects of professional architecture and to test the limits of architectural knowledge (Murphy et al., 2012, p. 530-556). From this perspective, mimetic precedents provide a springboard to focus on anticipating problems, setting new goals, and creating their own challenges, thereby fostering a continuous, creative, proactive, empowering, flexible, open planning, and governance culture. They also assist the designer in analyzing and solving design problems, aiding in deriving through experimental research, metaphorical reasoning, and design thinking (Gentner and Colhoun, 2010, p. 35; Albrechts, 2005, p. 247-269; Choi et al., 2013, p. 119-138).

The contextual conditions within the built environment are always different from one another because the existing structure is dependent on and unique to the environment it resides in (Brooker and Stone, 2012, p. 14). Treating mimetics as a learning strategy will open the way for the learner to engage with the context through within-domain/between-domain resources. An architect can

understand, interpret, develop, and rejuvenate a place by understanding the essence of the place and the unique context it resides in, thus using the existing structure as a source of knowledge, examining its qualities, and using it as a starting point or the foundation of the design's next stage (Brooker and Stone, 2012, p. 22). Leveraging the knowledge of precedents in architectural design to create a new design and establish a new source of knowledge is a particular form of imitation. Within mimesis, there is a process of imitation from the heap of knowledge acquired from the example, and resorting to mimetics is a helpful tool in explaining the reasoning process within the spectrum of concrete and abstract (Coyne et al.,1994, p. 113-125; Özkan Yazgan and Akalın, 2019b, p. 1193-1206). When solving a design problem, designers often resort to reconstructing partial solutions based on familiar previous solutions, analogies, combinations, or abstractions in the context of the ambiguity of knowledge. Thus, they find it reasonable to limit their actions through shortcuts (Akın, 2001, p. 118; Casakin and Goldschmidt, 2000, p. 105-119; Gero, 2000, p. 183; Newland et al., 1987, p. 2-16; Redström, 2020, p. 83-100).

There is a limited number of research studies on the development of creativity and the contribution of educational methods in design education (Ürey, 2021, p. 53-80). Furthermore, the evaluation of students' problem-solving skills within studio processes is an under-researched area (Acar et al., 2021, p. 212-222). On the other hand, although there are studies on mimetic reasoning in the literature (Casakin and Goldschmidt, 1999, p. 153-175; Casakin and Goldschmidt, 2000 p. 105-119; Casakin, 2004b, p.197-217; Casakin, 2004a; Casakin, 2006, p. 253-268; Casakin, 2007, p. 21-33; Casakin and Miller, 2007; Tezel and Casakin, 2010, p. 262-272; Casakin and Kreitler, 2011, p. 159-168; Casakin, 2012, p. 329-344), there is a need for more comprehensive experimental studies attempting to establish a connection between mimetic approaches and coping with epistemic uncertainty and learning styles. With this perspective, the details of the study are provided below.

RESEARCH QUESTIONS

- In a design studio where mimetics are used as a teaching strategy, how does creativity differ in the context of the relationship between learning style change and learning strategy?

HYPOTHESES

- Those who follow a linear path in design are less likely to exhibit changes in their learning styles. Considering that adhering solely to linear thinking with only associative reasoning throughout the design process leads to a series of repetitions along this path, richness in design will decrease.
- Learners who experience a change in learning style between pre-test and post-test results will generally cope with more information. Consequently, creativity levels in design will likely be higher. It is assumed that these individuals will not follow a linear path in the design process, leading to a greater exploration of design alternatives. As a result, original interpretations in design are expected to be higher, as the amount of inspired imagery in design increases, the originality of the product will also be positively affected.
- It is assumed that those who do not follow a linear path in design and utilize interdisciplinary mimetics will have a high ability to produce original designs.

METHODOLOGY

Design Experiment

During the educational term, systematic weekly observational follow-ups were conducted on the architectural design process and the products produced at the end of the education by 13 students who took the Architectural Design IV course. In order to enable the participating students to express their architectural projects, a two-week architectural modeling program training was provided initially. Following that, explanations were given in the context of modern and traditional mosques for the next two weeks. The site for the Architectural Design IV project was selected in Ankara, and the design topic was the reinterpretation of a post-Covid-19 public space, namely the worship spaces (Mosques). Due to the pandemic, participants were provided with site data digitally, and all constraints related to the development of mosque architecture, contemporary examples, and spatial arrangements were conveyed by the instructors. According to Ritter, who emphasizes the necessity for designers to reflect their personal perceptions and be relevant to them for successful application of knowledge and correct format (Ritter et al., 1981, p. 3), after the explanations, students were asked to find mimetics related to the subject and place context and then interpret these mimetics along with their own projects. The selected project area is a triangular parcel with an 18-meter slope in the Serhat neighborhood of Yenimahalle district in Ankara, which has been zoned as a religious facility area, mostly consisting of residential buildings in a new settlement area. The biggest input that will refer to the project design for the area is the park located across the field. Throughout the process, it was expressed that students needed to conduct research to more easily transfer the problems they identified regarding the place and subject to their designs, and they were informed that they could refer to both within and between domains sources in these researches. After researching within and between domains sources, students were asked to design a mosque mass covering at least 1/3 and at most 1/2 of the provided land. Throughout the semester, 13 students attended the course and presented their projects at the end of the term.

For this research, the method of using surveys and observations has been adopted for collecting research data. The use of both quantitative and qualitative[1] tools captures design behaviours comprehensively, allowing for a detailed analysis of the processes underlying students' task performance. To enable a detailed analysis of observational method[2] analysis in the study, drawings produced by students were systematically recorded on a weekly basis.

Learning Style, Kolb LSI (Kolb, 1984)

In its simplest definition, learning style is the path each individual follows for enduring learning (Gülbahar, 2005, p. 10-17). It is suggested in the literature that administering a learning style inventory before or after the initial session would be beneficial to determine students' learning preferences (Khorshidifard, 2011). Therefore, in the study, the experiential learning style inventory developed by

1 The dialogue between the instructor and the learners, covering the entire period of this studio study, was qualitatively analysed. While the qualitative findings supported the quantitative data, they were not included in this article due to word limitations.

2 In the literature, observation is regarded as examining an event or phenomenon in phases according to a plan as it occurs. Kuru Turaşlı (2003) categorizes observation into three headings: observation based on its method and purposes, observation based on physical proximity and relationship, and observation based on time (p. 63-80). Here, Kuru Turaşlı (2003) divides observation based on its method and purposes into two different categories: natural observation and systematic observation. She defines systematic observation as observing an event that occurs within the conditions we have prepared. Additionally, in systematic observation, the researcher is interested in a specific topic(p. 63-80). Accordingly, behaviours are subjected to scrutiny, and only behaviours related to the topic are observed (Kuru Turaşlı, 2003, p. 63-80).

Kolb and adapted into Turkish by Aşkar and Akkoyunlu was applied in a pre-test-post-test format to observe changes before and after the mimetic education approach. In their study, Aşkar and Akkoyunlu (1993) introduced Kolb's Learning Style Inventory and provided information about the statistical studies conducted with the questionnaire, stating that the questionnaire was suitable for use in Turkey after its translation into Turkish (p. 37-48). In Kolb's LSI, individuals' learning styles are considered as a cycle, and the inventory determines where individuals are in this cycle. Within this cycle, there are four learning modes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). Concrete Experience involves learning "by feeling," Reflective Observation involves learning "by watching," Abstract Conceptualization involves learning "by thinking," and Active Experimentation involves learning "by doing." According to the inventory, there is not a single form that determines an individual's learning style. Each individual's learning style consists of components of these four basic forms. Therefore, various situations are placed within a learning situation. The individual's most appropriate learning style is determined by the sum of their scores. These learning styles are "Converger, Diverger, Assimilator, Accommodator." The Learning Style Inventory consists of a short test of 12 questions with four options each. Each option in the test is arranged as follows: Option 1: Concrete Experience (CE), Option 2: Reflective Observation (RO), Option 3: Abstract Conceptualization (AC), Option 4: Active Experimentation (AE), and the individual assigns 4 points to the option they feel closest to, 3 points to the next closest option, 2 points to the next, and 1 point to the least preferred option. After answering the questions, a score between 12 and 48 is obtained. Then, to obtain combined scores, the score of AC is subtracted from the score of CE, and the score of AE is subtracted from the score of RO. The combined score falls within a range of -36 to +36. Using the table below, the individual's AC-CE score is accessed from the y-axis and the AE-RO score from the x-axis to determine the individual's learning style.

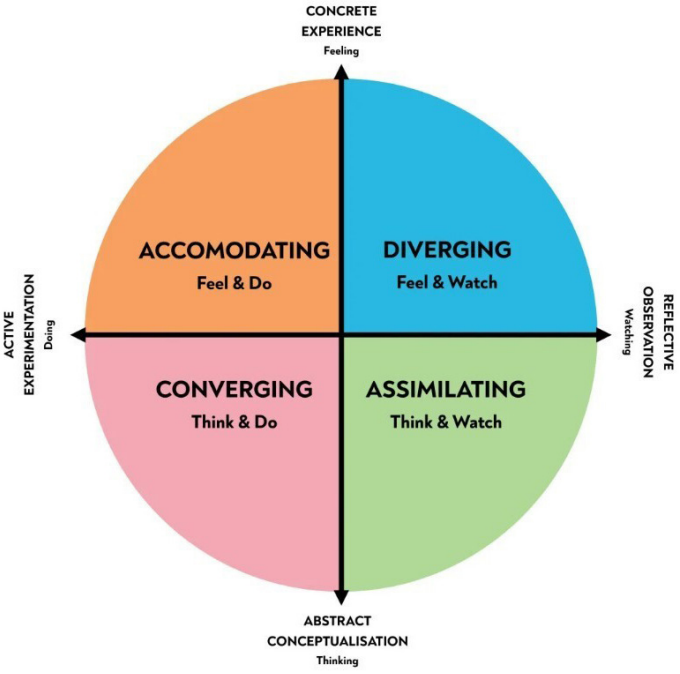


Figure 1. Kolb Learning Styles Graph (Mcleod, 2024)

Kolb's Experiential Learning Style Inventory has been the subject of numerous studies in the fields of architecture and design (Demirbaş and Demirkan, 2003 p. 437-456; Carmel-Gilfilen, 2012, p.47-68; Bender, 2004; Demirkan and Demirbaş, 2008, p. 254-266; Nussbaumer and Guerin, 2000, p. 1-15; Kvan and Jia, 2005, p. 19-34; Özdemir, 2015, p.10-21; Ayalp et al., 2015, p.68-82; Tucker, 2007, p. 246-255).

However, these studies do not address the relationship between changes in learning style and the components of creativity.

In the study, the Learning Style Inventory (LSI) developed by David Kolb was administered to students in a pre-test-post-test format to observe changes throughout the term. The inventory data were calculated according to the inventory's calculation method to determine which learning styles (Assimilator, Diverger, Converger, Accommodator) the students possessed. The information of the 13 students was coded as Ö1, Ö2, etc., and transferred in the study.

Below are the learning strategy and the analyses of the product produced with it. These findings, along with the pre-test and post-test LSI (Learning Style Inventory) results, were examined to evaluate the correlation between the learner's changing and unchanging learning styles in the learning strategy.

Analysis Method Rhodes (1961): Person-Press-Process and Product

In the study, the theoretical framework is based on Rhodes' (1961) four fundamental dimensions of creativity, which are person-press-process and product (p. 305-310). Person: The term 'person' encompasses information about personality, intellect, temperament, physical characteristics, habits, attitudes, self-concept, value systems, defense mechanisms, and behavior. Press: It denotes the relationship between individuals and their surroundings. In the study, contextual depth related to creativity in the area where the design will be conducted is considered in relation to the mimetic approach. Process: It is relevant to motivation, perception, learning, thinking, and communication. Key questions related to the process include: What causes some individuals to attempt to find original answers to questions while the majority are satisfied with traditional responses? What are the stages of the thinking process? Are problem-solving and creative thinking processes the same? Product: The term 'product' refers to an idea conveyed in the form of words, paint, clay, metal, stone, fabric, or any other material to other individuals. When we talk about an original idea, we imply a degree of novelty in the concept. When an idea is materialized, it is called a product. In the context of the study, the product is characterized as the final design solution that an individual puts forward after a certain process.

The study aims to describe the relationship between:

Reasoning Skills (Person) (Associative-Variant/Mixed-Adaptable/ Metaphoric-Original),

Resource Utilization in the Design Process (Press) (within-domains/Mixed/ between-domains),

Design Process (Process) (Linear/Non-linear), and

Created Product (Product) (Application-Analogy-Combination-Abstraction)

and to provide insights into the teaching approach effective in fostering a culture of creativity.

Reasoning Skills: Associative (Analogical), Mixed (Adaptable), and Metaphoric (Original)

Sloman (1996) uses the term associative system in reasoning to refer to a cognitive system that makes inferences based on similarity and proximity (p. 3-22). He mentions that rule-based reasoning systems have computational principles underneath them and are productive because they can encode an unlimited number of propositions. He also states that associations are associated

with similarity, while rule bases are associated with contiguity. An distinguishing feature of rule-based inference is that it involves transitions in a conceptual hierarchy (Sloman, 1996, p. 3-22).

Similarly, Pahl and Beitz (1984) examine creativity through product design and categorize design outputs into three categories: variant (variable) design, adaptable design, and original design (p. 617).

- Variant (variable) design refers to leaving certain aspects of the system unchanged while modifying others, without altering the function and solution principles. In this study, if the final product produced at the end of the design process is analogically related to mimetic sources, it is classified as variant design. In variant design, the dimensions and arrangements of parts and mechanisms vary within specified limits. The design produced is derivatives of what already exists. Therefore, variant design is the type of design with the lowest level of creativity and is based on fixed principles

- Adaptable design refers to using a known solution principle to fulfill a new or modified task. In this study, if the relationship between mimetics and the final product both resembles rule-based and carries visual similarity, it is considered adaptable design. In adaptable design, known established solution principles are adhered to, and adjustments are made within the framework of changing requirements

- Original design refers to determining an original solution principle for a system belonging to the same, similar, or new task and presenting a new design output. In this study, if design products are related to mimetics in a rule-based manner, they are considered original. According to Pahl and Beitz (1984), original designs involve new tasks and problems, as well as new solution principles (p. 617). These can be achieved by either selecting and combining known principles and technologies or inventing entirely new technologies. The term original design is also used when existing tasks are solved using new solution principles. Original designs can involve the entire product as well as its assembly or components.

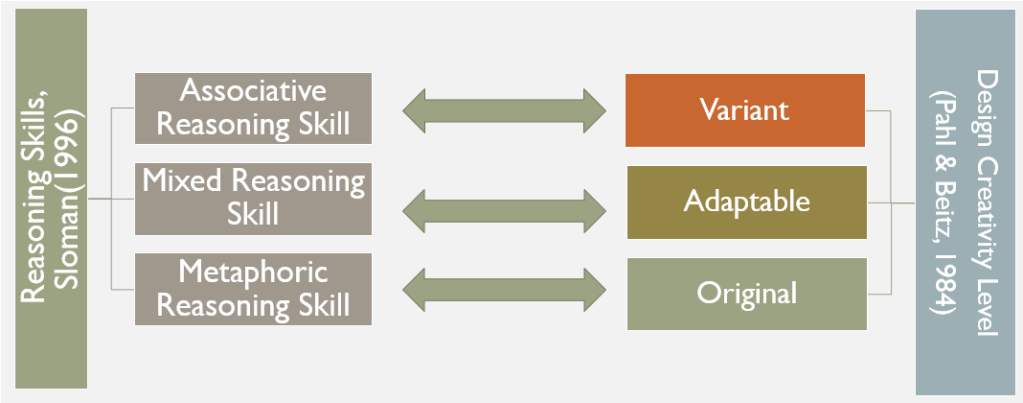


Figure 2. Cognitive Processing Skills in the Design Process

Resource Utilization in the Design Process (Press) (Within-domains - Mixed-Between-domains)

Casakin (2004a) emphasizes that blending within-domains and between-domains resources requires expertise. Between-domains resources are based on structural commonalities, making them more difficult to access (Casakin, 2004b, p. 197-217). However, successful mimetic approaches can be achieved when accessed (Vosniadou & Ortony, 1989, p. 199). Akalın (2018) and Özkan & Akalın (2019b) exemplify successful mimetic interpretations of final-year students who possess the skill to use between-domains resources in their studies (p. 1193-1206).

Özdemir and Akalın (2022) demonstrate the relationship between contextual depth and metaphoric reasoning through cross-sectional analyses in their study (p. 113-126).

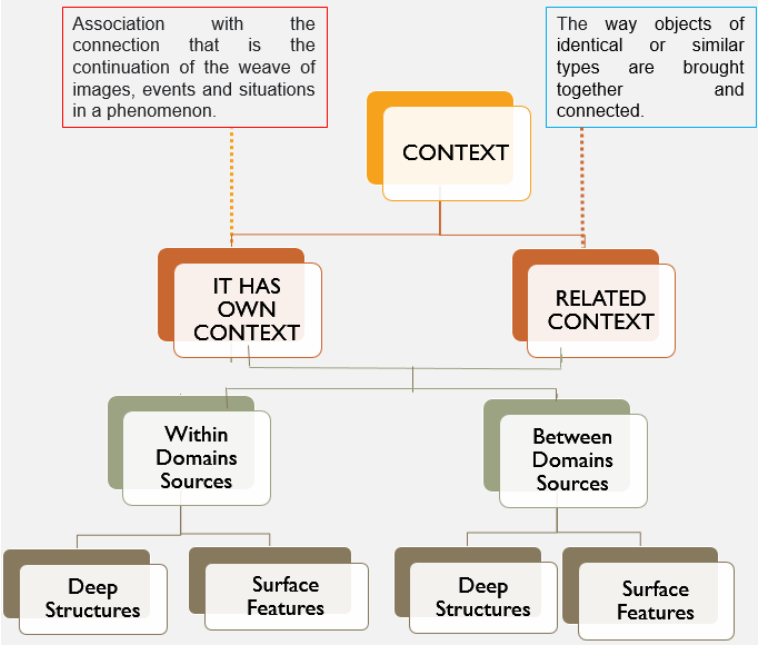


Figure 3. Conceptual Structure Explaining the Mimetic & Context Relationship (Inspired by Akalın 2018)

Akalın (2018) and Özkan Yazgan and Akalın (2019a) aimed to understand the relationship between mimetics used in the produced product based on the context of subject and location, which involves within-domains and/or between-domains resources (p. 183-202). Since the subject context of the study is the design of a worship space, designs related to worship structures are expressed as within-domains resources, while other types of structures outside of worship are considered between-domains resources.

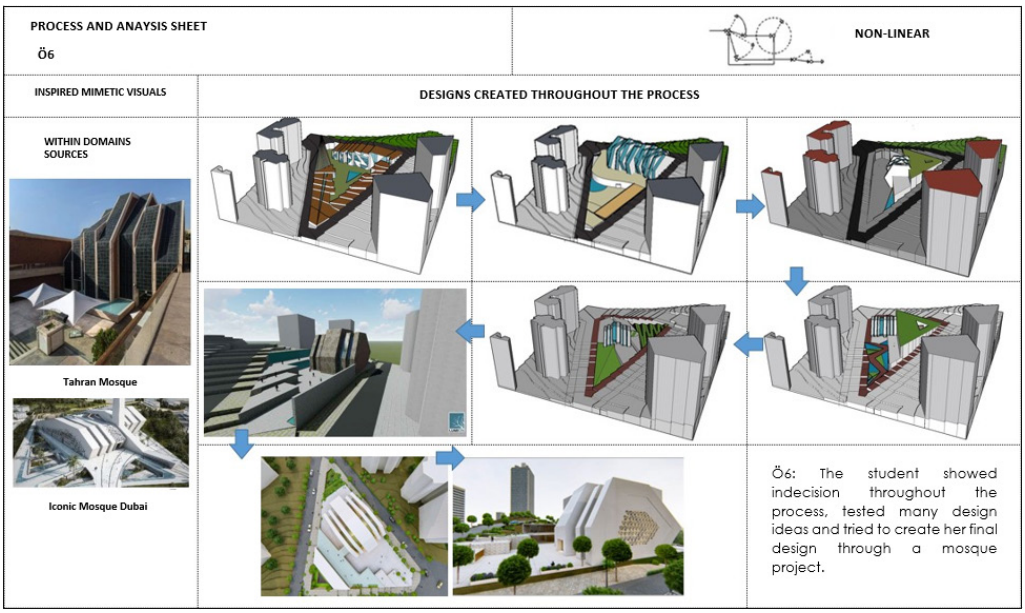


Figure 4. Within-domains Mimetic Sources Used by Ö6

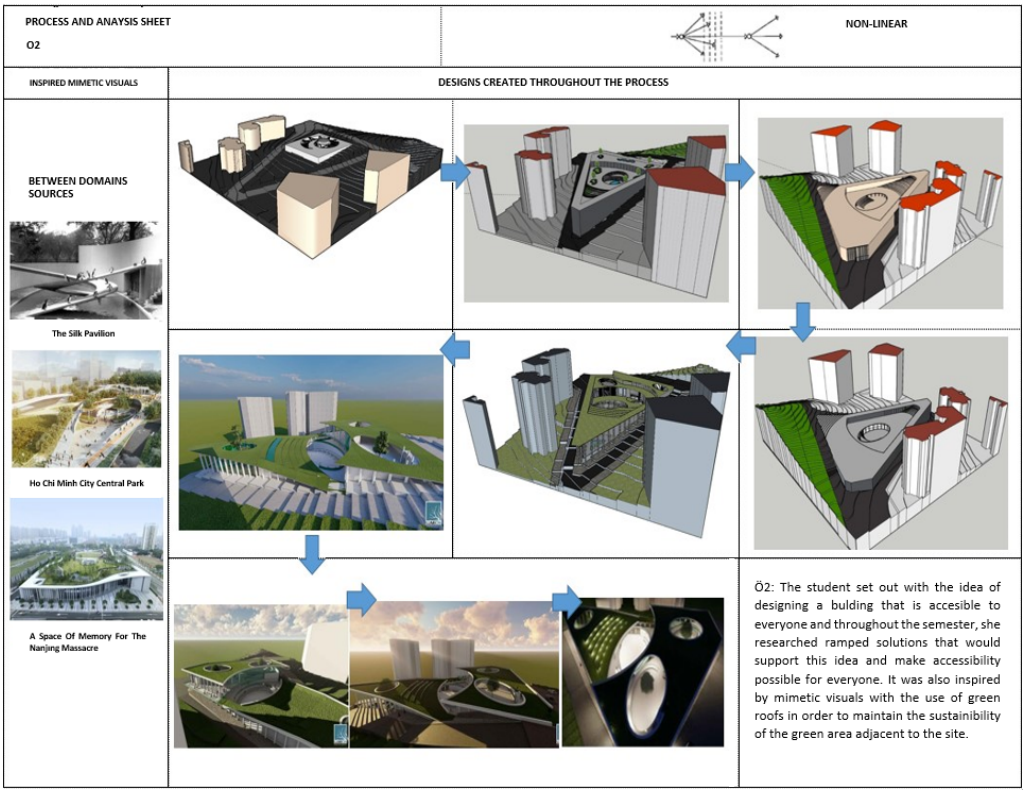


Figure 5. Between-domains Mimetic Sources Used by Ö2

Design Process (Process) (Linear / Non-linear)

Gero (2000) categorizes designs into two groups: routine and non-routine designs. Routine designs can be described as well-structured designs (p. 183-196). Non-routine designs are categorized into innovative and creative designs. Teal (2010) suggests, based on Deleuze and Guattari's rhizome theory, that the design process should not be linear and should progress rhizomatically through mapping (p. 294-302). Being rhizomatic means being productive (rhizome represents a non-linear quest process. (Teal, 2010, p. 294-302). The less regular the design processes, the less fixed or predictable they progress, they become part of a broad network. In such a network, mapping connections can reveal something about the nature of the interconnections between design movements. If the connections have recognizable structures and are repeatedly associated with the production of successful design products, it will be possible to extract productive connections (Goldschmidth and Tatsa, 2005, p. 593-611). In a non-linear design process, design aspects and alternatives are generated, presented, and evaluated simultaneously and in real-time. Moving towards non-linear design modes, allowing the production and evaluation of a greater number and variety of design alternatives, controversially increases design creativity. In creativity research, knowledge-intensive tasks are recognized as critical components of creative work (Candy and Edmonds, 1997, p. 185-194). Schuldberg (1999) discusses the application of chaos theory to the creative process and product (p. 259). The study indicates that chaotic processes exhibit flexibility and adaptability, and these processes are referred to as non-linear dynamic systems, which denote system behaviours that change over time. Additionally, the study notes that at least some of the relationships among the system components represent non-linear systems. The same study suggests that creative products emerge from dynamic processes and that creative products result from the interaction of multiple interconnected adaptable processes addressing intertwined problems.

In this study, Rittel's (1992) design process diagrams were taken into consideration in the analysis of the design process, and by focusing on a single mimetic visual, albeit fragmented, in stages such as analysis-synthesis-solution generation, the design shaping (in terms of space decisions and mass shaping) in the weekly productions made throughout the whole process is classified as linear if it reaches the final product without changing, and as a non-linear process if it changes. As Rittel (1992) states, while linear path tracing is considered as a process that "describes how the designer works, who knows in advance what needs to be done and essentially does not have to involve himself in the design adventure", non-linear approaches are classified by Rittel (1992) under 3 sub-headings;

- Testing or screening refer to a process where the designer attempts to progress by testing different ideas. In this process, if the designer cannot achieve the desired outcome, they go back to the beginning and try a different approach to reach a solution.
- Systematic design process with many alternatives: It is described as step-by-step progress on a design that has been successfully solved and tested by experimenting with multiple alternatives.
- Generating alternatives in a multi-stage process: The designer works with multiple solution proposals for a problem and then proceeds with constraints by reducing the alternatives to a reasonable number[3].

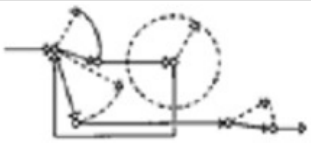
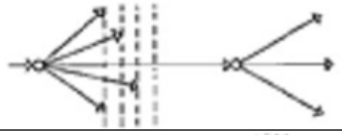
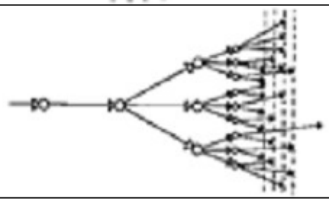
DESIGN PROCESS DIAGRAMS		Process Analysis within the Scope of the Study
	Linear Array	Linear
	Testing or screening	Non-linear
	Systematic generation of several alternative approaches	
	Creating alternatives in a multi-stage process	

Figure 6. Horst Rittel's (1992) design process analyses

The schematic diagrams seen in Rittel's (1992) table and the student's weekly productions are summarized in a table, and the path followed in the design process is attempted to be determined through these descriptions (p. 432). The following examples are provided to gradually demonstrate how each student shaped their design process, inspired by mimetic visuals, and the design followed a linear or non-linear path.[4]

3 In the conducted experimental field study, learners do not produce a single alternative for each lesson they participate in, so there is no student following this process.

4 The blue arrows in each table indicate how the process progressed for the respective student.

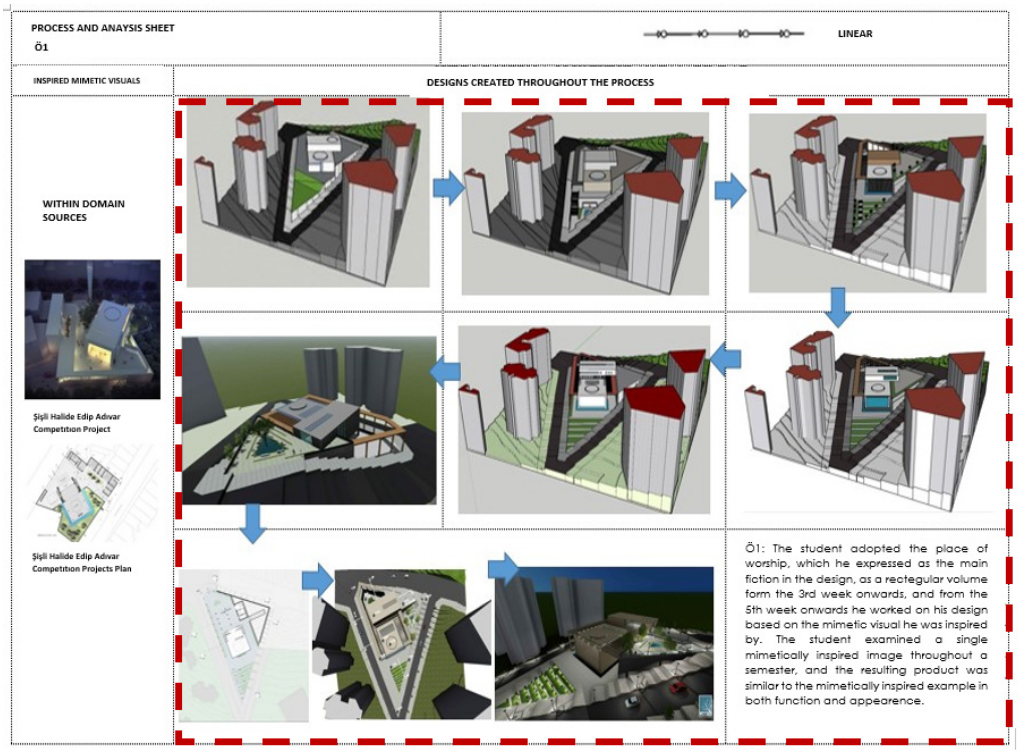


Figure 7. Linear design process used by Ö1

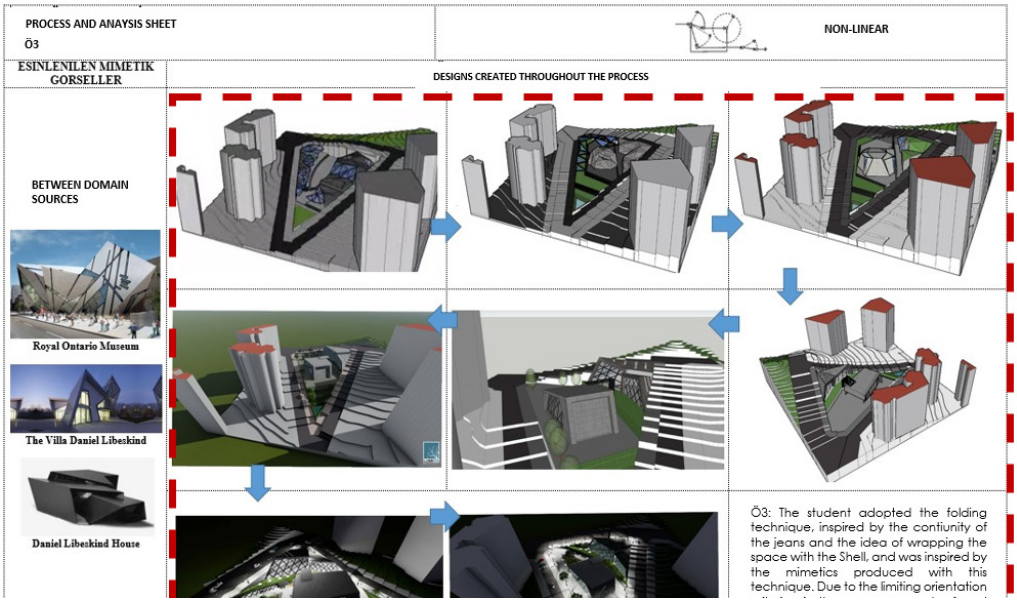


Figure 8. Non-linear design process used by Ö3

Generated Product (Product) (Application-Analogy-Combination-Abstraction)

While determining the learning strategy, in order to understand the relationship that the student established with the mimetic visuals, first of all, the codes in the designer reports were taken as a starting point, Gentner and Markman's (1997) table of overlapping similarity space-object definition showing different types of matches in terms of the degree of relationship was utilized and the level of relationship between the mimetic ones and the produced ones was tried to be understood with this matrix (p. 45-56).

Within the framework of Gentner and Markman's (1997) analytical perspective, the plans and views of the designs produced with the mimetics used in the teaching environment in the study were compared and compared according to the similarity (p. 45-56);

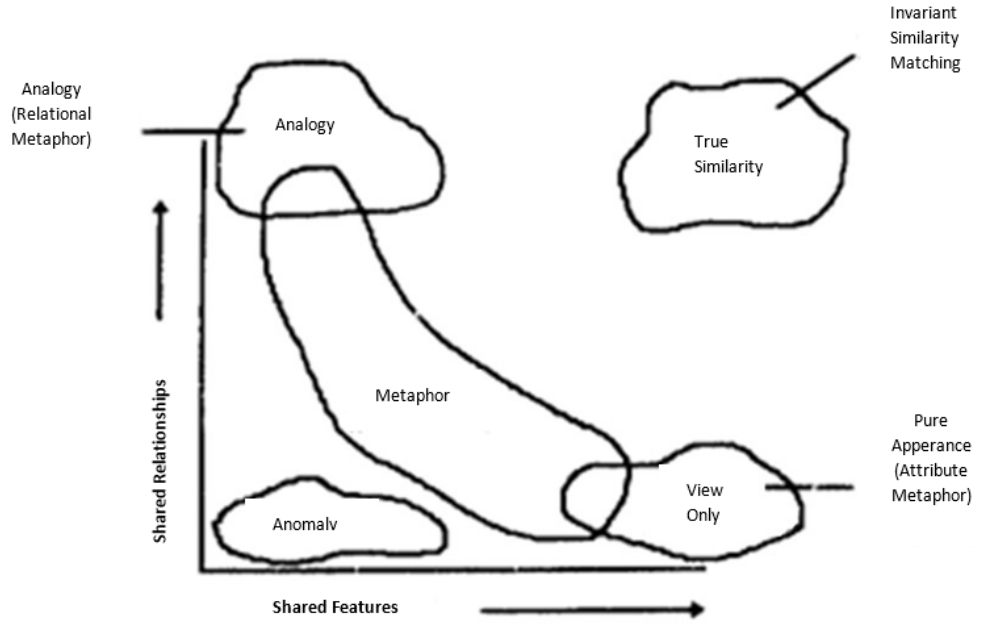


Figure 9. The overlap of the similarity space and the object definition, which show different types of matches in terms of degree of relatedness Gentner and Markman (1997, p. 45-56)

- Variant design through analogical reasoning (interpreted through imitation by changing plan / aspect ratios)
- Adaptive design through mixed reasoning (if the plan - views are transformed into mimetic by adding interpretation / if they bear traces of mimetic; if they have differences in terms of plan scheme but have similarities in appearance)
- Metaphorical reasoning is effective in the production of original design (rule-based relationships; there is no visual similarity, only relational similarities, for example, ramps circulating the building in the connection of elevations and contributing to the shaping).

Basically, analogy and similarity both involve the alignment of relational structure. The difference is that in analogy only relational predicates are shared, whereas in true similarity both relational predicates and object attributes are shared. Gentner and Markman (1997) place this distinction between analogy and similarity in a similarity space defined by the degree of qualitative similarity and the degree of relational similarity(p. 45-56). Analogy occurs when comparisons show a high degree of relational similarity with little qualitative similarity. As attribute similarity increases, the comparison shifts towards true similarity. View-only matches share object definitions, but not relations. The structure mapping engine then produces a structural evaluation of interpretations using a kind of cascade-like algorithm in which evidence is transferred from predicates to arguments (Gentne r and Markman, 1997, p. 45-56). Gentner (1989) refers to the intersection of analogy and metaphor as abstraction (metaphor) (p. 207). According to structure-mapping theory, analogical mapping is the process of establishing a structural alignment between two represented situations and then reflecting the inferences (Gentner and Colhoun, 2010, p. 35). While the main feature of analogies is relational and structural similarity, metaphors cover the spectrum of relational similarity at one end and similarity of appearance at the other end. In this context, metaphors are the transformation of current events into a figurative form of expression that has a more descriptive and explanatory character, rather than a purely abstract perception of processes that give rise to concreteness.

Welling (2007) mentioned that the first of the four mental processes used in creative cognition is the adaptive use of existing knowledge (p. 163-177). Özkan and Akalın (2019a) stated in their study that the exact imitation of existing knowledge is not preferred by architecture studio educators and students, while low place awareness is associated with analogy (formal imitation), high place awareness is associated with abstract conceptual features (abstract imitation) (p. 183-202). In addition, in the study, combination (mixed imitation) was considered as being associated with both analogical and abstract conceptual features.

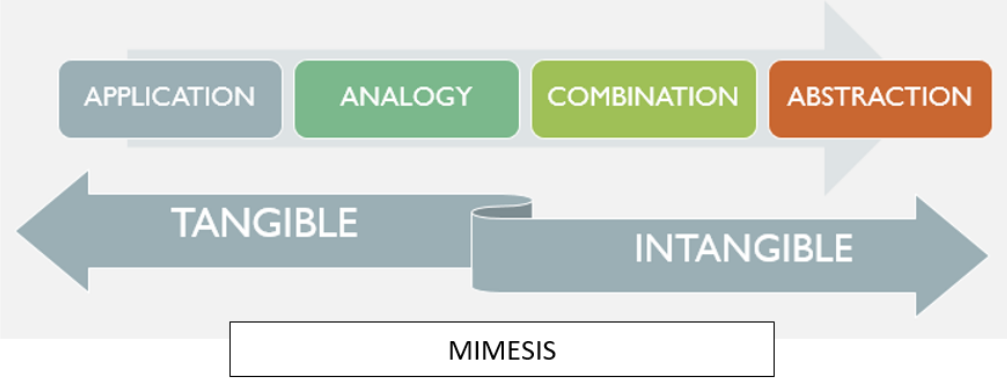


Figure 10. Product produced through mimetics in the design process

For designers, metaphors[5] are positive heuristics of working rules that they use to make things richer, to guide them to what they should choose, or to help designers avoid an ocean of anomalies (Newland et al., 1987, p. 2-16). Metaphors are considered as powerful problem-solving tools for dealing with design tasks, helping to understand the relatively abstract and unstructured as concrete and structured (Özkan Yazgan and Akalın, 2019a, p. 183-202). In metaphors, there is usually a comparison of two non-identical but concretely comparable events. The comparison is often found through creative thinking that connects different objects and discovers a new image in which the characteristics of both play a role (Gentner and Markman, 1997, p. 45-56; Ungers, 2020, p. 15). Designers make use of metaphors as an intellectual tool that bypasses logical processes and serves their opposite, clarity and vitality. As Aristotle defined and Deleuze[6] theorized, "metaphor is the intuitive grasp of similarities in differences". Metaphors do not have static, open and closed meanings, but are potentially capable of revealing multiple meanings that can be progressively revealed through the back and forth movement of the hermeneutical circle. This gradual back and forth process takes place in a context. We take cues not only from the metaphors or models themselves, but also from the situation in which they are situated, so that the conceptual environment in which they operate plays an important role in how we interpret and evaluate them. As the context changes, so does our understanding of the meaning of the models and metaphors we encounter. Thus, given a specific design reference, a student can learn to identify relevant concepts and build a theoretical foundation for design knowledge

5 The Greek word metaphora is "transfer", so metaphor is the transfer of one concept to another. In a broader sense, metaphor is not only a figure of speech, but also a figure of thought. The transfer of concepts takes place between words or images, between a text and its context, between parts of a meaning and the whole, or between two networks of expression or two complex conceptual systems (Snodgrass and Coyne, 1992, p. 56-74).

6 According to Deleuze, repetition changes nothing in the repetitive object, but it changes something in the mind that contemplates it. This famous thesis of Hume takes us to the very heart of a problem. On the contrary, there is a change in the observing mind: something new in the mind, a difference. In other words, whenever we encounter a variant, a difference, a disguise, a change of place, we will say that there is a repetition, but only derivative and "analogical." (Deleuze, 2017, p. 354)

that can then generate new design solutions (Snodgrass and Coyne, 1992, p. 56-74; Kowaltowski et al., 2010, p. 473-476).

The matches that are most likely to occur most easily are true similarity matches and pure appearance matches. In pure transfer, the learner initially knows something about the base domain, but little or nothing about the target domain. Once the base domain is accessed, the mapping process takes place. To transfer knowledge from one domain to another, one needs not only to access the base domain, but also to establish the correct object correspondences between the base and the target and map predicates. At this level, a mixture of deep and surface factors operate (Gentner, 1989, p. 232). The stage of abstraction is the stage where these depth and surface features meet. This stage is handled as metaphorical reasoning by Özkan Yazgan and Akalın (2019b, p. 1193-1206). Relational structures are robust enough to allow accurate mapping without surface support. However, for novice designers, surface similarity is a key determinant of success in structure mapping. The relational abstractions extracted can then influence the encoding (Gentner, 1989, p. 233). With sufficient domain knowledge, the set of known abstractions, such as flow rate or positive feedback state, becomes robust enough to allow relational encoding and retrieval.

Following the analysis of quantitative data in the study, the understanding of the relationship established by the student with mimetic visuals started by examining the codes in the designer reports. Utilizing Gentner and Markman's (1997) similarity space - the overlap of object definitions table showing matches of different types in terms of the degree of relationship, an attempt was made to comprehend the level of relationship between mimetics and the designs produced using a matrix (p. 45-56). According to this table, as the shared relationship with mimetics increases, the design becomes more analogical, while as shared features increase, the design shifts towards metaphorical. In the table, if there is no relationship or feature sharing with mimetics, the situation is described as an anomaly, while if shared relationships and features are common, the situation results in real similarity. If shared features are abundant and relationships are few, it is indicated that only appearance similarity exists. Taking all these data into account, the ways in which designers reasoned and the productions they made throughout the process were collectively examined.

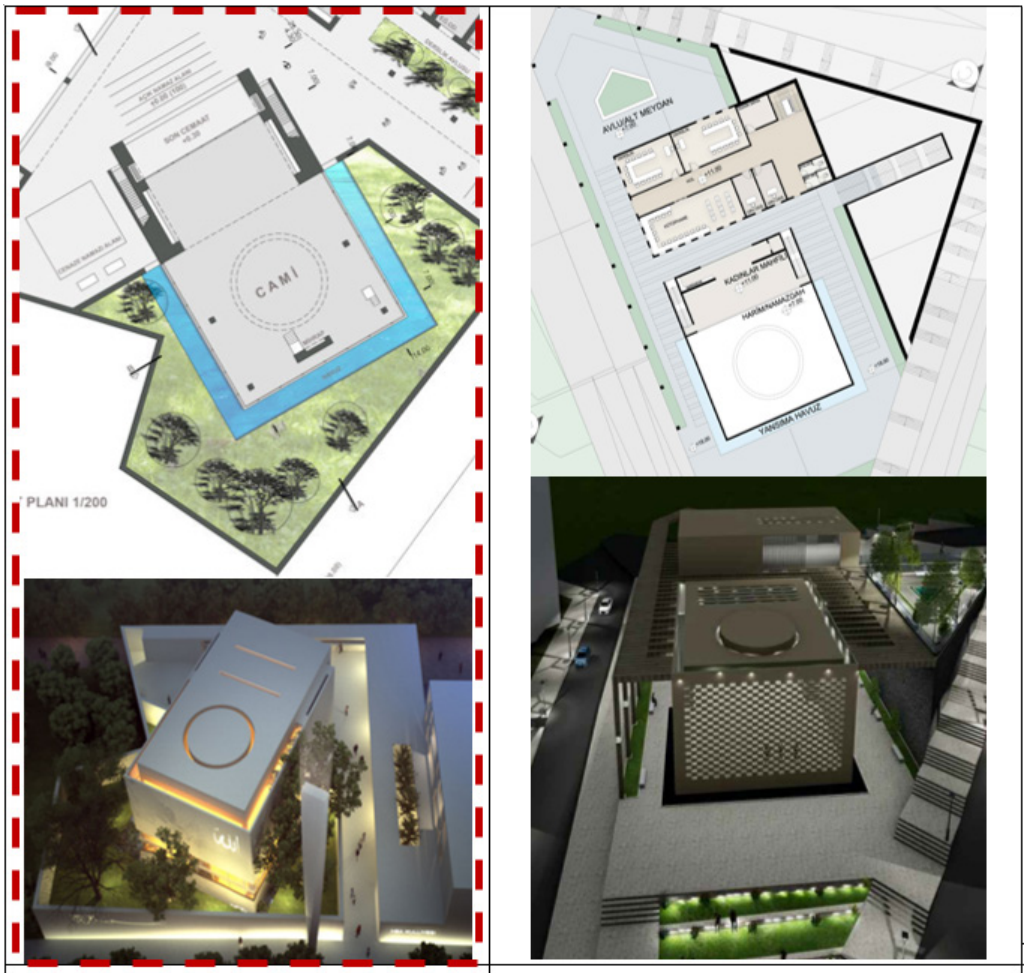


Figure 11. Example of variant design through analogical reasoning

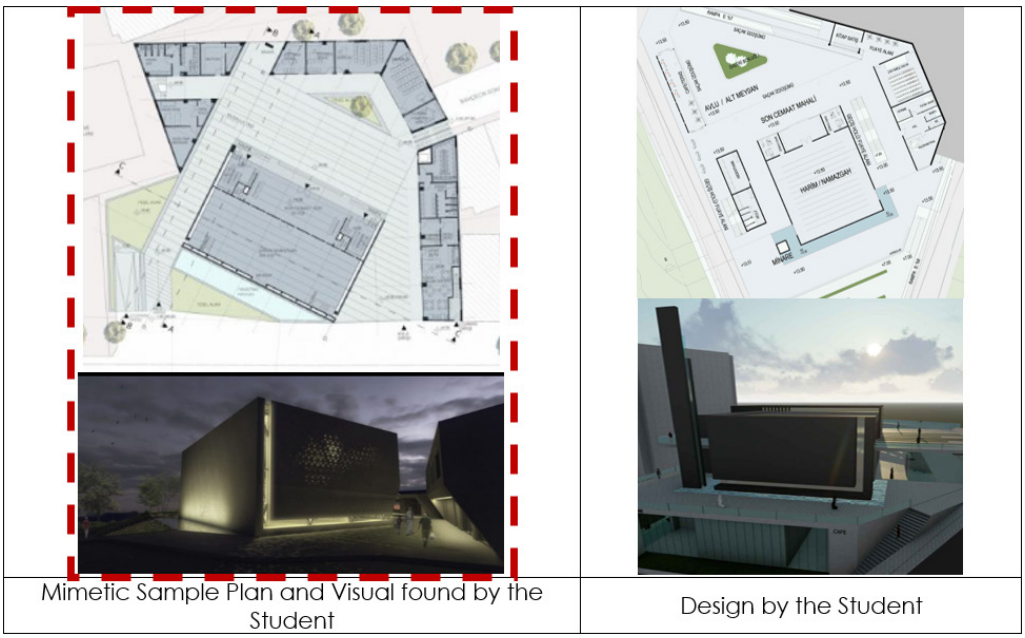


Figure 12. Examples of adaptable design through mixed reasoning

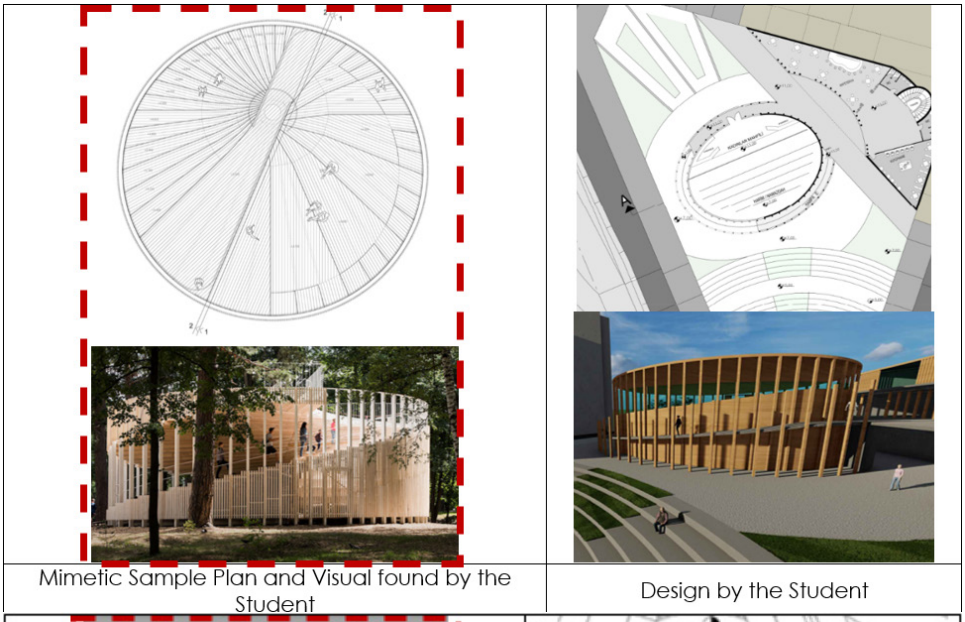


Figure 13. Examples of adaptable design through mixed reasoning

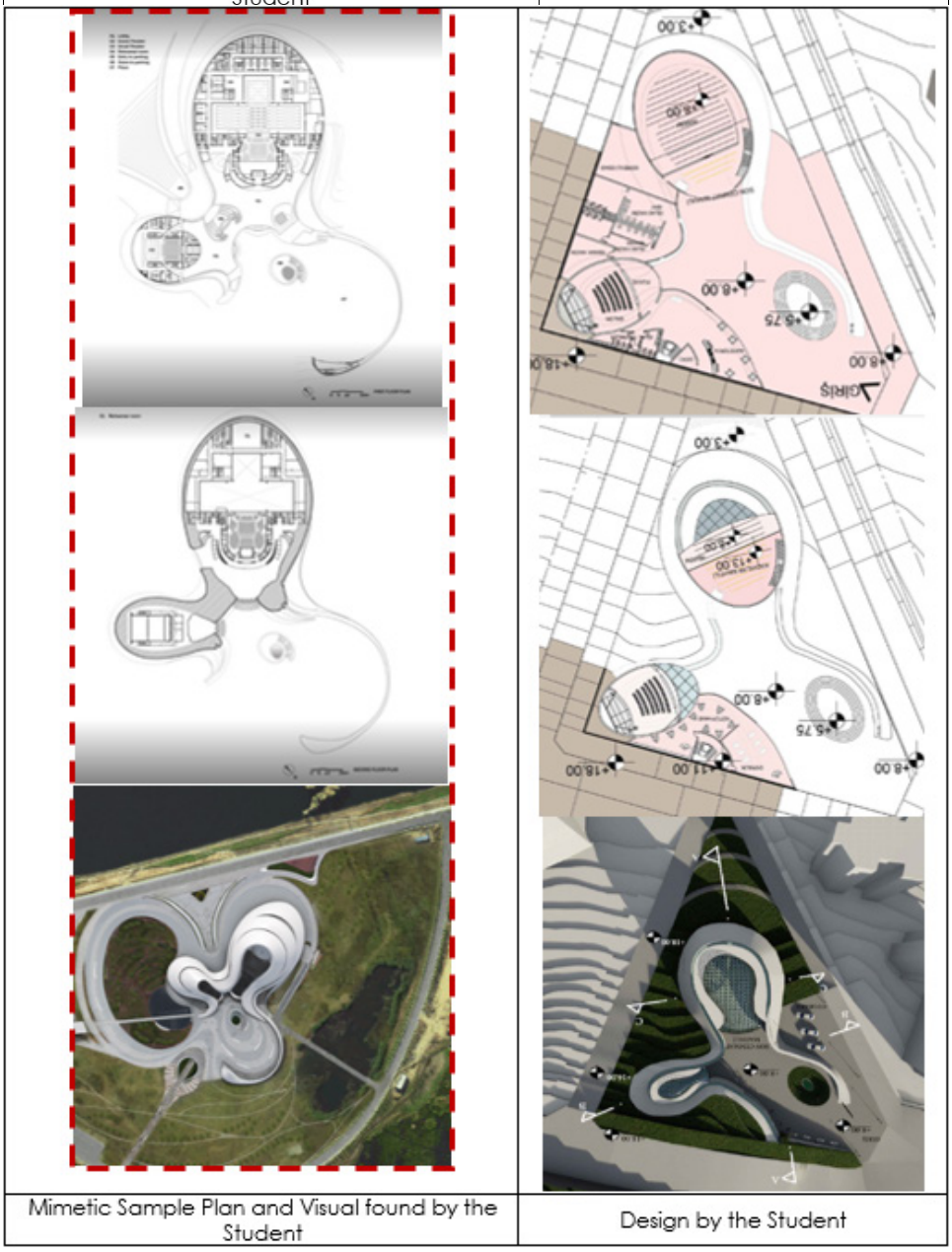


Figure 14. Examples of adaptable design through mixed reasoning

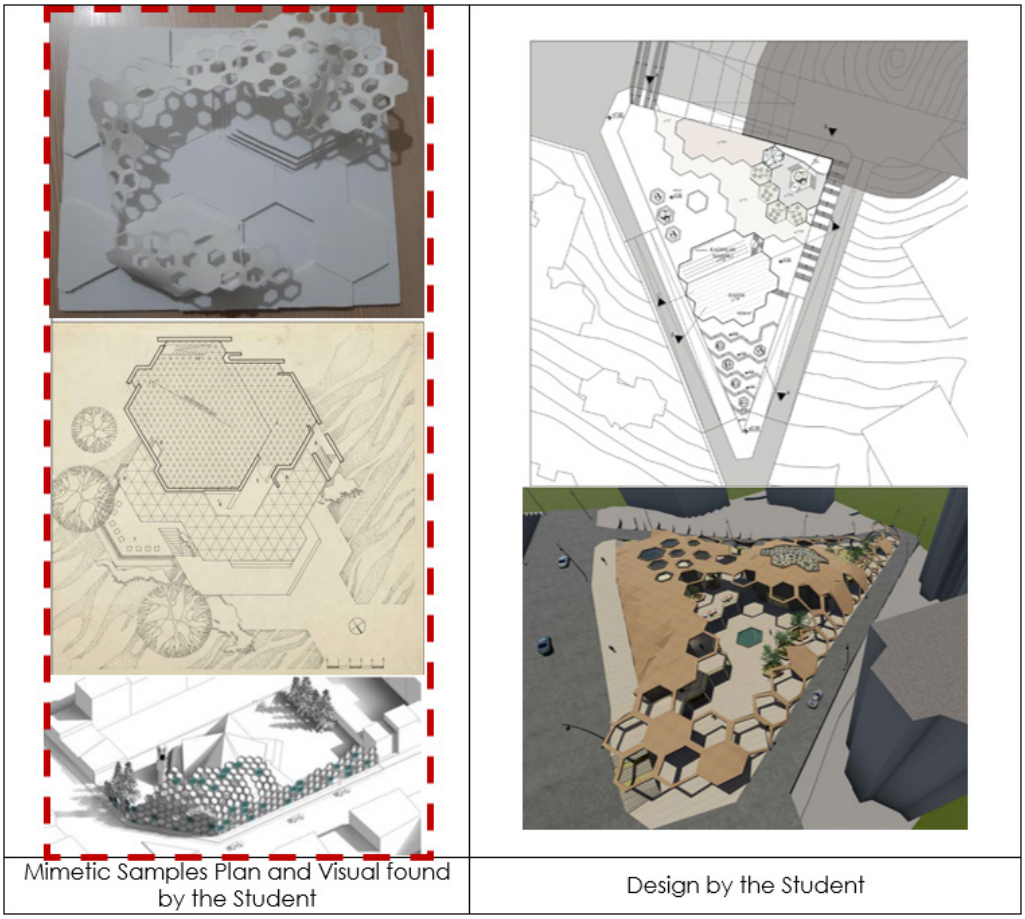


Figure 15. Example of original design through metaphorical reasoning

Findings: Learning Style, Kolb LSI (Kolb, 1984) & Rhodes (1961): Person-Press-Process and Product

Following these basic frameworks, products produced with mimetics were considered together, and correlation analyses were conducted to explore the relationship between learning style and dimensions of creativity in the study.

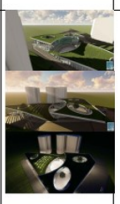
STUDENT	KOLB LSI II PRE- TEST	KOLB LSI II POST- TEST	REASONING SKILLS (ASSOCIATIVE-VARIANT / MIXED-ADAPTABLE / METAPHORIC-ORIGINAL) SLOMAN (1996) PAHL VE BEITZ (1984)	RESOURCE UTILIZATION IN THE DESIGN PROCESS (WITHIN-DOMAINS / MIXED/ BETWEEN-DOMAINS) CASAKIN (2004) AKALIN (2018) OZKAN & AKALIN (2019B)		DESIGN PROCESS (LINEAR / NON-LINEAR) RITTEL (1992)	MIMETIC SOURCES INSPIRED	LEVEL OF INSPIRATION IN DESIGN GENTNER & MARKMAN (1997)		DESIGN CREATED ASA RESULT OF INSPIRATION AND CRITISISM	DESIGN REPORT
				WITHIN DOMAINS	BETWEEN DOMAINS			SHARED RELATIONSHIPS	SHARED FEATURES		
Ö1	ASSIMILATOR	ASSIMILATOR	ASSOCIATIVE-VARIANT	WITHIN DOMAINS (MOSQUE)		LINEAR (LINEAR ARRAY)	 Şişli Halide Edip Adıvar Competition Project [13]	*MOSQUE FUNCTIONAL PLAN	*EXTERNAL APPEARANCE FEATURES OF THE FORM		IN THIS PROJECT, A MOSQUE, WHICH IS A PLACE OF WORSHIP FOR MUSLIMS, AND IN ADDITION TO IT, SOCIAL SPACES WERE BUILT. EVEN IF THE MAIN PICTURE IS WORSHIP, THIS PROJECT ALSO HOSTS AREAS WHERE PEOPLE CAN SOCIALIZE AND SPEND TIME. THESE AREAS ARE UPPER SQUARE, CAFE, LIBRARY, AMPHITHEATER SEATING AREA, ETC. IT CONSISTS OF SOCIAL SPACES. DUE TO THE SLOPING OF THE LAND, ACCESS TO THE SPACES IS PROVIDED FROM DIFFERENT ELEVATS. THE PLACE OF WORSHIP AND THE SOCIAL SPACES CONSIST OF TWO SEPARATE MASSES, AND THE PURPOSE OF THIS IS TO ENSURE THAT THE PLACES PROVIDE SIMULTANEOUS SERVICE.
Ö2	DIVERGER	ASSIMILATOR	METAPHORIC-ORIGINAL		BETWEEN DOMAINS (POOL, CENTRAL PARK, MEMORIAL HALL)	NON- LINEAR (SYSTEMATIC GENERATION OF SEVERAL ALTERNATIVE APPROACHES)	 The Penguin Pool [14]  Ho Chi Minh City Central Park[15]  Nanjing Massacre Victims Memorial Hall [16]	*FLUID DESIGNS THAT CONNECT ELEVATIONS TOGETHER	*USE OF RAMPS *CREATING GREEN ROOF AND INTERNAL COURTYARDS		WHEN STARTING THE PROJECT, WE STARTED WITH THE UNDERSTANDING OF DESIGN FOR EVERYONE. THE DESIGN IS AIMED TO BE NOT JUST AS A MOSQUE, BUT TO BE A PUBLIC SPACE OFFERING MANY OPPORTUNITIES FOR THE NEIGHBORHOOD. THUS, THE DESIGN HAS BECOME A PLACE WHERE VARIOUS ACTIVITIES ARE HELD. THERE ARE ENTRANCES FROM DIFFERENT ELEVATS IN THE DESIGN, AND THERE ARE ALSO RAMPS THAT PROVIDE PASSAGE BETWEEN THE LEVELS. AN NATURE-FRIENDLY GREEN ROOF SYSTEM WAS USED ON THE TOP COVER. WHITE CONCRETE AND GLASS FACADES WERE USED IN MATERIAL SELECTION, BASED ON THE IDEA OF SIMPLICITY AND TRANSPARENCY, WHICH WE BELIEVE TO BE AT THE FOUNDATION OF THE ISLAM RELIGION. THE MESH ON THE MIHRAB FACADE, WHICH IS IN HARMONY WITH THE ORGANIC FORMS IN THE DESIGN, HAS ENABLED THE LIGHT TO FILTER AND REACH THE AREA OF WORSHIP. ALSO, IN THE SECTION WHERE THE WORSHIP AREA IS LOCATED, LIGHT HAS BEEN BROUGHT IN THROUGH STAGED COVERINGS.

Figure 16. Table of analyses obtained from the study

[13] https://www.arkitera.com/proje/esdeger-mansiyon-sisli-halide-edip-adivar-kullivesi-ulusal-mimari-proje-yarismasi-3/
[14] https://www.iaacblog.com/programs/silk-pavilion-multispecies-empower-animals/
[15] https://worldlandscapearchitect.com/lava-and-aspect-studios-win-ho-chi-minh-city-central-park-design-competition/?v=3a1ed7090bfa#.Yn2DOuhBxPY
[16] https://kienviet.net/2019/12/18/nha-tuong-niem-nan-nhan-cua-vu-tham-sat-nam-kinh-p1/

After this fundamental finding, the products produced throughout the process were arranged through chronological matrices, and considering formal/ functional changes, an attempt was made to identify the strategies followed in the process.

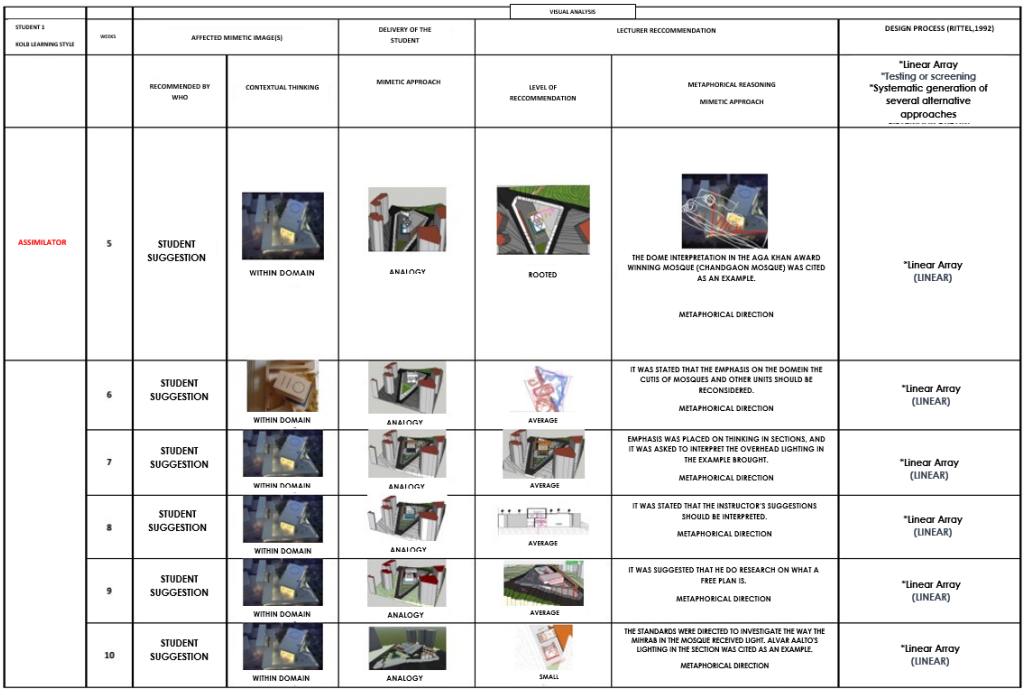


Figure 17. Weekly chronological process chart for Design Ö1

Analysing the weekly chronological charts:

- A student with an unchanged learning style, despite the metaphorical guidance from the instructor, utilized associative reasoning by using in-field resources and followed a linear process to produce an analogical product (see Ö1 and Ö8).
- Another student with an unchanged learning style, using interdisciplinary and mixed sources, benefitted from mixed reasoning, and despite the metaphorical guidance of the instructor, followed a linear process to produce a combination product (See Ö5, Ö7, and Ö13).
- A student with a changing learning style, despite using in-field resources and benefiting from associative reasoning, followed a non-linear path but produced an analogical product (See Ö6).
- Students with a changing learning style, using interdisciplinary or mixed sources for metaphorical reasoning, followed a non-linear process to produce abstraction products (See Ö2, Ö9, Ö10, Ö11, Ö12). Here, Ö2 and Ö9 progressed through the process individually, advancing their ideas rather than following the metaphorical guidance of the instructor. Ö10, Ö11, and Ö12 progressed by modifying mimetics through testing during the process, abstracting an idea from mimetics towards the middle of the process, and combining it with their own design ideas.
- Students with a changing learning style, using interdisciplinary or mixed sources for mixed reasoning, followed a non-linear process to produce combination products (See Ö3 and Ö4).

From the information in the table below; learning style is obtained from the learner's responses to the survey questions, and other headings are derived from

the process-product analysis evaluations conducted by the observer based on the theoretical framework described above.

Table 1. Summary Table

	LEARNING STYLE		Rhodes (1961) 4P			
			LEARNING STRATEGY			RESULT PRODUCT
STUDENT	**KOLB 1**	**KOLB 2**	**Reasoning Skills (Person)** Sloman (1996) Pahl ve Beitz (1984)	**Resource Utilization in the Design Process (Press)** Casakin (2004) Akalın (2018) **Özkan** and Akalın (2019b)	**Design Process (Process)** Rittel (1992)	**Produced Product (Product)** Gentner and Markman (1997) Welling (2007)
	Accommodator Assimilator Diverger Converger	**Accommodator Assimilator Diverger Converger**	**Associative-Variant / Mixed-Adaptable / Metaphoric-Original**	**Within-domains / Mixed/ Between-domains**	**Linear / Non-linear**	**Application-Analogy-Combination-Abstraction**
Ö1	Assimilator	Assimilator	Associative-Variant	Within-domains	Linear	Analogy
Ö2	Diverger	Assimilator	Metaphoric-Original	Between-domains	Non-linear	Abstraction
Ö3	Accommodator	Assimilator	Mixed-Adaptable	Between-domains	Non-linear	Combination
Ö4	Diverger	Assimilator	Mixed-Adaptable	Within-domains	Non-linear	Combination
Ö5	Converger	Converger	Mixed-Adaptable	Mixed	Linear	Combination
Ö6	Assimilator	Converger	Associative-Variant	Within-domains	Non-linear	Analogy
Ö7	Converger	Converger	Mixed-Adaptable	Between-domains	Linear	Combination
Ö8	Converger	Converger	Associative-Variant	Within-domains	Linear	Analogy
Ö9	Converger	Assimilator	Metaphoric-Original	Mixed	Non-linear	Abstraction
Ö10	Converger	Diverger	Metaphoric-Original	Between-domains	Non-linear	Abstraction
Ö11	Accommodator	Converger	Metaphoric-Original	Between-domains	Non-linear	Abstraction
Ö12	Accommodator	Assimilator	Metaphoric-Original	Between-domains	Non-linear	Abstraction
Ö13	Assimilator	Assimilator	Mixed-Adaptable	Between-domains	Linear	Combination

When looking at the correlation in the Pearson correlation analysis of this data;

1. A significant relationship was found between the change in learning style and the reasoning style in the design process. (A1XA2)

2. A strongly significant relationship was found between the change in learning style and the path followed in the design process. (A1XA4)

3. A strongly significant relationship was found between the reasoning style in the design process and the contextual relationship in the design process. (A2XA3)

4. A significant relationship was found between the reasoning style in the design process and the path followed in the design process. (A2XA4)

Table 2. Correlation Analysis Table

			A1	A2	A3	A4
			LEARNING STYLE Changing/ Unchanging	**REASONING SKILLS** Associative-Variant / Mixed-Adaptable / Metaphoric-Original	**RESOURCE UTILIZATION IN THE DESIGN PROCESS** Within-domains / Mixed/ Between-domains	**DESIGN PROCESS** Linear / Non-linear
A1	**LEARNING STYLE** Changing/ Unchanging	Pearson Correl.	1	**,569***	,296	**1,000****
		Sig. (2-tailed)		,042	,326	,000
		N	13	13	13	13
A2	**REASONING SKILLS** Associative-Variant / Mixed-Adaptable / Metaphoric-Original	Pearson Correl.	**,569***	1	**,777****	**,569***
		Sig. (2-tailed)	,042		,002	,042
		N	13	13	13	13
A3	**RESOURCE UTILIZATION IN THE DESIGN PROCESS** Within-domains / Mixed/ Between-domains	Pearson Correl.	,296	**,777****	1	,296
		Sig. (2-tailed)	,326	,002		,326
		N	13	13	13	13
A4	**DESIGN PROCESS** Linear / Non-linear	Pearson Correl.	**1,000****	**,569***	,296	1
		Sig. (2-tailed)	,000	,042	,326	
		N	13	13	13	13
*. Correlation is significant at the 0.05 level (2-tailed).						
**. Correlation is significant at the 0.01 level (2-tailed).						

Evaluation

This study has shown that the learners' non-linear approach in the design process is influenced by the change in learning style. It has been observed that the way learners establish a relationship with the context in the design process affects metaphorical reasoning skills and thus the level of product creativity.

- It has been found that in the case of an unchanged learning style, adaptable production with mixed reasoning comes to the forefront, while in the case of a changing learning style, original production with metaphorical reasoning comes to the forefront.

- Learners following a linear path were found to have unchanging learning styles at the beginning and end of the term. Those following a non-linear path, on the other hand, switched their learning style throughout the term. This variable condition has increased the creativity level in design as it allows designers to work in a versatile manner. These individuals have the ability to use different sources. Similarly, Casakin (2004a) and Özkan Yazgan and Akalın (2019b) have stated that the creativity level will be high in the use of between domains sources in design (p. 1193-1206).

- It has been observed that learners who follow a non-linear path in the design process mostly produce original designs (See Ö2, Ö9, Ö10, Ö11, Ö12). Indeed, in the literature, it is suggested that forming a strategy based on a combination of different specific exercises can be a useful method for improving the design skills of architecture students (Ceylan and Soygeniş, 2022, p. 320-340).

- In associative reasoning (See Ö1, Ö6, and Ö8), the use of within domains resources is prominent, while in mixed and metaphorical reasoning, the use of between domains resources is more prominent. Relationships abstracted from the inspired source become pieces of information that can be derived

in different ways for design, allowing the production of innovative solutions, and this enables the designer to reflect their own perspective. It is known that abstraction will increase shared features with the mimetic and that in this case, it will become a metaphor object rather than appearance similarity (Gentner and Markman, 1997, p. 45-56).

CONCLUSION

This study has been conducted to describe the relationship between the components of creativity in design and changes in learning styles by closely considering the potential role of mimetic strategies in dealing with epistemic uncertainties typically encountered in design contexts.

- The study shows that changes in learning styles are associated with the reasoning style used in the design process. There is also a strong correlation between the reasoning style and the product produced. This situation is in line with Sloman's (1996) use of the term associative system in reasoning, meaning a cognitive system that makes inferences based on similarity and proximity; rule-based reasoning is underpinned by computational principles, rule-based systems are productive because they can encode an unlimited number of propositions, and associations are associated with similarity, and the rule base is associated with contiguity (p. 3-22).
- The study shows the importance of the way of reasoning and utilizing resources in design processes.
- In the associative reasoning style, progressing linearly within domains resources has forced the student to abstract information from the mimetic source, leading the student to produce analogical designs.
- Even if the path followed is linear, students who use mixed reasoning by using between domains and mixed resources have reached a more creative end product by producing combination products. This finding is consistent with data on the relationship between resource use and creativity in the literature (Casakin, 2004b, p. 197-217; Vosniadou and Ortony, 1989, p. 199).
- In the study, it was found that students who did not show a change in learning styles followed a linear path, while students who showed a change in learning styles followed a non-linear path.

These findings indicate that following a linear path reduces the likelihood of reaching an original outcome in creativity, and that rhizomatic processes in design enhance creativity in the resulting product.

Learners experiencing a change in learning style often exhibit higher creativity levels in design, mostly due to their ability to transform and utilize knowledge with greater information handling capacity. These individuals tend to follow a non-linear path in the design process, exploring more design alternatives and achieving higher levels of original interpretations. In other words, the study establishes that as the amount of inspired imagery in design increases, the originality of the product is positively affected. However, those following a partially linear path generally do not exhibit changes in their learning styles.

The study also finds that the use of between domain sources in design contributes to abstract product generation through metaphorical reasoning. Casakin (2004a) emphasized the expertise required to blend and use both within domains and between domains sources effectively. Between domains

sources are based on structural commonalities, making them more challenging to access (Casakin, 2004b, p. 172). Nevertheless, successful mimicry can be achieved when accessed (Vosniadou and Ortony, 1989, p. 199).

A design studio is a microcosm that involves a process and is centred around the production of a product. Understanding the impact of the teaching strategy used in this microcosm on student creativity becomes crucial. This study serves as an indicator of how this understanding can be approached. By analysing the actors, actions, productions, and behaviours in the process, the theoretical framework that determines how creativity develops in studio education has been outlined. Mimesis, as a teaching approach that activates creative thinking, directs learners to explore, discover, internalize what they discover, and synthesize the knowledge they have learned in product production. Design studio instructors should support learners in developing their creative thinking in the process by conducting interdisciplinary research that enables contextual thinking with between domains sources. They should adopt an approach and attitude that moves away from being instructor-centred.

Creativity input is the precursor to producing creative output through the necessary process. Moreover, creativity input includes various components of creativity, including creative process and creative application behaviours. Design creativity performance (creative idea generation during the creative process and product creativity in the creative output) is influenced by creative components, situations (the path followed in the process), and behaviours (planned behaviour or logical action such as thinking style). Therefore, comprehensive design processes that trigger these stages should be investigated to realize design creativity. This study has shown that both creative components and planned behavioural components significantly affect idea creativity. Among creative components, creative thinking skills have been supported in the literature as having the highest impact on creativity. The most significant result obtained from the study is that when educating students with the metaphoric reasoning method, it is essential to help them explore mimetic solutions by moving away from linear thinking structures.

The study emphasized the importance of design studio facilitators directing students to think metaphorically when using the mimetic education approach, and revealed that adopting an approach that emphasizes relating to between domains resources in the process will affect creativity. Proceeding in a way that moves the student away from linear design and enables him to find examples that relate to his original idea will increase creativity. When the findings are examined, it is seen that the participants exhibited a number of common tendencies regarding both their contextual engagement with mimetics while producing projects and the process they follow when mobilizing design decisions. The study also showed the importance of the instructor's need to direct the linear student to do between domains research in order to encourage him to think metaphorically in relation to the context of place. In order to provide students with different thinking skills, an appropriate teaching strategy should be adopted in design studios by taking into account many factors such as the student's change in learning style, reasoning style, and use of resources.

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REFERENCES

Acar, A., Acar, A. Ş. S., & Ünver, E. (2021). Mimarlık Bölümü Birinci Sınıf Öğrencilerinin Kendi Problem Çözme Becerilerine Dair Algılarının Dikkat ve Görsel-Mekânsal Becerileriyle İlişkisi Üzerine Bir Araştırma. *Megaron*, *16*(2), 212-222. https://doi.org/10.14744/megaron.2021.98623

Ackermann, E. (2001). Piaget's constructivism, Papert's constructionism: What's the difference. *Future of learning group publication*, *5*(3), 438-449. https://learning.media.mit.edu/content/publications/EA.Piaget%20_%20Papert.pdf

Akalın, A. (2018, October 4-6). *Architectural Design Education as a Context Related Mimetic Discipline.* [Oral presentation]. In Dicle University 1st International architecture symposium: From environment to space, Diyarbakır, Turkey.

Akın, Ö. (2001). Variants in design cognition. Eastman, C., Newstetter, W., & McCracken, M. (Eds.). In Design knowing and learning: Cognition in design education (pp.105-124), Elsevier.

Akyıldız, E. C. (2020). Bir Öğrenme Ortamı Olarak Tasarım Stüdyosu: Maltepe Üniversitesi Tasarım Stüdyosu 1 Deneyimi. *The Turkish Online Journal of Design Art and Communication*, *10*(4), 389-407. https://doi.org/10.7456/11004100/005

Albrechts, L. (2005). Creativity as a drive for change. *Planning theory*, 4(3), 247-269. https://doi.org/10.1177/14730952050584

Aşkar, P., & Akkoyunlu, B. (1993). Kolb Öğrenme Stili Envanteri. *Eğitim ve Bilim*, *17*(87), 37-48. https://egitimvebilim.ted.org.tr/index.php/EB/article/view/5854/1987

Ayalp, G. G., Şenyiğit, Ö., & Erman, O. (2015). Exploring the learning style characteristics of Turkish freshman architecture students with the evidence of learning style inventory. *Balıkesir Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, *17*(2), 68-82. https://dergipark.org.tr/tr/download/article-file/220313

Aydınlı, S. & Avcı, O. (2010). Relational Thinking that Enhance the Critical Thinking: A design studio case based on the discovery of knowledge. Spiridonidis, C. & M. Voyatzaki (Ed.). *In educating architects towards innovative architectural education* (pp. 89-101), ENHSA Publication.

Ayıran, N. (2005). From systematic methods to the metaphorical approach in the design studio. *A | Z ITU Journal of the Faculty of Architecture*, *2*(01-02), 21-51. https://www.az.itu.edu.tr/index.php/jfa/article/download/544/494

Potur, A. & Barkul, Ö. (2010, June 23-25). *Stüdyo: Tasarım Eğitiminin Kalbi / Studio: The Heart of Design Education,* [Oral presentation]. International Conference on New Horizons in Education, Famagusta, North Cyprus.

Ball, L. J., & Christensen, B. T. (2009). Analogical reasoning and mental simulation in design: two strategies linked to uncertainty resolution. *Design Studies*, 30(2), 169-186. https://doi.org/10.1016/j.destud.2008.12.005

Bender, D. M. (2004, March 25). *Computer attitudes and learning styles of interior design students.* [Oral presentation]. In Conference Chair Wendy Beckwith La Roche College Abstract Review Marie Gentry Coordinators Nancy G. Miller University of Arkansas, USA.

Bottelli, L. Z. (2010). Identity and Time Tools for innovative architecture. Spiridonidis, C. & M. Voyatzaki (Ed.). *Educating Architects towards Innovative Architecture(pp. 453-461)*. EAAE Transactions on Architectural Education.

Bridges, A. H. (1986). Any progress in systematic design? A. Pipes (Ed.). In Computer-Aided Architectural Design Futures (pp. 5-15). Butterworth-Heinemann.

Brooker, G., & Stone, S. (2012). *İç mimarlıkta bağlam+çevre*. (C. Uçar, Trans.). Literatür Yayınları (Original work published 2008).

Candy, L., & Edmonds, E. A. (1997). Supporting the creative user a criteria-based approach to interaction design. *Design Studies, 18*(2), 185-194. https://doi.org/10.1016/S0142-694X(97)85460-9

Carmel Gilfilen, C. (2012). Uncovering pathways of design thinking and learning: Inquiry on intellectual development and learning style preferences. *Journal of interior design*, *37*(3), 47-68. https://doi.org/10.1111/j.1939-1668.2012.010

Casakin, H. (2004a, September 2-3). *Metaphors in the design studio: Implications for education*. [Oral presentation]. The 7th International Conference on Engineering and Product Design Education, Delft, Netherlands.

Casakin, H. (2004b). Visual analogy as a cognitive strategy in the design process: Expert versus novice performance. *Journal of Design Research*, *4*(2), 197-217. https://doi.org/10.1504/JDR.2004.009846

Casakin, H. P. (2006). Assessing the use of metaphors in the design process. *Environment and Planning B: Planning and Design*, *33*(2), 253-268. https://doi.org/10.1068/b3196

Casakin, H. P. (2007). Factors of metaphors in design problem-solving: Implications for design creativity. *International Journal of Design*, *1*(2), 21-33. https://www.ijdesign.org/index.php/IJDesign/article/view/53/27

Casakin, H. (2011). Metaphorical Reasoning and Design Expertise: A Perspective for Design Education. *Journal of learning design*, *4*(2), 29-38. https://doi.org/10.5204/jld.v4i2.73

Casakin, H. (2012). An empirical assessment of metaphor use in the design studio: analysis, reflection and restructuring of architectural design. *International Journal of Technology and Design Education*, *22*(3), 329-344. https://doi.org/10.1007/s10798-010-9149-x

Casakin, H., and Goldschmidt, G. (1999). Expertise and the use of visual analogy: implications for design education. *Design studies*, *20*(2), 153-175. https://doi.org/10.1016/S0142-694X(98)00032-5

Casakin, H. P., and Goldschmidt, G. (2000). Reasoning by visual analogy in

design problemsolving: the role of guidance. *Environment and Planning B: Planning and Design*, *27*(1), 105-119. https://doi.org/10.1068/b2565

Casakin, H., and Kreitler, S. (2011). The cognitive profile of creativity in design. *Thinking Skills and Creativity*, *6*(3), 159-168. https://doi.org/10.1016/j.tsc.2011.06.001

Casakin, H., and Miller, K. (2007, July 13-14). *An investigation of metaphor use and learning style in design problem solving.* [Oral presentation]. The 9th International Conference on Engineering and Product Design Education, University of Northumbria, Newcastle, UK.

Castillo, J. V. and Mora, M. (2010). Architecture without Condition. Spiridonidis, C. & M. Voyatzaki (Ed.). *Educating Architects towards Innovative Architecture(pp. 403-411)*. EAAE Transactions on Architectural Education.

Ceylan, S., and Soygenis, S. (2022). Improving Architecture Students' Design Skills A Studio Experience. *International Journal of Art & Design Education. 41*(2), 320-340. https://doi.org/10.1111/jade.12401

Chand, I., and Runco, M. (1992). Problem finding skills as components in the creative process. *Personality and Individual Differences, 14*(1), 155–162. https://doi.org/10.1016/0191-8869(93)90185-6

Choi, H. H., Kim, M. J., and Cho, M. E. (2013). A critical review of research on design education focusing on creativity in architectural design. *Archives of Design Research*, *26*(3), 119-138. https://doi.org/10.15187/adr.2013.08.26.3.119

Choi, H. H., and Kim, M. J. (2016). The Potential Of Reasoning Methods As A Teaching Strategy Supporting Students'creative Thinking In Architectural Design. *ArchNet-IJAR: International Journal of Architectural Research*, *10*(3), 6-20. https://doi.org/10.26687/archnet-ijar.v10i3.1048

Choi, H. H., and Kim, M. J. (2017). The effects of analogical and metaphorical reasoning on design thinking. *Thinking skills and Creativity*, *23*(1), 29-41. https://doi.org/10.1016/j.tsc.2016.11.004

Christiaans, H., and Venselaar, K. (2005). Creativity in design engineering and the role of knowledge: Modelling the expert. *International Journal of Technology and Design Education, 15*(3), 217-236. https://doi.org/10.1007/s10798-004-1904-4

Coyne, R., Snodgrass, A., and Martin, D. (1994). Metaphors in the design studio. *Journal of Architectural Education*, *48*(2), 113-125. https://doi.org/10.1080/10464883.1994.10734630

Deleuze, G. (2017). *Fark ve tekrar*. Norgunk Yayıncılık.

Demirbaş, O. O., and Demirkan, H. (2003). Focus on architectural design process through learningstyles. *Design Studies*, *24*(5), 437-456. https://doi.org/10.1016/S0142-694X(03)00013-9

Demirkan, H., and Demirbaş, Ö. O. (2008). Focus on the learning styles of freshman design students. *Design studies*, *29*(3), 254-266. https://doi.org/10.1016/j.destud.2008.01.002

Dinç Kalaycı, P. (2016). Etkileşimden Bütünleşmeye Bir Mimari Tasarım Stüdyosu Pratiğinin Anatomisi, Nobel Akademik Yayıncılık.

Dinç Kalaycı, P. (2018). *From Fantasy to Reality, Reality to Fantasy…* Design Studio as a Swinging Pendulum: Studio ThinkImagine, Architectural Episodes.

Dizdar, S. I. (2015). Architectural education, project design course and education process using examples. *Procedia-Social and Behavioral Sciences*, *176*(1), 276-283. https://doi.org/10.1016/j.sbspro.2015.01.472

Dudek, S. Z., and Côté, R. (1994). Problem finding revisited. In M. A. Runco (Ed.), *Problem finding, problem solving and creativity(pp. 130-150)*. Norwood, NJ: Ablex Publishing.

Fotiou, T. and Karvountzi, K. (2010). Realities versus Concepts From design studios to design laboratories. Spiridonidis, C. & M. Voyatzaki (Ed.). *Educating Architects towards Innovative Architecture (pp.233-245)*. EAAE Transactions on Architectural Education.

Frascara, J. (2020). Design education, training, and the broad picture: eight experts respond to a few questions. *She Ji: The Journal of Design, Economics, and Innovation*, 6(1), 106-117. https://doi.org/10.1016/j.sheji.2019.12.003

Friedman, K. (2002, April 10-12). *Design curriculum challenges for today's university*. [Oral presentation]. In International Conference from CLTAD, London, United Kingdom.

Gänshirt, C. (2012). Tools for ideas. In *Tools for Ideas*. Birkhäuser Press.

Gero, J. S. (2000). Computational models of innovative and creative design processes. *Technological forecasting and social change*, *64*(2-3), 183-196. https://doi.org/10.1016/S0040-1625(99)00105-5

Gero, J. S., and Kannengiesser, U. (2004). The situated function–behaviour–structure framework. *Design studies*, *25*(4), 373-391. https://doi.org/10.1016/j.destud.2003.10.010

Gentner, D., and Colhoun, J. (2010). Analogical processes in human thinking and learning. In B. M. Glatzeder, V. Goel, and A. von Müller (Eds.), Towards a Theory of Thinking: Building Blocks for a Conceptual Framework (pp. 35-48). Springer-Verlag.

Gentner, D. (1989). The mechanisms of analogical learning. In S. Vosniadou & A. Ortony (Eds.), Similarity and analogical reasoning (pp. 199–241). Cambridge University Press. https://doi.org/10.1017/CBO9780511529863.011.

Gentner, D., and Markman, A. B. (1997). Structure mapping in analogy and similarity. *American psychologist, 52*(1), 45-56. https://doi.org/10.1037/0003-066X.52.1.45

Getzels, J. W. (1987). Problem finding and creative achievement. *Gifted Students Institute Quarterly, 16*(4), 235- 241. https://doi.org/10.1080/02783199409553588

Goldschmidt, G., and Tatsa, D. (2005). How good are good ideas? Correlates of design creativity. *Design studies*, *26*(6), 593-611. https://doi.org/10.1016/j.destud.2005.02.004

González-Pérez, L. I., and Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st century skills frameworks: Systematic review. *Sustainability*, *14*(3), 26-31. https://doi.org/10.3390/su14031493

Green, L. N., and Bonollo, E. (2003). Studio-based teaching: history and advantages in the teaching of design. *World Transactions on Eng. and Tech. Edu*. *2*(2), 269-272.

Gülbahar, Y. (2005). Öğrenme Stilleri ve Teknoloji. *Eğitim ve Bilim*, *30*(138), 10-17. https://egitimvebilim.ted.org.tr/index.php/EB/article/view/4989

Gür, B. (2017). *Praksis: Eylem olarak tasarım ve eğitimi. Mimari tasarım eğitimine çağdaş önermeler.* YEM Yayınları.

Hançerlioğlu, O. (1979). *Felsefe ansiklopedisi: kavramlar ve akımlar*. Remzi Kitabevi.

Harrison, J., and Dalton, C. (2010). Educating Architects towards Innovative Architecture. Spiridonidis, C. & M. Voyatzaki (Ed.). *Making the Familiar Strange: Learning innovation by example. (pp. 159-171)*. EAAE Transactions on Architectural education.

Higgins, M., and Morgan, J. (2000). The role of creativity in planning The'creative practitioner'. *Planning Practice & Research, 15*(1-2), 117-127. https://doi.org/10.1080/713691881

Howard, T. J., Culley, S. J., and Dekonınck, E. (2008). Describing the creative design process by the integration of engineering design and cognitive psychology literature. *Design studies, 29*(2), 160-180. https://doi.org/10.1016/j.destud.2008.01.001

Khakzand, M. and Azimi, M. (2015). Metaphor: a creative aid in architectural design process. *International Journal of Architectural Engineering & Urban Planning (IJAUP), 25*(2), 67-75. https://doi.org/10.22068/ijaup.25.2.67

Kvan, T., and Jia, Y. (2005). Students' learning styles and their correlation with performance in architectural design studio. *Design Studies*, 26(1), 19-34. https://doi.org/10.1016/j.destud.2004.06.004

Khorshidifard, S. (2011, April 20-23). *A paradigm in architectural education: Kolb's Model and learning styles in studio pedagogy*. [Oral presentation]. In ARCC Conference Repository. Ryerson University, Toronto, Canadian.

Kolb, D. A. (1984). *Experiential learning: Experiences as the source of learning and development.* Englewood Cliffs, New Jersey, Prentice-Hall.

Kowaltowski, D. C., Bianchi, G., and De Paiva, V. T. (2010). Methods that may stimulate creativity and their use in architectural design education. *International Journal of Technology and Design Education*, *20*(4), 453-476. https://doi.org/10.1007/s10798-009-9102-z

Kuru Turaşlı, N. (2003). Bir ölçme değerlendirme yöntemi olarak" gözlem tekniği" ve okul öncesi eğitimde kullanılması. *Maltepe Üniversitesi Fen Edebiyat Fakültesi Dergisi, 1*(3), 63- 80.

Lakoff, G. and Johnson, M. (1999). *Philosophy in the flesh-the embodied mindand its challenge to Western Thought*. Basic Books.

Lee, L. (2010). Educating Architects towards Innovative Architecture. Spiridonidis, C. & M. Voyatzaki (Ed.). *Integrated Design Strategies for Innovation.* (pp. 31-43). EAAE Transactions on Architectural education.

Maher, M. L., Poon, J., and Boulanger, S. (1996). Formalising design exploration as co-evolution. In *Advances in formal design methods for CAD*, Boston, MA.

Mcleod. S. (2024). Kolb's Learning Styles And Experiential Learning Cycle. Retrieved February 2, 2024 from https://www.simplypsychology.org/learning-kolb.html

Milovanović, A., Kostić, M., Zorić, A., Đorđević, A., Pešić, M., Bugarski, J., & Josifovski, A. (2020). Transferring COVID-19 challenges into learning potentials: Online workshops in architectural education. *Sustainability*, *12*(17), 8-21. https://

doi.org/10.3390/su12177024

Morabito, G., Giuliani, F., Marrone, P., & Zacchei, V. (2010). Educating Architects towards Innovative Architecture. Spiridonidis, C. & M. Voyatzaki (Ed.). *Design Training and Education using an Evolutionary Process Training experiences in technological design* (pp. 439-453). EAAE Transactions on Architectural education.

Murphy, K. M., Ivarsson, J., & Lymer, G. (2012). Embodied reasoning in architectural critique. *Design Studies*, *33*(6), 530-556. https://doi.org/10.1016/j.destud.2012.06.005

Newland, P., Powell, J. A., & Creed, C. (1987). Understanding architectural designers' selective information handling. *Design Studies*, *8*(1), 2-16. https://doi.org/10.1016/0142-694X(87)90026-3

Newton, C., and Pak, B. (2015). *Virtuality and fostering critical design thinking: an exploration of the possibilities through critical theory, design practices and networked learning*. In Critical Learning in Digital Networks, Springer International Publishing. https://doi.org/10.1007/978-3-319-13752-0_6

Nussbaumer, L. L., and Guerin, D. A. (2000). The relationship between learning styles and visualization skills among interior design students. *Journal of Interior Design*, *26*(2), 1-15. https://doi.org/10.1111/j.1939-1668.2000.tb00355.x

Ohlsson, S. (1984). Restructuring revisited: I. Summary and critique of the gestalt theory of problem solving. *Scandinavian Journal of Psychology*, 25(1), 65–78. https://doi.org/10.1111/j.1467-9450.1984.tb01001.x

Onat, E. (2020). *Mimarlığa yolculuk*. Efil Yayınevi, 5. Yeniden Basım.

Özbudak Akça, B. and Aras Baylan, B. (2020). Assessment of conceptual efforts in architectural design education through studio-related experiences. *Online Journal of Art and Design*, *8*(3), 59-74.

Özdemir, E. E. (2015). Mimari tasarım araçlarından perspektif çizebilme başarısının öğrenme stillerine etkisi: birinci sınıf mimarlık öğrencileri örneği. *Artium*, *3*(2), 10-21. http://artium.hku.edu.tr/tr/pub/issue/2246/29610

Özdemir, E. E., and Akalın, A. (2022). The relationship between students› mimetic approaches and learning styles in architectural design education. *Periodica Polytechnica Architecture*, *53*(2), 113-126. https://doi.org/10.3311/PPar.17812

Özgür, S. (2018). Mimarlıkta taklit olgusu için bir öneri: mem örüntüleri ve mimari emsal hikayesi kavramı. *Megaron*, *13*(2), 192-200. https://doi: 10.5505/megaron.2018.69926

Özkan Yazgan, E., and Akalın, A. (2019a). The Comprehension of Place Awareness In A Historical Context: Metaphors In Architectural Design Education. *METU Journal of the Faculty of Architecture*, *36*(1), 183-202. http://dx.doi.org/10.4305/metu.jfa.2019.1.7

Özkan Yazgan, E., and Akalın, A. (2019b). Metaphorical reasoning and the design behavior of "prearchitects". *International Journal of Technology and Design Education*, *29*(5), 1193-1206. http://dx.doi.org/10.1007/s10798-018-9485-9

Pahl, G., and Beitz, W. (1984). *Engineering design, The design council*. Springer Press.

Park, E. J., and Kim, M. J. (2021). Visual Communication for Students' Creative

Thinking in the Design Studio: Translating Filmic Spaces into Spatial Design. *Buildings*, *11*(3), 91-109. https://doi.org/10.3390/buildings11030091

Redström, J. (2020). Certain uncertainties and the design of design education. *She Ji: The Journal of Design, Economics, and Innovation*, *6*(1), 83-100. https://doi.org/10.1016/j.sheji.2020.02.001

Rhodes, M. J. (1961). An analysis of creativity. *The Phi delta kappan*, *42*(7), 305-310.

Rittel, H. W. (1992). *Planen, Entwerfen, Design: Ausgewählte Schriften zu Theorie und Methodik*. Kohlhammer.

Ritter, J. (1981). *Building design: information and aids.* In Percey Thompson Partnerships Press.

Salama, A. M. (2005, January 29-31). *Skill-based/knowledge-based architectural pedagogies: An argument for creating humane environments.* [Oral presentation]. In 7th International Conference on Humane Habitat-ICHH. Rizvi College of Architecture, India.

Sarkar P, Chakrabarti A. (2008). Studying engineering design creativity-developing a common definition and associated measures, In, John Gero (Ed.) Studying Design Creativity, Springer Verlag.

Shixing, L. (2010). How far can we go from Precedents? Spiridonidis, C. & M. Voyatzaki (Ed.). *Educating Architects towards Innovative Architecture (pp.253-261)*. EAAE Transactions on Architectural Education.

Schuldberg, D. (1999). Chaos theory and creativity. Mark A. Runco, Steven R. Pritzker (Eds.) *Encyclopedia of creativity* (pp. 259-273). Academic Press. https://doi.org/10.1016/B978-0-12-375038-9.00037-6

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin, 119*(1), 3-22. https://doi.org/10.1037/0033-2909.119.1.3

Snodgrass, A., and Coyne, R. (1992). Models, metaphors and the hermeneutics of designing. *Design issues*, *9*(1), 56-74. https://doi.org/10.2307/1511599

Şentürer, A. (2001). Mimarlıkta Felsefe Nerede Duruyor?. Mimarlık ve Felsefe, YEM yayınevi.

Teal, R. (2010). Developing a (Non□linear) Practice of Design Thinking. I*nternational Journal of Art & Design Education*, *29*(3), 294-302. https://doi.org/10.1111/j.1476-8070.2010.01663.x

Tezel, E., and Casakin, H. (2010). Learning Styles And Students' performance In Design Problem Solving. *Archnet-IJAR: International Journal of Architectural Research, 4*(2/3), 262-272. https://doi.org/10.26687/archnet-ijar.v4i2/3.110

Tucker, R. (2007). Southern drift: The learning styles of first-and third-year students of the built environment. *Architectural science review, 50*(3), 246-255. https://doi.org/10.3763/asre.2007.5030

Ungers, O. M. (2020). *Morphologie-Kent Metaforları*. (C. Verbowski, Trans.). Lemis Yayınevi (Original work published 1982).

Ürey, Z. Ç. U. (2021). Fostering Creative Cognition In Design Education: A Comparative Analysis of Algorithmic and Heuristic Educational Methods In Basic Design Education. *METU Journal of the Faculty of Architecture, 38*(1), 53-80. http://dx.doi.org/10.4305/metu.jfa.2021.1.9

Vergopoulos, S. (2010). *Educating Architects towards Innovative Architecture*. Spiridonidis, C. & M. Voyatzaki (Ed.). Design Intentions and Innovation New teaching paradigms in the context of digital architectural design (pp. 411-423). EAAE Transactions on Architectural Education.

Vosnıadou, S. and A. Ortony (eds.) (1989) *Similarity and Analogical Reasoning*. Cambridge University Press.

Voyatzaki, M. and Spiridonidis, C. (2010). *Educating architects towards innovative architecture*. EAAE Transactions on Architectural Education.

Wallerstein, I. (2013). *Bilginin Belirsizlikleri,* (Berivan Alataş, Trans.). Sümer Yayıncılık.

Welling, H. (2007). Four mental operations in creative cognition: The importance of abstraction. *Creativity Research Journal*, *19*(2-3), 163-177. https://doi.org/10.1080/10400410701397214

Wong, Y. L., and Siu, K. W. M. (2012). A model of creative design process for fostering creativity of students in design education. *International Journal of Technology and Design Education*, *22*(4), 437-450. https://doi.org/10.1007/s10798-011-9162-8

Yüksel, F. C. G., Meral, S., & Kariptaş, F. S. (2021). Temadan Temsiliyete: Eleştirel Bir Stüdyo Deneyimi. *Online Journal of Art and Design*, 9(1), 229-244. http://www.adjournal.net/articles/91/9115.pdf

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Research Article

Neuro-Urbanism: Measurement of the Street Enclosure and its Influence on Human Physiology Through Wearable Sensors

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Abstract

This study explores the neurophysiological impact of visual qualities in Shanghai's chosen urban spaces, specifically focusing on the perception of street's visual quality. This metric has been defined by changes in physical space of intersection vs. in street, visibility of the sky, continuity of the wall, and ratio of sections. These variables contribute to the "enclosure rating", a dimensionless number that can determine the perception of urban street intersectional space by occupants. We measured the changes in average heart rate of 15 participants at the selected intersections using a customized wearable sensor kit. We compared the participants' heart rate towards the intersectional space and towards street and ask participants to complete a comfort-related post-evaluation. Analysis of the data show that subjects who look at enclosed views of streets experienced a lower heart rate than those who look at intersections.

Keywords: Environmental Psychology, Neurophysiology, Street Intersections, Urban Environment, Wearable Technology.

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Araştırma Makalesi

Nöro-Şehircilik: Sokak Çevresinin İnsan Fizyolojisi Üzerindeki Etkisinin Giyilebilir Sensörler Aracılığıyla Ölçümü

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Özet

Bu çalışma, Şangay'ın seçilmiş kentsel alanlarındaki görsel niteliklerin nörofizyolojik etkisini araştırmakta, özellikle caddenin görsel kalitesinin algılanmasına odaklanmaktadır. Bu metrik, kavşağın fiziksel alanındaki ve sokaktaki değişiklikler, gökyüzünün görünürlüğü, duvarın sürekliliği ve kesitlerin oranı ile tanımlanmıştır. Bu değişkenler, kentsel cadde kavşak alanının yolcular tarafından algılanışını belirleyebilen boyutsuz bir sayı olan "çevreleme derecesine" katkıda bulunmaktadır. Özelleştirilmiş bir giyilebilir sensör kiti kullanarak seçilen kavşaklarda 15 katılımcının ortalama kalp atış hızındaki değişiklikleri ölçtük. Katılımcıların kavşak alanına ve sokağa yönelik kalp atış hızlarını karşılaştırdık ve katılımcılardan konforla ilgili bir son değerlendirmeyi tamamlamalarını istedik. Verilerin analizi, sokakların kapalı görünümlerine bakan deneklerin, kavşaklara bakanlara göre daha düşük bir kalp atış hızı yaşadığını göstermektedir.

Anahtar Kelimeler: Çevresel Psikoloji, Giyilebilir Teknoloji, Kentsel Çevre, Nörofizyoloji, Sokak Kavşakları.

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INTRODUCTION

Street intersections play a critical role in defining our urban experience. Their visual features identified by architecture and urban design principles (Lynch, 1960; Meenar and Mandarano, 2021, p. 1-12) impact our navigational (Dalton, 2003, p. 1-14; Hillier and Lida, 2005) and aesthetic preferences (Galindo and Corraliza, 2000, p.13-27; Chatterjee, 2010, p.53-62) as well as our cognition (Hillier, 2007, p. 1-20) and well-being (Gehl, 2006, p. 63). Along with streetscape design, where experience is defined more through movement related to wayfinding (Emo, 2012), intersections also act as anchors or nodes determining more stationary human behaviours. There are several features that determine the quality of the experience at the intersection and how we behave in these places. Many of these parameters are qualitative, relying on questionnaires and appraisals, based on measurements, and evaluations assessed through disciplines such as environmental psychology. However, an approach based on quantified data and measurements is less common for streets (Ewing and Handy, 2009, p. 65-84; Blecic et al., 2017, p.1-19) and relatively rare for street intersections.

With this study, we attempt to quantify, analyse and relate human neurophysiological response defining experience at street intersections. Visiospatial cognition and experience in urbanism have recently been investigated in areas such as healthy cognitive aging (Cassarino and Setti, 2015, p.167-182), as well as in pedestrian navigation patterns based on urban activities (Natapov and Fisher-Gewirtzman, 2016, p. 60-70). However, the limitations of analysis methods make it difficult to objectively determine how the spatial attributes of an urban space affect user subjective experiences.(Morello and Ratti, 2009, p. 837-853)

During recent years, along with the development of information technology, computer-aided methods have been introduced, tapping into big data and looking at its uses in urbanism and design. Some of these researchers look at social media feeds or shared online websites, such as research on preferred routes in a city based on happiness (Quercia et al., 2014). However, making sense out of big data relies on the additional collection of various environmental information, focusing on correlations.

There has been substantial research on wearable sensor technology and their use in urban design studies. Recent advances in wearable health monitoring systems enabled the development of many wearable human health monitoring devices that provide continuous measurements while users are on the move within a built environment (Lou et al., 2020, p. 1-43). Mobile measurements in urban built environments can also assess environmental quality in addition to personal measurements (Mamun and Yuce, 2019, p. 7771-7788). There have been several studies investigating the neurophysiological feedback of the urban built environment experience looking into autonomic nervous system response and urban experiential design features such as depth and visual entropy (Li et al., 2016, p. 218-236); thermal comfort, zoning characteristics, and visual complexity (similar to entropy) (Benita and Tunçer, 2019, p. 1-14) and visual features such as landscape, sky and colours (Zhang et al., 2021, p.1-20). Adding to emerging studies, there is a potential to develop streamlined methods to deliver a significant assessment framework that can work in real time by providing feedback at street intersections using mobile body and environment sensors, along with AI-based scene analysis.

Investigating the contradicting scales and the activity of the street in the area allowed the start of a study on the role of the enclosure of street space in the perceived comfort by pedestrians. This study aims at the following:

1. Determine and assess variables that physically contribute to the extent of obstruction in street-level spaces.
2. Measurement of the variation in the heart rate of pedestrians reacting to changes in the building environment.
3. Examine the correlation between perceived comfort and human neurophysiological response.

MATERIALS AND METHODS

Overview

In the study, two different data collection techniques were used: self-report questionnaires and heart rate measurement with wearable sensors. Although self-report questionnaires provide information on human response and perceived emotions, they are subjective and open to judgment. Therefore, the use of wearable sensors that monitor physiological responses such as heart rate increases objectivity and therefore the reliability of the study. Furthermore, the wearable sensors allowed the heart rate response to be measured on different streets and at different degrees of occlusion.

Human emotional behaviour results from activation in unique neural pathways of the central nervous system (CNS) (Russell, 1980, p. 1161-1178; Posner et al., 2005, p. 715-734). Along with the CNS, autonomic nervous system (ANS) activity is an important component of the emotional response. ANS responses, including changes in heart rate, can be modulated directly or indirectly by visual and auditory projections to the medial prefrontal cortex and thalamus, bypassing the amygdala in the limbic cortex (Kreibig, 2010, p. 394-421). These emotional correlates can be measured directly or indirectly using noninvasive sensor technologies. We can measure CNS and ANS responses using neuroscientific methods that focus on the brain and nervous system.

Experimental Design

In this study, the term "enclosed" refers to the limits to which the landscape, walls, and other elements of buildings surround streets and public spaces (Augst and Pape, 2022). The enclosure of the street shapes the interaction of pedestrians in urban spaces. Interaction in urban built environments and the level of activity on the streets are widely used to measure comfort. (Alkhresheh, 2007). Previous research has shown that well-coiled streets tend to give users a more secure impression, and thus provide more opportunities for physical activity. In the meantime, large-scale, wide-range, nonclosed spaces create a feeling of inactivity (Arnold, 1980). Using the concepts and definitions mentioned above, we understand the physiological and emotional reactions of pedestrians to buildings.

The enclosure rating is a nondimensional value that quantifies the perimeter of a street (Tang & Long, 2019, p.1-18). Three physical indicators (visibility of sky, continuity of wall, and ratio of section) are used to determine the extent of street closure. Since each variable's measurement has different units, it is necessary to normalize them as seen in Equation (1):

$$z_i = \frac{a_i - \min(a_i)}{\max(a_i) - \min(a_i)} \quad (1)$$

Here, refers to the visibility of the sky / continuity of walls / ratio of section. When these three variables are normalized, they are summarized as an enclosure rating. as seen in Equation (2):

$$\text{Enclosure Index} = \sum_{i} \beta_i a_i \qquad (2)$$

Here, is equal to the total of normalized values of visibility of the sky / continuity of walls / ratio of section; value is the weight of parameters and is the normalized value of visibility of the sky, continuity of wall, and ratio of section.

The study focuses on the visual properties of the street that affect pedestrians. The visibility of the sky, the continuity of the walls, along with the section ratio, are physical aspects of the buildings, which contribute to the perception of enclosure by pedestrians.

Visibility of Sky refers to the amount of sky visible to pedestrians (Figure 1). The canopies and buildings surrounding trees that determine the amount of visible sky for pedestrians. The more the sky is seen, the more daylight enters the streets. Daylight stimulates visual awareness and improves pleasant and attractive environments. (Dover and Massengale, 2013, p. 416). The continuity of the wall is the ratio of the length of a solid wall to the length of an opening or transparent window of a store. This shows the porosity of the streets. A complete and continuous façade of the building creates a lively and flow-free street within the available enclosure (Ewing and Handy, 2009, p. 65-84; Ewing et al., 2016, p. 5-15). The ratio of Section (Figure 2) is the rate of the width of a road and the height of a building (in average). This might affect the perception of the scale of pedestrians and, therefore, their level of comfort. (Alkhresheh, 2007). Together, these values establish the enclosure rating.

The experience of the streets is based on the physical, physiological, and psychological comfort of pedestrians in the environment (Gehl, 2013, p. 63). Self-evaluations provide information on human responses and emotions, but they are open and subject to bias. Because of this, sensors that monitor physiological responses (such as heart rate) offer objective and reliable measures. Furthermore, sensors have allowed one to observe the heart rate reaction in different streets and at different enclosure levels.

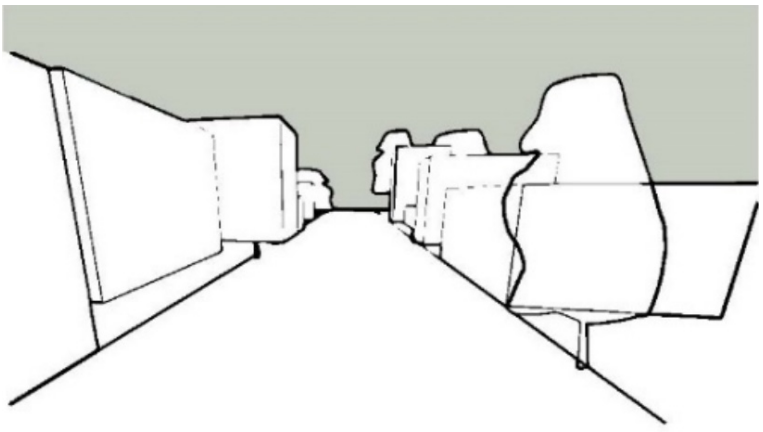

Figure.1- Visibility of Sky diagram

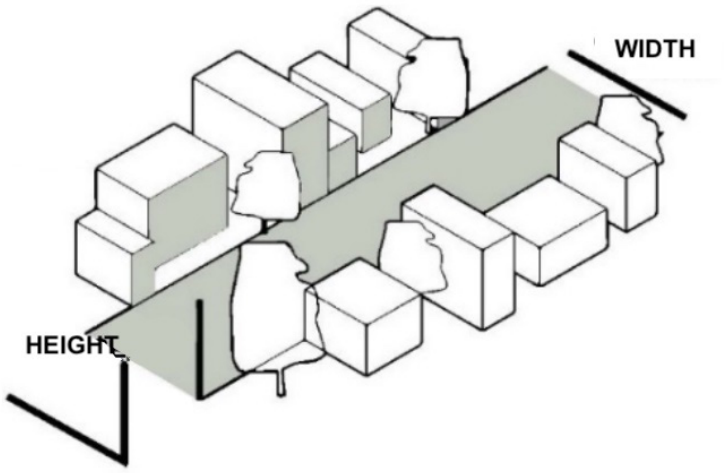

Figure.2- Ratio of Section diagram

Participants

We recruited participants among college students aged 19 to 28 years, through a short-term promotion in selected chat groups. We seek the following criteria in participants: Ability to communicate in English (reading and writing); No experience and training in architecture, urban planning, landscape, or interiors, or any design program related to the built environment-related design program; in good neurological and psychological health without any prior conditions; and normal vision (prescription glasses and contact lenses are allowed). Based on these criteria, we selected 15 adults to participate in this pilot study (Female to male ratio is 3:2; average age is 23). Due to COVID-19 related health protocols and lockdown measures, it was difficult to reach the desired number of participants. The participants are identified in 3 different countries in terms of their nationalities and native languages. They are given a printed questionnaire during the pre-experiment phase, which took an average of 5 minutes to complete. The questionnaire included 14 points of inquiry regarding their profile details, some of which are listed above, their current emotional state and stress levels, familiarity with the experiment area, whether or not they eat, drink any alcohol or caffeine-containing drinks, along with their age and major (Dixon-Woods et al., 2005, p. 45-53).

Stimuli

Figure 3 shows the Jingan area in Shanghai, a retail and commercial zone. The main street in the neighbourhood is close to a park and also to some single-lane streets. Many locals, tourists, and tourists enjoy the shops, cafes, and restaurants along the streets. The human scale with low-rise historic buildings, relatively narrow streets, and urban green creates a relaxing environment. Developed during the late nineteenth and early twentieth centuries, the area is known for its heritage European planning and architecture, and the region meets the criteria for its high urban vitality and excellent opportunities for social interaction (Dover and Massengale, 2013, p. 416). The six-way intersection chosen for the experiment has a distinct small park in the residual area surrounded and defined by the roads that join from different directions. The characteristic of the area is residential, with businesses on the first floor located in all except one direction facing that small park.

Figure.3- Map of the study site

Methods and Equipment

To measure different visual properties of the urban built environment, we have adopted a four-step method focusing on equipment, protocols to collect data, and analysis methods to achieve the results (Figure 4).

Visibility of Sky

- Equipment: Camera, Photoshop, and Tensorflow to process extracted images in the Pyramid Scene Parsing Network (PSPNet) (Zhao et al., 2017).
- Protocol: Take two photos of the view of pedestrians towards the intersections and towards the street of interest.
- Analysis: Images evaluated using PSPNet. The machine learning (ML) based algorithm performs semantic segmentation of the image, detecting the outline of objects (such as buildings, people, roads, trees). Using ML, the toolkit segments images into objects blocked as colours. Colour segments are identified, and percentages are automatically calculated (Figure 5)

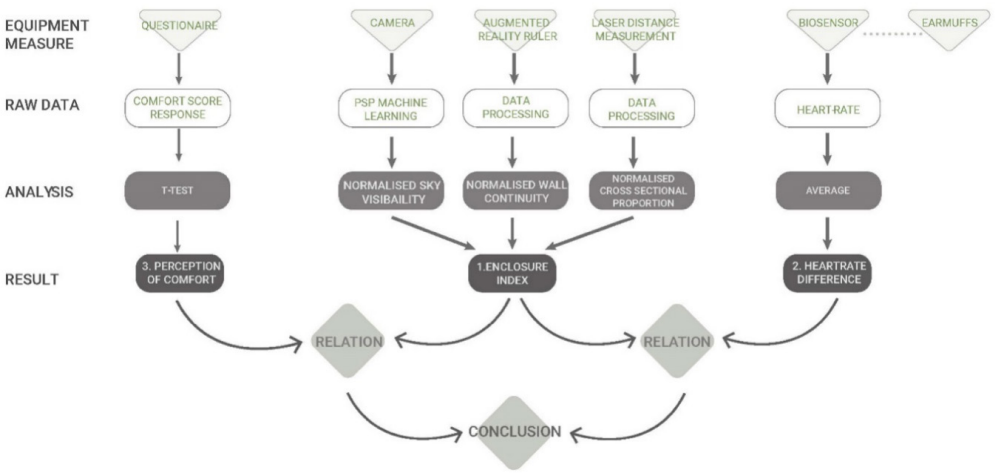

Figure.4- Methodology Diagram

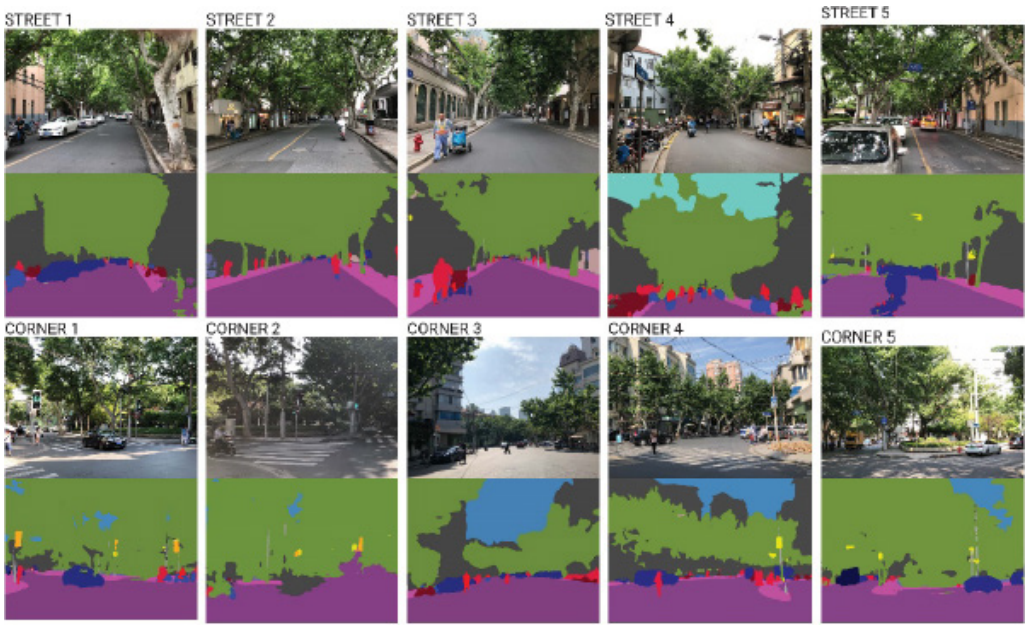

Figure.5- The framework to calculate the percentage of sky visibility using ML based PSPNet.

Continuity of Wall

- Equipment: A mobile app named Ruler (working in phone or tablet, Augmented Reality applications that measure the window width and openings) (Figure 6)
- Protocol: Measure the total length of the opening (such as the gap between doors and buildings) and transparent materials (such as store windows) along the façades on the street. Both sides were subjected to measurements.
- Analysis: The total length of the opening was divided into 100 meters.

Ratio of Section

- Equipment: Laser measurement device (Figure 6)
- Protocol: The height of all buildings on the 100-m street has been measured. The width of the road is measured.
- Analysis: The height of the buildings and the width of the road are average. On average, the height of the building and the width of the road are divided.

Figure.6- AR based measuring app and laser measurement device

Procedure

15 participants received a prequestionnaire and were randomly assigned to the space of the streets, as shown in Figure 7. The participants then carried a custom sensor kit (Figure 8), and heart rate was measured in seconds using four conditions using wearable biosensors.
1. looking intersection (urban noise and open space),

2. looking at the intersection of the street while wearing noise cancelation headphones (open, no noise),
3. looking at an enclosed street (loud and noisy and enclosed),
4. looking at the enclosed street with headphones (open, no sound).

After the experiment, the participants completed the self-evaluation. The higher they rank in the overall comfort rating; the more street comfort is assumed. This subjective questionnaire is used to attribute negative or positive emotions to the average heart beat rates of the heart (Figure 9).

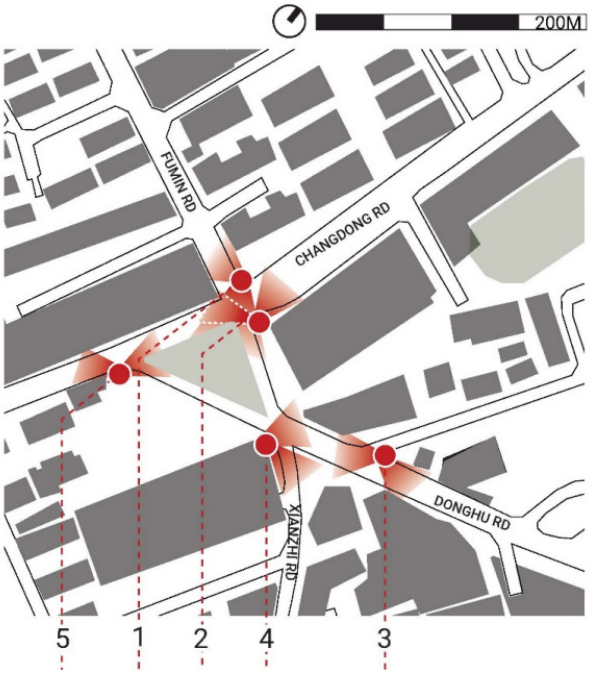

Figure.7- Experiment locations around the 6-way street intersection

Figure.8- Custom sensor kit and portable camera as worn by one of the subjects

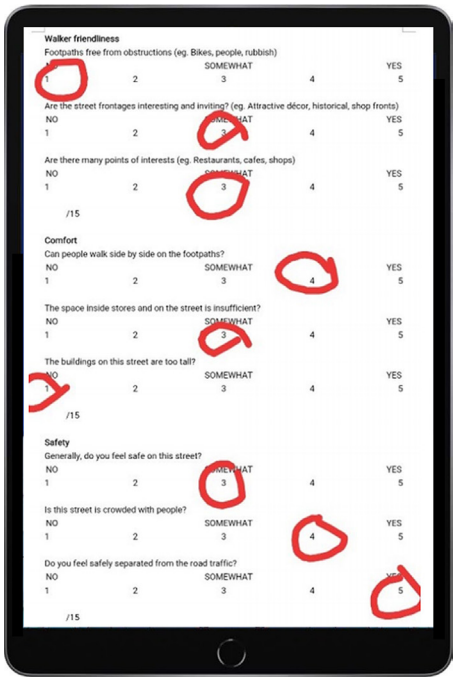

Figure.9- Comfort Scoring Questionnaire

Once the visibility of the sky was measured, the continuity of the walls and the proportional variables of the sections were measured. These numbers have been normalized. This value for each variable is summarized in the enclosure rating formula. This calculation was made for each corner of the road at intersections 1, 2, 3, 4 and 5 (Figure 7).

RESULTS

Enclosure Rating

Based on Tables 1 and 2, the enclosure rating value (0.021 – 1.231) is higher than the corner value (0.531 – 0.951), indicating that the street views of subjects are more closed. Street 1 has the highest enclosure rating of 2.101. This is mainly because of the low visibility of the sky (normalized value=0.081). The smallest difference in the space between the intersection and the street view was the location 1 (space difference = 1.151). At the same time, the difference between street 5 and corner 5 is the smallest, 0.041. This means that if the difference in enclosure is higher, there is more contrast in the features of the street features (e.g., greener areas, higher buildings, wider roads and a facade of a porous wall façade).

Street No.	Physical variables normalised			Street Enclosure Index
	Sky visibility	Wall continuity	Cross-sectional proportion	
1	0.88	1.00	0.22	2.10
2	0.49	0.55	0.20	1.24
3	1.00	0.00	0.57	1.57
4	0.72	0.32	0.41	1.45
5	0.31	0.07	0.50	0.88

Table.1- Normalized variables for Street

Corner No.	Physical variables normalised			Corner Enclosure Index
	Sky visibility	Wall continuity	Cross-sectional proportion	
1	0.23	0.50	0.22	0.95
2	0.05	0.28	0.57	0.89
3	0.00	0.00	1.00	1.00
4	0.37	0.16	0.00	0.53
5	0.16	0.035	0.65	0.84

Table.2- Normalized variables for Corner

Response of Heart Rate

There were 15 subjects (n = 15) who participated, whose heart rate was measured in four circumstances. In general, the average response to heart rate measured in the intersection condition (72.771 – 113.931) was greater than in the street condition (70.651–109.521). This trend has been observed, regardless of whether participants wear headphones. This shows that the lower the enclosure rating on average, the higher the heart rate. This indicates that subjects are under considerable stress in the open streets. In addition, from both points of view, the range of heart rate within headphones condition is higher than that of the condition while wearing headphones. For example, the results of the subjects are presented in Table 3. A consistent pattern showed a lower heart rate than the heart rate of the absence of headphones in the absence of headphones, showing that the response to heart rate was influenced not only by the physical form of the street, but also by sound (Table 4).

Table.3- Heartrate Response with Background Noise

Background Noise				
Streetscape no.	Participant	Heart rate		Enclosure Index difference
		Corner Heartrate	Street Heartrate	
1	1	113.93	109.92	1.15
	2	88.63	83.68	
	3	102.91	99.61	
2	4	99.44	97.22	0.35
	5	101.90	98.12	
	6	106.20	104.4	
3	7	104.11	101.41	0.57
	8	98.37	94.2	
	9	88.00	85.62	
4	10	73.42	70.32	0.92
	11	83.05	83.02	
	12	76.5	73.00	
5	13	74.21	74.06	0.04
	14	72.77	70.65	
	15	87.1	86.50	

Table.4- Heart Rate Response without Background Noise

No Background Noise				
Streetscape no.	Participant	Heart rate		Enclosure Index difference
		Corner Heartrate	Street Heartrate	
1	1	110.95	107.15	1.15
	2	87.05	84.17	
	3	110.95	108.64	
2	4	97.22	96.22	0.35
	5	99.58	96.05	
	6	97.22	95.33	
3	7	100.58	99.08	0.57
	8	97.43	92.55	
	9	100.58	98.70	
4	10	71.05	68.05	0.92
	11	82.10	79.58	
	12	71.05	68.75	
5	13	72.77	72.77	0.04
	14	71.63	70.23	
	15	72.77	71.89	

t-test: Ratings for Comfort

A t-test was performed to determine whether the heart rate response and comfort scores were correlative. Because all p-values are below 0.05, the correlation is statistically significant. Consequently, low heartbeats are associated with higher comfort scores.

Correlation

In the 'no-headphone condition', the difference is calculated between the distance of the heart rate from the street view and the corner. This gives a moderate positive correlation ($R^2 = 0.581$). This calculation of heart rate was also made for the microphone situation. This indicated a moderate correlation that is also positive ($R^2 = 0.451$). The similarity of the trend line indicates that the higher the difference in the speed of the enclosure, the higher the difference in the speed of the heart. In both conditions, the results showed that the heart rate of the pedestrians decreased when facing the street (Figure 10).

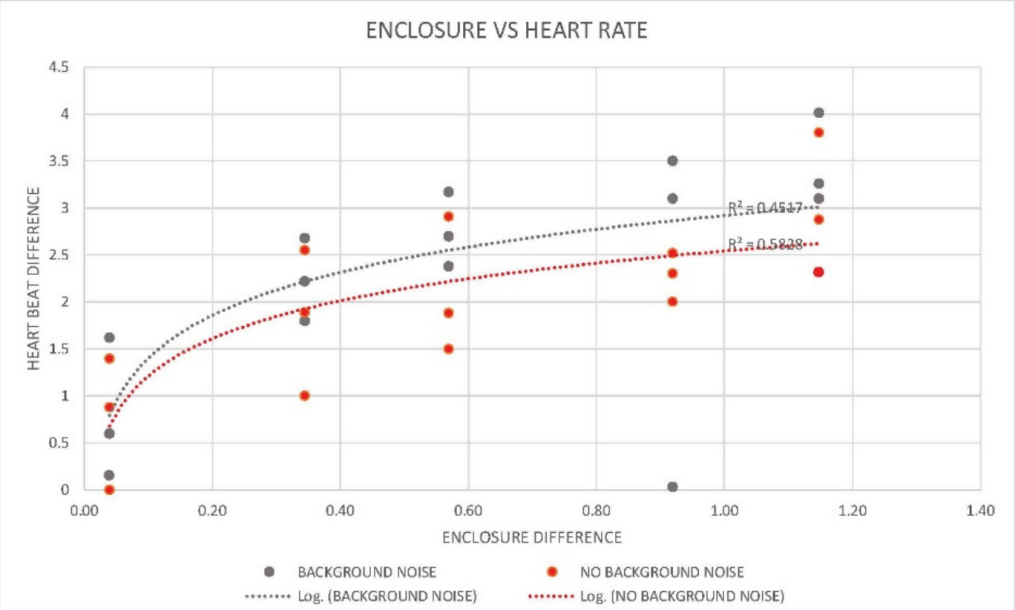

Figure.10- Correlation between enclosure and heart rate

DISCUSSION

The results of our study indicate that the perception of street shapes has a major impact on human physiological responses. In general, according to the results, it is understood that the higher the enclosure rating, the lower the heart rate is. This indicates that they are more relaxed. As a result, a higher heat rate means a higher degree of stress and discomfort. Use of t-test was supported because the value of p between the street and the corner is less than 0.05 ($p<0.05$), which means that the statistical correlations are relevant.

Higher enclosure ratings are largely credited to the number of tree canopies that cover the view of the sky. Despite the canopies blocking the view, the leaves are not fully opaque and light can filter into the street, creating an environment that is visually comfortable (Tang and Long, 2019, p. 1-18). Second, streets with permeable façade (higher wall continuity values) meant more windows and openings on the store side. With a larger number of stores, there were more opportunities for social interaction between the walls and pedestrians. The more porous streets create a higher degree of social interaction with the facades of the walls. A pedestrian who can see more social interactions that occur on the street correlates with a higher comfort score. Street 1 was the most stable and Street 1 scored the highest average comfort score (street 1 scored 1.001, average comfort rating 32.671).

Although intersection views have high wall continuity values (more porous), motorways contribute significantly to the higher values mentioned above. The participants indicated in the questionnaire their comfort rating; Traffic-related

noise was stimulating and stressful. This concept is supported by a higher heart rate than without headphones in a headphone situation. This shows that visual stimulation is not only the influence of human neurophysiology and emotion, but the role of urban noise needs to be further studied. There were no physiological differences between participants of different backgrounds. Although the local participants know the area, the heart rate of the participants under different conditions is similar. This may be due to the sounds on the streets that have already been discussed (Figure 11 -12).

Figure.11- Visualization of subject's heart-rate average values under headphones condition compared against enclosure rating.

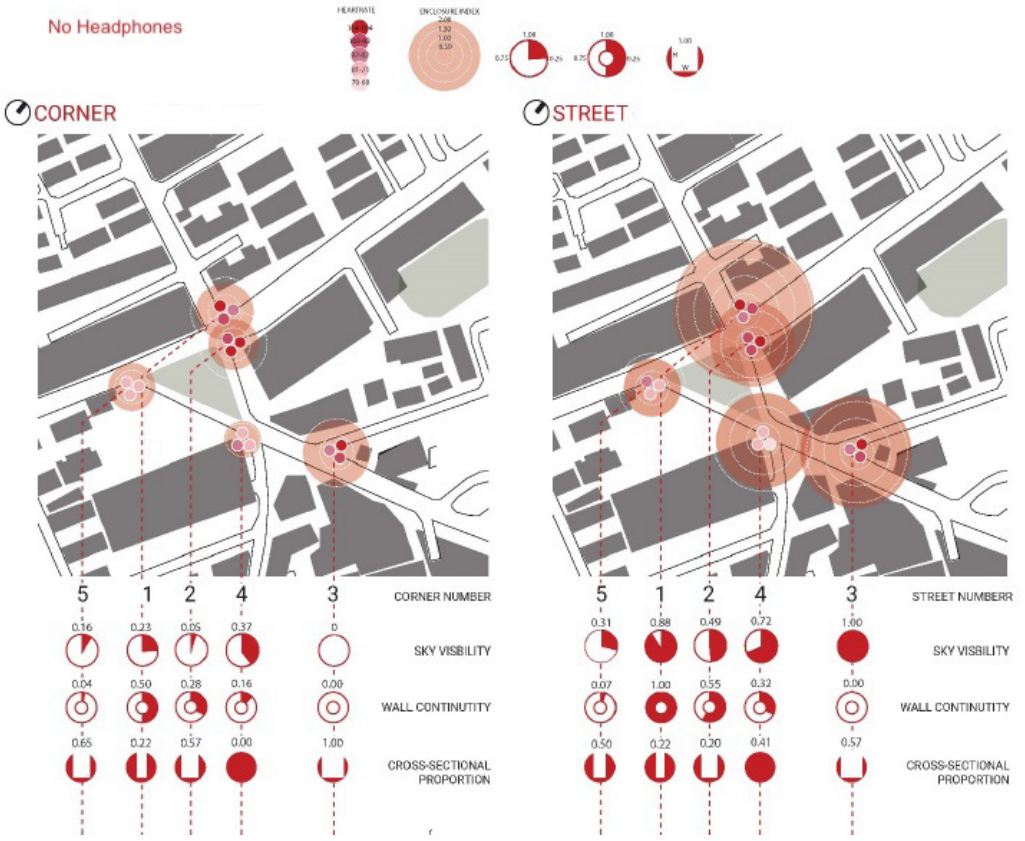

Figure.12- Visualization of subject's heart-rate average values under no-headphones condition compared against enclosure rating.

CONCLUSION

This study shows the physiological reaction of pedestrians to the building environment. This relationship can provide insight to architects and urban planners to gain insight into design to create a social environment that is a positive and comfortable built environment. Furthermore, the proposed measures for measuring the structure of the street can be used to better understand the human reactions to different street functions (schools, business districts, etc.). Continuous improvements to existing construction frameworks and theories can help to come up with better guidelines, especially regarding the design of intelligent public spaces. Finally, this study provides information on the potential impact of AI technology in construction environments. Machine learning and wearable sensors have shown the potential to integrate more advanced technologies and data collection devices.

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Conflict of Interest

The authors declare that the study conducted has no conflict of interest.

Author Contributions

EG writing of the original draft and editing of the manuscript; DYÖ review of the manuscript. All authors have read and approved the version of the submitted manuscript.

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Ethics Commitee Approval:

The study was carried out according to the Declaration of Helsinki guidelines and was approved by the Human Research Ethics Committee of Istanbul Technical University Health and Engineering Sciences. Approval Number: ITÜ-SM.INAREK-2021-05.

Legal Public/Private Permissions:

A written and signed consent was obtained from all subjects involved in the study. Upon completion of the study, participants received a 60 RMB cash gift to compensate for their participation and time.

REFERENCES

Alkhresheh, M. M. (2007). Enclosure as a Function of Height-to-width Ratio and Scale: Its Influence on User's Sense of Comfort and Safety in Urban Street Space. University of Florida Press.

Arnold, H. F. (1980). Trees in urban design. Van Nostrand Reinhold Company.

Augst, T. and Pape. G. (2022). Getting enclosure right: Creating a comfortable public room. Michigan State University, Retrieved April 2, 2024 from https://www.canr.msu.edu/news/getting_enclosure_right_creating_a_comfortable_public_room

Benita, F., and Tunçer, B. (2019). Exploring the effect of urban features and immediate environment on body responses. Urban Forestry & Urban Greening,

43(12), 1-14. https://doi.org/10.1016/j.ufug.2019.126365

Blecic, I., Canu, D., Cecchini, A., Congiu, T., & Fancello, G. (2017). Walkability and street intersections in rural-urban fringes: A decision aiding evaluation procedure. Sustainability (Switzerland), 9(6), 1-19. https://doi.org/10.3390/su9060883

Cassarino, M., and Setti, A. (2015). Environment as 'Brain Training': A review of geographical and physical environmental influences on cognitive ageing. Ageing Research Reviews, 23(Part B), 167–182. https://doi.org/10.1016/J.ARR.2015.06.003

Chatterjee, A. (2010). Neuroaesthetics: A coming of Age Story. Journal of Cognitive Neuroscience, 23(1), 53-62. https://doi.org/ 10.1162/jocn.2010.21457

Dalton, R. C. (2003). The secret is to follow your nose: Route path selection and angularity. Environment and Behavior, 35(1), 1-14. https://doi.org/10.1177/0013916502238867

Dixon-Woods, M., Agarwal, S., Jones, D., Young, B., & Sutton, A. (2005). Synthesising qualitative and quantitative evidence: A review of possible methods. Journal of Health Services Research and Policy, 10(1), 45–53. https://doi.org/10.1258/1355819052801804

Dover, V., and Massengale, J. (2013). Street Design: The Secret to Great Cities and Towns. John Wiley & Sons Press.

Emo, B. (2012, September 3). Wayfinding in real cities: Experiments at street corners. [Oral presentation]. In Spatial Cognition VIII: International Conference, Berlin Heidelberg, Germany. https://doi.org/10.1007/978-3-642-32732-2_30

Ewing, R., Hajrasouliha, A., Neckerman, K. M., Purciel-Hill, M., & Greene, W. (2016). Streetscape Features Related to Pedestrian Activity. Journal of Planning Education and Research, 36(1), 5-15. https://doi.org/10.1177/0739456X15591585

Ewing, R., and Handy, S. (2009). Measuring the unmeasurable: Urban design qualities related to walkability. Journal of Urban Design, 14(1), 65-84. https://doi.org/10.1080/13574800802451155

Galindo, M. P., and Corraliza, J. (2000). Environmental Aesthetics and Psychological wellbeing: Relationships between preference judgements for urban landscapes and other relevant affective responses. Psychology in Spain, 4(1), 13-27.

Gehl, J. (2006). Life between buildings: Using public space (Jo. Koch, Trans.). The Danish Architectural Press (Original work published 1987).

Gehl, J. (2013). Cities for People. Island Press.

Hillier, B. (2007). Space is the machine: A configurational theory of architecture. In Space Syntax Press.

Hillier, B. (2003, June 17-19). The knowledge that shapes the city: the human city beneath the social city [Oral presentation]. 4th International Space Syntax Symposium. London, UK.

Hillier, B., and Iida, S. (2005, September 14-18). Network effects and psychological effects: A theory of urban movement [Oral presentation]. In International conference on spatial information theory, Berlin, Germany.

Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. Biol Psychol, 84(3), 394-421. https://doi.org/10.1016/j.biopsycho.2010.03.010

Li, X., Hijazi, I., Koenig, R., Lv, Z., Zhong, C., & Schmitt, G. (2016). Assessing Essential Qualities of Urban Space with Emotional and Visual Data Based on GIS Technique. ISPRS International Journal of Geo-Information, 5(11), 218-236. https://doi.org/10.3390/ijgi5110218

Lou, Z., Wang, L., Jiang, K., Wei, Z., & Shen, G. (2020). Reviews of wearable healthcare systems: Materials, devices and system integration. Materials Science and Engineering, 140, 1-43. https://doi.org/10.1016/j.mser.2019.100523

Lynch, K. (1960). The Image of the City. MIT Press.

Mamun, M. A. A., and Yuce, M. R. (2019). Sensors and Systems for Wearable Environmental Monitoring Toward IoT-Enabled Applications: A Review. IEEE Sensors Journal, 19(18), 7771-7788. https://doi.org/10.1109/JSEN.2019.2919352

Meenar, M. R., and Mandarano, L. A. (2021). Using photovoice and emotional maps to understand transitional urban neighborhoods. Cities, 118(1), 1-12. https://doi.org/10.1016/j.cities.2021.103353

Morello, E., and Ratti, C. (2009). A digital image of the city: 3D isovists in Lynch's urban analysis. Environment and Planning B: Planning and Design, 36(5), 837–853. https://doi.org/10.1068/b34144t

Natapov, A., and Fisher-Gewirtzman, D. (2016). Visibility of urban activities and pedestrian routes: An experiment in a virtual environment. Computers, Environment and Urban Systems, 58(2), 60–70. https://doi.org/10.1016/j.compenvurbsys.2016.03.007

Posner, J., Russell, J. A., & Peterson, B. S. (2005). The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. Development and Psychopathology, 17(3), 715–734. https://doi.org/10.1017/S0954579405050340

Quercia, D., Schifanella, R., & Aiello, L. M. (2014, September 1-4). The shortest path to happiness: recommending beautiful, quiet, and happy routes in the city. [Oral presentation]. In Proceedings of the 25th ACM conference on Hypertext and social media, NewYork, United States. https://doi.org/10.1145/2631775.2631799

Russell, J. A. (1980). A circumplex model of affect. Journal of Personality and Social Psychology, 39(6), 1161–1178. https://doi.org/10.1037/h0077714

Tang, J., and Long, Y. (2019). Measuring visual quality of street space and its temporal variation: Methodology and its application in the Hutong area in Beijing. Landscape and Urban Planning, 191(10), 1-18. https://doi.org/10.1016/j.landurbplan.2018.09.015

Zhang, Z., Zhuo, K., Wei, W., Li, F., Yin, J., & Xu, L. (2021). Emotional responses to the visual patterns of urban streets: evidence from physiological and subjective indicators. International Journal of Environmental Research and Public Health, 18(18), 1-20. https://doi.org/10.3390/ijerph18189677

Zhao, H., Shi, J., Qi, X., Wang, X., & Jia, J. (2017, July 21-26). Pyramid scene parsing network. [Oral presentation]. In Proceedings of the IEEE conference on computer vision and pattern recognition (CVPR), Honolulu, USA. https://doi.org/10.48550/arXiv.1612.01105

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Research Article

Effective Elements and Interior Typologies in the Public Space Construction of Shopping Centres

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Abstract

Shopping centres, which are urban public spaces, support environments where different groups living in the city can be together and symbolize their power. These environments, which respond differently to today's sociality and daily life, affect the awareness of publicity and direct the formation of physical architecture and social space. While the urban model setup is used against the problem of large-scale building solution under a single roof/cover in shopping malls, it brings together the urban spaces scattered in the city and gives the human communication/interaction process with entertainment culture. The discourse of being an alternative to the city centre, which brings people together, connects time and space, and intertwines activities that vary, prevails in shopping centre designs. In this study, the differentiated interior plan types of shopping malls in Turkey are extracted in the physical context with the spatial analysis, and the intensity of use and supported objects/elements specific to the focus spaces are determined. In the social context, the spatial continuity of the existing public space phenomenon in the city in the common use areas (foci) of shopping centres is evaluated through subjective perception. Beyond similar architectural examples with the effect of globalization and consumption habits, different interior typologies are shown for the designs of new shopping centres, and the effective elements of publicity fiction are discussed.

Keywords: Publicity, Public Space, Shopping Centres, Urban Model, Typology.

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Araştırma Makalesi

Alışveriş Merkezlerinin Kamusal Mekân Kurgusunda Etkili Ögeler ve İç Mekân Tipolojileri

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Özet

Kentsel kamusal mekân olan alışveriş merkezleri, kentte yaşayan farklı grupların bir arada olabilecekleri ve güçlerini sembolize edebilecekleri ortamları desteklemektedir. Günümüz sosyalite ve gündelik yaşam biçimlenmesine değişik yanıtlar veren bu ortamlar, kamusallık bilincini etkilemekte, fiziksel mimari ve sosyal mekân oluşumunu yönlendirmektedir. Alışveriş merkezlerinde tek çatı/örtü altında büyük ölçekli yapı çözümü sorunsalına karşı kent modeli kurgusu kullanılırken, kentte dağılmış kentsel mekânları bir araya getirmekte ve insani iletişim/etkileşim sürecini eğlence kültürü ile vermektedir. Değişkenlik gösteren etkinlikler ile insanları bir araya toplayan, zamana ve mekâna dair bağ kurduran, aktiviteleri iç içe geçiren, kent merkezine alternatif olma söylemi alışveriş merkezi tasarımlarında ön plana çıkmaktadır. Bu çalışmada, yapılan mekânsal analizlerle fiziksel bağlamda, Türkiye'deki alışveriş merkezlerinin farklılaşan iç mekân plan tipleri çıkarılmakta, odak mekânları özelinde kullanım yoğunluğu ve desteklenmiş obje/elemanlar belirlenmektedir. Sosyal bağlamda ise, kentte var olan kamusal mekân olgusunun, alışveriş merkezlerinin ortak kullanım alanlarındaki (odaklar) mekânsal devamlılığı sübjektif algılama üzerinden değerlendirilmektedir. Küreselleşme ve tüketim alışkanlığı etkisi ile birbirine benzer mimari örneklerin ötesinde, yeni yapılacak alışveriş merkezleri tasarımları için farklı iç mekân tipolojileri gösterilmekte, kamusallık kurgusunun etkili ögeleri ele alınmakta ve tartışılmaktadır.

Anahtar Kelimeler: Alışveriş Merkezleri, Kamusallık, Kamusal Mekân, Kent Modeli, Tipoloji.

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INTRODUCTION

Shopping centres, which are seen as the new faces of public spaces, have a spatial arrangement and semantics where people can come together and powers can be symbolized (Şahin, 2005; 2009, p. 61-62). Public spaces are places where we come and go as we wish without the permission of the authorities or without stating a justified purpose; where we experience our privileges or a sense of belonging (Yenice, 1998; Türkoğlu, 1998, p. 57-63). Even if these venues have special functions such as shopping, the same freedom is involved. Each activity is understood collectively at a certain level, and participation may be institutionalized or random (Gehl and Birgitte, 2013, p. 1-8). Common use spaces in shopping centres include many other functions identified with urban daily life with activities that ensure user coexistence (Oktay, 1999, p. 54-61).

It is thought that shopping centres should have the feature of being sensitive to human movements and establishing relationships through the spaces they create, not with two-dimensional surfaces in the areas where they come into contact with the city (Şahin, 2005, p. 27). In terms of people's mutual relations with their environment, people-human groups show different characteristics by being under different and multifaceted conditions (economic, socio-cultural, historical-social, life process, personality and group characteristics). Investigation of space-dependent requirements that can be explained as a result of condition-ground, perception and behaviours has an important place. Needs that can be explained within the relationships of people in their spatial-physical, social and cultural environments are divided into different scales such as city, city part and city region with perception and behaviour theories (Çevik, 1991, p. 48).

The formation of public space in shopping centres, the preservation of place characteristics that offer an urban environment and the character of the foci that pave the way for social events are emphasized in terms of urban texture continuity (Kostof, 1991, p. 82). Shopping centres designed with different theme features cause an increase in user potential (diversity/density) with the diversity of activities and architectural form integrity they contain. The quality of being a meeting (hub) centre varies with spatial responses to daily life practices that appeal to all segments beyond commercial concerns (Gruen and Smith, 1960, p. 140-170). In the context of this study; the location characteristics of today's shopping centres, which are selected according to the criteria and characteristics of different interior space types, are discussed at the scale of spatial detail. The perceptual fiction of a visual continuation of the designed urban fragment, the development order of the city and the traces of life are examined based on spatial principles.

RELATIONSHIP BETWEEN THE CONCEPT OF PUBLICNESS AND SHOPPING CENTRE PUBLICNESS

While the fact that it carries the title of being public is visible and audible to everyone, it expresses a common world for all of us except our private one (Arendt, 1994, p. 92). Publicity, political behaviour, the concept of rights, the regulation of the family is part of a very broad balance in society, which includes the boundaries of the state (Sennett, 1996, p. 130). The public phenomenon is the value that the individual shares as an individual of the public, and this is often important and indispensable for both parties (Moughtin, 1992, p. 11-24). There is no public thing that is independent and superior to individual interests, ignoring the individual as an individual. Therefore, although an event or activity that occurs somewhere is collective, it may not be public (Erdönmez, 2005, p. 81).

Shopping centres, which are the foci of new experiences in life practice, offer escape and enchantment environments for people who are overwhelmed by the rational thought guidance of the modern world. In these centres, individuals both engage in consumption activities that reflect the description of their personal identity and immerse themselves in the artificial formation of spaces that challenge their imagination. Thus, incidental processes disappear in urban life where production and consumption are planned (Vural, 2005, p. 143). Shopping centres are the centres where the turnover rate of consumption is increased behind the concepts such as fashion, impermanence and consumption is made continuous in order to increase and ensure the continuity of the highly rationalized production system today (Vural and Yücel, 2006, p. 97-106).

Publicness has different degrees of publicity. These actions, which carry publicity in different powers, are in an effort to find the most suitable and meaningful place for themselves (Trancik, 1986, p. 100). Accordingly, certain qualities of those who use public space, those who act and behave in public action determine the publicity of the action (Gehl, 2010, p. 198-211);

- Heterogeneity proportion of public actors
- Form of interaction
- Created meaning
- It is related to daily life
- Number and size of people and groups interacting
- Legal, political, political framework

Actions in public space are manifested by groups of people of a certain color, ethnicity, income group, age and gender, in which people are homogeneous. This feature is observed especially in actions taken on political and social issues. It is important that the interaction is active or passive, introverted or extroverted in this regard (Madden, 2010). In the face of the open articulation of individuality and inner life, the consciousness of publicity disappears. In today's public life, where strangers do not have the right to talk to each other and everyone's right to be left alone is reserved, silence becomes the rule as people begin to fear that their own inner fears will be revealed uncontrollably in interaction with strangers. Thus, public behaviour today is more about observation, passive participation and watching (Sennett, 1996; Rapoport, 1990, p. 236-238). When the capitalist system was adopted, the enlarged publicness lost its relationship with the private rather than being subject to the critical control of a judgemental minority. Both the publicity of public reasoning has declined, and the boundaries of privacy have stretched. This situation is considered as the ground for the collapse of public space. Between these two areas, and also in the field formed by these two areas together, a re-politicized social space is formed, which breaks away from the distinction between public and private (Habermas, 1992, p. 256-257).
Active interaction, communication of verbal expressions between individuals and groups when going public and sometimes conducting discussions on political issues come to the fore in a way that other members notice in public behaviours (Carr et al., 1992, p. 23-26). The action taking place in the public space is more public in the amount that it connects groups and individuals with societies, the world and cosmic worlds and memories among the members. By establishing the relationship of the action with the space, individuals begin to perceive this place as a 'place'. If urban space contributes to the formation of a common memory, it successfully supports social functions (Rapoport, 1977, p. 265). Urban space is geometrically delimited areas with various facades. The

main feature that makes it easier for us to perceive the space depends on a clear and unambiguous understanding of the geometric construct. The outdoor space where we find these qualities is urban space and has public, semi-public, private zones (Krier, 1979, p. 13-22).

Urban public spaces are places where urban people meet each other. In general, unstructured and structured spaces that constitute urban public spaces should meet the needs that emerge as a result of the quantitative and qualitative concentration of our social life. There are important functions provided by public spaces (Çubuk, 1989). It is possible to group them into four groups:

- Providing psychological and sensory requirements
- Providing social relations
- Ensuring economic changes
- Provision of useful displacements

When considered socially, public spaces conceptualize others as subjects, not objects (Bhabha, 1994, p. 51). In order to achieve this, "contact" opportunities between others and the subject are required. They are places where everyone can safely exist as themselves, as well as encounter differences, meet and contact. Instead of neutralizing the differences, public spaces are expected to support the theme and cosmopolitanism so that they can be living hybrid zones (Demirtaş et al., 1996, p. 39-44). Since publicity, in its most general sense, refers to a plurality and comfortable use, it is closely related to "shopping centres" due to many features inherent in living conditions. For this reason, it should be known with which features shopping spaces constitute the publicity consciousness as places where forms of publicity appear, develop and transform in various ways.

Space, Behaviour Relationship and Perception

The spaces where people live and move are shaped by architectural structures and systems. In this sense, architectural spaces are more than the places created by visual experiences beyond the current experiences (Şahin and Çevik, 2010). Daily experiences are perceived as a relationship between space and social behaviour. Spatial formations have a deterministic effect on social relations as a result of architectural forms (Hiller and Hanson, 1984, p. 27-29). In addition to being physical elements, architectural spaces also have semantic and sociological functions. Spaces are community organizers with common areas. The reality of a structure is not the physical frameworks that make it up, namely walls and roofs. It is what occurs and is experienced by them (Benedikt, 1979, p. 47-65). The social structure of the space in human settlements is provided by spatial rules. Social forces working through spatial rules reveal the differences in settlement patterns and unchanging qualities (Hillier, 2001).

In order to understand the behavioural relationship of the space, it is necessary to examine the connection between "built spaces", which are planned formations, and social functions. The divisive boundaries and unifying connections in the built places undertake a kind of social task, enabling the behaviours, activities and people in these places to stand together or apart. Therefore, in order for there to be social logic in a place, that place must cover people's daily lives, shape their social relations, and bear the traces of society and culture in its form (Peponis and Wineman, 2002, p. 271-291).

Cognitive maps are produced regarding the relationship between physical space and behaviour in the space. These maps are developed to encode, store, recall, and decode the characteristics of people's whereabouts and physical environments as a mental process when necessary. Cognitive maps are not the creation of mental replicas of the reality of a city, or a building, but a mental model of the reality. Especially in buildings with complex structures such as shopping centres when people are asked to depict the characteristics of their space, it is observed that the results differ according to personal perceptions and the subject focused, and some of them can be grouped (Lang, 1987, p. 22).

Physical space leads to a functional and social impact. The regulation of the relations between spaces is considered important in terms of human-space, human-human relations. Physical space creates an artificial environment and, perceptual barriers, through which people's primary relationship with the environment is formed. Thus, spaces become a part of society (Peponis, 2001). Perception exists when a balance is established between the perceiver and the perceived. This balance is achieved by the perception and reflection of the characteristics of the space and the relationships formed by these characteristics by the subject. Environmental images are the result of a two-sided process between the observer and their environment. The environment reveals distinctiveness, selects, organizes, and makes meaningful what it sees in the observer (Lynch, 1961). Buildings become suitable for creating an image in the environment with the differentiation of the boundaries and surfaces within the space (Başkaya et al., 2004, p. 839-867). In this sense, the three measurable components of environmental images complement each other in terms of identity, structure and meaning (Lynch, 1961; Çevik, 1991, p. 48-52).

The perception process of people in space develops as forms and objects begin to be interpreted. This approach explains that perception in shopping centres consists of layers of superficial structure rather than objects (Gibson, 1978, p. 227-235). Motion is important in perception. The fact that the observer or the observed is in motion causes changes in perception characteristics. In shopping centres, the strength of the relationship between space, light and visibility has an important role in user perception. Visible space is closely related to every point and environment within a region in connection with the individual's stance in the space. However, each person has their own physical characteristics and perception differences arising from superficial characteristics in the space (Benedikt, 1979, p. 47-65). In order for the perception to be strong and the shopping action to be effective, the abundance or control of the visible areas in the spaces is important. For this, collecting or distributing areas such as focus areas are selected as strategic points with maximum visibility level. The information systems provided to the user from these points facilitate the holistic perception of the space and ensure the continuity of the shopping action (Lang, 1987, p. 31).

Urban Image and Urban Model

The image of the city is formed with shape, texture and a felt order. Along with all these, its quality gives the observer clues about the identity and structure of the city (Harvey, 1989, p. 226). The image elements that make up the city play an important role in establishing an emotional integration between people and space. These elements may be dependent on individual qualities and experience, as well as space elements in which social values are expressed (Giritlioğlu, 1991, p. 75). "Appearance, view and sensation" are emphasized for visual quality in urban space. The relationship between appearance and function should be strengthened and felt in the form of the environment. The

sensations received from the environment are limited to the biological structure of the human being. While visuality and image are sought in the whole city on a large scale, qualities become noteworthy as elements of the whole in the small-scale parts that make up the urban system (Lynch, 1961, p. 37-50).

The environment we live in, the environment-city, which is called familiar by everyone, brings together the group of people and creates common memories and symbols that enable communication with each other. This situation creates a safe, emotional relationship between people and the environment (Erdönmez, 2005, p. 48). It is the feature that makes the identity of a place memorable for people and differentiates that place is divergent from other places with its unique character (Lynch, 1981; Çevik, 1991, p. 50). The concept of legibility (nodes, borders, roads, regions, and landmark) facilitates the formation of the city image. The fact that the appearance of the city is in a prominent clarity or "readability" and that it is visible as a smooth model consisting of comprehensible symbols means that its symbols are easily recognizable and easily clustered in a detailed mold (Çevik, 2002; 2004). The fully commercialized space organization of the shopping centre, which aims to reconstruct the vitality in the urban space in an environment isolated from the cars and defines itself as an alternative to the city centre, is essentially based on the principle of re-establishing the components of the urban space within the structure in line with a specific purpose. The main purpose of the shopping centre is to consume more; therefore, the urban space components in the building turn into a means for this purpose. The urban space is imitated with the help of measures such as taking as much natural light as possible into the building or providing artificial lighting to create this feeling and designing the store facades as similar to the building facades on the main streets of the city (Birol, 2005, p. 421-427).

Sociality has an important role in creating the right and perfect urban model. In new spatial approaches, the urban model concept helps large complex constructions to be understandable and comprehensible. Designing urban image elements with dimensional, proportional changes in a limited area in effective and sub-space formations ensures that the city falls under the architectural crust (Habermas, 1992, p. 12).

Indoor Typology in Shopping Centres

Indoor typology in shopping centres is one of the factors that guide spatial behaviour and determine environmental performance. One of the most basic components of the interior typology of shopping centres is the passageways where the stores expressed as "mall" are listed. These passages are the reflection of pedestrian paths in traditional shopping environments into the building (Robertson, 1993, p. 361-370).

The developments of cities in the historical process and their contemporary planned developments occur in various ways as physical form or macro form, especially by directing physical conditions (Ostrowski, 1970; Hartshorn et al., 1992, p. 97). The physical models of the city are linear (parallel, spaced, spine, star-satellite), grid (right angle, side angle), concentric (star, radial), corridor-band, mega forms-utopias, underground, floating city, axial network, introverted, intertwined square. Krier (1983) defines the interior form as square, rectangle, triangle, circle, amorphous and combinations of these in different forms. Krier lists the spaces formed by these combinations as geometric, attached, intertwined, fragmented, sliced, deformed types. The geometric structures of the spaces, on the other hand, consist of square, converging to square, sequential unit, rectangular, octagonal, cross-like, circular, attached and intertwined interiors. Moughtin (1992) states that if the urban space is handled with a three-dimensional

arrangement, this space will become a positive element, and the structures will become the ground. Shape-soil analysis in an urban area reveals the spatial relationships between the building masses and the space surrounding them. Trancik (1986) classifies the types of shape-soil relationship in urban space as grid, angular, curved, single-centre radial, located on an axis (linear) and organic. Hillier (1996) states that there are two types of axes in the urban space. Unidirectional arrangements include single-purpose and uniformity. While those who provide diversity offer a versatile, optional space organization, axes are classified as symbolic and auxiliary.

Based on these classifications, 60 shopping centres were visited, observed and their plans were plotted graphically throughout Turkey in order to determine the interior typology of the shopping centres. The data obtained show that the intertwined attached space forms of shopping centres, which have reached large-scale mega sizes, are widely used. When a certain distinction is made in terms of the concept of "mall", which determines the interior space and the form of the whole formation, it is possible to talk about four types of interior spaces due to the differences created in terms of form. We can classify them as follows;

- Linear Interior Spaces are the forms of space in which spaces develop in a linear way and inter-storey connections and passageways are separated from each other by various galleries. The ability to easily understand the orientation and perception of the whole comes to the fore (Figure 1).

- Curvilinear Interiors are arranged in a visual axis presentation and surprise space understanding depending on the form structure, where the spaces are shaped by lining up on a curvilinear line. Different, interesting theme reflections integrate with architecture and show the orientation setup on the syntactic backbone (Figure 2).

- Central Interiors; By combining square, circular gallery-oriented shaping and linearly oriented spaces, consecutive formation is defined. The spaces lined up around the centre reveal the feeling of emptiness and comfortable navigation (Figure 3).

- Mixed Interiors are a form of space that is not seen in certain linearity and is supported by the surprising characteristics of a large number of geometric orders in different directions. In interiors with a large area, they are places where the concern of not being able to find direction and getting lost comes to the fore (Figure 4).

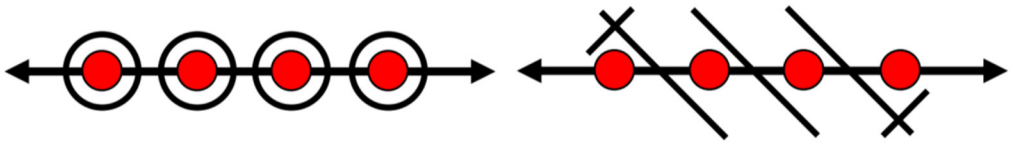


Figure.1- Linear interior type shaping (Diagram/modeling was drawn by the authors).

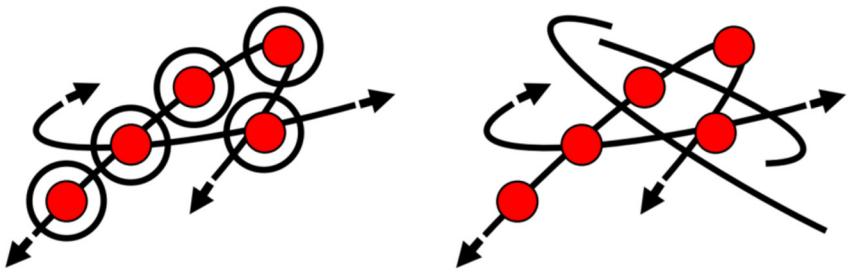


Figure.2- Curvilinear interior type shaping (Diagram/modelling was drawn by the authors)

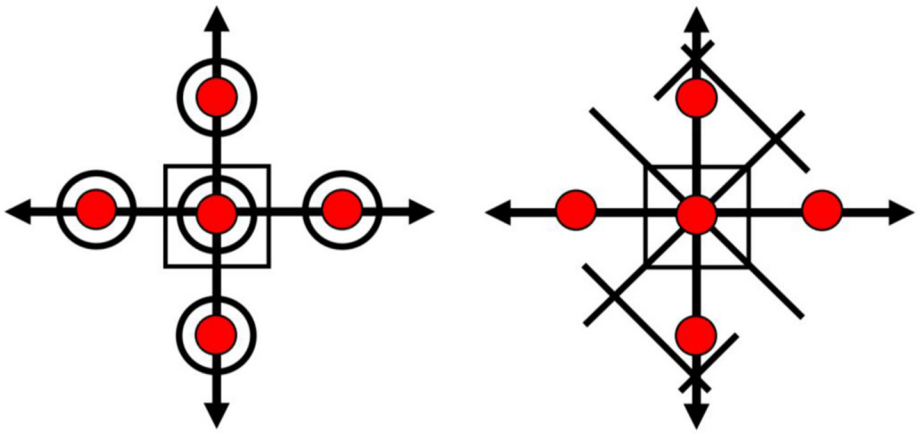


Figure.3- Central interior type shaping (Diagram/modelling was drawn by the authors)

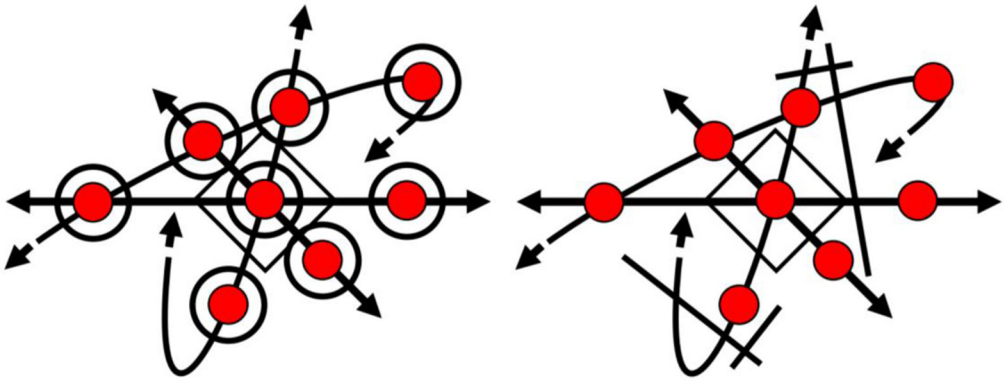


Figure.4- Mixed interior type shaping (Diagram/modelling was drawn by the authors)

PURPOSE AND METHOD OF THE RESEARCH

The possibilities offered by alternative spaces designed with the physical architectural setup of shopping centres are gradually increasing. The use of these centres is similar to the urban public space features near the city and in it. With the qualities it hosts, the social, cultural aspects and architectural formations of the spaces take the appearance of a part of the city due to the fact that people prefer these spaces and spend more time at the point of continuity of the city. The aim of the research is to examine the reflections of urban public space on the use of centres without abstraction from the city, the interaction of social and cultural space integrity that we encounter with their separate location in the city, and the direction of meeting the needs under one roof.

The similarities and differences of different physical architectural space formations in cities with shopping centres designed in the city are evaluated by presenting their publicity and grading, urban public space qualities in a model setup. Thus, it is important to seek answers to the questions of how much the centres overlap with the city where they are located, whether they cater the needs met in the city and why they are preferred, and whether the spatial qualities are met. Due to the fact that the selected subject has an interdisciplinary approach and a wide-ranging perspective, the nature of the place characteristics allows the phenomenon of publicity to gain prominence when the interior typologies of the designated shopping centres are taken into consideration. The change in publicity and ratings requires working with more than different method and technique within the sub-sections of examining the perceptions and meanings of users in spaces open to common use by everyone. The perception, trial-experience, subjective and objective implications of the urban public space qualities offered by shopping centres in the urban model fiction are discussed in the physical and social context.

Çevik (1991); Based on the doctoral study «Space-Identity-Identification Trabzon Streets Example»; the first part of the research is the analysis of the interior typology study, plan, focus types, dating types, types in terms of general structure (focuses, connections, sub-spaces) and supported objects/elements as well as the physical/architectural characteristics of these spaces. In the second part of the research, the phenomenon of urban public space in the city in a social context and the spatial continuity of shopping centres in common use (foci) areas are evaluated. The inferences in social spaces, which are determined and influenced by the physical characteristics created by the urban public space qualities that support the claimability of the urban model view idea, are mostly handled within subjective perceptions and evaluations. The physical architectural features of the spaces in shopping centres and the existence or absence of the criteria that should be in the understanding of public space in the integrity of the users are examined by on-site observation, determination and analysis studies.

The study area should be limited; the research area should be narrowed according to the subject explained, its purpose, scope and the content to be done. Accordingly, it should be taken into account whether the study area has won many architectural awards on national and international platforms or it offers an alternative way to meet the physical-architectural and socio-cultural requirements to distinguish it from other examples of interior. Spatial fiction and density analysis are performed by selecting the Linear Interiors İstinyepark Shopping Centre, Curvilinear Interiors Kanyon Shopping Centre (open-top), Central Interiors Cevahir Shopping Centre, Meydan Shopping Centre (Ecological-topped), and Mixed Interiors Forum İstanbul Shopping Centre from a total of 60 shopping centres examined (Table 1, 2).

Physical Architectural Space Elements, Criteria and Typology

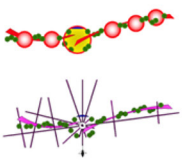
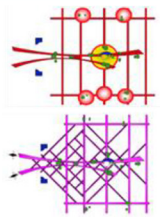
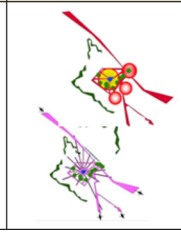
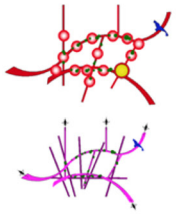
In this research step, it is aimed to examine the physical architectural aspect of shopping centres within the scope of revealing and supporting the social space quality with the typology approach by investigating the formation of common areas of shopping centres and the formation principles that constitute the focus space types. This step consists of 3 sub-sections. In the first subsection, a typological approach is created by graphically transferring the formation of interior space types of shopping centres and the formation model setup (plan, foci, dislocations). In the second sub-section; general structure (foci, connections, sub-spaces) analyses of the types are made. In the third subsection, physical space elements are discussed together with their characteristics specific to focal spaces (central, secondary).

The plans, sections, and views of the shopping centres selected for the research are drawn, and the mass structure and interiors of these buildings are examined with the on-site fieldwork. The identified shopping centres, general usage areas and interior spaces are grouped in terms of physical architectural features and spatial character. Considering the integration of the selected shopping centres with the city, the number of the malls is reduced in terms of having a certain character and especially. Accordingly, the samples are collected in four main groups as Linear, Central, Curvilinear, and Mixed interiors. The general structures of the types obtained in the first stage are presented in tables to compare and express the characteristics of the foci (courtyard/gallery, courtyard/square/gallery), connections (street/street courtyard, corridor), sub-spaces (focus +sub-space, connection+sub-space), (Tables 3, 4, 5, 6, 7).

Table.1- ID Cards of the Shopping Centres

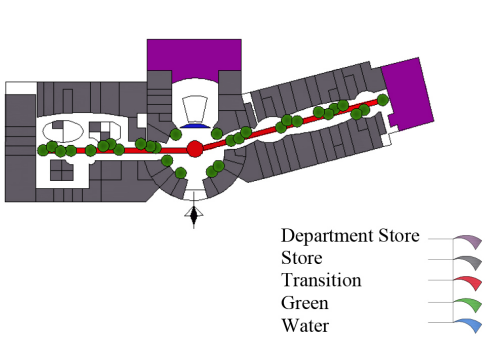
	DATA ABOUT THE BUILDING		FOCUSES
İSTİNYE	Place of Construction	Sarıyer/İstanbul	 
	Architect	Ömerler Architecture	
	Opening Year	2007	
	Space (m²)	276,000 m²	
	Number of Floors	6	
	Building Type	Lineer	
KANYON	Place of Construction	Levent/İstanbul	 
	Architect	M. Tabanlıoğlu/Jerde	
	Opening Year	2006	
	Space (m²)	250,000 m²	
	Number of Floors	9	
	Building Type	Curvilinear	
CEVAHİR	Place of Construction	Şişli/İstanbul	 
	Architect	Minori Yasamaki	
	Opening Year	2005	
	Space (m²)	358,000 m²	
	Number of Floors	6	
	Building Type	Central	
MEYDAN	Place of Construction	Ümraniye/İstanbul	 
	Architect	FOA/Alejandro Zaero	
	Opening Year	2007	
	Space (m²)	55,000 m²	
	Number of Floors	3	
	Building Type	Central	
İST. FORUM	Place of Construction	Bayrampaşa/İstanbul	 
	Architect	ERA/Ertun-Ali Hızıroğlu	
	Opening Year	2009	
	Space (m²)	495,000 m²	
	Number of Floors	5	
	Building Type	Mixed	

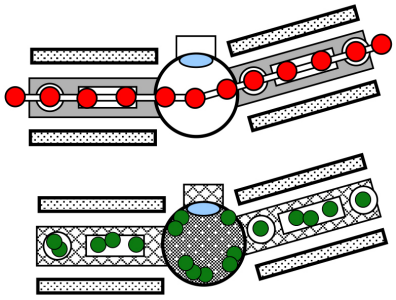
Table.2- Focus and Spine Diagrams of Shopping Centers (Diagram was drawn by the authors)

İSTİNYE	KANYON	CEVAHİR	MEYDAN	İST. FORUM
				

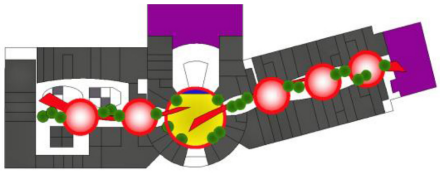
İSTİNYEPARK SHOPPING CENTRE

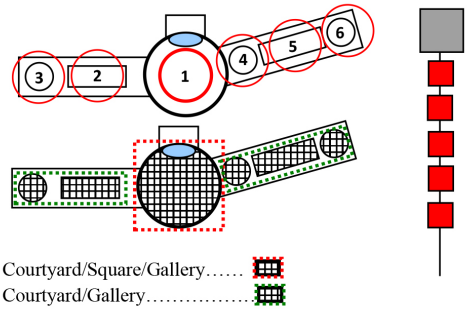
PLANS





FOCUSES





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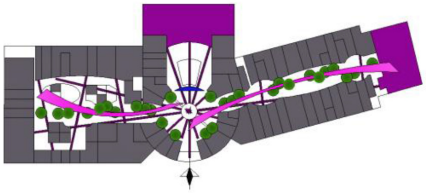

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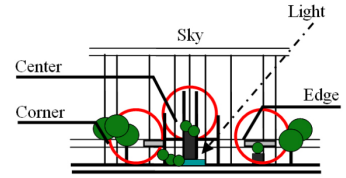


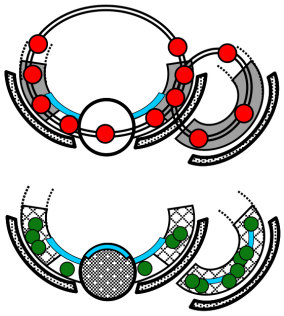
• Spatial cantilever
  • Corner √ • Edge √ • Center √
• Floor connections
  • Bridge √ • Stairs √ • Elevator √

Table.3- Interior Type Analysis of İstinyepark (Diagram/modelling was drawn by the authors)

Table.4- Interior Type Analysis of Kanyon (Diagram/modelling was drawn by the authors)

KANYON SHOPPING CENTRE

PLANS



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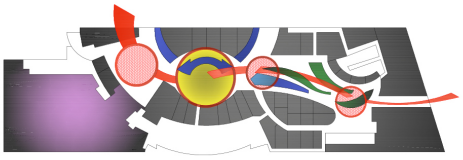

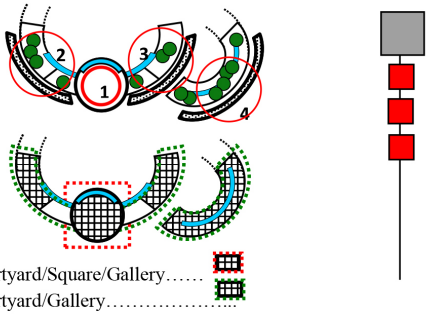

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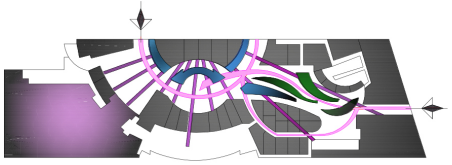

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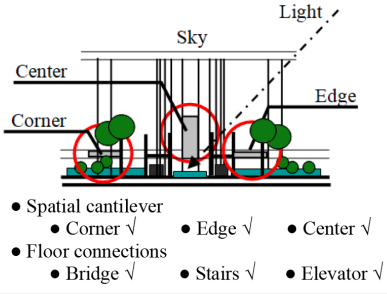
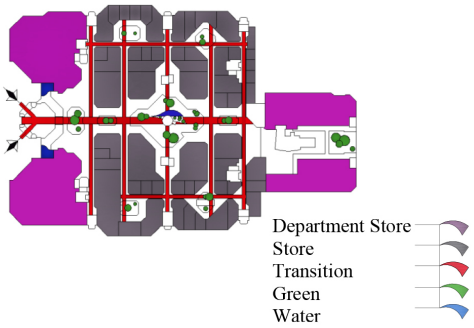
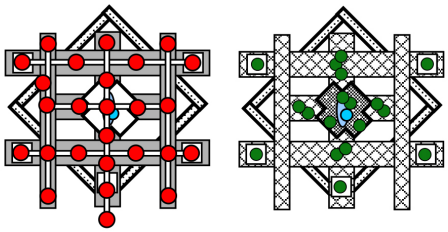


CEVAHİR SHOPPING CENTRE

PLANS





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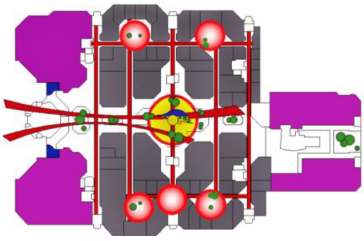

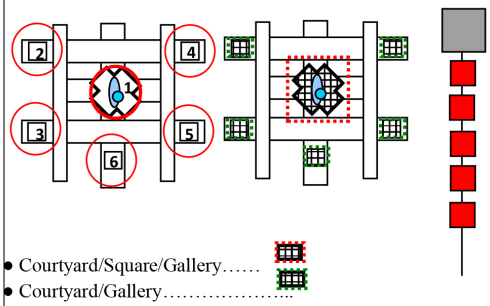

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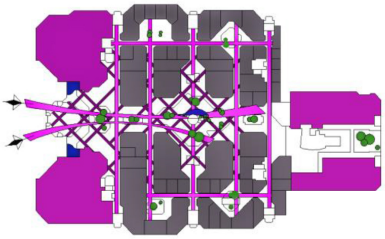

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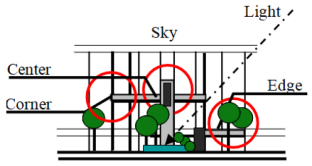


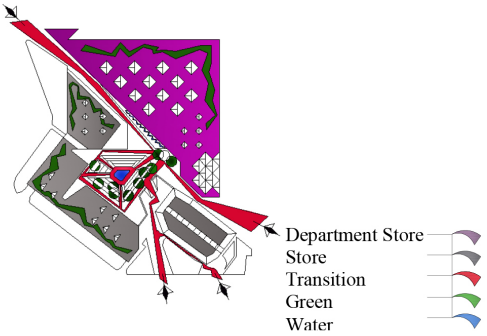
• Spatial cantilever
  • Corner √ • Edge √ • Center √
• Floor connections
  • Bridge • Stairs √ • Elevator √

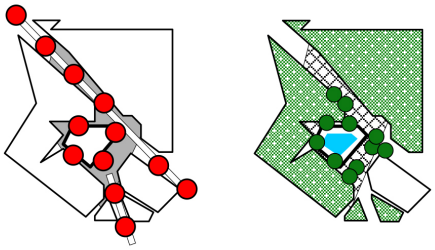
Table.5- Interior Type Analysis of Cevahir (Diagram/modelling was drawn by the authors)

Table.6- Interior Type Analysis of Meydan (Diagram/modelling was drawn by the authors)

MEYDAN SHOPPING CENTRE

PLANS





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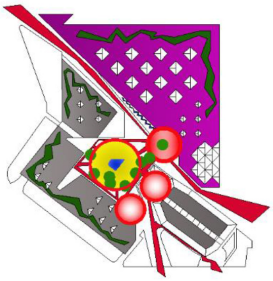

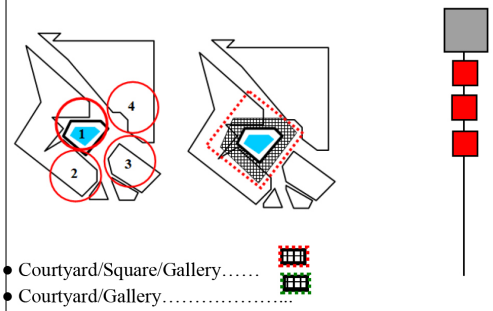

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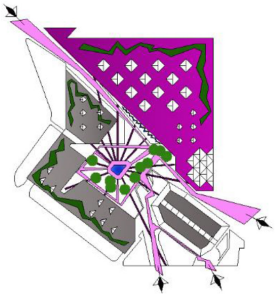

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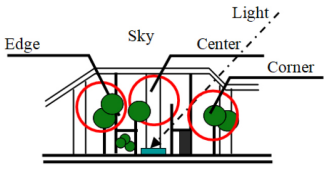

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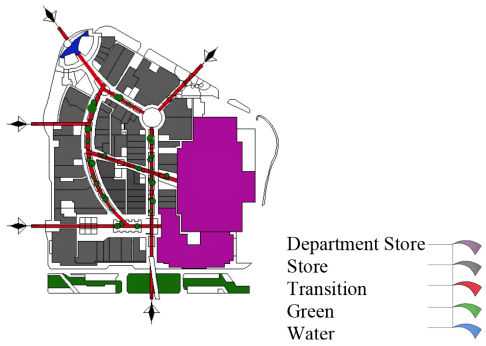
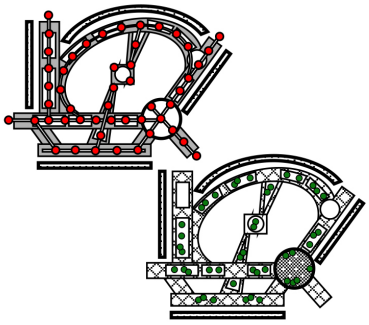
  - Edge √
  - Center √
- Floor connections
  - Bridge
  - Stairs √
  - Elevator √

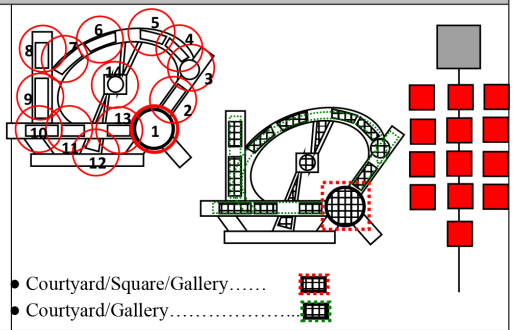
FORUM ISTANBUL SHOPPING CENTRE

PLANS

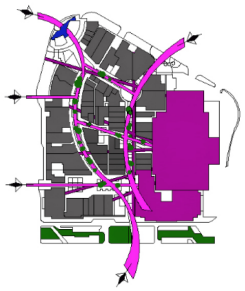




FOCUSES



DENSITY/SPINE



CANTILEVER

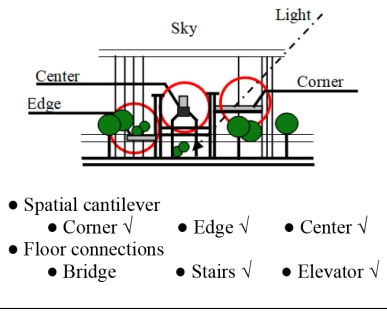


Table.7- Interior Type Analysis of Forum İstanbul (Diagram/ modeling was drawn by the authors)

The common and different aspects of the model established with the city allow the formation of new common meeting foci (Table 8). The subheadings presented in the table consist of actions and qualities that support the idea of the city image/model that shapes the design infrastructure of shopping centres in line with the observations and information collected. The new faces found by different aspects discussed due to the formations related to the scale and spatial setup of the urban space and the shopping centre are given comparatively. City images, which are designed as a new face, constitute the symbols of communication between society and individuals and provide accumulation for urban memory. In the visual chaos of modern cities, life gains new meanings with new designs, and a strong symbol of a multifaceted society is formed.

Table.8- Urban space-different and common aspects of the shopping centre (The comparison was done by the authors)

URBAN SPACE	SHOPPING CENTER	COMMON ASPECTS
Node points Squares	Focus areas Courtyard/Square/Gallery Courtyard/Gallery	√ Living/living environment √ Comfortable-functional details √ Charm/Aesthetics √ Upholstery elements √ Cover elements √ Boundary elements √ Stores √ Social-cultural activities (cinema, theatre, dance, play, fashion show, show, concert, signature day, concert, etc.) √ Circulation elements (ramp, stairs, elevator) √ Routers, Locators (material-texture-colour difference, water, green, lighting, elevation differences, furniture, etc.) √ Urban furniture (fountain, lighting elements, sitting elements, etc.) √ Artistic objects (painting, decoration, embossing, etc.) √ Parking √ Democracy √ Safe-Hygienic √ Noise/calmness Actions √ Meetup √ Introductions √ Stroll √ Travelling √ Developing talents √ Explore √ Informing-Learning √ Surprise √ Excitement-Scaring √ Disappearance √ Rest-Recreation √ Bond formation (Memory)
Boundary linearity (building facades, mountain, sea, wall, barrier, etc.)	Shop fronts/displays, railing	
Routes Avenue/Street	User common circulation areas (circulation)	
Regions Different functional departments (housing, health, education, work/office, etc.)	User zone (shopping, shared space, event area), Service zone	
Landmarks Monument, Tower	Sculpture, architectural object-element, clock, etc.	
View	Facade/Transparency	
Daylight-Natural environment	Roof, facade windows/partially outward formation (natural-artificial)	
Terraces	Cantilevers (cruising, sitting, eating-drinking)	
Climatic conditions	Air conditioning	
Demographic structure	User type	
Time (day-night)	Specific time	
Accessibility (traffic)	Floor connection (physical-visual)	
Neighbourhood	Inter-store dialogue	
Landforms/Location (messy)	Location (togetherness)	
Economic activities (agriculture, industry, tourism)	Shopping, Social-Cultural activities	
Announcement, Signboard, Signboards	Navigation, Led	
Recreation/Parks	Green, water, elevation differences, furniture, platform etc.	
Infrastructure (water, sewage, gas, electricity, pavement, etc.)	Installation (heating-ventilation)	
Recreation-Rest	Activities, thematic games.	
Courtyard	Atrium/Gallery	
Coincidence/randomness	Planning	
Free visuality	Compressed/constrained	
Real	Imitation/artificial	
Urban shell	Architectural shell	

FINDINGS AND EXAMINATIONS

The architectural interior design and thematic understanding of İstinyepark, Kanyon, Cevahir, Meydan, Forum İstanbul shopping centres are intellectually distinctive. The Kanyon shopping centre with its curved interior and the Meydan shopping centre with its central interior are supported by open-top and surprise spaces. While İstinyepark shopping centre, Cevahir shopping centre for linear interior, Forum İstanbul shopping centre for central interior and mixed interior shopping centres are illuminated from the transparent surfaces on their roofs, they look like a closed box. The space organization, the quality of the materials used and the structural detail solutions make the centres feel different. Green, water, elevation differences and different architectural object densities in all shopping centres increase their usage characteristics while defining the interior.

The coexistence of the brand mix (food and beverage, clothing, furniture, technology, etc.), the product variety of the anker stores, the presentation of different activities and the service understanding are among the pleasing qualities.

While Meydan shopping centre and Kanyon shopping centre, which are handled with an open-top design concept, are provided with visual communication transparent surface and different elevation planes, supporting it with surprise interior design and activities increases its visual power. Meydan shopping centre, which is called the green valley, stands out with its architectural structure that offers a visual perspective that respects nature with its features that contain ecological qualities. İstinyepark, Cevahir, Forum İstanbul shopping centre, atrium formations and side surface, which are seen as multi-storey complexes with interior design, provide external connection with transparent elements. The fact that the courtyards, streets and corridors, which are located in all shopping centres with different thematic approaches, are supported by natural light from the cover system and different artificial lighting elements causes an increase in the visual effect.

İstinyepark, Kanyon, Cevahir, Meydan shopping centre is built by providing a ring with the circulation elements located at the ends of the indoor fluidity. The Forum İstanbul shopping centre, which has a mixed interior, provides syntactic fiction with thematic space sections. In all shopping centres, store placements and common use space understanding differ depending on the interior typology. Material, texture and color collage used in common areas are seen as effective in detail solutions. Architectural objects, elevation differences, water, green, lighting elements, furniture, walls support the use for orientation purposes. The Forum İstanbul shopping centre, which has the largest square meter, helps its users with digital routing boards. The behavioural restrictions on users in all shopping centres are not at a level that will disturb them too much. Accordingly, the rules of behaviour that must be followed in society are considered valid within the shopping centre. When there is no specific effort to share ideas and it is deemed necessary, wishes, requests, complaints are made to the information centre, consultancy and the competent unit. The authorities respond to requests by e-mail, telephone or face-to-face meeting.

The arrangements for fixed-moving rest on the turf roofs, viewing terrace, amplifier and sloping surface platform in the Meydan shopping centre, which is distinguished from the others by its design fiction, attract attention. Cevahir shopping centre, which has many entertainment venues, is among the reasons for preference of families with children who want to experience fear and excitement with its interesting games. It is thought that the number of entertainment and resting places in İstinyepark, Forum İstanbul shopping centre will reduce the quality of the centre when it is deemed sufficient and excessive. While users who do not have time restrictions for all shopping centres prefer to use rest and entertainment spaces, those who come for a certain purpose have to act limited.

Kanyon shopping centre responds to the needs differently with its classy shops and elite venues. In all shopping centres, to the extent of the expectations of those who come for shopping purposes, the existence of pricing practices that will appeal to every class, the variety of quality products, the coexistence of different brands, the attractiveness of the spaces offered, and the comfort aspect are seen as a whole. Participation takes place when there is a popular artist, writer, etc., who is involved in a different activity. Such organizations are

followed with curiosity from time to time to participate in activities (having fun, getting informed etc.) without the thought of coming for shopping purposes.

Although İstinyepark, Cevahir, Forum İstanbul shopping centres look like a closed box, the presence of outdoor places for shopping and resting is seen as different. In İstinyepark, Forum İstanbul shopping centre, the artistic reflection of the lighting system that will make the interior attractive and lively is effective. In İstinyepark shopping centre, traditional motif arrangements that capture the logic of urban shopping in architectural form (shopping on the pedestrian road) and usage are seen. It is attractive that in the Kanyon and Meydan shopping centres, spatial and event areas offer a visual perspective together, as they are open and interesting. In the Kanyon, Cevahir, and Forum İstanbul, there are alternative transportation facilities besides the underground system. In all shopping centres, playgrounds for children and activities organized in common areas to increase the entertainment element and attractiveness.

Although users find places in the city that can meet their needs, they prefer shopping centres, where everything is presented together in order to go beyond the usual, experience the difference, and visit. Shops and cafes spread over a large area in the city are often not preferred due to time constraints. The space mix in all shopping centres is used depending on the preference of the users. In addition to shopping, eating and drinking, watching movies, users have the opportunity to sit in the open area, walk around, be a part of the live environment, relieve stress and participate in organized events. Gathering, chatting, cruising, spending time, following fashion closely, performing actions take place.

CONCLUSIONS

Supporting the basic elements that ensure the urban continuity and vitality of shopping centres that look like part of the city gains quality with the transformation of physical-architectural spaces into social spaces. According to the evaluations made in central and secondary foci in shopping centres with publicity and ratings formed by spatial arrangements, criteria-quality depending on physical and social spaces can be determined. Focus areas should be designed in sufficient numbers to respond to other cultural and social needs as well as shopping action. The common areas shaped according to the interior design are supported by the sub-space for some actions to take place. Focus spaces that provide interaction-communication with the spatial qualities offered/not offered gain positive/negative value qualitatively.

The physical-social space setup of shopping centres reveals the compressed city model in which the parts that meet different requirements are reflected together. The fact that alternative facilities are offered with quality and comfortable qualities under a single roof attracts the attention of all segments and increases the usability value of the centre. Supporting common use spaces with cultural and social activities as well as shopping action strengthens the attraction area. Mechanicalised user behaviours affected by changing-changing living conditions understanding depending on developing technique and technology may emerge within the consumption culture. The topics that will highlight the interaction of perceptual, semantic features while evaluating the inferences discussed throughout according to the characteristics that different interior types of shopping centres (linear, curvilinear, central, mixed) reflect and evoke are examined below;

- Shopping centre designed as a central attraction area

Today, shopping centres are "social centres" that gain attractiveness with their alternative facilities and air-conditioned high-standard spaces, and they continue to become a focal point in the city with great speed. Thanks to the social centres created, people can communicate with each other, share their experiences, develop their skills, and actively/passively find themselves in activities.

Urban spaces, where users of all ages can find supplies to their different needs, reveal the quality of the attraction area with the qualities they offer. In an environment other than open spaces (limited indoor spaces), this phenomenon comes to life again. In this case, the urban space is redefined within the structure and continues to serve the public through another channel. The designed buildings are handled as part of the city and the urban space becomes structured through the idea of recreating publicity.

The difference of human relations from smaller organizations in metropolitan life also emerges in the relations established in relation to shopping activities and in the provision of individual freedom conditions in space. The main purpose of public space can be determined as "placing sociality and balancing social relations". Public spaces in shopping centres not only provide opportunities to use it, but also include many other functions and activities that are synonymous with urban life.

For users, the use of spaces in shopping centres aims to escape the racket of the city and to get out of the monotony they constantly live in. The possibilities symbolize the escape from the situation for the user at some point. One of the requirements of being public is that the spaces offered should be the scene of social events and actions in connection with social identity, as well as being the place where people come together to create power and symbolize their power in relation to the power-space relationship.

Adaptation to physical-social conditions can be considered as a natural adaptation to the given spatial and social environmental conditions, which emerge by feeling peaceful, comfortable, reliable, and at home in the centre, sometimes without an alternative or coercion- adaptation that develops in the process of passive mutual relationship -active adaptation. The intensity of the use of shopping centres, a satisfying and enjoyable atmosphere, a wide variety of modern stores and activities are visually observed. The proliferation of functional activities also enables the use of the centre by psychologically attracting people who want and do not want to shop to shopping centres with its moving image in the centre. Increasing these elements and clarifying the spatial arrangements in a richer environment to include their internal constructs and purposes is seen as an important phenomenon.

- Shopping centre changing as consumption indicator

The most important factor that supports the transformation of shopping activity into consumption is the linear distribution of the urban components within the structure. Such a distribution does not allow for the optional spatial organization and spatial diversity that exist in real urban space. Thus, the functional diversity in the real city space in the shopping centre and the optional space organization are eliminated and this mechanical order is organized as a behaviour directed to consumption in the user. In this case, the contemporary shopping centre

contributes significantly to the formation of a new model of social life focused on consumption.

Shopping centres, which are envisaged to serve as a social and cultural centre beyond being a commercial centre for contemporary urban life, are becoming consumption centres today where not only consumer products but also social and cultural activities are consumed. In order to increase the turnover rate of the over-rationalized production system and to ensure its continuity, they are the centres where the turnover rate of consumption is increased and made continuous behind concepts such as fashion and impermanence. These centres are defined as the public space of the citizens who have neither the time nor the desire to explore urban life, which is planned at every moment of their daily life.

The fact that public interiors are functionally more planned and organized than many open spaces enables users to carry out various activities in a shorter time. In today's contemporary social life, where the concept of time is much more valuable than in previous periods, the desire to save time is also a reason for the use of well-planned and organized interiors. The orientation of social life to interior space and its presentation in compressed form requires questioning the quality of public life. While public interiors increase individual comfort with artificial air conditioning, the use of contemporary materials, techniques and regular interior organization, they generally reduce social interaction. In other words, individualization, which is a necessity and result of contemporary life, causes public interiors to be preferred, and on the other hand, these contemporary interiors lead society to individualization.

The unique identity texture that each society makes its own should shape and support the public space. Otherwise, the dialectical relationship in the original development process becomes alienated and reveals an interaction without a soul. Each space should be characterized by unique characteristics defined by physical-architectural data and many components of the social space. Accelerated public life for consumption should be among the factors that guide the design within the thematic framework within the spatial setup. Accordingly, social identity, which has become defined in shopping centres, should bring the "public interior" to the forefront by interpreting the innovations and developments brought by the age in its own way.

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No conflict of interest was declared by the authors.

Authors' Contributions
The authors contributed equally to the study.

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REFERENCES

Arendt, H. (1994). *İnsanlık durumu* (B. S. Şener, Trans.). İletişim Yayıncılık (Original work published 1958).

Başkaya, A., Wilson, C. and Özcan, Y. Z. (2004). Wayfinding in an unfamiliar environment: different spatial settings of two polyclinics. *Environment and Behaviour, 36*(6), 839-867. https://doi.org/10.1177/0013916504265445

Benedikt, M. L. (1979). To take hold of space: isovist and isovist fields. *Environment and Planning B: Planning and Design,* 6(1), 47-65. https://doi.org/10.1068/b060047

Bhabha, H. K. (1994). *The location of culture*. Routledge.

Birol, G. (2005). Çağdaş alışveriş merkezlerinde kent dokusunun yeniden yorumlanması. *Gazi Üniversitesi Mühendislik Mimarlık Fakültesi Dergisi, 20*(4), 421-427. https://dergipark.org.tr/tr/pub/gazimmfd/issue/6666/88943

Carr, S., Francis, M., Rivlin, L. G. and Stone, A. M. (1992). *Public space*. Cambridge University Press.

Çevik, S. (1991). *Mekân-kimlik-kimliklendirme Trabzon sokakları örneği* [Unpublished doctoral thesis]. Karadeniz Teknik Üniversitesi.

Çevik, S. (2002). Kentsel tasarım bilgisi lisans ders notları. Karadeniz Teknik Üniversitesi, Mühendislik-Mimarlık Fakültesi, Mimarlık Bölümü, Trabzon.

Çevik, S. (2004). Kentsel tasarımda biçimlendirme lisansüstü ders notları. Karadeniz Teknik Üniversitesi, Mühendislik-Mimarlık Fakültesi, Mimarlık Bölümü, Trabzon.

Çubuk, M. (1989, May 15-16). *Kamu mekânları ve kentsel tasarım* [Oral presentation]. Kamu Mekânları Tasarımı ve Kent Mobilyaları Sempozyumu, Mimar Sinan Üniversitesi, İstanbul, Türkiye.

Demirtaş, S., Diken, B. and Gözaydın, İ. B. (1996). Mekân ve ötekiler. *Defter Dergisi*, (28), 39-44. https://defterdergisi.wordpress.com/2012/11/07/sayi-28/

Erdönmez, M. E. (2005). *Açık kamusal kent mekânlarının toplumsal ilişkileri yapılandırmadaki rolü, Büyükdere-Levent-Maslak aksı* [Unpublished doctoral thesis]. Yıldız Teknik Üniversitesi.

Gehl, J. (2010). *Cities for people*. Island Press.

Gehl, J. and Birgitte S. B. (2013). *How to study public life*. Island Press.

Gibson, J. J. (1978). *The ecological approach to visual perception*. Pergamon Press.

Giritlioğlu, C. (1991). *Şehirsel mekân ögeleri ve tasarımı*. İstanbul Teknik Üniversitesi, Mimarlık Fakültesi Yayını.

Gruen, V. and Smith, L. (1960). *Shopping towns USA*. Van Nostrand Reinhold Publishing.

Habermas, J. (1992). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. Polity Press.

Hartshorn, T. A., Dent, B. D. and Heck, J. I. (1992). *Interpreting the city: An urban geography*. John Wiley & Sons, Inc.

Harvey, D. (1989). *The condition of postmodernity*. Blackwell Publishers.

Hiller, B. and Hanson, J. (1984). *Buildings and their genotyps, in the social logic of space*. Cambridge University Press.

Hillier, B. (1996). *Space is the machine.* Cambridge University Press.

Hillier, B. (2001, May 7-11). *A theory of the city as object: or, how spatial laws mediate the social construction of urban space* [Oral presentation]. 3rd International Space Syntax Symposium, Atlanta, Georgia, USA.

Kostof, S. (1991). *The city shaped: Urban patterns and meanings through history*. Thames and Hudson.

Krier, R. (1979). *Urban space.* Academy Editions.

Krier, R. (1983). *Elements of architecture, architectural design.* Academy Editions.

Lang, J. (1987). *Creating architectural theory, the role of the behavioural sciences in environmental design.* Van Nostrand Reinhold Publishing.

Lynch, K. (1961). *The image of city.* The M. I. T. Press.

Lynch, K. (1981). *A theory of good city form.* The M. I. T. Press.

Madden, D. J. (2010). *Urbanism in pieces: publics and power in urban development.* Columbia University Press.

Moughtin, C. (1992). *Urban design: Street and square.* Butterworth-Heinemann.

Oktay, D. (1999). Kentsel ortak mekânların niteliği ve kent yaşamındaki rolü. *Yapı Dergisi*, (207), 54-61.

Ostrowski, W. (1970). *Contemporary town planning: From the origins to the Athens charter.* IFHP-CRU.

Peponis, J. (2001, May 7-11). *Interacting questions and descriptions-how do they look from here?* [Oral presentation]. Proceedings of the 3rd International Space Syntax Symposium, Georgia Institute of Technology, Atlanta, USA.

Peponis, J. and Wineman, J. (2002). Spatial structure of environment and behaviour. In R. B. Bechtel and A. Churchman (Ed.), Handbook of environmental psychology (pp. 271-291). John Wiley & Sons, Inc.

Rapoport, A. (1977). *Human aspects of urban form: Towards a man-environment approach to urban form and design.* Pergamon Press.

Rapoport, A. (1990). *Meaning of the built environment.* The Universiy of Arizona Press.

Robertson, K. A. (1993). Pedestrianization strategies for downtown planners: Skywalks versus pedestrian malls. *Journal of the American Planning Association, 59*(3), 361-370. https://doi.org/10.1080/01944369308975887

Sennett, R. (1996). *Kamusal insanın çöküşü* (S. Durak & A. Yılmaz, Trans.). Ayrıntı Yayınları (Original work published 1977).

Şahin, F. (2005). *Alışveriş merkezlerinin biçimlenmesinde önemli boyutlardan kamusal mekân ve kamusallık olgusu* [Unpublished master's thesis]. Karadeniz Teknik Üniversitesi.

Şahin, F. (2009, Jun 11-12). *Alışveriş merkezlerinde toplum yapısına bağlı anlamsal kriterler ve değişiminin incelenmesi* [Oral presentation]. Planlama ve Mimarlık Alanının Son On Yılı Sempozyumu, İstanbul, Turkey.

Şahin, F. and Çevik, S. (2010, May 10-13). *Influences of art to the quality of public sphere in shopping centres* [Oral presentation]. Identity and Interaction in Art, International Symposium, Mimar Sinan Fine Arts University, İstanbul, Turkey.

Trancik, R. (1986). *Finding lost space: Theories of urban design.* Van Nostrand Reinhold Publishing.

Türkoğlu, H. D. (1998). Açık mekânların kapalı mekânlara dönüşümü: Şehir merkezlerinde alışveriş alanları. *Yapı Dergisi*, (195), 57-63.

Vural, T. (2005). *Değişen üretim-tüketim ilişkileri bağlamında alışveriş merkezlerinin anlamsal ve mekansal dönüşümüne eleştirel bir bakış* [Unpublished doctoral thesis]. İstanbul Teknik Üniversitesi.

Vural, T. and Yücel, A. (2006). Çağımızın yeni kamusal mekanları olan alışveriş merkezlerine eleştirel bir bakış. *ITU Dergisi A, 5*(2), 97-106. http://itudergi. itu.edu.tr/index.php/ itudergisi_a/article/view/912

Yenice, Ş. (1998). *"Kamusal olma" içeriğinin kamusal mekânın anlamsal ve kullanımsal boyutuna yansıması üzerine bir analiz çalışması* [Unpublished master's thesis]. İstanbul Teknik Üniversitesi.

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Research Article

Sustainability of Historical Buildings Through Reuse Projects: A Case Study of the Kadıköy District in Istanbul

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Abstract

This research focuses on the preservation and adaptive reuse of historic structures. It emphasizes the importance of conserving cultural and historical heritage, suggesting that assigning new functions to these buildings contributes to sustainability. The study progresses through successful examples of adaptive reuse of historical buildings acquired by the Kadıköy Municipality, addressing spatial, cultural, and legal dimensions. It underscores the importance of preserving the architectural characteristics, spatial organizations, and surroundings of these buildings when assigning new functions. The research advocates for minimal intervention principles in adaptive reuse projects, ensuring the historical and cultural values of the buildings are considered. Furthermore, it highlights that these projects should not only focus on physical restoration but also faster social and cultural interaction. Adaptive reuse projects in the Kadıköy region have been developed in line with these principles, creating active and functional spaces that respond to community needs. These projects successfully demonstrate how the preservation and active use of historical buildings can contribute to regional and cultural sustainability. Finally, the research addresses the challenges encountered in the preservation and adaptive reuse of historical buildings in Turkey, discussing legal, economic, and technical issues, and offers suggestions for effective strategies in this field. The aim is to increase awareness and develop efficient strategies for the preservation of Turkey's historical structures.

Keywords: Adaptive Reuse, Cultural Heritage, Conservation, Historic Buildings, Istanbul, Kadıköy, Planning, Restoration, Spatial Memory, Sustainability.

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Araştırma Makalesi

Tarihi Yapıların Sürdürülebilirliği Açısından Yeniden İşlevlendirme Projeleri Üzerine İstanbul Kadıköy Bölgesi Örneği

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Özet

Bu araştırma, tarihi yapıların korunması ve yeniden işlevlendirilmesine odaklanmıştır. Bu çalışmada, kültürel ve tarihsel mirasın korunmasının önemi vurgulanırken, bu yapılara yeni işlevler yüklenerek kullanılmalarının sürdürülebilirliğe katkı sağlayacağı belirtilmiştir. Araştırma, Kadıköy Belediyesi tarafından kamulaştırılan tarihi yapıların başarılı yeniden işlevlendirme örnekleri üzerinden ilerlemekte ve bu süreçte mekânsal, kültürel ve hukuki boyutları ele almaktadır. Araştırmada, tarihi yapılara yeni işlevler verilirken, yapıların mimari özelliklerinin, mekânsal organizasyonlarının ve çevrelerinin korunmasının önemi üzerinde durulmuştur. Yapılan yeniden işlevlendirme çalışmalarının, yapıların tarihsel ve kültürel değerlerini göz önünde bulundurarak, minimum müdahale prensibiyle gerçekleştirilmesi gerektiği vurgulanmıştır. Ayrıca, bu projelerin sadece fiziksel restorasyonu değil, aynı zamanda sosyal ve kültürel etkileşimi de desteklemesi gerektiği belirtilmiştir. Kadıköy bölgesinde yapılan yeniden işlevlendirme projeleri, bu prensiplere uygun şekilde geliştirilmiş ve toplumun ihtiyaçlarına cevap veren, aktif ve kullanışlı mekânlar yaratılmıştır. Bu projeler, tarihi yapıların korunması ve aktif kullanımının, bölgesel ve kültürel sürdürülebilirliğe katkıda bulunabileceğini başarılı bir şekilde göstermektedir. Son olarak, araştırma Türkiye'deki tarihi yapıların korunması ve yeniden işlevlendirilmesi konusunda karşılaşılan zorlukları ve bu süreçteki yasal, ekonomik ve teknik sorunları ele alarak, bu alandaki çözüm yollarına dair öneriler sunmaktadır. Araştırma, bu konuda farkındalığı artırma ve Türkiye'deki tarihi yapıların korunması için etkili stratejiler geliştirme amacını taşımaktadır.

Anahtar Kelimeler: İstanbul, Kadıköy, Koruma, Kültürel Miras, Mekânsal Bellek, Planlama, Restorasyon, Sürdürülebilirlik, Tarihi Yapılar, Yeniden İşlevlendirme.

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INTRODUCTION

The principle "form follows function" emphasizes the interrelation of function and form in architectural design. This fundamental rule in architecture primarily involves identifying the requirements of structures and then designing spaces, volumes, and structural dimensions to suit these needs. This process requires consideration of various factors such as cultural awareness, technology, and material selections.

In this conceptual framework, the adaptive reuse of historical buildings in the Kadıköy district of Istanbul holds special importance. Historical structures reflect the cultural diversity of societies and connect the past to the present. Preserving their authenticity while addressing contemporary needs is vital for their continuity.

The cultural memory of societies is formed not only in abstract ideas but also in spaces. Therefore, the contribution of historic buildings to spatial memory plays a crucial role in maintaining the link between the past and the present. The conservation of historic buildings is a matter of not only local but also international significance, involving international institutions and principles for the preservation of cultural heritage.

Sustainability holds a central role in the preservation of historic buildings. It promotes the conscientious use of resources and ecological practices. The sustainability of historic buildings encompasses the preservation of both their intangible and tangible attributes. Istanbul's rich historical and cultural heritage, particularly in the Kadıköy region, is of special interest due to its historical significance and the variety of civilizations it has hosted.

This study aims to examine adaptive reuse projects of historic buildings in the Kadıköy area and investigate how these projects contribute to the collective memory. It will also explore the methods used in the conservation of these structures and the impact of these methods on social memory.

Conceptual Framework
The Concept of Sustainability

The concept of sustainability has evolved into an approach that necessitates a holistic consideration of economic, social, and environmental factors. Initially perceived with a narrow perspective in certain segments of society, it has transformed into a mandate requiring collaborative action across all sectors of the community. Sustainability aims to address global issues such as ecosystem degradation, depletion of fossil fuels, and the increase in greenhouse gases (Türkmen, 2019, p. 5; Kara and Şimşek, 2016, p. 245-269).

Developing alongside concepts like clean production and environmentally sensitive technology in the 1990s, sustainability has become a crucial aspect of ecology, emphasizing the importance of preserving biological diversity (Türkmen, 2019, p. 5). It aims to harmonize with nature and adopt solutions that inflict minimal damage on the environment (Güneş and Demirarslan, 2020, p. 81-99).

The Amsterdam Declaration of 1975 underlined the significance of sustainability in the preservation and adaptive reuse of historic structures, asserting that this approach has become a preferred method of conservation worldwide (Saraç, 2017, p. 1). In architecture and construction, sustainability transcends mere energy consumption control and encompasses all factors that could impact the environment (Türkmen, 2019, p. 21).

Sustainable architecture focuses on minimizing environmentally harmful factors, utilizing renewable energy sources, preferring recyclable materials, and transforming environmental factors positively (Gökdağ, 2019, p. 2). In this context, international organizations granting green building certifications contribute to the proliferation of sustainable architecture (Gökdağ, 2019, p. 2).

The 1987 report "Our Common Future" by the Brundtland Commission established a significant link between sustainable progress and urbanization, proposing solutions to issues such as poverty, consumption of environmental resources, and uncontrolled urban growth (Tosun, 2009, p. 1-14).

The sustainable urbanization approach encompasses land use planning, urban design, housing, transportation, environmental conservation and restoration, energy and material usage, green architecture and construction, equity and environmental justice, economic development, and population (Tosun, 2009, p. 1-14). This approach emphasizes the need for resource transformation and adaptive reuse, highlighted by the concept of sustainable urban renewal, in response to population growth (Alagöz, 2015).

In conclusion, sustainability is a comprehensive and multidimensional concept that seeks to balance environmental, economic, and social factors while meeting the needs of today without compromising the ability of future generations. This concept plays a vital role in architecture and urban planning, as well as in the preservation and management of historical cultural heritage (Kuşçuoğlu and Taş, 2017, p. 58-67).

Sustainability in Historic Buildings

Sustainability in historic buildings carries the purpose of preserving and transmitting the cultural and historical heritage of societies to future generations. Historic structures have suffered various damages due to factors like historical events, wars, political changes, natural disasters, and environmental impacts. The preservation of these buildings falls under the management responsibility of their societies, with laws and scientific data providing guidelines to support conservation and sustainability (Temiz, 2009, p. 11; Urak, 2002, p. 45-62).

Historic buildings, by showcasing the architectural trends of their eras, offer significant insights into architectural history. Revitalizing these functionally obsolete structures with new purposes within the scope of sustainability plays a critical role in preserving cultural heritage. When assigning new functions, it is essential to avoid harming the physical and spiritual characteristics of the building and to preserve its internal organization (Pekol, 2010, p. 22).

Interdisciplinary collaboration in architectural projects enhances the environmental and cultural impacts of the buildings. Preserving historic buildings facilitates understanding of past techniques and methods, and transforming these buildings into ecological designs is significant for sustainable development. In this process, factors like energy consumption, waste management, and material selection of the buildings should be considered (Gökdağ, 2019, p. 3; Çoban, 2019, p. 20).

The preservation of cultural heritage enables societies to understand their shared past and shape their future. Organizations like UNESCO and ICOMOS classify cultural heritage into tangible and intangible elements. Tangible cultural heritage includes movable and immovable cultural assets (Kuşçuoğlu and Taş, 2017, p. 58-67). The conservation of historic buildings contributes to preserving the identities of cities and enhancing tourism potential. However, structural

changes in historical areas and the wear and tear caused by tourism can lead to deviations from the conservation goal (Duman, 2019, p. 101).

Sustainability in historic buildings signifies maintaining the connection between the past and the future and ensuring the cultural continuity of society. The preservation of these structures provides an opportunity to safeguard and express the historical and cultural identity of communities (Saraç, 2017, p. 16; Altan and Özsoy, 2017, P.642). While the adaptive reuse of historic buildings offers numerous economic, social, and cultural benefits, this process emphasizes designs that are user-oriented, environmentally friendly, and sustainable (Altan and Özsoy, 2017, p .634-654).

The sustainability of historic buildings is a vital tool in preserving cultural heritage and strengthening the bond between societies and their past. In this process, environmental sensitivity, conservation disciplines, cultural values, and the needs of the community should be taken into account in planning.

Adaptive Reuse in Historic Buildings

Adaptive reuse in historic buildings plays a crucial role in preserving cultural assets and adapting them to contemporary societal needs. According to the Law on the Conservation of Cultural and Natural Properties (1983), cultural assets are tangible and intangible assets related to science, culture, religion, and fine arts from prehistoric and historical periods (Yıldırım, 2016, p. 5). Adaptive reuse enables historic buildings to be adapted to changing conditions of the era and societal needs (Arabacıoğlu and Aydemir, 2007, p. 204-212).

The concept of adaptive reuse was first addressed in the 1931 Carta Del Restauro, emphasizing the need for new functions of a building to align with its original purpose. Later, this approach was further developed in the 1964 Venice Charter and the 1975 Amsterdam Declaration, highlighting the need for historic buildings to be conserved in harmony with their environments. In Turkey, legislation regarding the preservation of historical and cultural assets was formalized in 2005 (Abacı, 2018, p.18).

Adaptive reuse encompasses two fundamental concepts: 'reprogramming' and 're-architecture.' Reprogramming refers to the rearrangement of space, while re-architecture involves interventions in a building considering the style and techniques of its era (Selçuk, 2006, p. 10). When assigning new functions to historic buildings, structural and spatial compatibility must be considered, and spaces accessible to everyone should be created following universal design principles.

Adaptive reuse in historic buildings is crucial for preserving cultural heritage and maintaining the connection with a community's cultural memory. Architectural movements like post-modernism have adopted similar principles in their approach to historic buildings (Pekol, 2010, p. 12). The conservation of historic buildings is also significant in preserving the identity and symbolic values of cities. Adaptive reuse is valuable not only for its economic benefits but also for its social and cultural contributions. In this process, preserving the original characteristics of the buildings and ensuring that interventions are reversible is crucial (Abacı, 2018, p. 2; Bilal, 2018, p. 5).

The adaptive reuse process in historic buildings encompasses two main concepts: "reprogramming" and "re-architecture." Reprogramming involves rearranging the space to suit its new use, while re-architecture refers to interventions made in the building, taking into account its historical style and techniques (Selçuk, 2006,

p. 10-11). In assigning new functions to historic buildings, structural and spatial compatibility must be considered, and interventions that could damage the building should be minimized (Altınoluk, 1998, p. 55).

Technical analyses in the interior spaces of historic buildings cover areas such as lighting, installations, and air conditioning. Integrating contemporary additions in a way that is compatible with the building's circulation axis is important (Dedeoğlu, 2019, p. 77-103). The interventions made after adaptive reuse should meet user needs without harming the building and contribute to its sustainability (Aydın and Yaldız, 2010, p. 1-22).

Fundamental factors to consider in the adaptive reuse process include architectural and spatial values, as well as social and environmental factors (Yıldırım, 2016, p. 21). The structural values and spatial arrangements of buildings play a significant role in the re-functioning process. Additions and modifications made during this process should be carried out in a way that preserves the building's character (Kılıç, 2015, p. 8-9).

Adaptive reuse plays a critical role in preserving cultural heritage and maintaining the connection with a community's cultural memory. Assigning suitable new functions and conserving historic buildings offer both economic and socio-cultural benefits. Adaptive reuse enhances the sustainability of historic buildings and ensures their transmission to future generations (Abacı, 2018, p. 12; Selçuk, 2006, p. 26).

Adaptive Reuse Criteria
Historical Factors

In the process of adaptive reuse of historical buildings, historical factors play a significant role. When assigning new functions to historical buildings, the past, present, and future should be considered together, and an awareness of the historical environment should be created. Historical buildings are considered as a part of the social memory, reflecting the social, cultural, economic, and architectural characteristics of the period in which they were built (Kaşlı, 2009, p. 14-15).

In adaptive reuse projects, historical analysis forms the basis of the design. A historical reference system is established by considering the building's history, its place in architectural history, decorative embellishments, architectural elements, and technical features (Kılıç, 2015, p. 11-12). Riegl (1903) emphasizes the age, historical and artistic values, and usage values of historical buildings. In assigning new functions, the harmony between the historical value and contemporary value of the building should be ensured, and highlighting the historical value is important (Kılıç, 2015, p. 11-12).

The success of adaptive reuse depends on the compatibility of the new function assigned to the building with its historical and architectural features. The original function provides an important reference point and determines which technical features are suitable for the building (Kılıç, 2015, p. 16). Therefore, difficulties may arise in changing the function of a building initially designed as a museum.
Assigning new functions to historical buildings provides both material and spiritual gains. During this process, the preservation and transmission of historical and cultural values to future generations are fundamental. Adaptively reused buildings not only create new meanings and values at the structural level but also make their mark in history at the regional level (Arabacıoğlu and Aydemir, 2007, p. 204-212).

In conclusion, careful consideration of historical factors in the adaptive reuse process of historical buildings plays a crucial role in efforts to preserve their historical and cultural heritage and adapt to contemporary societal needs. Considering the past, current status, and future potential of these buildings is critical in giving new life to historical buildings while preserving their original values.

Environmental Factors

In the process of adaptive reuse of historical buildings, environmental factors play a crucial role in redefining the relationship between the buildings and their communities and surroundings. Over time, historical buildings may become unable to meet changing environmental needs. Therefore, adapting these buildings to meet contemporary environmental requirements is necessary (Kaşlı, 2009, p. 26; Yıldırım, 2016, p. 17).

Ensuring the continuity of historical buildings by adapting to environmental changes requires considering the building and its environment as a whole. Evaluating the interventions to the building together with environmental conditions facilitates not only the preservation of historical and cultural continuity but also the fulfillment of social needs (Kaşlı, 2009, p. 16; Korkut, 2019, p. 9).

Alsaç (1992) states that environmental conditions significantly impact architectural structures. Interventions suitable for slowing down and minimizing the wear and tear of buildings integrated with their environment over time are essential (Yıldırım, 2016, p. 17). Historical buildings are directly related to environmental factors, and the functions assigned to these buildings can change with evolving needs. Replacing functions that are no longer needed with new ones that meet the needs of the contemporary era can ensure the sustainability of these buildings (Yıldırım, 2016, p. 19).

Adaptive reuse is vital for the continuation of the community's cultural memory and the preservation of the environmental texture. This method, especially applied to prevent large industrial structures from becoming defunct, provides not only material benefits but also environmental and cultural gains (Aydın and Yıldız, 2010, p. 1-22; Saraç, 2017, p. 20). Instead of constructing new buildings, transforming existing ones is not only economically beneficial but also reduces the environmental damage caused by construction processes (Gökdağ, 2019, p. 80).

In conclusion, environmental factors in the adaptive reuse process of historical buildings are critical in redefining their relationship with the environment and in aligning with the cultural and social needs of the community. This process not only supports the preservation and environmental sustainability of historical buildings but also ensures the transmission of cultural heritage to future generations.

Physical Factors

In the process of repurposing historic buildings, physical factors are crucial elements that affect the building's cultural value and its relationship with the environment. Article 9 of The Burra Charter emphasizes that the location of a building is part of its cultural value and the relationship between the building and its surroundings influences the culture.

Changes in the physical environment and the transformation of the social environment are intertwined. Historic buildings, being part of the urban fabric, should not be considered in isolation. Cities represent a whole, and buildings

represent parts of this whole. When approaching historic buildings, it is important to consider their spatial relationship with the city (Kılıç, 2015, p. 17).

The tectonic characteristics, geometric forms, and spatial forces of a building form the basis of the physical assessment. This assessment is conducted through the building mass, facade, plan, section, and interior views. Space organization expresses the connections between buildings and plays a significant role in the repurposing process (Kılıç, 2015, p. 18).

The plan organization of a building can vary as single-zoned, repetitive zoned, or complex types. The compatibility of the new function with the old function and the preservation of space organization should be evaluated considering the intervention limitations in registered buildings (Altınoluk, 1998, p. 75). Whether the space required for the new function is available in the existing structure and the building's structural system are critical factors in determining the new function.

In the process of repurposing historic buildings, physical factors should be considered to ensure the preservation of the building's historical and cultural value, the harmony with the environment, and the successful integration of the new function. These factors directly affect the building's current and potential use, sustainability, and social impact.

Legal Restrictions and Determinants

Legal restrictions and determinants play a significant role in the preservation and sustainable use of historic buildings during the repurposing process. International declarations, charters, national laws, and local regulations ensure that interventions are made without harming the identity and historical value of these buildings. In Turkey, this legal framework is defined by the Law on the Conservation of Cultural and Natural Property and related regulations.

Legal determinants aim for any intervention in the building to be minimal, preserving the structural integrity and identity of the building. It is also emphasized that the interventions should be reversible and flexible, allowing for future interventions. Materials added to the building or artefact later should be distinct, contributing to the preservation and understanding of the building's original features (Abacı, 2018, p. 29).

In the repurposing process, it is necessary for buildings to comply with current legal and regulatory requirements, especially safety-related regulations like earthquake codes. However, these regulations can affect the spatial organization and aesthetic characteristics of historic buildings, hence careful planning and implementation of interventions are crucial (Selçuk, 2006, p. 34).

In the repurposing of historic buildings, legal restrictions and determinants play a key role in preserving the physical, cultural, and historical integrity of the buildings while meeting safety and usability standards. In this process, the minimal and reversible nature of interventions, considering the historical and cultural context, is vital for ensuring sustainable preservation.

Repurposing and Sustainability

Repurposing plays a vital role in preserving and ensuring the sustainability of historic architectural structures. In this process, preserving the original architectural and cultural values of the building is fundamental. Repurposing rehabilitates structures that have lost their initial functions, reintegrating them into society and preserving them for future generations, thus transforming buildings from merely

visual objects into livable spaces. Ensuring that these structures harmonize with the community is crucial during this process.

Article 5 of the Venice Charter states that the preservation of buildings of historical value is facilitated by their use for the benefit of society. It emphasizes that the newly assigned functions should be applied without disturbing the architectural plan and decorative elements of the building (Abacı, 2018, p. 40). In sustainable architectural practices, revitalizing buildings whose usage life has ended with new functions contributes to sustainability by reducing environmental impacts and preserving cultural heritage.

In the repurposing process, considering the building and its environment together and preserving the connection between the improvements made and the environment are important. Environmentally compatible landscaping and the design of social spaces make the surroundings of the building vibrant and interactive. Spaces that are accepted and preferred by users can become sustainable spaces (Çoban, 2019, p. 21). In line with changing social structures and needs, the renewal of spaces that have lost their function is crucial in preserving the cultural and historical heritage of cities. Considering cities as living organisms, the modernization of structures within them in a way that suits contemporary conditions requires a holistic and interconnected approach (Ürük, 2020, p. 165-186). The repurposing process ensures the sustainable preservation of historic structures and, while reintegrating these buildings into society, it preserves their architectural and cultural values, supporting the continuity of the city's historical texture and cultural memory.

The Contribution of Repurposing Historic Structures to Spatial Memory

The repurposing of historic structures significantly contributes to urban and social memory. The Turkish Language Association defines "memory" as the ability to consciously store experienced events and learned information in the mind. Urban memory, on the other hand, forms over time through the accumulation of events in the social consciousness and is intertwined with the city's structure.

Historic structures are parts of a societal memory reflecting the social, cultural, and economic characteristics of their communities. From the 1970s, with humanist and postmodern approaches, the concepts of "place, people, and memory" have come to the forefront, aiming to adapt historic structures to contemporary needs and to transmit the characteristics of the period to future generations (İncedere, 2019, p. 51; Dedehayır, 2010, p. 26).

The preservation of historic environments is considered crucial for a society's historical consciousness and cultural continuity. Historic structures, throughout their historical processes, collect all events experienced by the city, functioning as a kind of document and enriching the urban memory with aesthetic values (Pekol, 2010, p. 33; Dedeoğlu, 2019, p. 77-103).

In the repurposing process, it's essential to preserve the aesthetic and cultural values of historic structures, catering to the needs and visual preferences of users. The materials used in the design of buildings, colours, descriptive features, and their harmony create an aesthetic value appreciated and perceived positively by users (Güner and Giritli, 2004, p. 19-30).

In conclusion, the repurposing of historic structures strengthens social memory, preserves urban identity, and contributes to the sustainability of cultural heritage. While this process is carried out specifically for buildings, it is essential that it also

maintains the integrity of the general urban fabric and aligns with strategic urban planning (Yenel, 2015, p. 54-77).

Repurposing of Historic Structures for Sustainability

The repurposing of historic structures for sustainability is an essential strategy for preserving cultural heritage and addressing contemporary societal needs. These structures, reflecting the life ways, social, economic, and cultural values of past eras, necessitate the conveyance of their cultural heritage significance to the community.

While technological advancements and urbanization threaten the fabric of historic structures, changing societal needs make adapting these structures functionally challenging. Physical improvements and applying new functions to maintain their connection with society are required. Preserving and reusing existing structures is a more sustainable approach than building new ones. Regular maintenance and minimal intervention are ecological and environment-friendly approaches. Sustainability in material sourcing should also be considered in preservation decisions (Orbaşlı, 2008, p. 61).

Cervellati asserts that structures can retain their values over time, even amidst changes, as long as they adhere to their original forms. Repurposing necessitates finding functions that can maintain these old forms (Kuban, 2016, p. 306). Historic structures and their surroundings should be assessed for spatial characteristics, architectural techniques, styles, and plan schemes. Typological definitions should consider structural systems, construction techniques, materials, and dimensional characteristics (Kuban, 2016, p. 303).

Repurposing historic structures ensures temporal and spatial continuity through environmental modifications and modern necessities such as lighting and heating. Each project is specific to the structure, aiding in the appreciation of historical periods. Applications that appeal to the senses can make the integration of historical fabric enjoyable (Durukan, 2020, p. 195-210; Yenel, 2015, p. 54-77).

This perspective underlines that repurposing historic structures is a significant strategy that supports both physical and cultural sustainability, preserving community historical consciousness and cultural heritage.

Repurposing historic structures for sustainability is a crucial approach to preserving architectural heritage and responding to contemporary societal needs. As historic structures reflect the social, economic, and cultural values of past periods, their preservation as part of cultural heritage is necessary for community transmission. Technological advancements, urbanization, and changing societal dynamics that threaten the fabric of these structures are countered by repurposing, ensuring both their preservation and continued societal connection.

Issues such as heritage problems, financial constraints, and biases against conservation methods are frequent barriers in the preservation of historic structures in Turkey. Hence, raising awareness about conservation in society and transmitting cultural heritage is a responsibility for everyone (Çelebi and Gültekin, 2007, p. 30-36; Kaşlı, 2009, p. 11-12).

Repurposing historic structures, by assigning new functions, minimizes environmental impact while ensuring the transmission of their embodied histories to future generations. This process should consider the structure's environment,

analysis, and characteristics, and employ sensible functions accepted by society (Urak, 2002, p. 45-62; Aydın and Yaldız, 2010, p. 1-22). Adaptation processes can enhance environmental and service features, but interventions should not harm the originality of the structure and should be mindful of preserving the historical fabric (Abacı, 2018, p. 36).

In the adaptations applied to historic structures, the organization of space, supporting systems, building elements, and material selections are crucial. When assigning new functions, designs should be carried out without harming the existing support system or building elements and without distorting the character and authenticity of the historic structure (Alsaç,1992, p. 86-87).

Repurposing supports the concept of sustainability by maintaining and protecting historic structures in a social and cultural context. Adaptation to the continuously evolving dynamics of society and the environment makes repurposing an effective strategy for preserving and transmitting cultural heritage.

In Turkey, the sustainability and repurposing of historic structures have gained new dimensions, especially since the 2000s. The "Law No. 5366 on the Renewal and Preservation of Deteriorated Historical and Cultural Immovable Properties," enacted in 2005, defined 'deteriorated' areas within conservation sites as renewal areas. However, this law contains inconsistencies with the conservation law and has led to the change in status of conservation sites, resulting in physical space-focused projects that neglect the social environment. This situation has led to consequences such as the empowerment of Renewal Boards instead of Conservation Area Boards and the ineffectiveness of conservation zoning plans in these areas (Tan and Arabacıoğlu, 2020, p. 204-216).

The sustainability of historic environments is directly linked to situations requiring repurposing due to social and economic changes. However, incorrect interventions can disrupt the historical fabric and lead to the formation of identity-less social structures. Especially in globally recognized historic cities like Istanbul, modernization has led to the loss of historical characteristics, and deliberate actions like fires have damaged historical fabrics. Since the 1970s, with the increasing awareness of preserving historical values, newly created living spaces in cities have become urban formations lacking aesthetic and social values, distant from past relationships between nature-buildings and humans-structures. This situation has resulted in the creation of environments that have lost their meaning and traditional characteristics (Arabacıoğlu and Aydemir, 2007, p. 204-212).

The process of conserving and repurposing historic structures contributes to the sustainable development of cities and the transmission of cultural heritage to society. In this process, considering the physical, historical, and social dimensions of structures plays a crucial role in preserving cultural values for future generations and creating a sustainable urban fabric.

REPURPOSING EXAMPLE FROM THE KADIKÖY DISTRICT OF ISTANBUL

History of Kadıköy District

Located on the Anatolian side of Istanbul, Kadıköy's foundation dates back even before the establishment of Istanbul itself. Historically, the area was first known as Chalcedon. According to Greek history, the city of Chalcedon was founded 17 years before Megarians established Istanbul. It was also established in the area presently known as Kurbağalıdere. Initially, Phoenicians migrated to the area. The name Chalcedon is thought to have originated from the word

'Karkidon', meaning city, or possibly due to the copper mines in the region. Evliya Çelebi mentions that around 600 vineyards existed in the area during the reign of Sultan Murat IV. The district's aesthetic value was enhanced by the affluent class through the construction of mansions, mosques, schools, and fountains (Kolbay, 2010, p. 4-5).

Kadıköy Municipality, originally a branch of the Istanbul Municipality, became a district municipality under the Istanbul Metropolitan Municipality after a reorganization in 1984. Located in the southwest of the Anatolian Side, Kadıköy is bordered by the Marmara Sea to the west and south, Üsküdar to the north, and Ataşehir and Maltepe districts to the east. As of 2020, the population of Kadıköy district is 481,983. While Kadıköy is perceived as a socio-economically affluent area, it also hosts many people from less prosperous backgrounds. Historically, there have been many individuals with minimal economic means but owning property in the region. Despite this, Kadıköy is distinguished from other districts with its above-average socio-economic and cultural development and unique institutions and perspectives (Küçük, 2018, p. 198-217).

Anadolu Yakası, or the Anatolian side of Istanbul, is prominent in terms of spatial and visual transformation. Before World War II, areas like Kızıltoprak, Feneryolu, Fenerbahçe, Kalamış, Erenköy, Kozyatağı, Bostancı, and the higher altitudes of Yakacık, known for their expansive gardens and mansions owned by Ottoman elites, have transformed into densely populated areas. Despite efforts to maintain social status in areas close to the sea, such as around Bağdat Avenue, these regions have lost connection with their past. They have evolved into modern urban landscapes with high-rise buildings reaching up to 20 floors, grid-patterned streets, luxury shops, and the loss of historic trees along the coastline. Today, the historical connection of the Kadıköy region with Istanbul is preserved in a few documents, museums, some mansions, gardens with remaining pine trees, and in the names of neighbourhoods (Kuban, 2020, p. 315).

Kadıköy, located on the Anatolian side of Istanbul, boasts a history that predates the city's own establishment. Initially named Chalcedon, Kadıköy was established as a settlement area by the Phoenicians, 17 years before the Megarians founded Istanbul. The name Chalcedon is thought to be derived from either the copper mines in the area or the word 'Karkidon', meaning city. Evliya Çelebi notes that there were about 600 vineyards in the region during the reign of Sultan Murat IV. The affluent residents' mansions, mosques, schools, and fountains have added distinct aesthetic values to Kadıköy (Kolbay, 2010, p. 4-5).

Following a reorganization in 1984, the Kadıköy Municipality became a district municipality under the Istanbul Metropolitan Municipality. Surrounded by the Marmara Sea to the west and south, Üsküdar to the north, and Ataşehir and Maltepe districts to the east, Kadıköy had a population of 481,983 in 2020. Despite being perceived as socio-economically affluent; it also houses individuals from less prosperous backgrounds, distinguishing it from other districts with its higher socio-economic and cultural development (Küçük, 2018, p. 198-217).

Kadıköy plays a significant role in the spatial and visual transformation of Istanbul's Anatolian side. Areas like Kızıltoprak, Feneryolu, Fenerbahçe, Kalamış, Erenköy, Kozyatağı, Bostancı, which hosted mansions with extensive gardens of the Ottoman elite before World War II, have now transformed into densely populated areas. Despite efforts to maintain social status, regions near the sea, such as around Bağdat Avenue, have partially lost their historical connection due to high-rise buildings, luxury stores, and changed street structures. The historical connection of Kadıköy with Istanbul is preserved in documents, some

preserved mansions, certain gardens, and neighbourhood names (Kuban, 2020, p. 315).

According to Küçük's 2018 study, Khalkedon in the Anatolian side of Istanbul, historically known as Kadıköy, served as a granary, healing, and retreat area for Byzantion/Dersaadet throughout the Ancient and Middle Ages, and even into the Early Modern Period. Despite its coastline, it never developed into a bustling commercial port. External factors, including embargoes from neighbouring Byzantium, hindered Khalkedon's development, leading to a lack of capital accumulation. The area showed stagnation in urbanization and architecture during both the Eastern Roman and Ottoman periods (Kütükçü, 2018, p. 13-14).

During the Ottoman era, Hızır Bey, Istanbul's first judge, was assigned to the Kadıköy Region as an arpalık (a type of feudal territory). In the time of Fatih Sultan Mehmed, there was a plan to build a mosque larger than Hagia Sophia. However, upon realizing that the constructed mosque was not larger, Fatih punished the architect, reflecting the period's adherence to the rule of law and justice. By the time of Sultan Murat IV, Kadıköy was renowned for its palaces, vineyards, and gardens. Evliya Çelebi, in his Seyahatname, writes of six hundred vineyards in Kadıköy during this period. The palaces and windmills in the Yeldeğirmeni area attracted people from other parts of Istanbul, making Kadıköy a gathering place for intellectuals from this period onwards (Kütükçü, 2018, p. 15-16; Akerman, 2009, p. 16).
The research continues with examples of repurposing from the Kadıköy district of Istanbul.

The Example of Sustainable Reuse of Eglisia Notre Dame Du Rosaire Church as Yeldeğirmeni Art Centre

The historical texture of the Yeldeğirmeni district began to take shape with the construction of the Ayrılık Çeşmesi in 1600 and the Osman Ağa Mosque in 1612. These structures laid the foundation for the development of a settlement in the area (Çolpan and Erkan, 2016, p. 83-93).

During the Ottoman period, the lifting of restrictions on non-Muslims between 1789-1807 following Sultan Selim III's reforms significantly influenced the economic structure of society and the development of Kadıköy. A group known as the 'Levantine', primarily engaged in trade, played a major role in the development of Kadıköy. In neighbourhoods such as Rasimpaşa, Moda, Bahariye, Altıyol, Yoğurtçu, Erenköy, and Bostancı, where Levantines were predominantly residing, buildings were constructed to suit their religious beliefs and cultural values. Notable among these buildings were the French Girls' and Boys' School, Hemdat Israel Synagogue, and Ayia Yorgi Church (Tarkay, 2010, p. 38).

Significant urban changes occurred in Istanbul following the works of the İntizam-ı Şehir Commission established in 1856. New regulations were implemented in areas like roads, sidewalks, lighting, sanitation, and waste management, marking a transformation in the city's classic appearance. In 1857, 14 municipal districts were established in Istanbul, with Eyüp, Üsküdar, and Kadıköy each having their own municipalities (Tarkay, 2010, p. 33).

The historical building located on İskele Street in Rasimpaşa Neighbourhood of Yeldeğirmeni is recorded to have been constructed in 1895 as a church, monastery, and school. The Notre Dame du Rosaire church was opened by French nuns to serve as the chapel of the Sainte-Euphemie Girls' School (now Kemal Atatürk High School) (Arısoy, 2014, p. 115).

Figure.1- Notre Dame du Rosaire church - Cultural Center (Bilgin, 2014, p.112)

"In 1913, Notre Dame Du Rosaire Church housed 20 nuns and 360 students. In the major fire of 1911, the monastery and church sections suffered damage, but the school building remained relatively unharmed. The church closed in the 1930s, and the school building was transferred to the Ministry of Education in 1935. The church, which fell into disuse from the 1950s, contains valuable stained-glass windows, wall and ceiling frescoes (Atılgan, 2017, p. 43). In the 1960s, the church's lower floor was used as a hall by Kemal Atatürk School, but post-restoration, the hall was halved, with part of it planned as toilets (Atılgan, 2017, p. 45). The monastery and school buildings, used as a sports hall in the 1980s, were in poor condition. The building, with a meeting hall accessible from the school's inner courtyard and a balcony for women (Figure 4), remains impressively lavish to this day (Atılgan, 2007, p. 30).

In 1981, Yeldeğirmeni area was declared a conservation area by the Monuments High Council and the No. V Preservation Board. The targeted conservation plans for the area were approved by the Istanbul No. II Preservation Board in 1996, with regional boundaries reviewed in 1998. In 1999, the area was evacuated due to damage from an earthquake. Within Rasimpaşa, where Yeldeğirmeni is located, there are 184 structures registered by the High Council for Conservation and the Istanbul Regional Preservation Board. The aim of prospective projects is to preserve the existing neighbourhood culture and structure, designing the environment as a whole. Hence, the projects are shaped as neighbourhood renewal rather than urban transformation. It is decided that the real owners of the region are its residents, and solutions should be based on their demands (Şahin, 2013, p. 33). The most crucial point in transformation concepts is to include the environment in planning. Transformations actively involving the local community are critical for the continuity of spaces."

Figure.2- Women's Department (Atılgan, 2007, p.30)

Figure.3- Interior of the church. The photo on the left is 2007, the photo on the right is 2014 (Atılgan, 2017, p.45)

Kadıköy Municipality purchased the 19th-century French Eglisia Notre Dame du Rosarie Catholic Church from its owner François Xavier Jacob for eight hundred thousand liras. After the restoration of the church, it was planned to be used for ceremonies and concerts. The church, which will also function as a museum, can serve as a place of worship. In 1979, the Conservation Board decided that the church had lost its 'worship characteristic', leading to a restoration decision. After the new function was assigned, the option of worship was planned to be added additionally.

The historical structure, built thanks to the rights granted during the Tanzimat Period, is considered an architectural monument. In 2007, the hall of the church was reinforced with steel beams and columns. The long-abandoned church was purchased by Kadıköy Municipality in 2012 and restored in 2014, transforming it into an art centre. Yeldeğirmeni Art Centre opened on March 14, 2014, hosting various art events. The "Live Your Street" event organized activities such as painting, puppet, and coffee workshops, and theatrical performances in the area. It was awarded the "Project Award" in the 2011 "Historical and Cultural Heritage Conservation Project Implementation Encouragement Competition" by the Union of Historical Towns. The centre, while being an ideal venue for classical music concerts, also hosts cinema screenings and exhibitions.

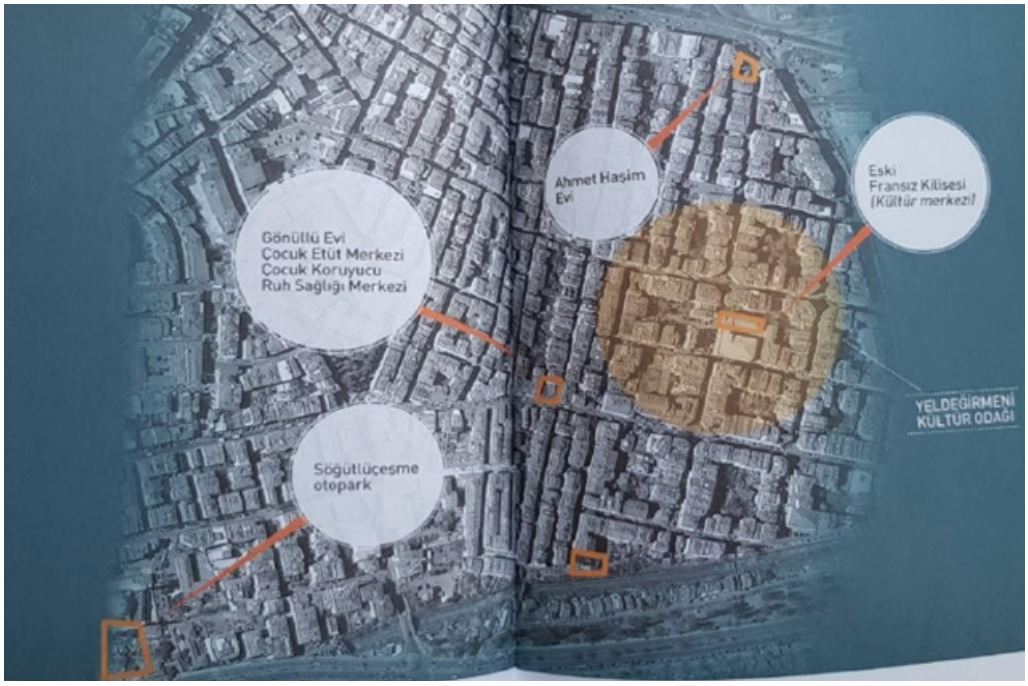

Figure.4- Old French Church - Cultural Center (Bilgin, 2014, p.115)

The Yeldeğirmeni district in Kadıköy has been a significant settlement on Istanbul's Anatolian side since the Ottoman period. Renowned for its historical and social fabric, this area has hosted various communities throughout different eras. Named after the windmills that utilized the wind in the area, Yeldeğirmeni was a centre for meeting the palace's flour needs during the Ottoman era.

Until the 20th century, Yeldeğirmeni continued to exist as a neighbourhood with cultural diversity, home to Jewish, Muslim, Greek, and Armenian populations. In the early years of the Republic, the Turkish and Jewish populations were of equal number, with Armenians and Greeks as minorities. Today, actively used synagogues, mosques, and Greek churches in the area reflect the historical and cultural diversity of the region.

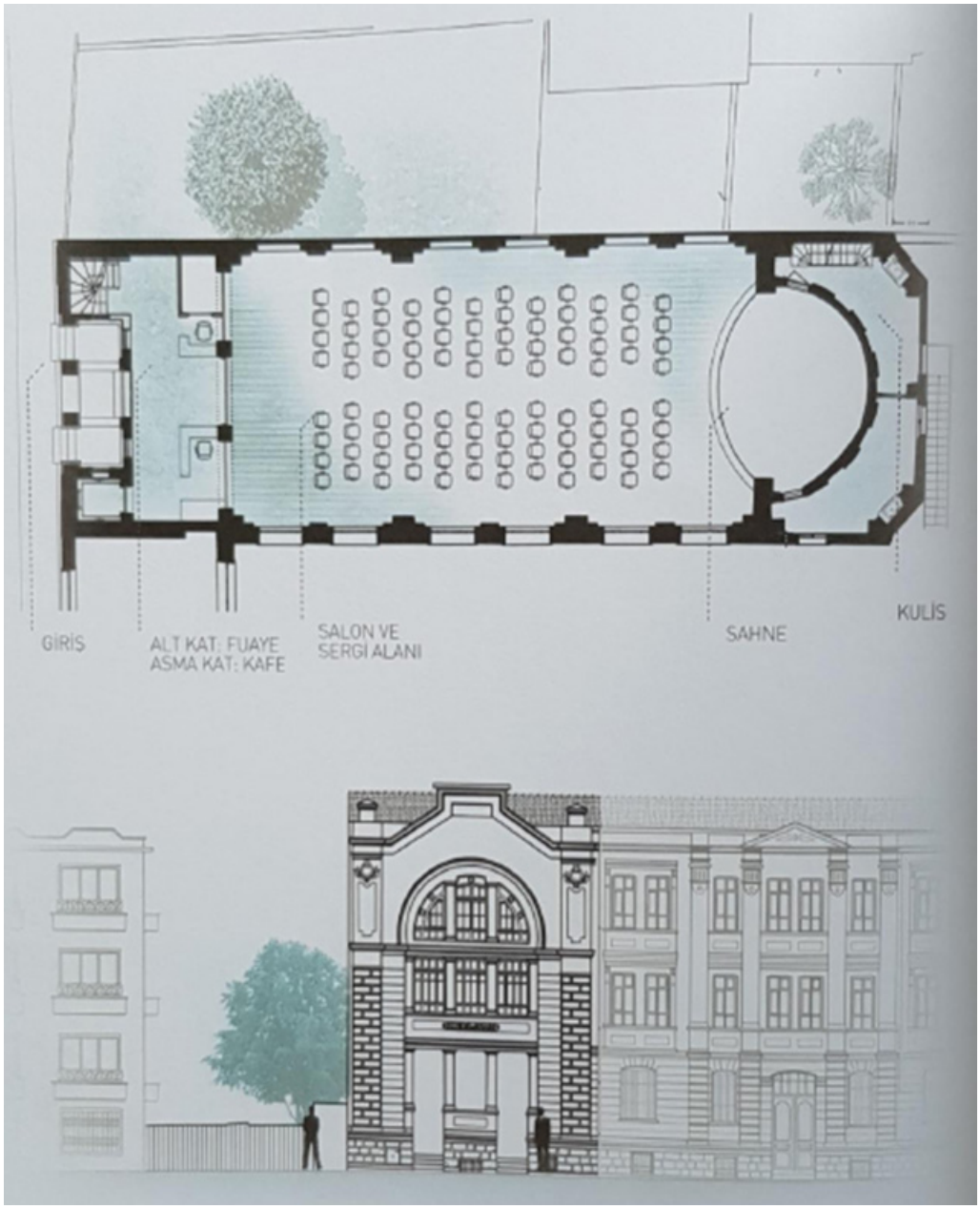

Figure.5- Yeldeğirmeni Art Center Plan (Bilgin, 2014, p.114)

Bahariye and Moda are other key centres influencing Yeldeğirmeni's social and cultural structure. Cultural facilities such as cinemas, theatres, exhibition halls in these areas have significantly contributed to Kadıköy's cultural life. Additionally, the Moda Sea Club, since 1935, has been a major centre for cultural and sporting activities.

Iskele Street is a significant part of Yeldeğirmeni, where various structures like historic apartments, religious buildings, and educational institutions are located. These include the Saint Euphemie French School (now Kemal Atatürk Middle School), the Eglisia ND Du Rosarie Church, the German School (Osmangazi Elementary School), and the Rasimpaşa Mosque. The location of Iskele Street, suitable for land, sea, and rail transportation, has contributed to the economic and social vibrancy of the area.

The Yeldeğirmeni area has been a neighbourhood inhabited by Greek, Jewish, and Muslim communities since the 19th century, where apartment buildings first appeared in Kadıköy. The area saw increased apartment construction from the

1950s, a rise in crime rates after the 1980s, and gained diversity. In the 2000s, the area became popular among university students and artists.

The Yeldeğirmeni Art Centre was opened following the restoration of a 119-year-old building by Kadıköy Municipality, contributing significantly to the cultural life of the area by hosting artistic activities.

Figure.6- Eglisia Notre Dame Du Rosaire Church-Yeldeğirmeni Art Center (https://planetaestambul.com/2019/07/09/notre-dame-du-rosaire/)

Figure.7- Eglisia Notre Dame Du Rosaire Church-Yeldeğirmeni Art Center (https://planetaestambul.com/2019/07/09/notre-dame-du-rosaire/)

Figure.8- Sign showing the entrance of Notre Dame du Rosaire church (https://planetaestambul.com/2019/07/09/notre-dame-du-rosaire

Figure.9- Front Facade of Notre Dame du Rosaire Church (planetaestambul.com)

CONCLUSION AND RECOMMENDATIONS

Sustainability, rooted in the awareness of limited societal resources, is a pivotal concept influencing various realms from construction technologies to energy resources. At the building scale, sustainability is intricately linked with these concepts, with the method of repurposing historical buildings gaining significant importance in this context. The preservation procedures applied to historical structures focus on improving their physical integrity yet leaving them functionless turns them into mere visual objects. Assigning new functions to these buildings, responsive to modern needs and considerate of environmental factors, is essential for spatial sustainability.

In selecting functions for historical buildings, changing life conditions and values must be considered, ensuring minimal intervention and relevance of the chosen functions in the future. Since historical structures reflect a society's cultural heritage, their preservation and transmission to future generations are of great importance. In repurposing projects, interventions should be carried out without damaging the original fabric of the building and within the confines of legal limitations.

The selection of new functions for historical buildings necessitates the evaluation of historical, environmental, physical, and legal factors. In Turkey, owners of historical buildings can intervene within the criteria set by relevant authorities. Interventions in registered buildings are evaluated within the scope of restoration, yet this can lead to legal and financial obligations that often result in owners abandoning the buildings. Therefore, restoration and repurposing of historical buildings are crucial for both cultural heritage preservation and societal progress.

Repurposed historical buildings require a careful analysis of their existing spatial organization, location, and environment. The original architectural features, period characteristics, spatial properties, circulation areas, and structural systems of historical buildings must be preserved. Principles set by international organizations serve as a primary guide in the preservation of historical buildings, encompassing interventions that maintain the original textures. The reversibility of interventions and distinguishability from the original identity are critical. Ensuring that any intervention does not harm the building's original fabric is fundamental.

The decision-making process for a historical building's new function is directly linked to its preservation. The suitability of the assigned function, meeting user needs, and environmental interaction are vital. Restoration requires interdisciplinary work, taking into account the period characteristics and space identities of the building. Preserving the building's spatial layout and interior architectural features is critical for the success of restoration projects. The role of interior designers in these projects contributes significantly through space analysis and implementation of designs. Since conservation science requires an interdisciplinary approach, architects and interior designers play fundamental roles in this process.

In summary, repurposing historical buildings involves preserving their original fabric, selecting appropriate functions, and implementing restoration projects with an interdisciplinary approach. These are key factors in maintaining cultural heritage and ensuring sustainability.

The process of repurposing the Notre Dame Du Rosaire Church aimed to provide a function for the building where communities can gather and host cultural and

social events. This process redefined the building not just as a historical object but as an active space within the community.

While Turkey's heritage in the field of preservation dates back to the Ottoman era, the concept of preservation began to develop in a modern sense when the Supreme Board of Real Monuments and Antiquities adopted the Venice Charter in 1967. The notion of the "urban conservation area," introduced two years before the Amsterdam Declaration of 1975, emphasized the evaluation of historical buildings not in isolation but in conjunction with their surroundings. However, erroneous restoration practices and changing political authorities have led to shifts in approaches to implementation, supervision, and preservation, resulting in significant challenges in the preservation of historical buildings.

In the repurposing of historical buildings, the use of materials and construction techniques should align with the period-specific architectural features of the buildings. Aesthetic and rhythm, as perceived by users, affect the monumental status of historical buildings in the public's mind. Preserving the sense of monumentality and the existing historical fabric is crucial in newly repurposed historical buildings.

Rather than adopting a freeze-in-time preservation approach, repurposed historical environments should be conceived as active spaces compatible with the benefits of modern technology. Historically, these designed structures contribute culturally and economically to the city and country. Especially when repurposed structures align with the needs of society, they play a vital role in preserving cultural values and ensuring the sustainability of such preservation. The examined buildings in the research have been repurposed with functions that the region culturally lacked. For example, the conversion of the Municipality building into a library is an example of this approach.

Preservation of historical and cultural values emphasizes the consideration of both abstract and tangible elements as a whole. In sustainable preservation projects, it is crucial to keep these structures not only physically but also actively engaged with the economic and social development of society. The repurposing of historical spaces acquired by Kadıköy Municipality aligns with these principles. This approach ensures that buildings are preferred by users not just for their visual impact but also for addressing societal needs.

In preservation projects in Turkey, challenges such as a lack of expertise and the approval of projects before reaching sufficient maturity are present. Regular maintenance and inspection are critical for the sustainability of projects in preserving historical buildings. Particularly in a city as historically and strategically significant as Istanbul, the preservation of heritage becomes a global responsibility, not just a local one. The financial obligations associated with preservation efforts often make it impractical for property owners to implement them, emphasizing the importance of legal and regulatory mechanisms. Municipalities playing a pioneering role in preservation and repurposing can be effective in preserving cultural values and the spatial memory of the community for future generations.

The projects undertaken by Kadıköy Municipality in acquiring and repurposing spaces have been designed in accordance with the needs of the community and adhere to general principles. These projects serve as important examples in terms of the sustainability of the cultural, historical, and spatial memory of the community.

Conflict of Interest

No conflict of interest was declared by the authors.

Authors' Contributions

The authors contributed equally to the study.

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REFERENCES

Abacı, E. (2018). *Tarihi konutlarda işlev değişikliğinin değerlendirilmesi* [Yüksek Lisans Tezi, Maltepe Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Akerman, M. T. (2009). *Kadıköy: Dünü, Bugünü, Yarını* (1. Baskı). Siyah Beyaz Yayınları.

Alagöz, M. (2015, 28-30 Mayıs). *Sanayi Yapılarını Yeniden İşlevlendirme ve Sürdürülebilirlik* [Sözlü Sunum]. 2nd International Sustainable Buildings Symposium, Ankara, Türkiye.

Alsaç, Ü. (1992). *Türkiye'de Restorasyon*. İletişim Yayınları.

Altan, H. ve Özsoy, Ş. K. (2017). Tarihsel süreçten günümüze büyük han ve yeniden kullanıma adaptasyonda sosyokültürel sürdürülebilirlik bağlamında mekân işlevlendirilmesi. *The Turkish Online Journal of Design, Art and Communication-TOJDAC, 7*(4), 634-654, DOI NO: 10.7456/10704100/010

Altınoluk, Ü. (1998). *Binaların Yeniden Kullanımı*. YEM Yayınları.

Arabacıoğlu, P. ve Aydemir, I. (2007). Tarihi çevrelerde yeniden değerlendirme kavramı. *MEGARON Yıldız Teknik Üniversitesi Mimarlık Fakültesi E-dergisi,* 2(4), 204-212.https://megaronjournal.com/jvi.aspx?pdir=megaron&plng=eng&volume=2&issue=4

Arısoy, A. (2014). *Kentsel Yenilemeye Farklı Bir Yaklaşım: Yel Değirmeni Deneyimi*. ÇEKÜL Vakfı Yayınları.

Atılgan, A. (2007). *Yel Değirmeni* (1. Baskı). TMMOB Mimarlar Odası İstanbul Büyükkent Şubesi Anadolu 1. Büyükkent Bölge Temsilciliği.

Atılgan, A. (2017). *Evvel Zaman İçinden Yel Değirmeni* (1. Baskı). K- İletişim Yayınları.

Aydın, D. ve Yaldız, E. (2010). Yeniden kullanıma adaptasyonda bina performansının kullanıcılar üzerinden değerlendirilmesi. *Orta Doğu Teknik Üniversitesi Mimarlık Fakültesi Dergisi, 27*(1), 1-22. Doi: 10.4305/Metu.JFA.2010.1.1

Bilal, E. A. (2018). Geç Osmanlı mimarlık mirasının yeniden işlevlendirilmesi üzerine bir değerlendirme: Jean Botter köşkü [Yüksek Lisans Tezi, Maltepe Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Bilgin, O. (2014). *Kentsel Yenilemeye Farklı Bir Yaklaşım: Yel Değirmeni Deneyimi*. ÇEKÜL Vakfı Yayınları.

Çelebi, G. ve Gültekin, A. B. (2007). Sürdürülebilir Mimarlığın Kapsamı, Kavramsal

Bir Çerçeveden Bakış. *Mimaran Dergisi, (1)*2, 30-36. https://drive.google .com/file/d/1b89JYrOEK7mlwkJtHWrGENLdEnM0Usuc/view

Çoban, G. (2019). Yeniden işlevlendirilmiş yapılarda sürdürülebilirlik: Afyonkarahisar tarihi kent merkezinde üç yapı değerlendirmesi [Yüksek Lisans Tezi, Gazi Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorgu SonucYeni.jsp

Çolpan, C. ve Erkan, N. Ç. (2016). Bir semtin kimliğinin sürdürülmesinde kentsel belleğin yeri: yel değirmeni örneği. *Mimar-ist,* 57, 83-93. https://www. mimarist.org/mimar-ist-sayi-57-guz-2016/

Dedehayır, H. (2010). *Yerelden Ulusala Ulusaldan Evrensele Koruma Bilincinin Gelişim Süreci.* ÇEKÜL Vakfı Yayınları.

Dedeoğlu, E. F. (2019). Yeniden işlevlendirilen kilise yapılarında iç mekân müdahalelerine yönelik analizler: Sivrihisar Ermeni kilisesi örneği. *Sanat ve Tasarım Dergisi*, 23, 77-103. https://dergipark.org.tr/tr/pub/ sanatvetasarim/issue/46013/578627

Duman, B. (2019). *Kentsel yenileşme ve kentsel dönüşüm*. Sosyoloji Lisans Programı, İstanbul Üniversitesi Açık ve Uzaktan Eğitim Fakültesi.

Durukan, A. (2020). Yeniden işlevlendirilmiş anıtsal yapılarda deneyim odaklı tasarım: Antalya Kaleiçi ve Balbey örneği. *Mediterranean Journal of Humanities*, X (2020), 195-210. DOI: 10.13114/MJH.2020.526

Gökdağ, B. (2019). *Tarihi yapıların sürdürülebilir mimarlık ilkelerine göre yeniden işlevlendirilmesi: Boğaziçi Üniversitesi Erkek Yurdu (Hamlin Hall) örneği* [Yüksek Lisans Tezi, Hacettepe Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Güner, A. F. ve Giritli, H. (2004). İnşaat sektöründe toplam kalite yönetimi ve Türkiye'deki uygulamalar. *İstanbul Teknik Üniversitesi Dergisi/a, 3*(1), 19-30. http://itudergi.itu.edu.tr/index.php/itudergisi_a/article/view/1004

Güneş, S. ve Demirarslan, D. (2020). Sustainability and Environmental Approaches in Furniture Design. *International Journal of Humanities and Art Researches,* 6(5), 81-99.

İncedere, L. (2019). Eşitsiz gelişme ve mekânsal ayrışma üzerine karşılaştırmalı bir analiz: İzmir (Karşıyaka) örneği [Doktora Tezi, Ege Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Kara, H. ve Şimşek, S. (2016). Kent konseylerinin işlevselliği ve sürdürülebilirliği: Kadıköy kent konseyi örneği. *Ordu Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi,* 6(15), 245-269. https://dergipark.org.tr/tr/pub / odusobiad/issue/27575/290206

Kaşlı, B. (2009). *İstanbul'da yeniden işlevlendirilen korumaya değer endüstri yapıları ve iç mekân müdahaleleri: Santralistanbul örneği* [Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi]. https://polen.itu.edu.tr/items/305e0a1a-2a61-4e39-94aa-e4a934009ba9

Kılıç, E. C. (2015). *Tarihi yapılar için yeniden işlevlendirme kriterleri ve Ali Paşa hanı örneklemesi* [Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Kolbay, İ. (2010). *Rıdvan Paşa Köşkü ve yapıları: Nuriye Hanım Davet Köşkü, restorasyon önerisi* [Yüksek Lisans Tezi, Mimar Sinan Güzel Sanatlar Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Korkut, E. (2019). *Yeniden işlevlendirme kapsamında Tarihi Sultanahmet Cezaevi örneği [*Yüksek Lisans Tezi, İstanbul Aydın Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Kuban, D. (2016). *Doğan Kuban Yazıları Antolojisi (2. Cilt), Sanat, Mimarlık, Toplum Kültürü Üzerine Makaleler.* Boyut Yayıncılık.

Kuban, D. (2020). *İstanbul 1600 Yıllık Bir Müzedir.* Yem Yayın.

Küçük, H. (2018). Türkiye'de merkezi yönetim ve yerel yönetim ilişkisinde sosyal politikalar üzerine karşılaştırmalı bir değerlendirme: Kadıköy belediyesi ve Esenler belediyesi örneği. *Balkan Sosyal Bilimler Dergisi, 7*(14), 198-217. https://dergipark.org.tr/tr/pub/bsbd/issue/38666/449296

Kuşçuoğlu G. Ö. ve Taş M. (2017). Sürdürülebilir kültürel miras yönetimi. *Süleyman Demirel Üniversitesi Yalvaç Akademi Dergisi, 2* (1), 58-67. https://dergipark.org.tr/tr/pub/yalvac/issue/32621/334791

Kütükçü, T. (2018). *Geçmiş Zamanların, Mekânların ve Hatırlamaların Rafında Kadıköy'ün Kitabı.* Ötüken Neşriyat Yayınları.

Orbaşlı, A. (2008). *Architectural Conservation.* Blackwell Publishing.

Pekol, B. (2010). *İstanbul'da yeni işlevlerle kullanılan tarihi yapıların üslup sorunsalı* [Yayınlanmamış Doktora Tezi). İstanbul Teknik Üniversitesi.

Riegl, A. (2015). *Modern Anıt Kültü*. Daimon Yayınları.

Şahin, S. (2013). *Kültürel miras alanlarının dönüşümünde katılımcı modeller: yel değirmeni örneği* [Yüksek Lisans Tezi, İstanbul Bilgi Üniversitesi].

Saraç, Ö. (2017). *Yeniden işlevlendirilen tarihi yapılarda sürdürülebilirliğe etki eden çekicilik faktörleri* [Yüksek Lisans Tezi, Kastamonu Üniversitesi]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Selçuk, M. (2006). *Binaların yeniden işlevlendirilmesinde mekânsal kurgunun değerlendirilmesi* [Yüksek Lisans Tezi, Selçuk Üniversitesi].

Tan, B. ve Arabacıoğlu F. P. (2020). Tarihi çevrede mimari tasarım: İstanbul yenileme alanları. *MEGARON, 15*(2), 204-216. DOI: 10.14744/MEGARON.2020.05935

Tarkay, G. (2010). E*valuation of urban regeneration ıssues for an early 20th century quarter: Kadıköy-yel değirmeni* [Master Thesis, Middle East Technical University]. https://open.metu.edu.tr/handle/11511/19701

Temiz, G. (2009). Konutta değişim: mekânsal ve estetik kalitenin İzmir örneği üzerinde incelenmesi [Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi].

Tosun, E.K. (2009). Sürdürülebilirlik Olgusu ve Kentsel Yapıya Etkileri. Paradoks, Ekonomi, Sosyoloji ve Politika Dergisi, 5(2), 1-14.

Türkmen, B. (2019). *Türkiye'de sürdürülebilir bina sertifikalı ve yerel mevzuata göre inşa edilmiş sanayi yapılarında kabuk elemanlarının çevresel etki değerlendirmesi* [Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi].

Urak, G. (2002). Kullanımda değerlendirme: Ankara Kaleiçi restorasyon/işlevsel dönüşüm uygulamaları ve Ankara halkı. *Hacettepe Üniversitesi, Edebiyat Fakültesi Dergisi, 19*(1), 45-62.

Ürük, Z.F. (2020). Mekânların sürdürülebilirlik anlamında yeniden işlevlendirilmesi. *International Journal of Social and Humanities Sciences (IJSHS), 4*(2), 165-186.

https://dergipark.org.tr/tr/pub/ijshs/issue/57028/809519

Yenel, A. (2015). Ankara Kalesi'ndeki Hatipoğlu Konağı için yeniden işlevlendirme önerisi. *Ankara Araştırmaları Dergisi, 3*(1), 54-77. https://ankaradergisi.org/jvi.aspx?pdir=jas&plng=tur&un=JAS-84803&look4=

Yıldırım, İ. (2016). *İstanbul kapalı sarnıçlarının işlevsel dönüşümünün mekânsal bağlamda irdelenmesi* [Yüksek Lisans Tezi, Beykent Üniversitesi].

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