ICNTAD CONFERENCE

INTERNATIONAL CONFERENCE ON NEW TRENDS IN ARCHITECTURE AND INTERIOR DESIGN

9th International Conference on New Trends in Architecture and Interior Design

PROCEEDINGS BOOK

ICNTAD CONFERENCE

INTERNATIONAL CONFERENCE ON NEW TRENDS IN ARCHITECTURE AND INTERIOR DESIGN

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Dear Colleagues,

I am honored to invite and send you this call for papers on behalf of the Congress Organization Board of "9th International Conference on New Trends in Architecture and Interior Design (9th ICNTAD'23)", to be held in Skopje, North Macedonia dates between May 19-21, 2023

The Conference will focus on a broad range of topics related to new trends in architecture and design. The Conference organizers invite papers and presentation proposals relevant to conference themes. Considering the theme of the conference, papers with any of the following or related subjects would be appropriate for presentation:

- Criticism of sustainability/unsustainability
- The architecture of philosophy/architecture without philosophy
- Professional settlement of interior architecture
- Human contact to space with furniture
- Intangible skin of space: lighting design
- Tangible skin of space: material
- Ideology in architecture or architecture of ideology
- Spaces without space: 3D design
- The artistic value of space
- Architecture without architect
- Cultural codes / architecture
- Post-COVID Architecture & Interior Design
- Post-COVID Design Education Models
- Spatial Reflections of Pandemics/Epidemics in History

The 9th International Conference on New Trends in Architecture and Interior Design Conference (9th ICNTAD'23), aims to bring together experts from several institutions such as universities, administrative organizations, architects, engineers and designers, at the framework of conference topics of building, architecture, interior design, product, material, etc. High-level academicians, professionals and design students from around the world will explore the intersection of design, architecture and best practices with leaders from the design professionals. The participation of early-career scholars and postgraduate researchers is also positively encouraged.

We kindly wait for your attendance at our congress to be held on May 19-21, 2023, with a hope to realize a satisfactory congress with its scientific ones and leaving a trace on your memories.

Regards

Prof. Dr. Burçin Cem ARABACIOĞLU
Mimar Sinan Fine Arts University – Turkey
Conference Chair

19 MAY 2023 FRIDAY

10:00 – 10:10
Welcome Speech : **Prof. Dr. Burçin Cem ARABACIOĞLU (Conference Chair)**
Mimar Sinan Fine Arts University

10:10 – 11:00
Keynote Speech : **Prof. Doctor José Manuel Pagés MADRIGAL**
EXPECTED ARCHITECTS' ROLES IN CONFLICT TERRITORIES: EXPERIENCES IN KOSOVO, LEBANON AND CYPRUS

SESSION A

TIME	PAPER TITLE	PRESENTER/CO AUTHOR
11:00 – 11:20	OPTIMIZING SPATIAL LAYOUTS: BALANCING LOCAL COMPLEXITY AND GLOBAL COHERENCE	Christoph OPPERER
11:20 – 11:40	MARGHAM - A SUSTAINABLE DESERT COMMUNITY	Cristiano LUCHETTI - Gianluigi MONDAINI - Francesco CHIACCHIERA
11:40 – 12:00	RETHINKING LEFTOVER SPACE WITH THE NEW DIGITALIZED PARTICIPATORY DESIGN METHOD	Lütfiye YILMAZ – F. Pınar ARABACIOĞLU
12:00 – 12:20	TWO INTERNATIONAL WORKSHOPS ONLINE	Cem TOPÇU - E. Ümran TOPÇU
12:20 – 12:40	THE RELATIONSHIP OF GENDER-SPACE-FURNITURE IN THE OTTOMAN PALACE	Mergül SARAF YILDIZOĞLU - Sevinç ALKAN KORKMAZ
12:40 – 13:00	DIGITAL CONSERVATION IN TAI O VILLAGE: POINT CLOUD SPACE AND ARCHITECTURE CONSERVATION LEGIBILITY	Daniel Keith ELKIN - Chi-Yuen LUENG - Norah Wang XIAOLU

13:00 – 14:00	**LUNCH BREAK** LUNCH IS NOT INCLUDED INTO REGISTRATION FEE

SESSION B

TIME	PAPER TITLE	PRESENTER / CO AUTHOR
14:00 – 14:20	RETHİNKİNG STATİC TYPOLOGİES: NEGOTİATİNG TERRİTORİES AS NEW DESİGN APPROACH FOR DYNAMİC EXPERİENCES IN HYPERDENSE CONTEXT	Veronica Ching LEE
14:20 – 14:40	A STUDY ON THE PHYSICAL IDENTITY ASSESSMENT OF THE CONTEMPORARY LANDMARKS IN GLOBAL CITIES: THREE FRAGMENTS FROM ISTANBUL	Gözde KIZILKAN - Feride Pınar ARABACIOĞLU
14:40 – 15:00	THE USE OF CONTEXT AS KNOWLEDGE IN ARCHITECTURE: A HOLISTIC APPROACH	Rüya KURU YÜCEL - Feride Pınar ARABACIOĞLU
15:00 – 15:20	RE-UNDERSTANDING THE MULTI LAYERED PROCESS OF BUILDING DESIGN DEVELOPMENT THROUGH THE CONCEPT OF SUSTAINABILITY	Özge Selen DURAN - Celal Abdi GÜZER
15:20 – 15:40	ANALYZING ARCHITECTURE & UTOPIA, SPACE & BOND CONCEPTS THROUGH MIYAZAKI MOVIE; SPIRITED AWAY	Ceren ÇELİK
15:40 – 16:00	CREATIVE CULTURAL TRANSFORMATION OF INDUSTRIAL PORT AREAS: EXAMPLE OF OBERHAFEN, HAMBURG	Gamze ERGİN

16:40 – 16:20	**B R E AK**

18:30 – 22:00	**GALA DINNER** **Participants who registered as FULL PACKAGE has free Access to Dinner**

20 MAY 2023 SATURDAY

SESSION C

TIME	PAPER TITLE	PRESENTER / CO AUTHOR
11:00 – 11:20	PANDEMIC REFLECTIONS ON INTERIOR DESIGN EDUCATION	Liudmila CAZACOVA
11:20 – 11:40	RETHINKING OPEN AND GREEN SPACES IN ARCHITECTURE AND URBAN REALM AFTER COVID-19 PANDEMIC: THE CASE OF ISTANBUL	Tuğçe ÖZTÜRK - Mustafa DALLI
11:40 – 12:00	THE VALUE OF SPACE SEEN THROUGH ART - FROM INNER MEANING TO OUTER MANIFESTATION	Patricia OPINCARIU - Ioan-Horaţiu COMAN
12:00 – 12:20	LESSONS OF ARCHITECTURE WITHOUT ARCHITECTS IN PÉCS, HUNGARY	Tibor Zoltán DÁNYI
12:20 – 12:40	ARTISTIC VALUE OF INTERIOR FORMS: SANLIURFA HARRAN HOUSES	Fatma TUNÇAY - Mehmet Ali TÜFEKÇİ - Olcay ÇETİNER ÖZDEMİR
12:40 – 13:00	SPACES WITHOUT SPACE: 3D MODELING AS AN INSTANCE OF VISUALIZING THE CREATIVE VIRTUAL SPACE IN THE DESIGN PROCESS	Ioan-Horaţiu COMAN - Patricia OPINCARIU

13:00 – 14:00	**LUNCH BREAK** LUNCH IS NOT INCLUDED INTO REGISTRATION FEE

9th International Conference on New Trends in Architecture and Interior Design

OPTIMIZING SPATIAL LAYOUTS: BALANCING LOCAL COMPLEXITY AND GLOBAL COHERENCE

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Abstract
This paper explores how to balance global legibility with local complexity in spatial design. When a space is complex, confusing, and difficult to understand, it can be challenging or even impossible to navigate with a specific goal in mind. If the space lacks a certain level of complexity, it may feel less private and personal, which is not conducive to certain activities or behaviors. This suggests that optimizing a spatial configuration to provide a certain level of complexity and variety locally, while maintaining a coherent and intuitive layout globally, is important in creating environments that are both attractive and functional. To achieve this, the focus of this research is on the use of visibility-based analysis and geometric optimization to create a balance between global intelligibility and local complexity. Several visibility-based measures are used as the basis for the optimization process, which is applied to a variety of procedurally generated layouts. In addition, a large number of space syntax measures are compared and correlated to explore the relationship between different measures in the context of geometry generation and optimization.

Key Words: space syntax; visibility; intelligibility; complexity; optimization

1. Introduction

The relationship between visuospatial properties, psychological responses, and behavior is a crucial consideration in architectural design. Over the years, several theories have been proposed to explain this relationship, such as Kaplan's information-processing theory [1], Berlyne's theory of arousal [2], Gibson's theory of ecological perception [3], and the prospect-refuge theory by Appleton [4] and later Hildebrandt [5]. While the perception of spatial and atmospheric qualities of architectural environments is subjective and dependent on individual experiences and preferences, certain aspects of space can be (objectively) measured and analyzed. Visibility-based methods such as isovist analysis [6] and visibility graph analysis [7] are a way to explore and understand these relationships [8–11]. Combined with procedural geometry generation and robust optimization methods, space syntax methods provide a great opportunity in architectural design to create rich experiential spatial environments.

In order to create an appealing and functional space, it is important to consider both the global and local factors that contribute to its quality. While the global structure should be coherent, easy to understand and therefore easy to navigate, locally the space should provide a certain level of complexity and variety that allows for a wide range of uses and interactions. Rooted in the theory of prospect and refuge, this concept suggests that individuals are attracted to environments that offer a balance between these two elements, as they play a critical role in how the environment is perceived and experienced.

The paper is divided into five main sections. The first section provides a brief overview of the methods and software tools used in this research. The second section describes the various measures used to calculate and represent spatial legibility and complexity. The third section outlines the general setup of the optimization framework, which is a crucial aspect of this study. The fourth section focuses on conducted case studies and concludes with the findings and results as the fifth section of this paper.

2. Overview, Methods, Tools

To optimize a spatial configuration, four challenging requirements have to be addressed: (1) Procedural geometry generation and modification, (2) isovist analysis (geometry-based) and visibility graph analysis (topology-based), (3) geometry optimization, and (4) data analysis and visualization. In addition to these fundamental requirements, several secondary considerations must be taken into account, such as fast ray-casting for visibility analysis, a flexible and open software framework for implementing the optimization algorithm, and several others.

The most critical component in this process is the isovist and visibility graph analysis, which needs to be performed many times during the optimization run to compute the fitness value of each candidate solution. Consequently, the visibility-based analysis has to be both fast and flexible enough to be integrated into the overall optimization framework. To meet these requirements, we used our custom visibility analysis application "VISSOP" which has been implemented in SideFX Houdini [12]. Most of the implemented algorithms are fully multi-threaded and have been written either in VEX, Houdini's internal high-performance scripting language running on the CPU, or in OpenCL to take full advantage of today's GPU processing power. To ensure flexibility and customization, only a few algorithms have been written in C++ based on the Houdini Development Kit (HDK) due to performance reasons.

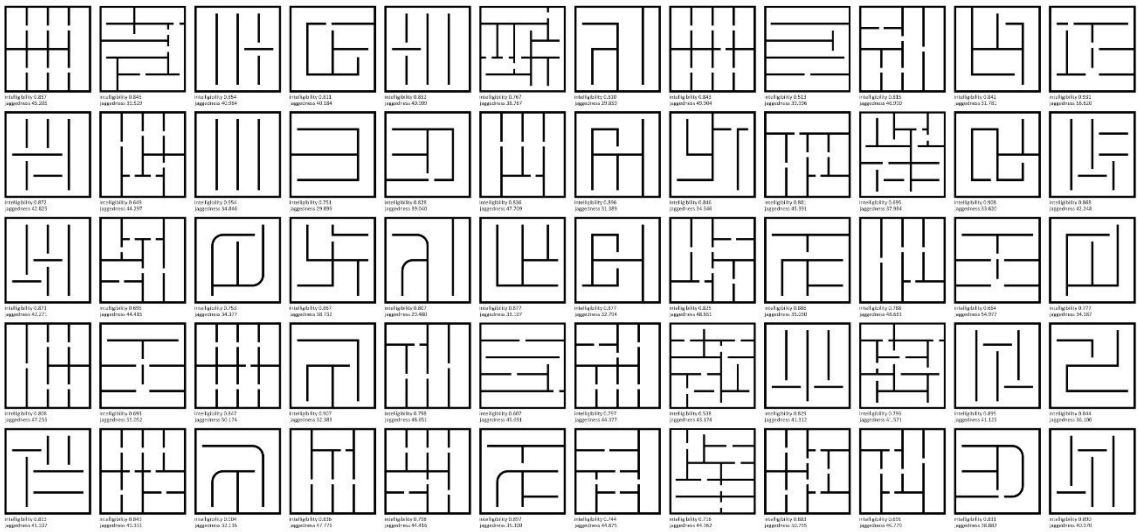
A simple genetic optimization algorithm (GA) has been implemented using Python within Houdini's Procedural Dependency Graph (PDG) context, as the basis of the optimization pipeline. However, to access a wide range of advanced algorithms, we also used the Python optimization library pygmo2 [13]. By leveraging Houdini's highly optimized data generation and manipulation capabilities, this setup allowed us to perform all the necessary steps within a single software environment.

In space syntax research, visibility analysis is typically performed using two main approaches: Axial line analysis and isovist or visibility graph analysis (VGA). Axial line analysis examines the connectivity of linear spaces based on the minimal number and maximal length of sightlines, whereas isovist and VGA analysis assess the visual field observable from a particular point within a space. Since this study focuses solely on interior architectural spaces, we are not using axial maps and instead rely entirely on isovist and VGA-based methods. However, we acknowledge that VGA-based integration, and thus the measure of intelligibility, may exhibit inconsistencies under certain conditions [14].

3. Space Syntax-Related Measures

Since this research aims to optimize spatial layouts for a maximum of legibility and complexity, several requirements in terms of geometry and space syntax theory had to be considered. A legible, coherent, and structured layout is typically characterized by the following properties: (1) Clear and direct paths, where spaces are connected via easily discernible and straight paths, minimizing the need for complex decision-making during navigation. (2) High visibility, with unobstructed lines of sight between different points in a spatial layout and visible connections between spaces, assisting people in understanding their surroundings and forming a cognitive map of the environment. (3) Hierarchical organization that organizes spaces coherently with a clear distinction between primary and secondary spaces, aiding wayfinding and comprehension.

The most important measure in space syntax for the order and structure of a configuration is intelligibility.



Intelligibility refers to the global, overall configuration, is a topological second-order measure and relates to human behavior, wayfinding and navigation, cognitive processes, and the "imageability" and "memorability" [15, 16] of a configuration. As a topological measure, it is typically computed on a graph.

Spatial complexity in space syntax theory is mainly related to the convexity of an isovist and refers to the intricacy and variation of a visual field at a smaller, more focused spatial scale. It refers to local or quasi-local visuospatial properties of space, is typically (but not necessarily) a geometric measure and relates to human behavior and psychological response. It is particularly relevant when examining the immediate surroundings of a specific point within a built environment.

The relationship between intelligibility and complexity is typically inversely proportional, with greater complexity in a space resulting in lower intelligibility and vice versa.

3.1. Intelligibility

Intelligibility was first discussed by Hillier et al. [17], who quantified it as the degree of correlation between connectivity and the global integration values of the axial lines in space syntax analysis. He claimed that a strong correlation between connectivity and global integration ensures that the spatial configuration is comprehensible and can predict pedestrian movement.

Intelligibility is a measure of how well a space is connected to other immediate spaces from the point of view of the situated observer. It refers to a person's ability to make judgments about a space's relationship to the entire system and is therefore strongly related to the part-to-whole relationship of a spatial configuration. In simple terms, it reflects how easily a user can comprehend and navigate the spatial structure of an environment. According to various studies [16–19], intelligibility is a property that links to space cognition, spatial use pattern, wayfinding and ensures higher levels of social interaction and the predictability of a system.

In space syntax theory, intelligibility is typically computed on axial line maps describing the correlation between local connectivity measures and global integration measures, expressed as a value between 0 and 1. However, intelligibility can also be computed on the visibility graph, although it has been shown to be inconsistent compared to the computation on the axial line map [14], most notably because of its relation to the number and density of sample points [20]. For example, Zhang demonstrated that the intelligibility value of mazes can vary significantly based on their configuration [14]. However, a simple labyrinth may have a higher intelligibility value than a complex maze, which seems counterintuitive [14]. In general, however, it can be assumed that in highly intelligible environments, spaces with high local connectivity also exhibit high global integration [21], resulting in more predictable and easily understood spatial configurations.

3.2. Complexity

In space syntax theory, several measures are used to determine the complexity of a space. One such measure is jaggedness [22], which refers to the irregularity of an isovist polygon and is computed by dividing the square of the isovist perimeter by its area. In a study conducted by Krukar et al. [23], participants rated a space as more spacious if the vantage point had a lower jaggedness, while a high jaggedness indicates a visually complex space that has reduced visual accessibility and therefore feels more private.

Jaggedness is inversely related to circularity [8, 24] and compactness [8, 24, 25] and is linked to the perception of enclosure [8]. Circularity and compactness measure the degree to which a space deviates from a circular form and quantifies the roundness or compactness of a spatial configuration. A perfectly circular space would have a high circularity value, while irregular or elongated spaces would have lower circularity values. Jaggedness, circularity, and compactness are interrelated, but distinct measures, strongly linked to isovist analysis and the concept of convexity.

Another important measure related to convexity is the clustering coefficient [7], which is a relational second-order measure and describes the intervisibility between all points visible from a particular vantage point. Unlike the previous measures, it is not geometrical but topological and computed on the visibility graph. Conceptually, clustering coefficient is not a local, but a quasi-local measure and represents the mean overlapping area between an isovist and all the isovists visible from it [7]. According to Charalambous it is also a strong measure for perceived myth of a space [26]. Another quasi-local measure linked to spatial complexity is revelation [19] which basically describes how much new visual information is revealed when moving from one location to another. Directly related to the measure of revelation is occlusivity [6]. Occlusivity is small in a space that offers no view into other parts of the configuration. According to Franz and Wiener, occlusivity correlates with the perception of beauty, complexity, and spaciousness of a configuration [22]. Spatial complexity is an important property that affects how individuals perceive, experience, and navigate through spaces. Nevertheless, there is no universal guideline for determining the appropriate level of visual complexity, as it is contingent upon the intended function of the space and the requirements of its users.

Note: In the following pages, the term “complexity” describes a spatial property and is used interchangeably as a collective representation of different isovist- and visibility graph measures. “Intelligibility” however, refers specifically to the measure of intelligibility as defined in space syntax theory.

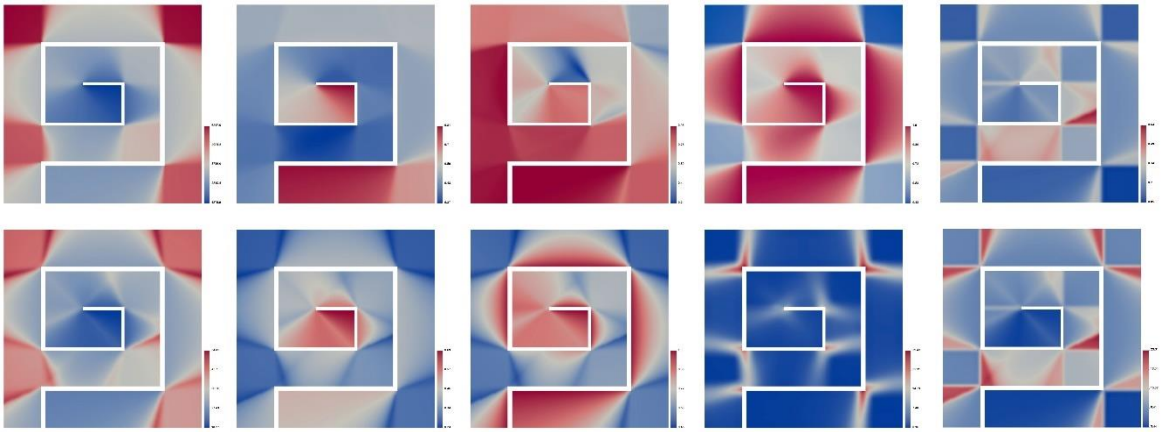


Fig. 2: Several space syntax measures. (Top row from left to right) Connectivity, visual integration, quasi-local intelligibility, clustering coefficient, openness. (Bottom row from left to right) Jaggedness, compactness, convexity, revelation, occlusivity.

4. Optimization Framework

The optimization process involves two primary steps: (1) The generation of an initial set of layout configurations with basic features, which serve as the starting point for the optimization. Procedural geometry generation is guided by several input variables defined by the user, and it is crucial to ensure that the generated layouts are diverse and representative of the possible solution space. (2) These layouts are then optimized based on a fitness function that describes the optimization objective(s). In this research, the desired objectives are to maximize specific isovist and visibility graph measures, or more precisely, global intelligibility and local complexity. This involves iteratively evaluating and refining the layout configurations to enhance their performance based on the specified constraints and objectives, ultimately leading to an optimal or near-optimal spatial layout.

4.1. Variables

The number of design variables required for a specific problem can vary, depending on various aspects of the spatial layout, such as wall rotation and translation or the number and position of doors or connections between adjacent rooms. It is important to note that the computation time is strongly influenced by the number of variables involved. A larger number leads to a higher-dimensional search space, increasing the computational effort needed to evaluate and optimize numerous design alternatives. As a result, the optimization process may take longer to converge to the "optimal" solution. Therefore, it is crucial to strike a balance between the complexity of the problem and the desired level of detail, when defining design variables for the optimization. Simplifying the problem by reducing variables can accelerate the optimization process but may limit the scope and richness of the resulting spatial layouts. On the other hand, including a larger set of variables can yield more diverse and detailed solutions but at the cost of increased computation time.

4.2. Objectives

The goal of the optimization process is to achieve the highest level of intelligibility on a global scale while maximizing complexity on a local scale. Since intelligibility and complexity are inversely related, these are two distinct and conflicting objectives which present a challenge to the optimization. Intelligibility refers to the overall layout and can be easily described as a single value between 0 and 1, making it an ideal optimization objective. Conversely, complexity is computed locally for each sample point in the environment, resulting in an array of values that cannot, or at least should not, be used directly as an optimization objective for performance reasons. While it is technically possible to consider all complexity values, doing so would result in 6000 distinct objectives (corresponding to the 6000 sample points in our case), which would be difficult to handle efficiently in the optimization.

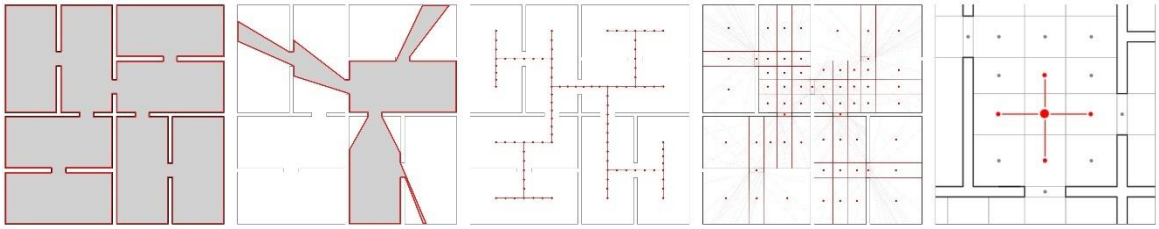
There are two main options for addressing this issue: (1) The most obvious way is to aggregate all local complexity values by summing and averaging them to get an overall global measure for the entire layout. However, this approach undermines the fundamental idea of optimizing local complexity, which is a crucial part in the context of this research. (2) An alternative and more viable option is to select specific points that represent important features of the layout, compute the amount of complexity at these locations and use the computed values as objectives in the optimization process. This approach still yields an array of values, but it is comparatively small and, more importantly, provides a better representation of local complexity. However, this method raises two important questions: (A) Which points in the spatial layout are considered significant feature points, and (B) how many points are required to obtain a well-defined objective fitness function leading to a well-qualified result?

4.3. Fitness Evaluation

In order to determine the most appropriate method for calculating visual complexity, a series of tests and evaluations were conducted using pre-generated layouts, taking into account factors such as generality, reliability, and comparability. Two methods proved to be effective: (1) Calculating complexity based on points located at the center of s-partition spaces [27], and (2) calculating complexity at points along the medial axis of the layout.

The first method involves partitioning the layout into convex, non-overlapping s- and e-partition sub-spaces as proposed by Peponis et al. [27]. These sub-spaces are so-called "visually stable" regions where new visual information is only revealed when their boundaries are crossed. Points at the center of s- and e-partitions mark important locations for the perception of complexity in a spatial configuration as they are related to the concept of occlusivity [6] and the measure of revelation [19, 22]. Rather than using the complexity values at these points directly, they were compared with adjacent (boundary-crossing) values to derive a new relational value. To minimize the number of sample points in the optimization, the s-partitioning was used, which worked reasonably well in our case studies, although it is a simplification compared to the e-partitioning.

Fig. 3: (From left to right) Overall layout for intelligibility computation; isovist for local complexity computation; sample points along the medial axis; sample points at the center of s-partitions; relational complexity measure crossing s-partition boundaries.



The second method involves calculating complexity based on the medial axis, which effectively represents a spatial layout in the form of a skeleton. The medial axis is related to wayfinding and navigation, making it a suitable solution for locations related to the perceptual complexity of a spatial configuration. The computation of the medial axis was implemented based on the medial axis transform algorithm as described by Peters [28], which demonstrates robustness and speed, essential features within the optimization process.

Both, the s-partition, and the medial axis provide an efficient method for the geometric abstraction of a spatial configuration, describing significant regions and locations within the layout. Determining which method is considered "better" depends largely on the specific task and application at hand. While s-partitions are better suited for describing and optimizing static locations within the layout, points along the medial axis are better suited for computing complexity, related to movement and circulation within the spatial configuration.

4.4. Optimization

Procedural geometry generation, as well as isovist and visibility graph analysis were done using VISSOP within SideFX Houdini, so it made sense to keep the optimization process within the same software framework. Initially, we implemented a basic Genetic Algorithm (GA) within Houdini's Procedural Dependency Graph (PDG) context. This was simple to set up and eliminated reliance on external tools. However, this setup had a significant limitation - GA is a single-objective optimization algorithm, allowing only one objective function to be defined. As our goal was to optimize intelligibility and complexity, we had at least two objectives.

One possible solution to this problem was combining different objectives into a single value using a weighted sum approach. However, since it was crucial to determine complexity as a localized measure based on several sample points, we decided to investigate multi-objective optimization approaches. This led us to the Non-dominated Sorting Genetic Algorithm-II (NSGA-II), a widely used solver for real-world problems. Given the complexity of implementing NSGA-II compared to a simple GA, we chose to leverage the Python optimization library pygmo2 within Houdini as our optimization framework. Utilizing such a highly optimized and specialized library allowed us to compare different optimization algorithms to identify the most effective approach for various configurations.

5. Case Studies

The optimization framework described previously was evaluated through a series of test scenarios. However, it is important to note that these studies were based on hypothetical setups and certain factors have been simplified for demonstration purposes.

The geometry generation during the optimization process is based on a 5 x 5-meter grid, which is used to form various configurations (grid structures with subdivisions ranging from 4x4 to 7x7) resulting in horizontal and

vertical edges. These edges can be either “on” or “off” and are represented as an array of zeros and ones. Short edges are extended to avoid single, unconnected “walls” and to create a more realistic layout consisting of closed rooms. Openings between rooms are created to ensure accessibility while avoiding redundant double connections. Except for toggling individual edges “on” or “off”, these processes are decoupled from the optimization stage and handled within the geometry generation step. This approach results in between 16 and 49 design variables for the optimization process. For each layout (a candidate solution) generated during the optimization run, an isovist and visibility graph analysis is performed using 6000 sample points. On the scale of the entire layout, this corresponds to an average distance of about 0.16 meters between points, providing an appropriate resolution for the analysis to capture even small geometric details and variations in the spatial configuration of the layout. Intelligibility is calculated based on the Pearson correlation between the global integration and local connectivity values of all 6000 sample points, as described in the space syntax literature. Complexity is determined at the centers of s-partitions and/or along the medial axis (as described above) and is represented by the jaggedness measure [22].

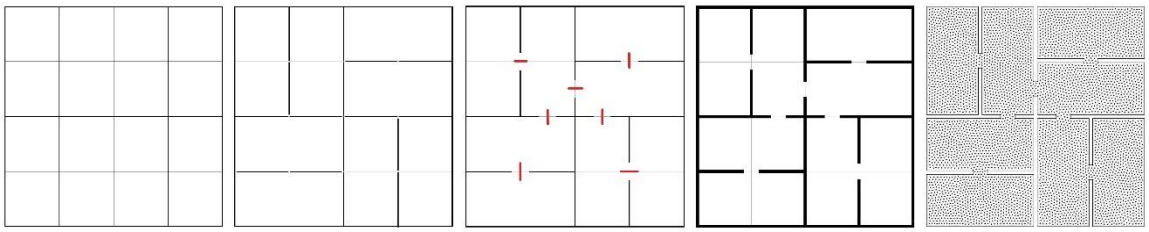


Fig. 4: (From left to right) 4x4 subdivided grid; edges switched on and off; connections (doors) between adjacent rooms; walls of the layout; sample points for isovist and visibility graph analysis.

The efficiency of optimization is directly related to the number of input variables and objectives. Therefore, we were interested in exploring different combinations, especially in conjunction with different optimization algorithms. Using the previously described setup (with 4x4 edges and thus 16 design variables, 81 objectives - 80 points along the medial axis for complexity and 1 value for global intelligibility), several tests were conducted. Using the multi-objective NSGA-II algorithm to maximize all objectives yielded promising results: Intelligibility = 0.918, jaggedness = 0.892. However, because NSGA-II had to manage many objectives, the algorithm required a large number of generations to reach an "optimal" solution. In our tests, we ran the algorithm for 100 generations with a population size of 49 candidate layouts, requiring 4900 isovist and visibility graph analyses using VISSOP. The average computation time per layout was about 6.5 seconds, which is relatively fast for 6000 sample points. Nonetheless, this value has to be multiplied by 4900, resulting in a total time of 31850 seconds, or close to 9 hours of total computation time.

Because NSGA-II is a multi-objective optimization algorithm, identifying the single “best” solution is not straightforward, as multiple “optimal” solutions are distributed along the Pareto frontier. While this approach is advantageous for more complex optimization problems, it seemed excessive for our relatively simple test case. Therefore, we used single-objective optimization algorithms in all subsequent studies, as they are significantly faster in finding an “optimal” solution.

In order to use a single-objective algorithm, the various objectives were combined into a single fitness value using a weighted sum approach. This was done through a two-step process.: (1) A single complexity value was determined by first applying the weighted sum approach to the jaggedness value at individual points, which were then weighted by the normalized connectivity value of the same point. This ensured that sample points offering more visible space were given greater weight, emphasizing the maximization of complexity at those specific locations. (2) This combined complexity value was again combined and equally weighted with the measure of global intelligibility, producing a single fitness value as objective.

6. Data Analysis and Results

In most test scenarios using a single-objective algorithm, we allowed the optimization to run for up to 100 generations with a population size of 24, resulting in 2400 potential solutions. To ensure that the optimization did not run longer than necessary, a termination criterion was introduced to stop the optimization when the improvement in fitness value fell below a certain threshold or remained unchanged for a certain number of evaluations. Since we used relatively simple test cases, the optimization algorithm typically terminated before reaching the maximum number of generations. Using a combined weighted single-objective fitness function proved to be effective in terms of performance and convergence.

To run our tests, we relied on pygmo2 through Python and used the Simple Genetic Algorithm (GA), Particle Swarm Optimization (PSO), and Artificial Bee Colony (ABC) optimization algorithm. Depending on the layout configuration and geometry generation setup, these algorithms performed at similar speeds, with PSO converging slightly faster than the others.

The location of the sample points used for local complexity calculation had a significant impact on the results. For instance, using the average jaggedness value of all 6000 points in the fitness evaluation produced a significantly different solution than calculating the value of points based on the medial axis or the s-partition. However, since using the average over all points as a measure of local complexity does not make much sense (as described earlier), the difference in results using the other two methods is interesting and important. Points along the medial axis produce a solution that is related to the movement paths of people, and thus to circulation within the layout. In contrast, points based on s-partitions are likely to produce a solution associated with static locations where people would stand or sit. The choice between these two methods depends largely on these considerations, as they serve different purposes in evaluating spatial layouts and optimizing objectives.

In our research, we were concerned not only with the optimization results but also with the correlation between different measures used in the optimization process. The primary focus was on the measures of intelligibility and jaggedness for which a normalized version in the range of 0-1 was used instead of following the definition provided by Franz and Wiener [22]. In addition to these two main measures, several other space syntax measures were computed during the isovist and visibility graph analysis. Since each layout was saved during the process, it was easy to compare and visualize these different variants to further investigate the optimization process.

To explore the relationships between different spatial properties and their respective measures, the "best" layouts from each generation were selected and compared. The focus was on two aspects: (1) The correlation between different measures representing intelligibility and complexity, and (2) the consistency of different measures with respect to the optimization result. Since intelligibility and complexity have an inverse relationship, the "optimal" solution is always a compromise between the two measures. In other words, the final optimization result is not simply the one with the highest values but rather the optimal balance between the two.

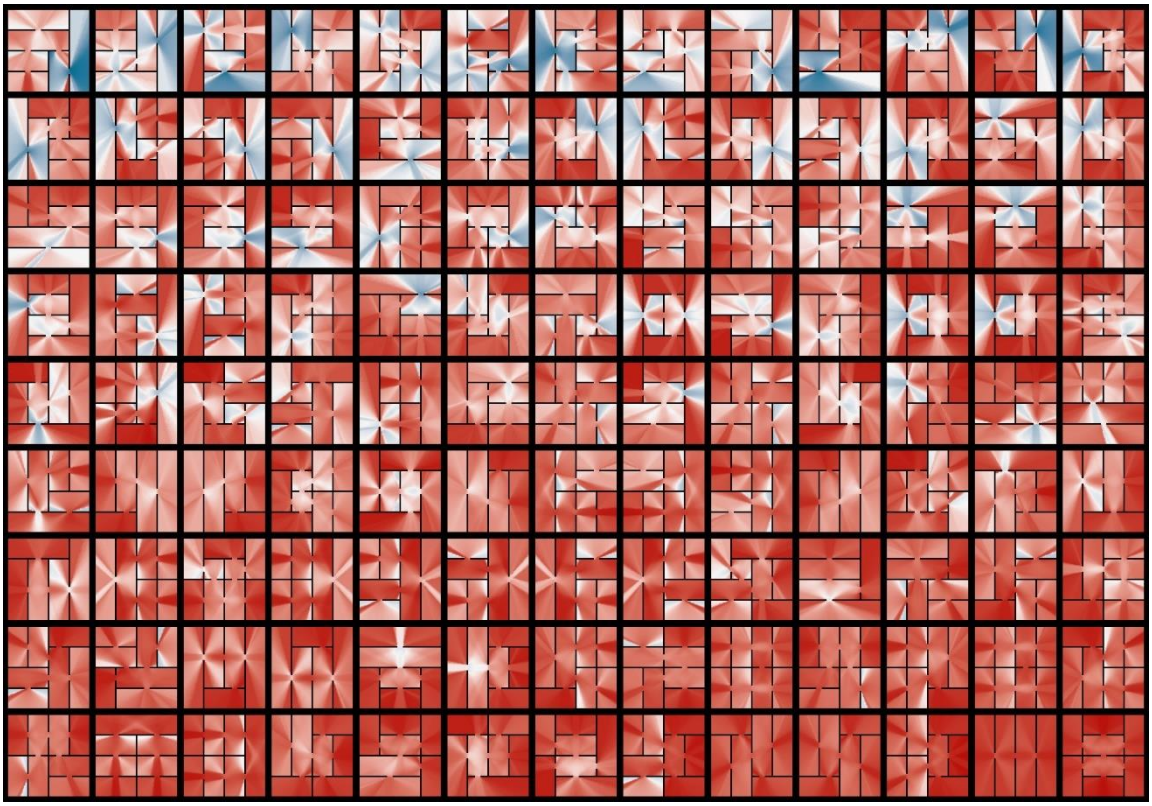


Fig. 4: "Best" layouts from each generation, showing the evolution of optimization for maximized intelligibility and complexity.

A correlation analysis was conducted between the combined weighted fitness value (based on intelligibility and jaggedness) and several other measures calculated for each layout. Despite equally weighting intelligibility and complexity in the fitness function, intelligibility surprisingly had a stronger impact on the optimization in most of the studies, resulting in a larger correlation. Further research is necessary to explore this phenomenon.

High correlations were observed between the fitness value and several measures, including intelligibility, jaggedness, boundary angle deviation, circularity, openness, controllability, and vertex density. Conversely, convexity, compactness, roundness, and clustering coefficient showed an inverse correlation, as expected, since these measures relate to the convexity of the space and thus are inversely related to jaggedness.

In many studies, the optimized layout showed a high degree of symmetry, which seems logical since it is an important property for the order and structure of a configuration [22]. However, it is crucial to distinguish between the overall geometric symmetry of the configuration and the perceived spatial symmetry from within the configuration. Interestingly, the overall symmetry does not necessarily correspond to the spatial symmetry. Often there was a negative correlation between the two in the range of $r = -0.087$ and $r = -0.585$. Only a few layouts centered around a core showed a positive correlation. It is important to note that in all studies the correlation between intelligibility and mean connectivity was rather low, confirming the effectiveness of the optimized solution. Typically, layouts with high mean connectivity tend to result in high global intelligibility [14, 21]. However, because they were also optimized for high complexity, these solutions resulted in lower mean connectivity. In fact, some layouts even showed a negative correlation between connectivity and intelligibility, highly dependent on the general layout type. Assessing a logical connection between the correlation of certain measures in relation to geometry requires further research and will be investigated in a future paper.

7. Conclusion

By combining procedural geometry generation, isovist and visibility graph analysis, along with single- and multi-objective optimization algorithms, the aim of this research is to achieve a balance between global intelligibility and local complexity in spatial configurations. Several measures from space syntax theory were discussed, including their definitions and their relation to human behavior, navigation, and perception of space. Two viable methods for computing and optimizing local complexity based on s-partition spaces and the medial axis were presented. These methods allowed for a focus on local complexity while ensuring that the optimization process remained computationally efficient. The choice of sample points significantly impacted the optimization results, highlighting the importance of selecting appropriate methods depending on the intended spatial layout evaluation and design goals.

Despite the promising results of this research, there are some limitations to the proposed method that should be acknowledged. The case studies were based on hypothetical setups with certain factors simplified for demonstration purposes, which do not fully capture the complexity of real-world architectural planning situations. The efficiency and effectiveness of the optimization setup is also sensitive to the initial conditions, population size, and other algorithm-specific parameters, and the choice of these parameters has a significant impact on the results. Additionally, while we have primarily studied intelligibility and jaggedness as the main measures, there are several other relevant spatial measures that could further improve the optimization process. For example, exploring the use of agent-based modeling methods could lead to a more comprehensive understanding of spatial layouts and their optimization. This could be particularly relevant in conjunction with the use of partial isovists [18], which better reflect human vision and perception.

Applying the proposed method to real-world architectural planning projects could provide a more accurate assessment of its effectiveness and practicality. Research on adaptive algorithms and automatic parameter tuning techniques could help improve the performance of the optimization by adjusting parameters based on the characteristics of the problem. Finally, since VISSOP is capable of analyzing three-dimensional environments, the proposed optimization approach could be extended to the third dimension, which would be an interesting topic for further research.

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RETHINKING LEFTOVER SPACES WITH THE NEW DIGITALIZED PARTICIPATORY DESIGN METHOD

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Abstract
Leftover spaces are urban areas that have not been designed or have lost their current function and fallen into disuse. The primary condition for reevaluating these areas is to define their use cycle, both physically and socially. The actors who best define these urban leftover areas are the users, rather than the designers or managers. In this context, user participation, as a form of democratic action, is now important in terms of determining the value of these spaces and creating a roadmap for regeneration. However, in today's fast-changing metropolitan cities, traditional user participation methods remain limited and inefficient in terms of the space-time relationship. This study questions user participation in defining and reevaluating urban leftover spaces using digital methods, in a comparative manner with traditional methods. The main purpose is to propose a new potential contribution to the weaknesses of the traditional method by rethinking these processes through a digital mapping-based model. The method of the study consists of three stages. In the first step, the traditional processes of the user participatory design approach were examined through literature analysis, and an organizational schema was determined. In the second step, the analysis methods of the literature studies using the ARCGIS program, which is a digital geographic mapping system, were explored. The possible conflicts of this digital method with the traditional schema determined in the user-participatory design organization were examined. In the last step, the benefits and drawbacks of traditional and digital methods were revealed through a comparative SWOT analysis. The important conclusions of the study evaluate the role of urban users and the contribution of the role-playing method in the reevaluation of leftover spaces. In summary, this new digitalized model provides faster feedback on instant urban changes, contributes to social sustainability by creating an equal and transparent participatory behavior policy, increases the potential for these areas to be noticed and visible, and contributes to urban memory by creating a multi-layered archive for the changing space-time-subject relationship. On the other hand, there are potential threats to this new digital method, including the loss of an eye-level scale when looking at the area, rapid consumption, and the destruction of the sense of belonging to the area by involving non-local users in the design process. These are considered the most significant threats.

Key Words: *Urban Leftover Spaces, Participatory Design Method, Digitalized Participation Approach, ARCGIS, Urban Actors*

Introduction: Analyses on the Concept of Leftover Spaces

The concept of "leftover" is defined as the remaining part of something after it is used or spent. From an urban perspective, this concept generally refers to empty spaces that have not been designed, have been forgotten, excluded, or left aside. In the literature, it is found that this concept is related to different concepts such as ruined regions, abandoned areas, dead areas, consumption areas, lost spaces, empty spaces, undefined areas, and unused spaces. It is very important to distinguish these concepts from each other in terms of the effects they create and how they impact their environment to identify the approach to these areas.

Considering the related key concepts, it can be observed that Lefebvre describes the places that cannot renew themselves and therefore cannot transform in a city that constantly renews itself as ruins [1]. In urban centers that have acquired an identity in cycles of sustainability, these ruined areas, which damage physical communication and disrupt social connections, are often left vacant and become derelict due to political sanctions and coercion. Depending on the erosion of social movements, these spaces turn into places that are merely passed through and fall into disuse [2]. In 1999, Urry mentions that these spaces are formed with an economic concern beyond political policies and that tourism policies fueled by sociocultural productions become consumption spaces that emerge due to imbalanced consumption habits [3]. Habermas, with a more human-oriented approach, emphasizes that these areas are fundamentally a problem of alienation and uses the concept of urban placelessness to define them [4]. In a similar vein, Löw refers to the imbalanced position of the subject in the public space and the fact that functional spaces become exclusive rather than inclusive and defines these spaces as lost spaces [5]. On the other hand, to emphasize the potential of these spaces, Calixto and Brito refer to them as unused spaces that are not occupied in any way [6]. Beyond a preference for use, these spaces can also be defined as abandoned areas that have lost their users and thus their source of production due to social, economic, or physical reasons [7]. Based on all these conceptual analyses, it can be said that the main source of the formation of these areas, which are left derelict or

abandoned for use in the city, stems from problems based on the insufficient or incorrect establishment of the subject-space relationship.

Within this confusion of concepts, Lynch's description of a space left over from a used space in 1990 is important [8]. This is because leftover spaces, which are mostly typologically evaluated as under bridges, courtyards of old buildings, passageways in the city, entrance squares of old factories, doorways, or passages squeezed between two buildings, can be seen as excluded parts of an urban system that is still in use (Figure 1). These spaces, defined as nobody's space or free space with these characteristics, also possess the potential to form alternative public realms.

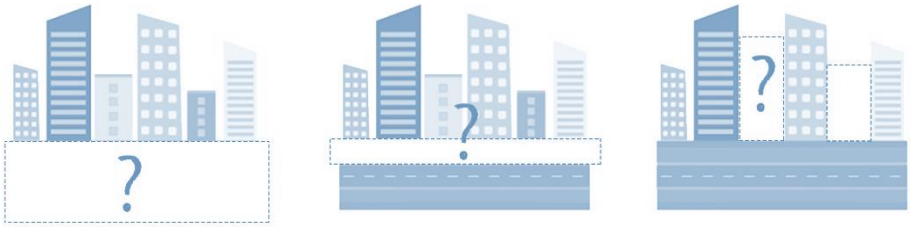

Fig. 1. Leftover City Fragments

To unlock the potential of leftover spaces in cities, it is necessary to define these spaces accurately and analyze how they were formed. Recognizing the existence of these areas in the city on a social scale is the primary condition for their regeneration. This awareness can only be achieved by fostering collective participation and making democratic decisions through a user participatory model. However, in rapidly growing metropolitan cities that constantly expand in scale and complexity due to population growth, the ever-changing user profiles and demands, unconscious responses to the increasing need for functional space, and new regulations hinder the formation of sustainable participation awareness. In today's crowded and multi-sensory metropolitan cities of the information era, new digital interfaces have emerged to broaden the scope of participation and foster shared concerns.

The main focus of this study is to explore the potential contributions, risks, obstacles, and threats of using geographical mapping information systems as a tool in the user participatory design model. In this context, the actors involved in the user participatory design method are identified, and the organizational scheme of the process is examined. The communication phases of this traditional scheme are reimagined using the ARCGIS program, a digital-based geographical mapping system, and a comparative SWOT analysis is conducted to question the traditional and digital methods. The ultimate goal is to propose a new potential contribution that addresses the weaknesses of the traditional method by rethinking the leftover spaces in cities (Figure 2).

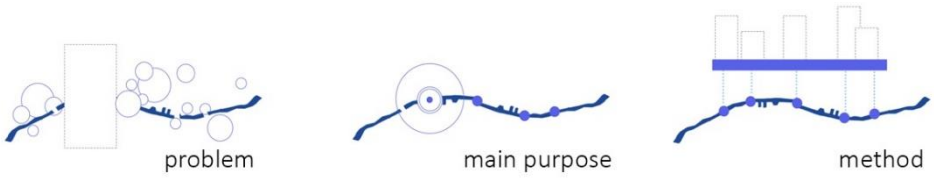

Fig. 2. Framework Diagram (a) problem; (b) main purpose; (c) method

Identifying Urban Actors of Residual Spaces

Urban spaces are areas where social life activities take place in a continuous order. Beyond the ongoing practices that occur in a continuous flow, these spaces hold memories, bring together diverse voices, and foster a sense of belonging to a community. They contribute to the construction of collective consciousness. According to Norberg Schulz, urban spaces are created through the design of a space that caters to the needs of the urban user, who is the subject [9]. Similarly, Bachelard suggests that these spaces emerge as a result of the subject's interaction with the place [10]. This perspective grants urban spaces a subjective evaluative ability. Additionally, Bachelard's view can be supported by Deleuze and Guattari's analogy of spaces to machines, which argues that spatial production depends on the interaction between the subject and the space [11]. Lefebvre, on the other hand, considers the subject as a prerequisite for space production [12].

According to Lefebvre, the urban subject, which is the main driving force behind the creation and maintenance of urban spaces, assumes the roles of user, designer, and manager in the organizational structure of today's metropolitan cities (Figure 3). Although designers and managers, who appear as dominant actors in space organization, are also urban users, the decisions they make may not reflect collective representation unless they represent a significant majority. Collaborative decision-making mechanisms involving a sufficient majority of

urban users are often limited and inadequate. Therefore, ensuring equal participation of all actors in the design and decision-making processes, empowering users, leads to the creation of more socially sustainable cities.

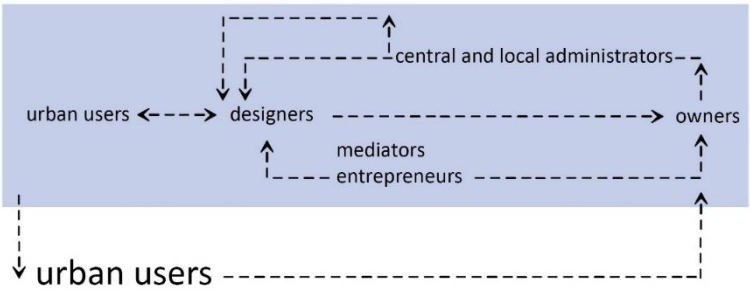

Fig. 3. Relationship Diagram of Urban Actors

Method

The methodology of this study is primarily planned to consist of three stages. In the first stage, the literature on the user participatory design approach was reviewed. The reasons for employing this method, its constituent processes, the involved actors, and how it has evolved over time were examined in the analyzed studies. Based on the findings, a comprehensive relationship diagram illustrating the organization of the participatory design method was constructed. The second step focuses on explaining the operational principles of geographical mapping systems, taking advantage of their widespread usage and easy accessibility in the digitization of the traditional method. As an example, the ARCGIS program, a geographical mapping system, was selected. Lastly, the potential conflicts and contradictions between the digital method and the traditional scheme are analyzed. A comparative SWOT analysis is conducted to evaluate both the traditional and proposed digital models as alternative approaches.

User Participatory Design Approaches in the Context of Leftover Spaces

Leftover urban spaces are components of a system that operates for a period of time before coming to a halt and stagnating. However, the changes occurring in these areas do not follow a linear trajectory but rather a cyclical one. Throughout the processes before and after interventions in these areas, both the area itself and the user within it undergo constant changes while decision mechanisms are at work (Figure 4). Within this cycle of change, it is crucial to adopt a majoritarian approach to ensure that the decisions made are both prompt and site-specific.

In this phase of the study, the literature has been reviewed to understand the role of participatory design as a democratic method for reconsidering and reevaluating leftover spaces. Participation denotes a state of involvement and consent in a process. The participating subject plays an active role in actions that generate added value [13]. In the field of architecture, the increased active involvement of users in the design process has become widespread, especially since the 1960s, with the recognition that space is not only a physical object but also a sociocultural phenomenon. This process has highlighted the need for the subject, as a user of space, to assume a more active role in the practice of design and thinking [14]. Through this role, the subject's engagement with the challenges posed by evolving urban areas enables the outcomes of change to be adaptable to the city by considering all processes holistically (Figure 5).

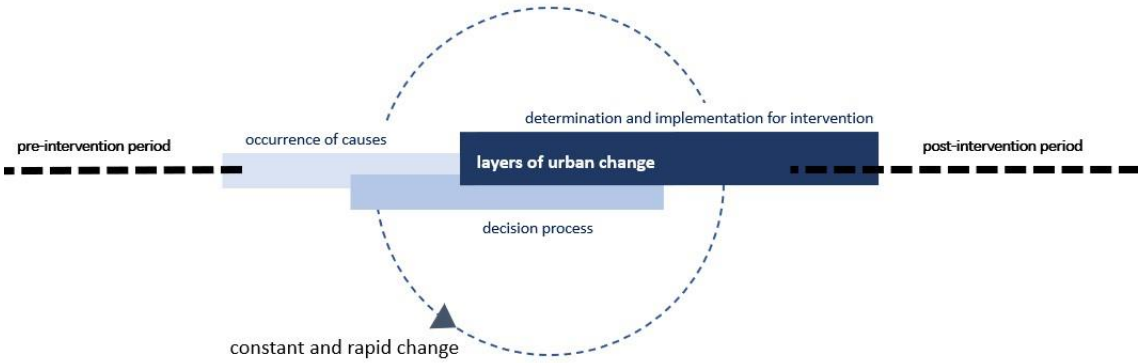

Fig. 4. Intervention Stages in Urban Change Processes

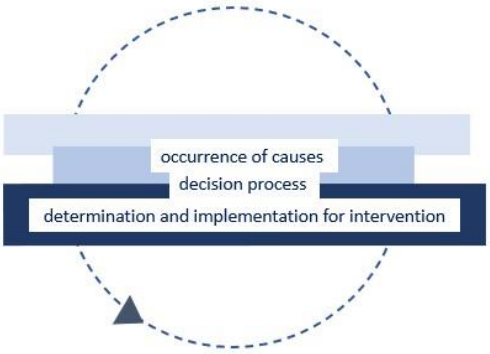

Fig. 5. Intervention Stages in Urban Change Processes with Participatory Design Approach

Regardless of the scale of the subject or area under evaluation, the roles assigned to the user, designer, and management groups in the participatory design method display an attitude that can be developed and modified based on existing experiences [15]. In the traditional representation, the user becomes the object of study, the researcher observes the user and gathers information, the designer reports on the process, and the manager provides the necessary environment and funding to bring all groups together. However, these roles can be interchanged among the user, designer, researcher, and manager [16].

The organizational chart of the traditional process can be summarized as consisting of four main steps, as presented in the model proposed by Hacıalibeyoğlu in 2013, based on Sanoff's theoretical studies and Cherulnik's research on environmental behavior (Figure 6). The first step, the decision-making process, begins with creating suitable environments and conditions. In this process, the participants are identified, the approaches relevant to the field are determined, and preliminary reports are prepared. The second step, the design process, is directly influenced by the preliminary interviews conducted in the first step. However, throughout the design process, the initial analyses are supported by surveys, focused interviews, and workshops. User participation reevaluates each stage, from creating awareness of the area to the development of the project. The third step involves implementing the outputs of the design process. This phase is almost detached from the user, as any issues that arise during the process are directly resolved by the designer. The last step, the usage process, needs to be periodically reimagined throughout the lifespan of the designed object/structure/area. User feedback determines the frequency of revitalization periods and serves as the primary source of information. In this context, the traditional method follows a cyclical approach [14].

In terms of its contribution to the field, it can be said that the participatory design method constructed through this framework establishes a process that continuously evolves and provides feedback by discussing design alternatives, as opposed to a linear and result-oriented design process. Additionally, it establishes an urban communication scheme that minimizes tension between professional knowledge and user demands, is directly connected to time and changes, strengthens a sense of belonging, preserves urban experiences, and fosters awareness.

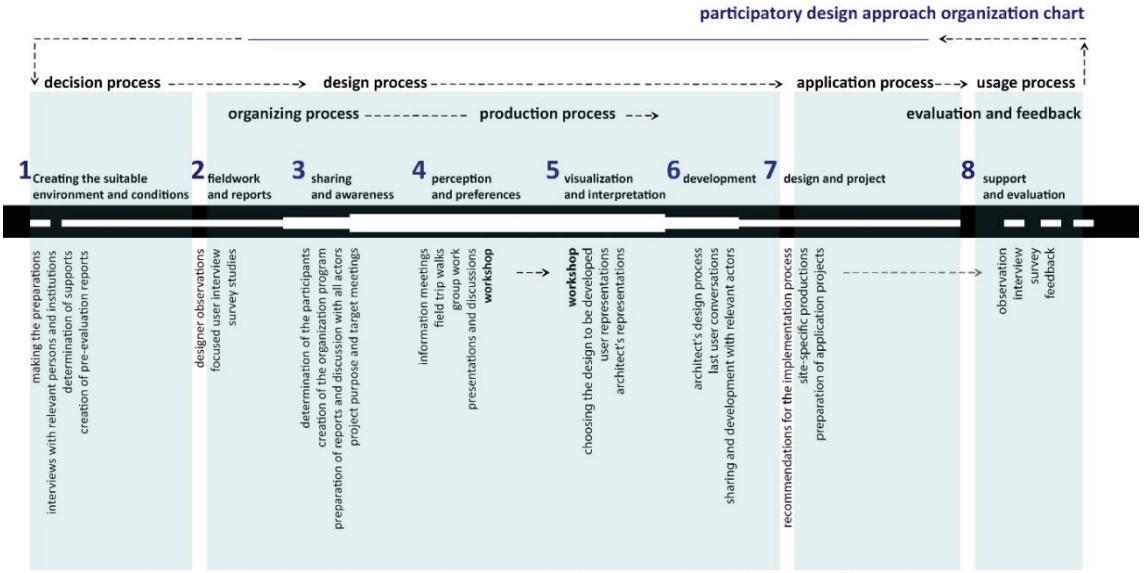

Fig. 6. Traditional Participatory Design Approach Chart [14] (Adapted from Hacıalibeyoğlu, 2013)

Understanding the Working Discipline of ARCGIS Program as a Geographical Mapping System

It is believed that utilizing digitalized geographical mapping system programs would be beneficial in proposing a new model for accessibility, which is considered the main source of weaknesses in the traditional organization scheme used in participatory design approaches. At this stage of the study, understanding the working principles of these programs is crucial to identify potential conflicts with the user participatory design method.

In this study, ArcGIS is chosen as a sample among the widely used programs in digital geographical mapping systems. ArcGIS is a digital mapping and analysis platform developed to visualize data of an area and make informed decisions based on the analysis results [17]. The process of evaluating the analyzed area within the program begins by identifying and marking the problems on the maps. To identify the problems, physical and socio-cultural analyses of the area are converted into numerical data and processed using Excel program. The evaluation tables obtained by transferring the Excel data to the ArcGIS program create a database. This database is continuously updated throughout the entire process. With up-to-date data that can be tracked and redesigned according to current requirements, the program provides predictions based on ongoing changes and supports the user in determining priorities (Figure 7).

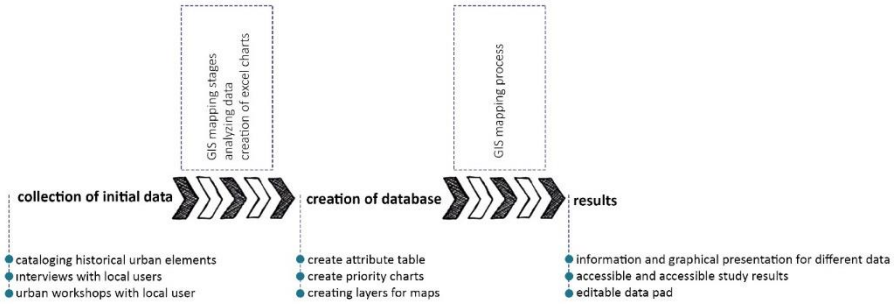

Fig. 7. ArcGIS Program Operation Process Diagram

There are no significant differences in transferring real spaces in the city to the virtual environment using ArcGIS software compared to a typical architectural analysis process. Therefore, there are no major concerns about the accuracy of the results obtained. In comparison to the traditional method, the problems, potentials, and threats discovered in the analyzed areas are overlapped with the points marked on the maps at different time periods. This layering creates time-space and cause-effect graphs of the city's changes. The main advantage of this digital method, compared to traditional paper-based analyses, is that the obtained data can be easily and quickly followed by various urban actors (Figure 8).

Fig. 8. User Interface Diagrams of ArcGIS Program

In this context, the new method is expected to enable the creation of simultaneous urban awareness for different areas. The real-time analysis of potential situations can provide urban users with perspectives not only within a specific area but also on other interconnected scales. Moreover, this method of utilization is crucial in terms of shaping public opinion and determining the goals and needs of a constantly changing city. It also offers advantages in addressing security vulnerabilities, identifying physical needs, and implementing necessary measures to combat criminal networks [18].

Rethinking the Traditional Organization Chart in a Digital Way

The proposed model for rethinking leftover spaces through the participatory design method aims to enhance user participation and inclusion in the redesign process. To ensure effective user participation, it is important to address the challenges of defining leftover spaces as areas that do not belong to anyone and to incorporate adequate user representation and timely involvement.

Considering the fast-paced and densely populated nature of modern metropolises, achieving meaningful user participation that represents the majority becomes crucial. Incorporating the digitalized lifestyle of the information age into participatory design processes is seen as a valuable approach to addressing these challenges and developing solutions.

The final phase of the study brings together the steps of the traditional participatory design approach and the fundamental principles of the ARCGIS program. The resulting model is not linear but simultaneous, with each step informing and feeding into the others. This allows users to have a voice at every stage while ensuring the continuous progress of the work by the designer and manager groups. Establishing a database for systematic evaluation of the collected information, particularly in decision-making processes, forms the basis for subsequent steps.

In the digitalized process, the creation of a suitable environment and conditions becomes an integrated part of each action in the decision-making and design processes. This fosters early user awareness and ensures accessibility for all actors (users, designers, and managers) at all times. The design and implementation processes, which are influenced by the decision-making processes, are shared with the participating user and manager at regular intervals through open channels. Unlike the traditional model, the digital model allows for sharing and voting on design visuals, user control over material choices, transparency in tender and procurement processes, and user participation in implementation processes. This approach may also contribute to the use of local materials and the creation of regional employment opportunities.

By continuing to use the same interface after the completion of the design, the designer can gain instant insights about the area without long waiting periods. The layered graph of user feedback, collected at short intervals over an extended period, can serve as a sense of ownership and belonging to the designed area. Consequently, the area will be constantly updated within the larger context of the city (Figure 9).

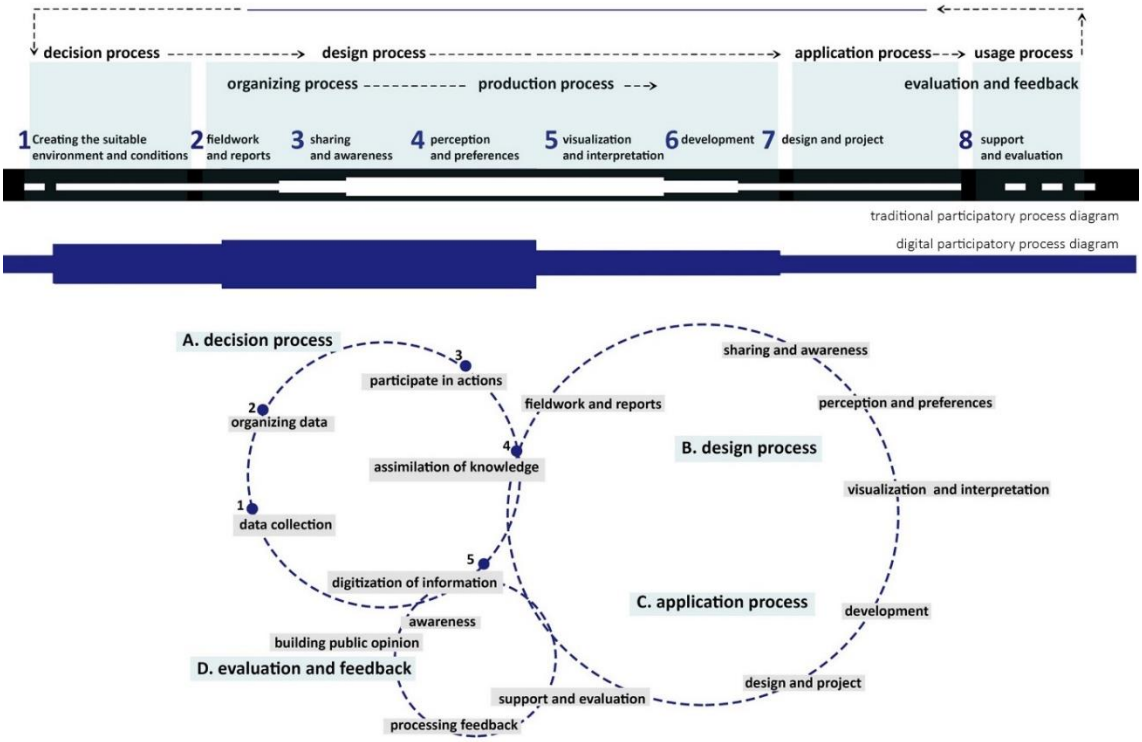

Fig. 9. Participatory Design Approach Chart Rethought by Digitalization

Findings

The SWOT analysis of the proposed new digital model for re-evaluating leftover spaces through participatory design reveals several strengths, weaknesses, opportunities, and threats:

Strengths:

1. Rapid recognition of changes and quick feedback: The digital model enables swift identification of changes in the field and obtaining prompt feedback on problems, allowing for a more up-to-date approach compared to the traditional method.

2. Flexible working hours and unlimited spatial boundaries: The digital platform transcends physical boundaries, enabling flexible working hours and reaching a wider population, leading to more objective results.

3. Enhanced user profiling: Through social networks and survey responses, the digital model allows for better recognition of target groups, facilitating faster and more accurate suggestions during the design phase and minimizing feedback in the decision-making process.

4. Contribution to social sustainability: The proposed model promotes equal, transparent, participatory, and democratic policies, making it accessible to all participants and fostering social sustainability.

Weaknesses:

1. Profile limitation: Digital platforms are predominantly used by specific age and income groups, potentially limiting the user profile for research field studies. Efforts should be made to protect the rights of children and the elderly.

2. Vulnerability to fake profiles: Digital channels are susceptible to the creation of fake user profiles, potentially compromising the decision-making processes with repeated responses from the same user groups.

3. Influence of external participants: The digital model may allow participation from individuals outside the regional user group, which can disrupt the evaluation of the area based on its own criteria.

Opportunities:

1. Archiving and viewing work: The digital model enables the archiving and viewing of work not only by managers and designers but also by users and participants, providing a permanent record for future reference.

2. Time and cost savings: The permanent archive of work can save time and costs in re-evaluating the same area in subsequent processes.

Threats:

1. Perceived scale and perspective: Digital interfaces often provide a two-dimensional, top-view mapping system, potentially affecting the perception of scale and leaving out the eye-level experience of the city.

2. Rapid consumption of new areas: The ability of digital processes to keep up with rapid changes may accelerate re-evaluation processes, potentially leading to the rapid consumption of new areas with implemented decisions.

3. Provocation and qualitative evaluation: Digital processes can be susceptible to provocation, necessitating well-designed and well-explained user interfaces to qualitatively evaluate the received feedback, particularly in decision-making processes.

Overall, the proposed digital model offers advantages in terms of real-time awareness, wider reach, enhanced user profiling, and social sustainability. However, limitations regarding user profiles, vulnerability to fake profiles, external influences, and potential challenges in scale perception and rapid consumption should be carefully addressed to ensure the effectiveness and reliability of the digital participatory design method.

Evaluations and Conclusions

Urban areas serve as the memory spaces of cities, much like attics or cellar rooms in houses. These spaces accumulate unused objects and store memories that are often overlooked and considered of secondary importance. The remaining parts of public spaces, formed by the layering of different urban identities, cultures, and functions, become the abandoned, ruined, and ghostly spaces of cities. Within the scope of this study, Lynch's definition of "parts of an ongoing system that belong to no one" resonates with the idea of leftover attic rooms. These areas, through which everyone passes but no one owns or protects, gradually turn into cancerous cells that spread over time and erode the urban identity.

In this regard, it is evident that these areas need to be reimagined and revitalized within the city. Actions undertaken in this context should be conducted transparently and fairly, considering sociocultural and economic changes in the reorganization of physical functions, while avoiding gentrification that excludes certain segments. One of the most effective methods to achieve this democratic condition is the user participatory design method, allowing the city's own users to determine the spatial needs. Moreover, this method contributes to the creation of social awareness in protecting the spaces that "belong to no one." However, for the process to proceed efficiently, user selections must possess both regional characteristics and represent wider masses in terms of number and quality.

Digital mapping systems have started to be utilized in today's metropolitan cities, contributing to the understanding and transformation of residual spaces. While they have not yet been widely employed throughout the entire design process from beginning to end, these systems play a significant role, especially in the context of residual spaces. Nonetheless, they also entail certain risks, threats, and obstacles.

Rethinking user participatory design approaches in a digital manner is believed to enhance urban memory due to its convenience, accessibility, permanence, and capacity to bring people together. The disappearance of physical boundaries in these spaces will make them equally accessible to everyone, enabling them to be more easily recognized and open to change for both the city and its users. However, as we are in an era of rapid change, it remains uncertain whether virtualized real spaces will facilitate social movement and communication or isolate and desensitize individuals, leading to the decline of interactive publicness. Considering the future applications of the proposed method, it is crucial to accurately identify and continuously update the risks and threats associated with the widespread use of these systems, managing them through a user participatory system process.

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DISTANT AND TOGETHER DURING COVID-19: UTILISING DIGITAL TECHNOLOGIES THROUGH TWO INTERNATIONAL WORKSHOPS

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Abstract
Learning experiences for students from all disciplines are highly influenced by Covid-19 pandemic period. Use of digital technology marked the period. Adaptations to new technologies and new teaching and learning methodologies in this period of uncertainty became very critical. This paper reflects on a teaching and learning experience in the Faculty of Architecture and Design of Bahçeşehir University in İstanbul, Turkey. Two online international workshops were designed and carried out. First, an "Online Summer Workshop 2020" titled "Let's face the future" on 15-24 July 2020 and second, "Online Easter Workshop 2021" titled "Let's get some fresh air" on 29 March-05 April 2021. Obviously the titles were closely related to the current situation.

The workshops intended to be the online versions of the international workshops that were held regularly between BAU FA&D, Yeditepe FA, UDG and UPC ETSAB, before the pandemic. The students were asked to create stop motion videos related with the workshop title and the lectures delivered during the workshops. They had no chance of being F2F in physical space which used to be the communication environment of architectural education before pandemic. Due to Covid19 pandemic and social distancing regulations, many universities around the world considered alternative ways of providing lectures and engaging students in a digital environment.

To maintain the studio as a social space is important in architectural design education, because considerable privacy and knowing what the other students are doing is part of the spatial integrity in the studio. Most architectural programs are based on the design studio approach because of the traditional nature of the design process. But in the last decades, distance education, virtual studio methods etc. were already on the agenda of architectural education. The physical space of the studio, which used to be the communication environment of shared space for discussions, presentation, conversation and participation in architectural education readily converted into a digital environment. However, all previous actions taken in physical space were held on online sessions and other digital communication platforms.

The paper is an attempt to respond to the pandemic's effect on traditional education by taking a pedagogical perspective of a new instructional model to design a proper and balanced international online environment. The students from Turkish and Spanish universities searched for a best learning experience, in spite of the short time for the making of videos. This technological tool needed no geographic proximity for the students. So, they performed as if they were together, which is one of the important challenges to universities around the world. There seems to be no doubt that the number of higher education institutions of design will aim at making and using more videos.
Key Words: *Covid-19; Online learning and teaching; Student Experience; Technology; Stop Motion Videos*

Introduction

Design is increasingly recognized as a value adding link between cultures and experiences. Design thinking, as a creative problem solving process developed and used by designers, is used as a driver for innovation. Due to increased importance of design, higher education institutions now offer a variety of design degrees. However, since the outbreak of Covid-19 and the resulting switch to online education, many higher education institutions have faced challenges, especially in teaching practical and skill-based courses such as design. The purpose of this paper is to shed light on how architectural education manifested new ways of integrating technology into online education during Covid-19. Two international workshop experiences held online by BAU Faculty of Architecture and Design is the context of the study.

In today's educational environments, both teachers and learners are constantly challenged to learn and respond to new situations, and meet new demands. With the recent advances in technology and subsequent learning demands, teachers and learners want to proceed neither time nor attention span for traditional methods. New digital technologies along with the advent of Covid-19 opened up new visions for design education, like the flexibility to learn at any time and any place.

International workshops held between two or more schools of architecture became an integral part of design education. The outcome has proved outstanding success, sharing and inclusion among students, besides developing confidence in international environments.

At the end of 2019, the World Health Organization was informed of Covid-19. By the end of January 2020, the disease had numerous confirmed cases and deaths. By March 2020, Covid-19 was declared a pandemic. Since the virus was unknown, contagious and with no vaccine, some measures were taken to slow down the infection. These measures included social distancing. As a result, education had to react, suspending face-to-face education and rapidly adopted online education, whereby teaching and learning was taken on digital platforms. With the sudden closure of schools worldwide, UNESCO stated that "the global scale and speed of the current educational disruption is unparalleled and if prolonged, could threaten the right to education".

This period has been very challenging for higher education institutions, educators and students alike, acting upon attendance, course schedules, course delivery, exams, evaluation and student progress. Besides these challenges, Covid-19 provided opportunities for creativity and innovations in teaching and learning methodologies, by making the most of online learning, digital tools and devices.

As most higher education institutions, Istanbul Bahcesehir University (BAU), Faculty of Architecture and Design reacted quickly to ensure the maintenance of the quality of education. This paper reflects on a teaching and learning experience in the architecture program of BAU. Two International Online Workshops were designed and carried out. First, an International Online Summer Workshop 2020 titled *"Let's face the future"* on 15-24 July 2020 (Figure 1a.) and second, International Online Easter Workshop 2021 titled *"Let's get some fresh air!"* on 29 March-05 April 2021 (Figure 1b.). Obviously, the titles were closely related to the current situation. The workshops intended to be the online versions of the international workshops that were regularly held between BAU FA&D, Yeditepe FA, UDG and UPC ETSAB before the pandemic.

The discussion here is based on a pedagogical perspective with the practice of new instructional models, to create a proper and balanced online environment for architectural education. Due to Covid-19 pandemic and social distancing regulations, many universities around the world considered alternative ways of providing lectures and engaging students. To maintain the studio as a social space is important in architectural design education, because considerable privacy and knowing what the other students are doing is part of the spatial integrity of the studio. Studio is a shared space for discussion, presentation, conversation and participation in education. The physical space which used to be the communication environment of architecture education converted into a digital environment. However, all previous actions were held on face to face sessions and other digital communication platforms were not utilized very often. The pandemic accelerated the distant education and virtual studio methods, which were already on the agenda of architectural education, by becoming an imperative.

(a) (b)

Fig. 1. (a) "Let's Face The Future" poster; (b) "Let's Get Some Fresh Air" poster

Two Online Workshops

In response to the growing Covid19 outbreak, all educational institutions switched to online learning. There was no chance for the intended Summer Workshop in BCN for July 2020, so a call for the Online Summer Workshop 2020 was sent out. This was an inspiring call to action on behalf of our immediate environment. We wanted the concerned students and faculty alike, to make their judgements about the Immediate Future. How could they do something they didn't know or haven't done before, without taking a risk? They were asked to follow this title.

I. "Let's Face the Future"

This was the title of an online workshop that would take place between 15–24 July 2020 in BAU Zoom Room. We had international students and teachers from different Schools of Architecture. The online workshop was to continue for 5 days, like it was always done before. There were invited speakers for the first three mornings.

Hüseyin YANAR from Tampere University/Finland with "Timeless Sketch:Between Past and Future"

Maan CHIBLI from BAU with "Urban Space"

Gizem KIYGI a young researcher of İstanbul with "The Scale Conflict:Pandemic and Cities"

The remaining time was for the students and the workshop teachers to work together but not in close proximity, to look for interrelated factors, concepts and policies for the immediate future. As for the end product of the

workshop the students were asked to design Stop MotionVideos and Posters to share with the Jury on 24 July 2020. All students were rewarded with a Certificate of Attendance.

As Covid-19 outbreak continued, so did the doors to university campuses across the world continued to be closed. BAU Faculty of Architecture and Design continued with online workshops. The second workshop took place as the Online Easter Workshop 2021 between 29 March - 05 April 2021 in BAU Zoom Room with the title

II."Let's get some Fresh Air!"

With the pandemic lockdown and people spending more time in their homes, balconies and terraces gained value ever than before. People used them more and rearranged these spaces, noticing the importance of sun light and natural ventilation. By using proper design language, the outside world can connect with interiors via balconies. When we feel depleted, we go for a cup of coffee, but according to research a better way to get energized is to connect with nature. Nature is the fuel of our souls. In the city? Where can you do it? In a park, a forest or a trail outside the city. You can also do this on your BalconY! There are inspirational examples in the literature (Figure 2a. and Figure 2b.)

With Covid19, did balconies become our new place of hope? Can a lesson be learnt from social distancing to build better balconies? These were a few questions to answer and only desire to create and to work hard was necessary. We wanted spatial innovations because we know, better spaces lead to better live.

(a) (b)

Fig. 2. (a) Bauhaus balcony and (b) Balconies as intermediate spaces

Now, it was the students turn to make reflections on Balconies with their Stop Motion Videos that they would produce in their groups. First, they were asked to think of a scenario that would best reflect their ideas on Balconies. They were supposed to think about its components: scenario, visual components like sketches, photographs, texts etc. It was all up to them to put the components together to compose a video of 3-4 minutes. The Online Workshop that was going to take place between 29 March –04 April 2021 in BAU Zoom Room. We had local and international students and teachers from different Schools of Architecture. We have invited speakers for three sessions and lecturers.

Judit TABERNA from ETSAB with *"Stop Motion Video"*
Karin HOFERT from ETSAB with *"Intermediate Spaces"*
Hüseyin YANAR from Tampere University with *"From Aalto's Paimio Sanatorium's Balcony to My Balcony"*
Onur DİNMEZ a young academic and practising architect from İzmir with *"Connecting through Public Space"*
The remaining time was for the students and the workshop teachers to work together but not in close proximity, unfortunately. The students working in groups were expected to design *Stop Motion Videos* and *Posters* to share with the Jury on 03 April 2021. All students were rewarded with a Certificate.

Video as a tool for representation

Video is different from other learning technologies because it offers the benefit of using visual perception, the most powerful of all our senses. An image in motion helps the viewer to see a process and find pot how things work, move and perform. According to Goodyear and Steeples [1] videos can present a clear and striking manner descriptions to articulate tacit information and knowledge hard to describe through text.

According to Siemens, Gašević, & Dawson [2] 'Education technology has gone through three distinct generations of development and now a fourth is emerging'. This fourth generation includes 'distributed and digitally shaped technologies: adaptive learning, distributed infrastructures and competency models'. Greater emphasis will be placed on 'the process of 'stitching' together distributed interactions' with learners who control their preferred toolsets says these authors. Video in education is one element of those 'distributed interactions' and the role that video plays within education is within the context and concern of the online workshops we have been dealing with.

Technology ranges from 'the basic notion of tools, to systems which employ or exploit technologies' and Higher Education needs to find ways to use tools in groups, and connections between tools, to create systems. In spite of the prevalence of technology, Bates [3] states that 'the key component is the intervention of the teacher'. Video is defined here as digitally recorded content that has sound and motion that can be stored or delivered live, and can be streamed to a variety of devices. It may or may not have the lecturer visible and can include an animated film, or a demonstration.

The role of the "teacher as facilitator" has different demands as from that of the "teacher as teller". Students should learn how to become active and self-directed learners. Technology integration is a way of supporting the learner and setting them up for their long-term independent success [4] [5] tarihlere dikkat,

The 'disconnecting' of the physical classroom, the lecturer and the students is one important consequence of technology and video, which is having an impact on the learning process within Higher Education. Siemens et al. [6] refer to this as 'thinning of classroom walls where learners are now able to use a range of technologies and interactions with learners and content around the world. In turn this has led to opportunities outside the classroom and is leading to a transformation in the educational landscape [7]. The responsibility of higher education seems to be ensuring that students develop appropriate 21st century skills, in other words 'the skills required for a knowledge-based society'.

Within Higher Education, the increasing prevalence of technology is driving the viability and availability of online teaching and the open academic resources, and video is playing a role in facilitating these developments. Greenberg & Zanetis [8] state that:

"Education is undergoing a major shift, as brick-and-mortar classrooms are opening up to rich media content, subject matter experts, and to one another. This shift has been influenced largely by technological and pedagogical trends, greater worldwide access to the Internet, an explosion of mobile phone users, and the appreciation for these technologies by young people, as well as by teachers. Video appears poised to be a major contributor to the shift in the educational landscape, acting as a powerful agent that adds value and enhances the quality of the learning experience".

In their second annual survey into video in education, Kaltura [9] state that in 2015 video is 'undeniably a hot topic' and that:

"Video is permeating our educational institutions, transforming the way we teach, learn, study, communicate, and work. Harnessing the power of video to achieve improved outcomes—for example, a better grade in exams/assignments or more effective knowledge transfer—is becoming an essential skill. A key pillar in the drive towards improved digital literacy, video brings considerable benefits to educational institutions: streamlined admissions, increased retention, and improved learning outcomes."

According to Bill Hettinger, Founder, Effective e-Learning,

"Technology is a tool, but it's not the only tool. The real tool is the knowledge, the facilitator's knowledge and the designer's knowledge. We need to be able to take this knowledge and use it in a way that can help us educate students."

Hettinger also discusses the importance of constantly being on the lookout for new tools which can do something useful. You don't have to be in the forefront or the first person to use new tools but you do have to understand that the tool you used six months ago doesn't necessarily work anymore. Thomson, Bridgstock, & Willems [10] state there is still very limited research into which pedagogic strategies are effective with video. They have developed four principles for planning educational videos:

(i) Give context and align purpose
(ii) Tell (show) a story
(iii) Keep it as short as possible and
(iv) Present with authenticity

Methodology

Art, architecture and education is seen as a rich environment where everyone has a place and their own path. Based on the experience of eight years of International Workshops, BAU Faculty of Architecture and Design offered these workshops to help students review and understand the Covid-19 conditions.

The Online Summer Workshop 2020 intended to focus on the direct experience of the participants. Students from the four faculties got together online, to discuss, examine and look for interrelated factors, concepts and policies for the immediate future, and completed their work by realizing it through a "Stop Motion Video". Online Technology is becoming more popular, or nowadays more like the "New Normal". Making videos is one of the different ways that students learn by doing. Videos could be the answer to better education. We have been told by research that, there is no one or only one answer to many questions. To understand a problematic case well, we must be open, go beyond words and feel. The participants from the four Schools of Architecture got into mixed groups like they always did in previous face to face experiences. They were given a rich list of concepts/keywords to select one or more of them, to build their stop motions on. They were asked to think of a scenario that would tell it best, create an audio visual story and share it. Concepts/Keywords were:

Past, Present, Social Distancing, Isolation, Elevators, Privacy, Art, Building Entrances, Studios, Video, Lecture Rooms, Corona, Staircases, Crowds, Hygiene, Isolation, Materiality, Vaccine, Creativity, Personal Space, Lockdown, Immediacy, Social Areas, Experience, Individual, Ventilation, Unpredictable, Architecture, Ambition, Stop Motion.

In both workshops, the students were asked to create stop motion videos related to their understanding of the workshop title. They were supposed to focus on the content of the lectures delivered.

As for the Online Summer Workshop 2020, the students produced 6 videos. The titles of the videos were *"4the Future", "Future in Me", "Not too Distant Future", "Candy dreams", "Koronapoly"* and *"Linetoons"*. After the grouped were formed, they were introduced to the stop motion technique. This was not a commonly used representation tool for all participating universities. The most important stage of doing a stop motion video is the way the story is introduced, that is to say "the storyboard". The students were given a template and were asked to document all of the elements that they wanted to take part in the video such as, the scene, the frames, the space(s), the characters, position of the camera, music, movements, time and actions. The first box of the template was supposed to have a three dimensional drawing, including the scene with the position of the characters and their movements. The second box was meant for the plan of the scene with the cameras' positions all written supplementary information was supposed to be on the template, too. All the relevant information was to be introduced. The tools students utilized for the stop motion videos were "Adobe Premier", "I Movie", "Windows movie Maker" etc. the platform used by the students was not the primary concern but how they visualized their story was.

As the titles and the posters (Figures3.-8.) of the videos indicate, they all responded to the growing Covid19 outbreak.

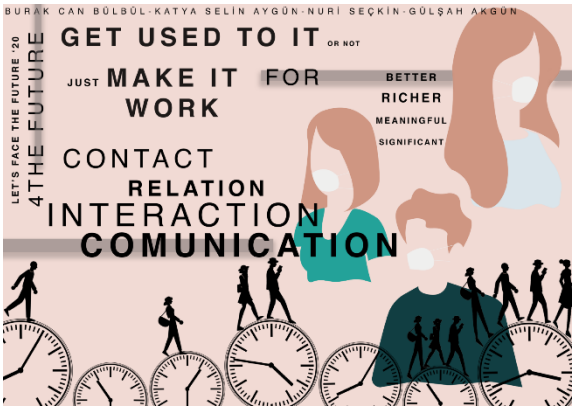

Fig. 3. Poster of Group "4 the Future"

Fig. 4. Poster of Group "Future in Me"

Fig. 5. Poster of Group "Not too distant Future"

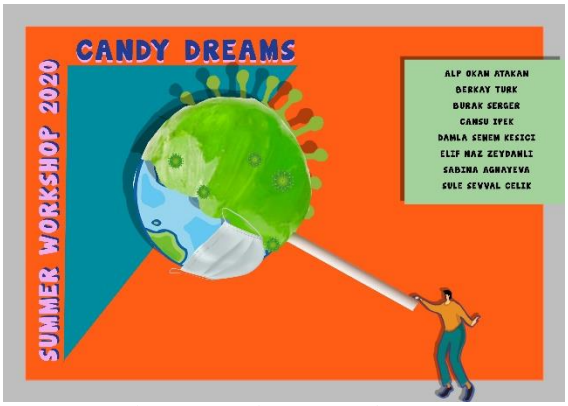

Fig. 6. Poster of Group "Candy Dreams"

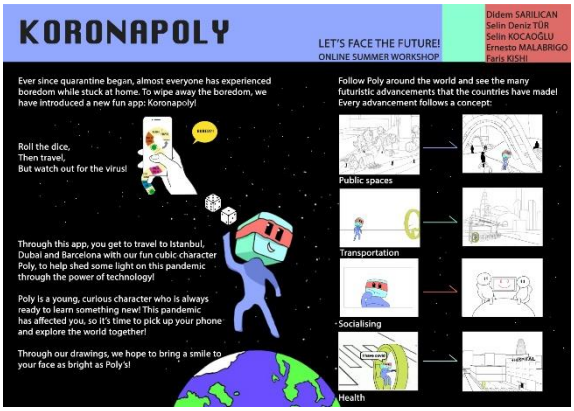

Fig. 7. Poster of Group "Koronapoly"

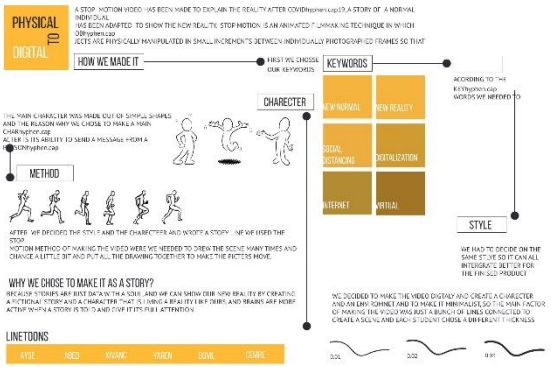

Fig. 8. Poster of Group" Linetoons"

Utilizing a similar methodology, on the second workshop namely, Online Easter Summer Workshop 2021, the students produced 8 videos, because there were more attendants, The titles of the videos were "Terra Musika", "Mission Balcony", "Mocking Bird", "Behind the Dust", "Flying Notes", "The Connection", "Soul" and "Over the Nest". After the grouped were formed, they were asked to think of a scenario that would tell it best, create an audio visual story and share it. Concepts/Keywords were:

Balcony, Social Interaction, Adoption, Function, Open Space, Personal Space, Friendship, Vitality, Community, Music, Global, Pandemic, Outdoor Activities, Fresh Air, Cities, Connection, Ventilation, Unpredictable, Architecture, Ambition, Stop Motion.

The students were shown different examples and were informed about possibilities of new ideas for making the stop motion videos. As seen in Figure 9. the stop motion video titled "Terra Musika" utilized the technique of cut newspaper letters for doing their title. This is seen as a common practice in stop motion videos.

Since people's capacity of perception varies from one to the other, the editorial decision for providing the optimal amount of information in videos for education is difficult. Sometimes it is the pace and the rhythm of the video that causes an overload rather than the amount of information. As early as 2008, Bishop et al., [11] found that sound and music attract attention but they do not have any effect on learning.

Fig. 9. Stop motion frames from "Terra Musica" and "4the Future"

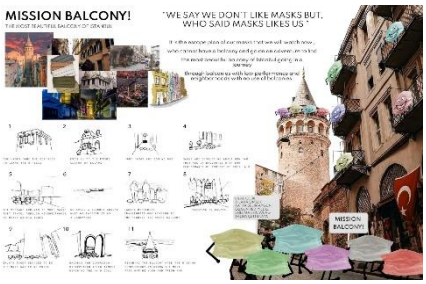

Fig. 10. Poster of Group "Mission Balcony"

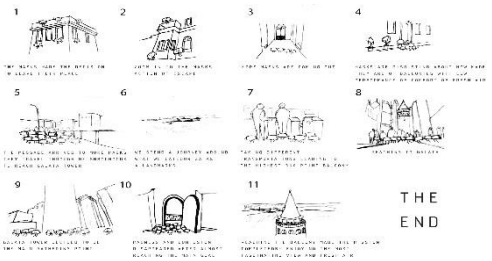

Fig. 11. Poster of Group Linetoons

Fig. 12. Poster of Group "Mocking Bird"

Fig. 13. Poster of Group "The Connection"

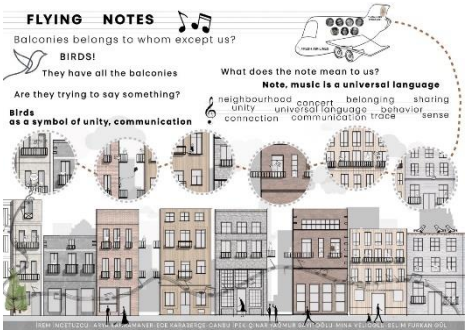

Fig. 14. Poster of Group"Flying Notes"

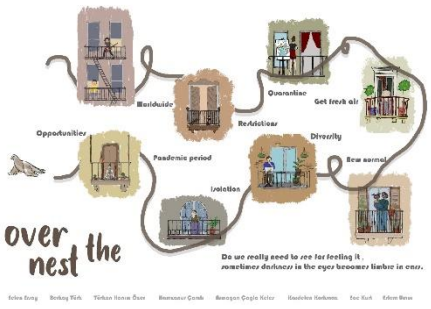

Fig. 15. Poster of Group "Over the Nest"

Fig. 16. Poster of Group "Terra Musika"

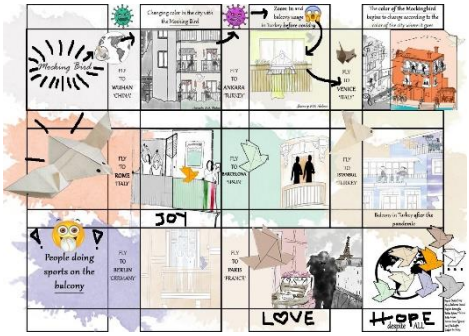

Fig. 17. Storyboard of Groups Mocking Bird

All of the groups used sketches and/or photographs in their stop motion videos (Figure 18. and Figure 19.). They were asked to create a story mixing all the techniques explained. They all did storyboards to visualize the whole video in advance. All of them did good research on this new way of experimenting with the visions of near future. The students enjoyed thinking and imagining the best ways to express their ideas.

Fig. 18. Stop motion sketch frames from the storyboard of group "Flying Notes"

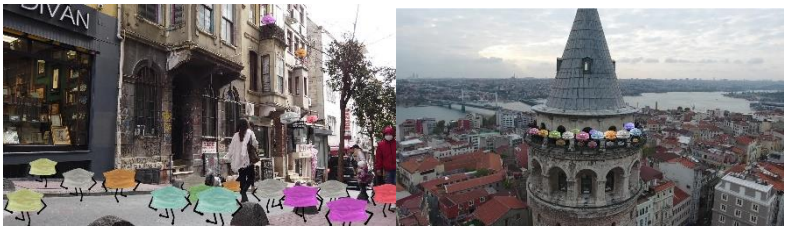

Fig. 19. Stop motion photo collage frames from "Mission Balcony"

As for the explanation of the process and how it ended in the production of a stop motion video for every group, the following would be an explanatory sum up. Making a stop motion video needs to follow certain steps like

1. Create a story board
2. Set the scene(s)
3. Set up the camera or phone in the case of students
4. Take picture(s)
5. Make change(s)

The first step for any project is having a story to tell. So, the story was the most important asset to convince the instructors and the group of students alike. The antagonist in every story was very important. And the audience was to be considered. Then, came the storyboarding. Many drawings and shots to choose out of were supposed to be there. Images at the beginning of the methodology chapter are the elements used in the storyboards. It was these storyboards that turned into animatics. Animatics allow the students see their film before it is full done. It is important to create them because, the pace of a stop motion is essential to get right in pre-production. Seeing the plans in real time lets the groups to know what needs more time and what can be cut. The final step in pre-production is putting all the materials together in the shoot location. A special place or a studio is not necessary to shoot a stop motion video. What you need is complete control over the light whatever room you are in. Now the stop motion starts to mean something. Every frame needs to be shot individually and every element in the scene needs to be manipulated incrementally. Stop motion video is an incredible art form and very rewarding. The two online workshops have been a proof of this, just like the face to face experiences we had been doing before the Covid-19.

Agreed upon rules for conducting scientific studies and for interpreting results have been evolving to higher levels of sophistication. The traditional narrative review is vulnerable on grounds of subjectivity. Two jury members may arrive at rather different conclusions from the same body of work. As for the evaluation of the stop motion videos, the jury was trained to value and maximize the objectivity factor in all of the videos, in the pursuit of knowledge. The jury met with the groups before the final jury. The jury consisting of senior and junior members, had a chance of observing the improvements, no matter how short the duration of the workshop was. They could follow the intergenerational communication and how the comments were considered for the improvement of the works. Truth like beauty, may in these instances, be in the eye of the beholder.

Conclusions

Over the last decades, technology has been reorganizing our ways of learning. Before Covid-19, technology was underutilized in higher education. In the Post Covid-19 future, higher education institutions can provide the catalyst to embrace educational technological affordances for blended learning. This will support the evolution of education pedagogy and better engage the students of tomorrow. Future education should reflect students cognitive and collaborative learning skills and help them to utilise their devices for learning through technology-based methodologies, which is expected to reinforce classroom-based learning. New learning experiences will sure add educational value to pedagogy of teaching and learning. On-going digitalization is having a substantial impact on the traditional education environment but digital tools are not just taking work out of the design studio, they're also providing new opportunities for students to contribute education to it.

The two online international workshops mentioned in this paper has brought together students of architecture from different contexts and provided challenge and engagement and facilitated learning. As the titles of the workshops indicate, they were both planned in accordance with the Covid-19's sequence. The first workshop titled "Let's face the future" was designed at a point where academia was equally astonished by the uncertainties going on all over the other realms of life. As for the second workshop with the title "Let's get some fresh air" coincided with a later stage of the Covid-19, where all realms of life became more familiar with the fact. It was the season when access to outdoors and fresh air presented a higher demand. So, the contents of both international workshops were chosen in accordance with the contextual realities, in search of solutions through the eyes of the students of architecture who could only get together in digital realms. Both experiences happen to be the early examples of what future design education demands. The two international workshops have proved that there is no more need to be in the same place as the documents or other artefacts to do the work. There is no need to know where you are at all, to be colleagues. The design studio is shifting from being a fixed geographic location. Work, workplace, productivity, and job satisfaction seem to be terms that need redefinion.

As such, it is the responsibility of higher education to ensure that students develop appropriate 21st century skills that is to say, 'the skills required for a knowledge-based society'. Multiculturality, equity, and high quality education are supposed to be the basics to refueling society with professional individuals that can take responsibility for professional roles in the society both in national and international scales.

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THE RELATIONSHIP OF GENDER-SPACE-FURNITURE IN THE OTTOMAN PALACE[1]

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Abstract
The Ottoman Empire was governed from five palaces since its foundation. Dolmabahçe Palace, the last palace where the Ottoman Empire was governed in the 19th century, consists of two main parts. These parts are Harem-i Hümayun (women's world) and Mabeyn-i Hümayun (men's world). Mabeyn-i Hümayun is defined with state affairs and potency. Harem-i Hümayun is associated with concepts such as the sultan's house, private life and women. In the Ottoman Palace there is a dynamic structure formed by the needs for daily life and traditions. However, it has always been a place reserved for women's use. This study focuses on Harem-i Hümayun, especially to the Valide Sultan's Residence and examines the gender-space-furniture relationship. Valide Sultan's Residence is located in Harem-i Hümayun of Dolmabahçe Palace and constitutes the focus of the study. Banquet Hall (no.106), living room (no.110), bedroom (no.111), sofa (no.112), Valide Sultan's bedroom (no.114) and main room (no.115) which are located in Valide Sultan's Residence were selected and examined. Archival research and on-site observations were made in the literature review of the study. Data on the use of space and furniture were collected by the literature review. In line with the collected data, the spaces were evaluated under the categories of space organization, the relationship between each other and interior design. The studies available on the subject have been examined and their approaches to the subject have been evaluated. As the result, it has been determined that there is a hierarchical relationship between gender-space-furniture. This hierarchical relationship originates from both space and gender (or user) and these two concepts support each other. In this context, the study is an evaluation proposal made on the spaces and furniture of Valide Sultan and focuses on the traces of the gender-space-furniture relationship on each other. The relationship between gender and furniture can also be discussed through the hierarchy of space. This determination makes it possible to re-evaluate the interior design in the 19th-century Ottoman Palace in the context of the power-gender relationship. Since Harem-i Hümayun has a inward-looking (internal) structure and identity, there are difficulties in accessing materials such as documents, photographs etc. Besides, some rooms in Valide Sultan Residence could not be examined, because they were not included in the sightseeing route. Thus, this study is limited with the halls, rooms and spaces, which can be visited without any special permission. It is possible to work in more detail for such studies by obtaining special permission. In addition, more comprehensive studies can be carried out by obtaining special permissions from the relevant institutions. As the result of such studies, knowledge can be obtained about other furniture in the archive that the audience has not seen because the objects exhibited in a museum-palace are the common cultural heritage of all humanity.
Key Words: *Dolmabahçe Palace; Harem-i Hümayun; Ottoman furniture; gender; interior design*

1.Introduction

Gender and space are phenomena shaped by the same social norms, belonging to the same cultural structure and directly or indirectly related to each other. In this context, the relationship between space, which is the primary subject of architecture, and gender defines a large area of interest and includes many different perspectives. The Ottoman Empire was ruled from 5 palaces since its foundation, these are Bursa Palace, Edirne Palace, Istanbul Old Palace (Saray-ı Atik-i Amire), Istanbul Topkapı Palace and Istanbul Dolmabahçe Palace. Of these palaces, only Dolmabahçe Palace is a 19th-century building and only the furniture in Dolmabahçe Palace overlaps with today's furniture typology. Therefore, Dolmabahçe Palace was chosen for this study. At this point, the study focuses on the use of space, especially by Valide Sultan, who was a female administrator in the 19th-century Ottoman Palace. It is aimed to examine the relationship between space and furniture within the scope of gender in the Ottoman palace. In this direction, in the first two parts, the concept and the spatial setup of the Harem-i Hümayun of the Dolmabahçe Palace were explained and analyzed. In the third part, the concept of Valide Sultan was mentioned. In the fourth part (the research findings) the spaces and furnitures used by Valide Sultan were examined in detail. In the last part evaluations and results are presented.

2.The Concepts of Harem-i Hümayun

The word harem originally "haramu(m)" in Akkadian, means "to cover, hide, protect from others, separate,

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isolate" also means "protected, holy and venerable thing or place" in Arabic. The sections in houses, mansions and palaces are also called harems, which are generally planned to face the inner courtyard, where women continue their daily lives without encountering foreign men. The cities of Mecca, Medina, Jerusalem, Halil and the holy spaces in those cities, where disrespectful behavior is prohibited and people go mostly for worship, are called harem. The word also means "wife" [1]. Harem literally refers to a place where entry is prohibited or under control and in which certain people or certain forms of behavior are prohibited. The parts of a household pertaining to private life and the women living there are also called harems. This is due to the fact that Islam restricts entry to these sections, especially for men who do not have a particular blood relation with the women of the household (namahrem). Harem is a term of respect, evoking religious purity and honor [2]. In the Ottoman tradition the term "Harem" was commonly used to describe the private area where the sultan's household lived, although the original term was "Darussaade". The sultan's household consists of the valide sultan, his wives and children, live in the Harem. In addition, the people who do the maid services in the Harem and the administrative staff who manage these services also took part in the Harem [3]. Topkapı Palace immediately comes to mind in harem discussions in the Ottoman Empire. When Topkapı Palace or Dolmabahçe Palace is mentioned, it should not be assumed that this is the sultan's house and the place where he lived with his family. The only place where the Sultan lived with his family was the Harem, which is a section of palace [4]. Although the Harem existed in the Ottoman palace since its foundation, its organization was realized during the reign of Fatih Sultan Mehmed and this organization was developed with the devshirme system in accordance with the general trend in the state structure. The term Harem-i Hümayun in the Ottoman palace organization includes both Harem and Enderun. Enderun was an educational institution for the training of men who would serve the sultan, the palace and the state, and the harem for women [5]. Harem-i Hümayun was a political institution that integrated the Ottoman dynasty with the Enderun-harem people and formed the staff that would rule the state. It has undertaken to train staff for public order. For this reason, the Enderun and the harem organization in the palace, known as the Harem-i Hümayun in the classical Ottoman period, showed integrity and became official as an indispensable institution of the state [6].

3.The Architectural Structure of Harem-i Hümayun in Dolmabahçe Palace

Dolmabahçe Palace, which is the architectural reflection of the 19th century Ottoman palace organization and life, was built on the Bosphorus coast between 1843 and 1856 by the order of Sultan Abdülmecid. It has the influence of European palace architecture, consisting of 3 main sections called Mabeyn-i Hümayun (men's section), Muayede Hall (Ceremony Hall) and Harem-i Hümayun (women's section). The interior of Dolmabahçe Palace, which is similar to European palaces in a symmetrical and successive order of spaces within a single building, consists of sections formed by room groups arranged around large halls [7]. In Dolmabahçe Palace, the plan scheme consisting of middle sofa+four iwans+corner rooms or middle sofa+two iwans+corner rooms was used [8]. Dolmabahçe Palace Harem section consists of three basic sections arranged for the sultan, the valide sultan, the wives of the sultan's (kadınefendi and ikbal), the princes and the princesses. In addition, there are guest rooms for the people who need to be hosted in the Harem. Also there are spaces and rooms used by masters, journeywomen and concubines. The three main sections of the Harem are the Harem Sultan's Residence, the Valide Sultan's Residence and the Kadınefendi / İkbal Residence (sultan's wives residence). Hünkar (Sultan) and Valide Sultan Residences are located parallel to the sea. The Kadınefendi / İkbal Residence (sultan's wives residence) are located perpendicular to the sea. There are 10 residences in the Harem and all of them are built as 4 floors: basement, ground floor, first floor and attic.

3.1.*Harem Sultan's Residence (Harem Hünkar Dairesi)*

The Ottoman Sultan lived in the "Hünkar Residence" the first and most magnificent residence of the Harem-i Hümayun. The first floor is the living area of the sultan, and the basement and ground floors are reserved for the masters, journeywomen and concubines. The Harem Sultan's Residence is located between the Mabeyn and the Harem. The Harem is separated from the Mabeyn by a long corridor and solid doors. On the Mabeyn side of the corridor the mabeyn-specific officers, on the side of the Harem, the harem-specific officers kept watch. The relationship between the Harem and the Mabeyn was maintained by officials who gained the sultan's trust. The rooms and halls of the Harem Sultan's Residence have very rich decoration. The most magnificent room of the Harem Sultan's Residence is the Red Room (Domed Room) with the number of 62, which is also the main room of the sultan's residence. Sultan Abdülmecid had decorated this room by the famous French decorator Charles P. Sechan. The sultan accepted his wives, his children and members of the dynasty to the meetings in this room. Another important room of the Harem Sultan's Residence is the Blue Hall with the number of 67 (Sultan's Sofa, Divanhane-Banquet Hall) decorated by Charles P. Sechan. This magnificent hall of the palace was used twice a year for the Harem's ceremonies. Starting from the reign of Sultan Abdülmecid, all the sultans who lived in this palace used Blue Hall, especially for the dynasty and the harem ceremonies. Another importance of the Sultan's Sofa is that it is a symbol of the limited participation of the Harem-i Hümayun in the state ceremony. The wives of the foreign heads of state or their representatives were hosted here by the valide sultan or sultan's first wife who is called Baş Kadınefendi [9].

3.2.*Valide Sultan's Residence (Queen Mother's Residence)*

On the first floor of the Valide Sultan's Residence, the Valide Sultan Divanhanesi (banquet-hall) numbered 106 (also called Sofa with Balcony, Pink Room), the corridor numbered 109, the living room numbered 110, the bedroom numbered 111 (Tiryal Hanım's room), the Valide Sultan Sofa's (Japanese Hall) numbered 112, the corridor numbered 113, the bedroom numbered 114 (Pertevniyal Valide Sultan's bedroom), Valide Sultan's Main Room (Adile Sultan's room) numbered 115, sofa numbered 116, room numbered 117, guest room numbered 118 (forewoman's room), sofa numbered 119, guest room numbered 120, room numbered 121 (Fatma Sultan's room) and valide sultan bath are located. On the ground floor the laundress master's room is numbered 128, the laundry room numbered 133 guest rooms numbered 127-103-106 and 102, rooms for journeywomen numbered 131 and 132, and the room for journeywomen is responsible for the place called Meşkhane where music and art activities are carried out and the Turkish bath used by journeywomen numbered 34-2; on the basement floor, there were the boxer master, the cellar master, the coffee master, the pitcher (ibrik) master, the journeywoman's room and the rooms used by the concubines in her entourage are located. The gate that opened out from the harem garden was called the Valide Gate (Harem-i Hümayun Sultanate Gate) and the entrance and exit of the harem's women to the palace was made from here. Concubines and other officers used a different gate called the Car Gate for entrances and exits.

3.3.*Sultan's Wives' Residence (Kadınefendiler Dairesi)*

More privacy is provided visually by positioning the Sultan's Wives' Residence on the part of the harem perpendicular to the sea. It is the only section in the Harem that does not have a seafront. It is necessary to pass through the Valide Sultan's Residence in order to pass from the Sultan Wives' Residence to the Sultan's Residence, but there is also a very special corridor that provides the passage from the Sultan Wives' Residence to the Sultan's Residence. Despite some minor differences in terms of layout and architectural elements, all eight wives' residences were designed as repetitions of each other. Only Valide Sultan's Residence has completely different architectural and design features. This situation is the reflection of the power and hierarchy of the Valide Sultan in the Harem-i Hümayun on architecture.The residences where the sultan's wives and children living are arranged as four floors. On the first floor are located the bedroom of the owner of the residence, the living room, the Sakal-ı Şerif room (pray room), the bedrooms of the princes and the princesses and the forewoman's or head concubine's room. On the ground floor a bedroom, dining room, rooms for journeywomen; in the basement dishwashing room, pantry, laundry and rooms for novice concubines; on the roof rooms for journeywomen and various service units are located. There are toilets and hand washbasins on each floor, as well as service stairs and storage areas that connect the floors.

4.The Ottoman Palace and Women's Sovereignty / The Concept of Valide Sultanate

The absolute sovereign and head of the harem is the valide sultan. She is the female sovereign in the dynasty. Until the reign of Sultan Murad III, this position was called "Mehd-i Ulya-yi Saltanat". During the reign of Sultan Murad III, the term Valide Sultan was established and continued in this way. [10]. Contemporary historical expressions of the rise of the Harem-i Hümayun have tended to portray the influence of the harem as an illegitimate usurpation of power. But the power of the women of the Ottoman sultan's family was broad and publicly expressed, embedded in the structure of imperial institutions, to be dismissed as illegitimate. Sovereignty has various forms of expression, and women have been an important force in the creation of the dynastic image. The women of the sultanate, who participated in the sultanate ceremonies and processions that strengthened the loyalty of the subjects, and increased the quality of urban life by protecting charities, foundations and culture, were the living symbols of justice, piety and generosity, which were the most valued qualities of the sovereignty [11]. Changes in the Ottoman State and society in the 16th and 17th centuries led women of the sultanate to participate more in such expressions of sovereignty. At this point, two important developments increased the influence of women and their ways of reaching power sources. First of all, the increasing importance of the imperial palace as the center of government enabled women to be physically closer to the sultan and created more opportunities for them to weave their networks of influence. Secondly, the change in the enthronement system resulted in the valide sultans playing a more central role [12]. Until the middle of the 16th century, the sultan's family lived in the Old Palace (Saray-ı Atik-i Amire). The wife of Kanuni Sultan Süleyman (Suleiman the Magnificent), Hürrem Sultan, moved to the New Palace (Topkapi Palace) in 1534, and Nurbanu, the wife of Sultan Selim II, used this place as a residence. Thus, the harem of the New Palace gradually expanded and became a place where the sultan lived with his family [13]. Until 1583, the mothers of the princes went to the sanjak (starboard) with their sons. Later, the sultans who came to the throne left this system and did not allow the princes to go to the sanjak (starboard) again. They began to keep them under strict surveillance in a flat of the Topkapı Palace. Thus, the male members of the dynasty took their place in the harem [14]. The prominence of the Valide Sultan took place with the transfer of the sultan's family to Topkapı Palace and the abandonment of the process of ascending to the starboard due to the struggle for the throne and the gathering of the sultan's family in the harem [15].

5.The Research Findings

Since Bezmialem Valide Sultan, the noble owner of the harem, the mother of Sultan Abdülmecid, passed away before the Dolmabahçe Palace was opened for use, this residence was mainly used by Pertevniyal Valide Sultan, the mother of Sultan Abdülaziz (approximately 15 years), after losing power as a result of a revolution by Şevkiefsar Valide Sultan, the mother of Sultan Murad V, lived in this residence for a short period of about three months [16]. Therefore, the first valide sultan who lived in the harem of Dolmabahçe Palace was Pertevniyal Valide Sultan, and the last valide sultan was Şevkiefsar Valide Sultan.

5.1.Pink Hall, Valide Sultan's Banquet Hall (hall numbered 106)

Today this sofa is called the Pink Hall, was also called the Valide Sultan Divanhanesi (Valide Sultan's Banquet Hall) during the Ottoman period. It is separated from the Sultan's residence by a door, and its decorations are simpler than the Blue Hall. Valide sultan and sultan's wives used to host their special guests in the Pink Hall. Some family meetings and entertainments with the participation of the Sultan were also held in the Pink Hall. The Pink Hall was also used by Atatürk. Different sitting sets can be seen in the Pink Hall in fig. 1a and 1b. However, in the study belong to Feryal İrez titled XIX. Century Ottoman Palace Furniture [17] the seating set in the photo is the same as in the fig. 1b. This situation raises doubts about the original sitting set of the living room and requires a deeper research.

Fig. 1. [a] The sitting set currently in the Pink Hall [18]. [b] Sitting set seen in 1989 and 2003 [19].

5.2.Living Room, Guest Room (room numbered 110)

This room, which was arranged as a bedroom today, was used as a guest (living) room by the valide sultan. Sultan Abdulhamid II's wife, Bidar Kadınefendi, spent her puerperal days in this room after giving birth to their daughter, Naime Sultan. İsmet İnönü (the second president of the Turkish Republic) also used this room. Different sitting groups can be seen in the Valide Sultan's living room in fig. 2a. and 2b. The constructions of the seating furniture are very similar, but the upholstery fabrics are different, suggesting that the upholstery fabrics may have been renewed.This requires in-depth research.

Fig. 2. [a] Valide Sultan's guest/ living room (2022) [20]. [b] Valide Sultan's guest/ living room (2003) [21].

5.3.Bedroom, Tiryal Hanım's Room (room numbered 111)

This room (Fig. 3) which is now arranged as a bedroom, is the first bedroom of Pertevniyal Valide Sultan, the mother of Sultan Abdulaziz. This room was allocated to Tiryal Kadınefendi, one of the wives of Sultan Mahmud II. This room has a simpler decoration than the room numbered 110. The sitting furnitures are in late 19th century neoclassical style.

5.4.*The Sofa of Valide Sultan, Japanese Hall (sofa numbered 112)*

This sofa is (Fig. 4.) also known as the Japanese Hall because of the Japanese-style furniture and decorative objects used in the furnishing. It is connected to the ground floor by stairs and to the last door which is opening to the sea front of the palace. Its central location is considered to be a passage hall or a space where guests to be accommodated in the residence for a while.

5.5.*Pertevniyal Valide Sultan's Bedroom (room numbered 114)*

This room (Fig. 5.) was used as a bedroom by Pertevniyal Valide Sultan, the mother of Sultan Abdulaziz. The bedstead, mirrored wardrobe and enema, which is the main furniture group of the room, were taken as a set. It is a set in rococo style, decorated with gilding on white lacquer and floral motifs in blue-green-pink colors. The consoles in the room are white lacquered in harmony with the bed, wardrobe and enema. Neoclassical style armchairs, chairs and lounge chair are in harmony with the general design concept of the room. This room was used as a servitor room when Atatürk was stayed in the palace. During the İsmet İnönü period, it was allocated to his son Erdal İnönü.

5.6.*Valide Sultan's Main Room, Adile Sultan's Room (room numbered 115)*

This room (Fig. 6.), arranged today as the bedroom of Sultan Mehmed V. Reşad, was the room where the Valide Sultan hosted the Sultan and the prominent members of the dynasty during the Ottoman period. Among the carved

decorations of the bedding set, the initials of the Sultan's name "MR" (Mehmed Reşad) are engraved. This room is reserved for honored guests of the Valide Sultan’s Residence. During Atatürk period, it was used as the general secretary's bedroom.

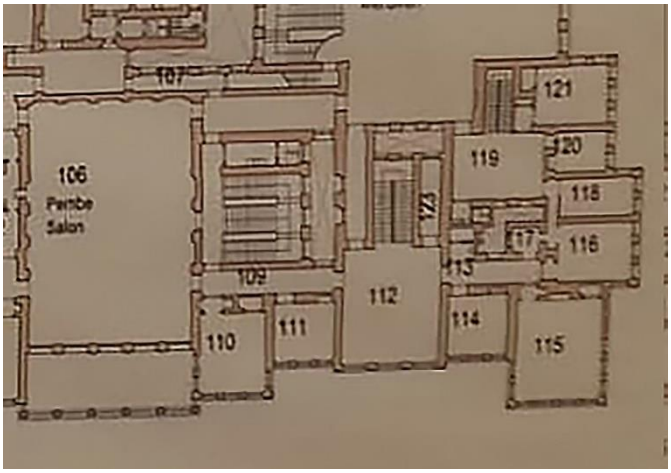

Fig. 7. The plan of the Valide Sultan Residence.

The furniture inventories and furniture styles in the selected rooms and halls can be seen in Table 1 as a result of the site inspection made on the sightseeing route of Dolmabahçe Palace. All the rooms in the Valide Sultan Residence could not be examined because they were not included in the sightseeing route. The ones included in the study consist of the rooms and halls on the excursion route. In the Fig. 7. there is a plan diagram showing the relationship between the rooms and halls in the Valide Sultan Residence.

Table 1. Inventory and style information on some rooms from the Valide Sultan Residence.

NAME OF THE ROOM	NUMBER OF THE ROOM	FURNITURE INVENTORY	FURNITURE STYLES
Pink Hall, Valide Sultan Banquet Hall	106	2 medallion-back sofas, 4 tables, 4 armchairs, 2 cabinets, 12 chairs	Rococo, Baroque, Eclectic
Living Room, Guest Room	110	1 bed, 1 cupboard, 1 table, 2 poufs, 1 mirrored console, 3 chairs, 3 armchairs	Baroque, Neo-classical
Bedroom, Tiryal Kadınefendi's Room	111	1 bed, 1 writing desk, 1 bedside table, 1 mirrored console, 1 table, 1 sofa, 2 armchairs, 3 chairs	Neo-classical
Valide Sultan's Sofa, Japanese Hall	112	4 cabinets, 1 mirrored console, 1 table, 17 chairs, 4 armchairs, 1 sofa, 4 coffee tables	Japanese type and Rococo
Pertevniyal Valide Sultan's Bedroom	114	1 bed, 1 wardrobe, 1 bedside table, 1 enema, 1 table, 2 chairs, 3 armchairs, 1 lounge chair, 2 wall consoles, 1 mirror cabinet	Neo-classical and Rococo
Valide Sultan's Main Room, Adile Sultan's Room	115	1 wardrobe, 1 bed, 1 dressing table, 1 mirrored console, 1 table, 1 sofa, 5 chairs, 3 armchairs	Baroque, Neo-classical, Rococo

6.Evaluation and Conclusion

The increase in Harem-i Hümayun's power was an important development for the 16th century Ottoman Empire. From the beginning of Kanuni Sultan Süleyman's reign until the middle of the 17th century, prominent women in the Ottoman family gained great political power and public importance. This period of the empire's history is called the "Reign of Women" (1533-1656)". In this period, Valide sultans and Haseki sultans used their political power directly, created political groups within the dynastic family, negotiated with foreign states and became regents for their sons. They played a central role that gave legitimacy to the sultanate, in the public rituals, the construction of monumental buildings and artistic production under the protection of the sultanate.

The absolute dominance of the Valide Sultan in the Harem-i Hümayun was also expressed in architecture. Valide Sultan Residence was positioned as the second space after the Sultan's residence in the palaces both in the classical period and in the 19th century. The juxtaposition of the Valide's Residence and Sultan's Residence is the continuation of a settlement tradition in classical palaces seen such as Edirne Palace. The plan scheme, service stairs, doors and corridors of the Valide Sultan Residence are indicative of the constantly moving functional position of this residence. The Valide Residence has two main entrances, one from the Sultan's Residence and the other from the Kadınefendiler's Residence. Only Valide Sultan's Residence opens directly to the Sultan's Residence among the Harem residences and so its decoration is completely different from the other harem residences. The privileged features of this residence are concrete proof that the Valide Sultan was the sole ruler of the harem and the protector of the sultan's family. This situation is also reflected in the furnishing and architectural position of the residence. The Valide Sultan Residence is located between the Sultan's Residence and the Kadınefendiler's Residence. This positioning ensured that the space was suitable for monitoring, controlling and observing the harem and to reach every part of the harem. This privilege in architecture is the result of Valide Sultan's position as the ruler of the harem and the protector of the dynasty [26].

The westernization movement, which gained momentum in the 19th century, was also reflected in the lifestyle. The western style palaces built during and after the Tanzimat period and the arrangement of these palaces with western furniture are also an important part of the change. In the years of the Ottoman westernization people who lived in the palace started to move away from the traditional ways of sitting and
lying in their daily life and began to act like European, while in the West, all the furniture styles that are the subject of art history had completed their life. Although the eclectic style have emerged, the styles of the past periods were also produced. So much so that it is possible to come across every style developed by the West starting from the Renaissance in the furniture collection of Dolmabahçe Palace during the 19th century. The point to consider when evaluating furniture is that they were all produced in the second half of the 19th century and no piece can actually be called a true baroque, rococo or neoclassical item [27].

Although her power changed periodically, Valide Sultan is the female administrator in the Ottoman Palace in every period. At this point, the visual language of the spaces and furnitures in Valide Sultan Residence represents the Ottoman Power. Although it does not prevent the Sultan's Residence, it can be said that interior arrangement and furniture selections were made considering the power that valide sultan represents. The architectural structure

and the furnitures of Dolmabahçe Palace presents a unique approach. Thus, it can be interpreted as the presentation of the styles developed in Europe, blended with the Ottoman identity.

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RETHINKING STATIC TYPOLOGIES: NEGOTIATING TERRITORIES FOR DYNAMIC EXPERIENCES IN CORRIDORS WITHIN HYPERDENSE ASIAN CONTEXT

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Abstract

Architects and interior designers have traditionally relied on established spatial typologies to design buildings and spaces. The typological classification categorises buildings and spaces into various functional territories, which are expressed through spatial layouts, programmatic configurations, and corresponding characteristics of materialisation (Dostál & Saey, 2020 [1]). This approach places a strong emphasis on the control exerted by designers and architects over spatial structures and functions, prescribing "what and how humans do" within an environment. However, in the hyperdense conditions found in cities like Singapore and Hong Kong, which rank as the second and third densest cities in the world, spatial functions in these contexts have merged and now exist as multi-layered temporal spatial types. The compression of everyday life within these densely populated interiors blurs the boundaries between different spatial territories, rendering conventional room divisions, zones, and areas irrelevant. Instead, some spatial functions of the interiors have been externalised, seeking expression in various threshold spaces and types of corridors. In light of these hyperdense Asian contexts, this paper aims to study how individuals make use of different types of corridor spaces, thereby blurring the boundaries between functional territories. As a result, the distinction between public and private, design objectives and subjective user experiences, and even the boundaries between interior and exterior spaces become obscured.

Methodologically, the paper will first establish an experiential-behavioural-spatial framework that problematises the conventional understanding of 'typologies.' Considering the cultural characteristics and living practices in Asia, this framework addresses the importance of habitual negotiation in hyperdense contexts – a process that reveals the descriptive definitions of spatial typologies into dynamic notions of habits and experiences rather than pre-defined ones. Employing the findings from an empirical study on human-spatial negotiations in Singapore and Hong Kong, this paper will focus on the examples of how shared corridor spaces have been used and perceived within the typology of public housing complex. The result will highlight the operative and descriptive features of how corridors become the venues for diverse possibilities of cultural and habitual events to occur in both cities. Ultimately, three negotiation strategies will be generalised, to conclude the necessity for spatial designers and researchers to consider the negotiation of territories as a new design method that responds to the ever-changing needs of individuals in hyperdense contexts. This includes the rethinking of threshold spaces usages and creating spaces that are prepared and ready for fast-changing conditions, which are characterised by fluidity and temporality, and maximising dynamic experiences within a static typology.

Key Words: *Hyperdensity; Negotiation; Corridrs; Dynamic Experiences; Human Behaviours*

Introduction

The Struggle of Spatial Compression in Hyperdense Asian Contexts

In the domain of urban habitation for hyperdense living, the Asian cities of Singapore and Hong Kong persist as two of the most densely populated cities. Singapore, ranked as the second most densely populated city worldwide, accommodates approximately 8,100 individuals per square kilometer. Conversely, Hong Kong, the third most densely populated city, surpasses 6,700 individuals per square kilometer (World Population Review, 2023 [2]). Notwithstanding Singapore's higher population density, its residents enjoy comparatively more spacious living arrangements in contrast to their counterparts in Hong Kong. The average area of living space within Hong Kong's public housing stands at 46.6 square meters (South China Morning Post, 2023 [3]), whereas Singapore's public housing units offer 82 square meters.

Fig. 1. Multi-layering of urban interior complexes in Hong Kong (left) and verticality of compacted living units in Singapore (right).

The construction of numerous contiguous skyscrapers, the highly compacted interior layouts of buildings, and the ample storage capacity within confined spaces collectively manifest an acute sense of extreme spatial compression amidst limited land availability. Fig.1 showcases the multi-layering of urban interior complexes in Hong Kong (left) and the vertical stacking of compacted living units in Singapore (right), in which the two cities express a strong notion of spatial compression – a volumetric expression that entails the multi-layering of spatial functions (Bruyns et al., 2022 [4]). In light of the concurrent reduction in available spaces and the intensification of aspirations for expanded spatial capacities, living in these limited-sized buildings and hybrid collective dwellings becomes a distinct challenge as inhabitants must tactically adapt to compact spaces that defy conventional notions of spatial functionality and boundaries. The compression of space has far-reaching implications for how people interact with and navigate their surroundings, particularly within the interior settings of these densely populated Asian cities.

Habitual Compression: The Multi-Layering of Spatial Functions and Human Activities

Given the aforementioned hyperdense living conditions, it is imperative for residents to promptly implement spatial adjustments and interventions (Bruyns, 2018 [5]; Lee & Kousoulas, 2021 [6]). Conversely, in an effort to optimise functional capabilities while minimising spatial demands, some inhabitants would collectively and temporarily utilise certain public spaces (Lee, 2020 [7]). For instance, in the context of public housing in densely populated Asian cities, individuals externalise various cultural practices and activities to shared corridors among residents. Hence, the main objective of this study is to empirically investigate the usage of shared-corridor spaces in public housing complexes in Singapore and Hong Kong. The aim is to uncover the intricate dynamics of spatial experiences in these shared corridors, including the accommodation of dynamic patterns of usage, as well as the experiential qualities on a habitual basis that reflect a sense of cultural territories (Song, 2012 [8]). This tactical approach acknowledges the dynamic patterns of habits and events within dense conditions. Additionally, this paper addresses the concept of habitual compression, resulting in the blurring of boundaries between functional territories and the utilisation of corridor spaces. Moreover, the multi-layering of cultural-spatial territories leads to the obscuring of boundaries between interior and exterior spaces, design objectives, subjective user experiences, and even the merging of boundaries between private and public spaces within these densely populated contexts. Furthermore, to enhance our understanding of the cultural characteristics and prevalent living practices, an experiential-behavioral-spatial framework will be established. This framework critiques the static notion of spatial typologies and embraces dynamic concepts based on habits and experiences, rather than fixed constructs. It emphasises the significance of habitual compression within densely populated environments, acknowledging the transformative nature of threshold spaces in densely populated Asian cities. In this regard, these spaces transcend the conventional role of corridors as mere circulation paths and instead become fluid zones that accommodate a variety of activities, connecting diverse functional areas and enabling various events to take place within the built environment.

Problematising the Static Notion of Spatial Typology in Hyperdense Asian Contexts

From Static Typology to Dynamic Experiences

Typology, in the context of spatial design and architecture, involves the classification and categorisation of spaces based on their functions, characteristics, and intended uses. In the book "Vers une architecture (Towards a New Architecture)" (Le Corbusier, 1923 [9]), it emphasised the importance of understanding and designing spaces according to their inherent functions and qualities. This approach entails organising spaces into distinct typologies, each with its predefined attributes and purposes. However, the hyperdense conditions prevalent in cities like Hong

Kong and Singapore have prompted a reassessment of these typologies. In light of contemporary urban development in hyperdense Asian cities, a complex network of cultural-spatial territories emerges—a fusion and compression of various spatial types. Lee (2020) [7] describes this phenomenon as an intensive tactical negotiation between interior and exterior spaces. The interconnectivity of private properties and infrastructures reflects urban compaction (Bruyns et al., 2022 [4]) and results in the hybridisation of programmes and functionalities within an environment. Simultaneously, the radical interiorisation and fragmentation of spaces contribute to an increasingly dense condition that challenges the conventional expression and static nature of typology.

For instance, Hong Kong has seen the emergence of compact typologies such as subdivided units and 'cage homes', offering affordable dwelling solutions with shared facilities. These configurations reduce homes to compact rooms or even individual bed spaces, limiting the conventional practices associated with a typical 'home'. However, they still function as collective dwelling solutions, providing relatively multifunctional spaces that compress the diverse potentialities for human activities. As spatial functions merge and coexist as multi-layered temporal spatial types, the traditional divisions of rooms, zones, and areas become increasingly irrelevant. Architects and interior designers, who traditionally rely on established spatial typologies to conceive and design buildings and spaces, now face a new reality where spatial functions merge and manifest as multi-layered, temporal spatial types. The compression of everyday life blurs the boundaries between different spatial territories, rendering the notion of typology as a static boundary obsolete. Instead, typology becomes a derivative constituted by the inhabitants' lived experiences—a notion of territoriality that shapes and describes spaces in a temporal sense. According to Sack (1986) [10], territoriality refers to the human behavioural attempt to influence, affect, or control objects, people, and relationships by delimiting and asserting control over a geographic area. Thus, it is necessary to move beyond the static notion of typology in design and engage in critical reflection that explores the intricate dynamics experienced among typologies. Within the context of hyperdense Asian cities, particular attention should be given to the blurring of boundaries between functional territories and the utilisation of corridor spaces.

The Experiential-Behavioural-Spatial Framework

In response to the evolving urban landscape and the challenges posed by hyperdensity, this study proposes an experiential-behavioural-spatial framework that seeks to challenge traditional typologies and prioritise the understanding of dynamic spatial experiences. Unlike static typological classifications, the framework acknowledges the influence of individuals' lived experiences and practices on their interactions with the environment. It emphasises the relationality between individuals and their surroundings and recognises the significance of habitual negotiations in shaping spatial experiences. Habits, formed through daily practices and living, play a crucial role in how individuals navigate and interact with their surroundings. By understanding and accommodating these habitual negotiations, spatial designers can create environments that effectively respond to the diverse needs and practices of the inhabitants.

Furthermore, the framework connects with the concept of territoriality, particularly in the context of hyperdense Asian cities. The blurring of boundaries between functional territories (typologies) becomes apparent as spaces merge and coexist in a multi-layered temporal sense. This challenges the conventional notion of typology as static boundaries. Territoriality takes on a temporal dimension, shaping and describing spaces based on the lived experiences of the inhabitants, in which the construction of functional territory arises from tactical habits as territoriality. As defined by Raffestin (2012) [11], territoriality encompasses the network of relationships that a society establishes with the external world and diverse entities to fulfil its needs while striving for maximum autonomy within available resources. On the other hand, territoriality refers to how individuals embody themselves within a space, resulting in a territorial production (Lee, 2020) [7]. By incorporating these different approaches, a functional territory should be re-approached as a cultural-spatial product of territoriality—a portion of space used and experienced by the inhabitants. This dynamic understanding of territoriality enables designers to capture the intricate dynamics experienced among different typologies. By considering the interplay between territoriality and the habitual negotiations of individuals, designers can create spaces that facilitate fluid interactions and adapt to the evolving needs of hyperdense environments.

In summary, the experiential-behavioural-spatial framework challenges traditional typologies by embracing the dynamic nature of spatial experiences and the importance of habitual negotiations. It recognises the influence of individuals' lived experiences and practices on their interactions with the environment. Furthermore, by connecting with the concept of territoriality, designers can better understand and respond to the blurring boundaries between typologies in hyperdense Asian cities. Fig. 2 shows the three stages of the experiential-behavioural-spatial framework: unveiling the conventional nature of static typology, critically examining and redefining the potential

of spaces, and emphasising the negotiation within cultural-spatial relations. These stages explore the boundaries between spatial elements and human experiences, redefine operative systems, and highlight the intricate connections between cultural experiences and spatial elements.

Fig. 2. The three stages of the experiential-behavioural-spatial framework.

In Stage one, the focus lies on unveiling the conventional nature of approaching static typology, which predetermines the functionalities of various spaces. The objective is to reveal the experiential and behavioural qualities inherent in these conventional typologies. This stage involves the delineation of boundaries, shifting the perspective from spatial elements to humans themselves. It explores how materials and spatial functions can exert control over human behaviour and shape their experiences within the environment. Stage two involves a critical examination of the conventional approach to static typology, emphasising the prioritisation of dynamic experiences. The aim is to comprehend the intricate interplay and exploration of diverse behavioural and experiential compositions. This stage seeks to redefine the potential of spaces through a boundary-drawing process. Here, the focus shifts from humans to spatial elements, exploring how humans inhabit and utilise spaces within an environment and subsequently redefining the operative systems of materials and spatial functions. Stage three, the emphasis is on negotiation within the realm of cultural-spatial relations. It involves the (re)negotiation of experiences, behaviours, and spaces, highlighting the intricate connections between cultural experiences and spatial elements. It considers the tactical responses of inhabitants as an emerging form of technology – a technology that is not merely a tool or an object but is integrated as part of human life and culture (Kousoulas, 2018) [12].

Empirical Study: Usage and Experiences in Corridor Spaces of Hyperdense Asian Contexts

Target Group of Study

In hyperdense Asian cities like Hong Kong and Singapore, public housing complexes provide vital affordable housing solutions. This study focuses on the diverse residents of these complexes, who face limited financial resources. They lead modest lifestyles, emphasising practicality and functionality in their living arrangements. Despite compact living spaces, residents creatively interevent and adapt their surroundings to optimise their limited area while maintaining comfort and identity. Focusing on the tactical usage of shared corridors in public housing complexes, which hold significant importance as shared spaces that foster social interaction, community bonding, and cultural expressions.

Sites of Study

With reference to the established experiential-behavioural-spatial framework, empirical investigations were undertaken in Singapore and Hong Kong with the aim of illuminating the corridors' potential to redefine spatial functions and habitual values within densely populated Asian contexts. The study focused on examining the usage and experiential dimensions of corridor spaces within public housing complexes, which serve as representative exemplars of the hyperdense living conditions prevalent in these cities. In particular, the study honed in on a specific public housing complex in each city, conducting a comparative analysis of the residential shared corridors situated on the upper residential floors. Fig. 3 and fig. 4 provide an overview and detailed depiction of the studied sites in Hong Kong and Singapore, respectively. By employing the method of photo documentation and conducting meticulous walkthroughs in both daytime and nighttime within the public housing complex, empirical observations and analyses were conducted to discern the activities and usages manifested within the corridor spaces.

Fig. 3. Overview of the public housing complex in Hong Kong (left) and the residential shared corridor of Hong Kong (right).

Fig. 4. Overview of the public housing complex in Singapore (left) and the residential shared corridor of Singapore (right).

The overarching objective was to categorise these activities and usages, accentuating the operative and descriptive features of corridors as cultural and habitual event venues. Of particular interest was the exploration of cultural-spatial conditions and the nuanced negotiation between temporal moments, ownership dynamics, and interior-exterior relationships within these corridors. Furthermore, a comparative analysis between the Hong Kong and Singapore cases was carried out to examine the differences and similarities within the corridor spaces of these densely populated and culturally diverse Asian contexts. This analysis focused on parameters such as experiences, behaviours (habits), and spatial expression, contributing to a deeper understanding of the distinct characteristics of corridor spaces in each city. By doing so, the study aims to generalise several key negotiation strategies that provide valuable insights for spatial designers to consider the intricate relationship between culture, space, and human-spatial negotiations in densely populated Asian environments. Through rigorous inquiry, the study aspires to contribute to the scholarly discourse surrounding corridor spaces and their transformative potential within densely populated urban environments. The findings aim to expand our understanding of the multifaceted roles that corridors can assume, surpassing their conventional functions, and underscore the significance of incorporating cultural and habitual dimensions in their design and utilisation.

Results: Multi-layered and Cultural-Spatial Habits in Hyperdense Asian Cities

The empirical study conducted in both Singapore and Hong Kong reveals the existence of multi-layered and culturally specific conditions within the shared corridor spaces of public housing complexes, challenging conventional boundaries and reflecting the notion of spatial compression and complexities inherent in hyperdense Asian cities. The findings highlight the emergence of merged spatial functions within these corridors, where activities and habits blur traditional distinctions. Corridors transcend their conventional roles as mere transitional spaces, assuming the role of venues for diverse events, social interactions, informal gatherings, and the performance of cultural and habitual practices. Notably, the study reveals that the corridors serve as fluid spaces accommodating a wide range of activities. The merging of functions within these spaces allows for seamless coexistence and overlap of different activities. This blurring of spatial functions represents a response to the spatial limitations imposed by hyperdensity, where every available space is utilised to its fullest potential. The corridors adapt to the diverse needs and practices of the residents, reflecting the adaptive nature of the built environment in hyperdense Asian cities.

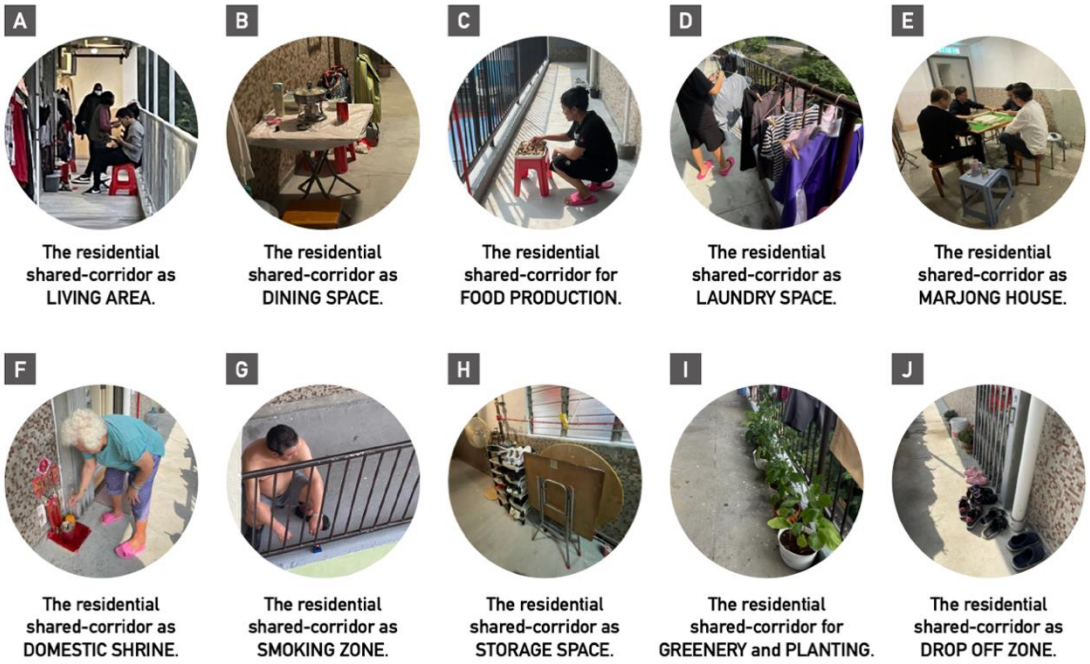

Fig. 5. Summary of the diverse cultural practices and experiences in public housing corridor of Hong Kong.

In the case of Hong Kong, extensive research has led to the identification of ten distinct types of cultural-spatial conditions observed within the corridor spaces of the city. These corridors have transcended their conventional roles as mere transitional spaces and thresholds, evolving into dynamic and lively venues for a wide range of cultural and habitual events. This significant finding emphasizes the deep-rooted importance of corridors in densely populated Asian contexts, where spatial limitations necessitate the exploration of alternative spatial functions. Fig. 5 provides a comprehensive summary of the diverse cultural practices and experiences found within the residential shared corridors in the public housing complex. It illustrates how the spatial-cultural territories, which are essentially the living spaces of the inhabitants, define the temporal "typologies" of the shared corridors at a particular moment in correspondence to their specific usage. The following are instances where the shared corridors transform into spaces for:

(A) Living space: Some corridors are utilised as extensions of residential units, providing extra living spaces for socialising, relaxation, or even makeshift workspaces. (B) Dining space: They become impromptu dining areas, fostering a sense of community and conviviality as residents gather to share meals. (C) Food production space: Moreover, corridors can function as spaces for small-scale food production, accommodating activities like dried food production. (D) Laundry space: Due to spatial constraints within apartments, corridors often become designated areas for laundry purposes, with residents installing clotheslines or utilising fences for drying clothes. In some instances, (E) mahjong houses are created, where residents can engage in the popular traditional game, offering a recreational outlet within the shared environment. Additionally, (F) domestic shrines are set up by some residents, utilising corridors as spaces to facilitate their religious or spiritual practices. Certain corridors are designated as (G) smoking areas, acknowledging the need for a specific space to accommodate smokers while respecting the preferences and health concerns of others in the community. In limited living spaces, corridors become essential (H) storage areas, accommodating various items and possessions. (I) Green areas are created as residents introduce mini-gardens or incorporate potted plants along corridors, enhancing the aesthetic appeal and introducing greenery into the urban fabric. Lastly, corridors serve as convenient (J) drop-off zones for deliveries or for temporarily leaving items, functioning as practical drop-off points.

Fig. 6. Summary of the diverse cultural practices and experiences in public housing corridor of Singapore

Shifting the focus to Singapore, a separate study conducted in a public housing complex identified a total of seven prevalent cultural-spatial conditions within its corridors. (Fig. 6.) The corridors in Singapore offer a distinct potential for redefining spatial functions and habitual values, providing a unique experience within the densely populated Asian context. The prevalent conditions observed within Singapore's corridors include:
(K) Green Areas: Similar to Hong Kong, corridors in Singapore feature green spaces, allowing residents to incorporate plants and vegetation, fostering a connection to nature. (L) Religious Temple: Some corridors in Singapore house small religious temples or altars, offering residents a dedicated space for worship and religious practices. (M) Drop-off Zone: As in Hong Kong, corridors in Singapore function as efficient drop-off zones for temporarily leaving items. (N) Household Welcome Sign: Corridors in Singapore sometimes feature personalised welcome signs or decorations, reflecting the unique identity of the residents. (O) Laundry Space: Due to spatial limitations within apartments, corridors serve as practical laundry spaces, accommodating drying racks. (P) Living Space: Similar to Hong Kong, corridors in Singapore are occasionally transformed into extensions of living spaces, providing additional space for various activities. (Q) Storage Space: Corridors become valuable storage areas for residents to store their belongings efficiently.

Discussion: Negotiation Strategies for Design

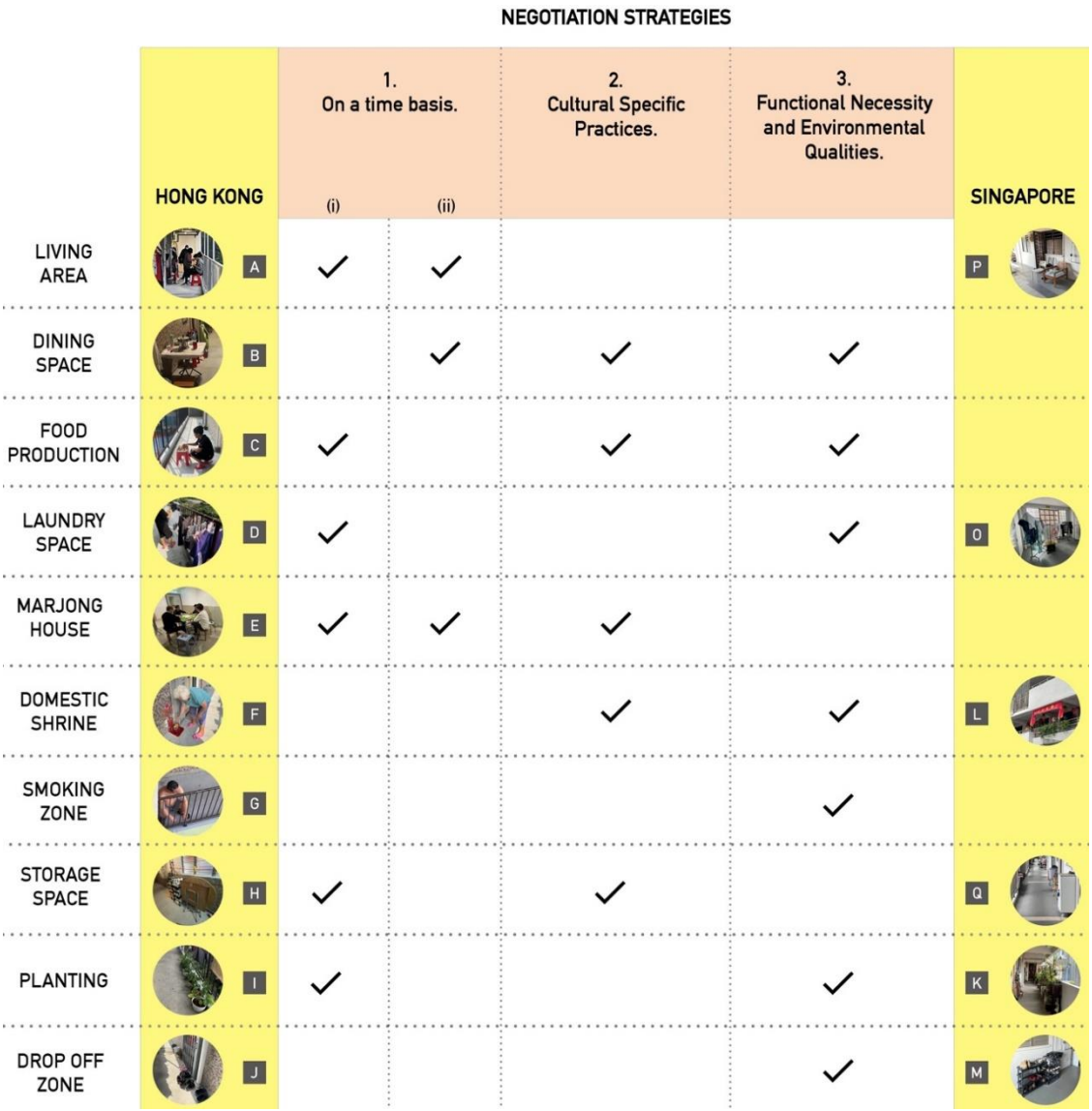

Fig. 7. Summary of the comparative study between Hong Kong and Singapore: Cultural-spatial habits and three negotiation strategies.

Based on the empirical findings regarding cultural-spatial habits within corridor spaces, the discussion should be focused on the exploration and generalisation of three key negotiation strategies. Fig. 7. serves as a summary of the comparative study between Hong Kong and Singapore, consolidating and comparing the cultural-spatial habits observed in Hong Kong while outlining the three identified negotiation strategies. These strategies shed light on the dynamic nature of corridor spaces in hyper-dense Asian cities and underscore the significance of considering them as novel design approaches.

Strategy One: Negotiation on a Time Basis

The first negotiation strategy that emerges from this study revolves around temporal considerations, encompassing both diurnal (day and night) and seasonal variations. For instance, during the day, residents may hang clothes on the fencing, taking advantage of natural daylight for drying purposes. Additionally, they may temporarily store items in the corridor to free up space within residential interiors, maximising the available activity space indoors. However, during the night, these activities are typically moved back indoors. Furthermore, on occasions such as festivals or gatherings, where there is a higher demand for interior spatial usage, residents may externalise certain activities and venues, such as creating dining spaces outside for children.

Strategy Two: Negotiation between Culturally Specific Habits

The second negotiation strategy focuses on the negotiation of cultural and habitual practices within corridor spaces. The empirical study reveals a rich tapestry of cultural, religious, and habitual activities taking place within these shared areas. Residents utilise corridors for prayer, meditation, and other communal rituals, transforming them into significant spaces that reflect and preserve cultural traditions. For instance, temporary domestic shrines may be set up in corridors for ceremonial worship. This negotiation of cultural and habitual practices underscores the necessity of considering the diverse identities and needs of the residents when designing shared environments. Spatial designers must strive to create inclusive spaces that respect and embrace the cultural heritage of the community.

Strategy Three: Negotiation between Functional Necessity and Environmental Qualities

The third negotiation strategy identified in this study revolves around the negotiation of functional necessities within corridor spaces. Residents employ various strategies to enhance the functionality and comfort of these areas. They may install fans, lighting fixtures, seating arrangements, and decorative elements to optimise the usability and aesthetics of the corridors. This negotiation of functional necessities highlights the importance of considering environmental qualities and controls during the design process. By integrating flexible design elements and providing residents with agency over the configuration of their spaces, designers can create environments that adapt to the ever-changing requirements of the community, promoting a sense of ownership and empowerment. For example, certain activities like food production that require daylight and ventilation are conducted in external corridor spaces to prevent strong odours from lingering indoors. Similarly, religious activities involving burning candles may be performed outside for safety and environmental considerations.

The identified negotiation strategies highlight the dynamic nature of corridor spaces in densely populated Asian contexts, emphasising their multi-functional adaptability to diverse temporal, cultural, and functional needs. Moreover, the discussion emphasises the characteristics of fluidity, temporality, and the maximisation of dynamic experiences within corridor spaces, wherein multiple cultural-spatial habits occur, constituting various temporal typologies at different moments.

Conclusion

In conclusion, this paper has shed light on the phenomenon of spatial compression in hyper-dense Asian contexts, particularly in cities like Singapore and Hong Kong. The paper has highlighted the need to tactically adapt to compact spaces that defy conventional notions of spatial functionality and boundaries in hyper-dense Asian cities. It has emphasised the significance of multi-layered functional territories and the negotiation of cultural-spatial territories within these contexts. The empirical investigation conducted in Singapore and Hong Kong has provided valuable insights into the intricate dynamics of spatial experiences and cultural practices within hyper-dense conditions. One important aspect that emerged from the study is the multi-layering of cultural-spatial territories, which challenges the static notion of spatial typology. To better understand these cultural characteristics and prevalent living practices, the paper has proposed an experiential-behavioural-spatial framework that embraces dynamic concepts based on habits and experiences. The framework highlights the importance of habitual exploration within hyper-dense environments and recognises the influence of individuals' lived experiences on their interactions with the environment. By considering the interplay between territoriality and the habitual negotiations of individuals, designers can create spaces that facilitate fluid interactions and adapt to the evolving needs of hyper-dense environments.

The empirical study in Singapore and Hong Kong reveals the transformative potential of corridor spaces in densely populated Asian contexts. These spaces surpass their conventional roles as transitional areas, becoming venues for diverse activities, social interactions, and cultural practices. The merging of functions within corridors reflects the adaptive nature of the built environment in hyper-dense Asian cities, emphasising the need to incorporate cultural and habitual dimensions in their design. Spatial designers should re-evaluate spatial typologies, prioritising dynamic experiences that consider individuals' lived practices. Recognising the role of habits in shaping interactions with the surroundings, designers should create environments accommodating these habitual negotiations. By blurring boundaries between functional territories and embracing cultural and habitual dimensions, designers can create fluid spaces that adapt to diverse needs. Future research should explore spatial compression and cultural-spatial territories to enhance our understanding of adaptation in hyper-dense urban contexts, ultimately aiming to prioritise well-being, quality of life, and inclusive environments for residents.

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A STUDY ON THE PHYSICAL IDENTITY ASSESSMENT OF THE CONTEMPORARY LANDMARKS IN GLOBAL CITIES: THREE FRAGMENTS FROM ISTANBUL

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Abstract
The phenotypical variations of buildings' identities in the contemporary world are related to how cities and socio-spatial relations enhance and develop each other. Physicality strongly connects with the object's identity, authenticity, and imageability. The appearances of the buildings on the sameness (homogenization in identity) or distinctness (heterogenization in identity) issues in the urban environment become a major problem in cities formed by buildings, and the consequences are frequently discussed in the literature. The global city concept has arisen in the intertwined and interconnected globalized world, where acceleration is a crucial indicator of being a piece of the global chain. The systems and models that have proven to be efficient are imported, hoping to gain extensive opportunities. The research hypothesis starts: "The greater the global affinity, the harder it is to authenticate the formation of the identity." However, it has evolved to reflect on the possible implications of "the quest for different styles and dimensions of togetherness" by deepening the research objective and transforming processes in the globalized world. This paper starts with a literature review by examining globalization and architectural paradigms to fortify a chronological foundation for the urbanized environment. The cityscape of global cities at the macro level is highly connected to matters of urban image and urban identity. Therefore, the research continues to investigate the components of urban identity and examine the physical features and qualities of contemporary buildings through image-related landmarks. A database is structured for analysis based on factor assessments. The determined database studies contemporary buildings in global cities as landmarks in their physical and visual dimensions quantitatively and the observed interpretation of their created forms qualitatively. Thus, it aims to create a guiding physical identity assessment table (factors, descriptions, and deductions) to make a measurable comparative analysis of the architectural forms of contemporary landmarks with their environments, often described as similar, contradictory, or creating a loss of identity. Istanbul, Turkey's only candidate to be a global alpha city, is chosen as the field of study. Three buildings in different fragments of Istanbul, erected after the announcement of the Urban Renewal Act #6306 (2012), are determined by their distinctive and specific locations (waterfront, city center, and hill) and their symbolic background. The natural and built environments are quantitatively described and analyzed. The meaning of the selected buildings, their relationship, and their interaction with their surroundings are qualitatively interpreted by their current status and usage objectives. Consequently, this leads to the guiding evaluation table on the physical identity assessment of contemporary landmarks in global cities. The measurable data derived from the natural and built environment with its changing variables indicates that the design approach and decision-making processes influence the recognition of the built structure. Adapting noninformative, discontinuing, noninteractive, indistinctive, and incongruous models with top-down design decisions shaped by trends for global market competitiveness proves to affect the multi-layered identification of contemporary buildings as landmarks. The findings of this research highlight the diversified features, integrated implementations, and categorized applications of identity on location, visual effect, usage, and meaning of the built environment.

Keywords: *global city; urban image; urban identity; landmarks; physical identity assessment.*

Introduction

Globalization is an international phenomenon that contributes to the development of cultural, economic, and political transformations around the globe. With increasing access to and spread of information, communication, and products, people and cities around the world are more connected to each other. The new global city concept has arisen in the intertwined and interconnected globalized world, where acceleration is a crucial indicator to be a piece of the global chain, and the systems and models that have proven to be efficient are imported in hopes of gaining extensive opportunities [1]. But the development is still not progressing evenly due to the volatile movements of capital flows, inward-oriented policies, migrating labor forces, adaptation of innovative technology, and reducing resources [2]. In this context, the hegemony of globalization and its epicenters as global cities have been the subject of many studies in the literature. The common denominators of these studies are that globalization makes cities and urban lifestyles similar [3], that globalization networks produce commodities that are consumed quickly [4] because they accelerate the spread of information, and that the governmental and corporate powers that want to be a part of the globalized world have borrowed either the same or completely differentiated and iconic textural patterns [5].

The city consists of many parts that give it its character and, by nature, can't be reduced to a single identity since it transforms itself and evolves from different and various formation processes. One of the main issues encountered in the literature is that globalization causes a modernist homogeneity [6] in the texture of cities. Modernism differentiates itself from 19th-century romantic revival architecture by emphasizing technological

innovations and the function of the building with its strong asymmetrical geometric form over stylized ornamentation. In contrast to the normative formality of modernism, postmodern architecture has developed a critical attitude by expressing grand narratives of the sanitized relationship of modern structures with their context. Therefore, the postmodernists emphasized the significance of historical symbolism and local cultural settings [7]. A conceptual terminology related to postmodernism has risen, and iconic buildings designed by starchitects [8] have become the new symbols of global cities, helping to create a marketable brand for them. Although modernism is often criticized for being the pragmatic reason for the global affinity of the superstructures, with rare exceptions, the starchitects' designs, with their distinct and eccentric novelty on the façades, fall into repetition with varying metaphoric discourses in several cities.

The formation of the cityscape is in solid interaction with the global economy and political ideologies, where globalization affects the spaces from its core to the peripheries. As we move into an era where ecological concerns, depletion of resources, pandemics and isolation, rapid urbanization, migration flows, and many other threats have acute and dramatic effects on the physical environment [9]. Hence, a new paradigm was reintroduced to the literature in 2010 [10]. Metamodernism, as an oscillation between modernism and post-modernism, has been studied in various disciplines. Metamodernism in architectural references can be discussed in the site-specific context via geographical and societal conditions, with the form playing an important role with its organic and artificial dimensions upon building mass, scale, and articulation, and a pluralistic building program covering function, technology, ecology, and spatiotemporal organizations. It unfolds the new not with familiar or distinctive solutions but in connection with a synthesis methodology where a metamodern sensitivity occurs in the re-signification of the present. Therefore, the metamodernist approach has a strong impact on the global and an integrated influence on the local. Although a developed theory for metamodernism has not been widely accepted, the foundation of a paradigm shift has legible clues that are observed and acknowledged in the cultural, economic, and political context [11].

The cityscape containing the urban forms is recognized in its vertical and horizontal dimensions, with combinations of physical components in the natural and built environment. The initial step for a city to be noticed physically is strongly related to its image. The imageability of a city is about the arrangement and organization of physical elements and how they evoke recognizable and memorable representations. Landmark, which is classified as one of the five elements of the city image by Lynch [12], is an important feature that is conspicuous in the physical environment and is perceived to help define the identity of the city. Landmarks also play an important role in describing the settlement, creating a reference point, and helping people remember the places later on [13]. There are semantic intersections between urban image and urban identity. However, the significant difference between them is that the image is based on a personal and individual evaluation and the identity on a communal and collective one [14].

Identity is a distinguishing set of characteristics and constraints that discerns an individual, a community, or a place from others. According to various studies on urban identity [15], it is composed of two components: physical and social identity (Fig. 1). The social identity, covering the socio-cultural, historic, demographic, institutional, and socio-economic features, is not within the scope of this paper due to the global boundaries of the research. On the other hand, the physical identity is the showcase of the cities at the macro level. It is structured by the natural and built environment. The natural environment can be documented via environmental analysis techniques to identify geographical location, topographical condition, geological structure, climate, and vegetational characteristics. The built environment contains two segments. Settlement components are the first ones, which include buildings, streets, squares, and urban furniture. The second segment is symbolic elements such as monuments. The built environment can be documented via solid-void analysis, circulation and transportation flow analysis, function analysis, etc. to identify the position, visual effect, meaning, and usage of the object.

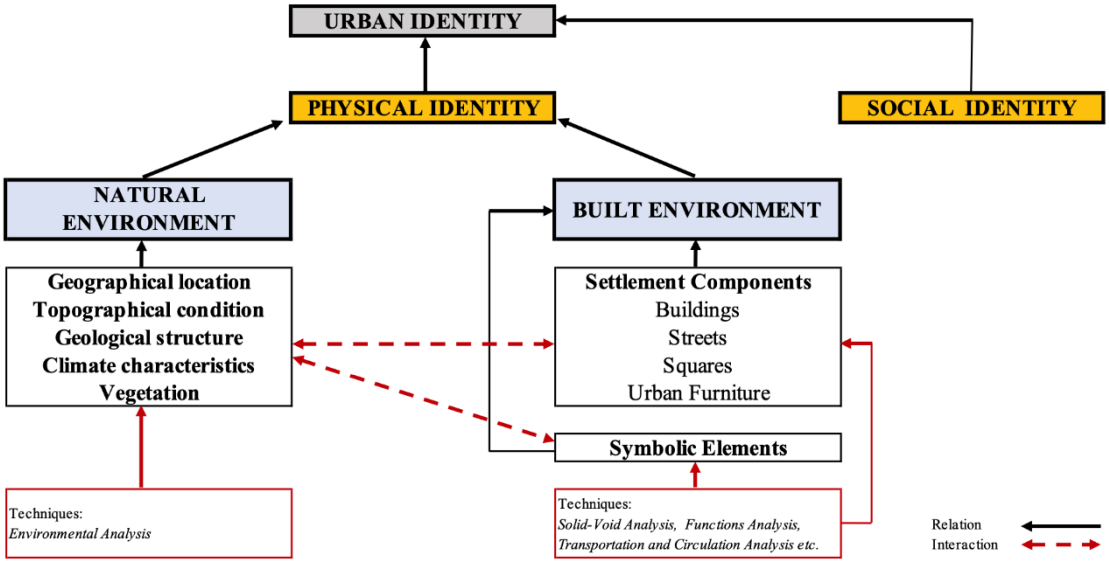


Fig. 1. The components of urban identity focused on physical identity and their analysis techniques (adapted from [16] and [17])

Buildings as landmarks can significantly affect the physical identity of cities at the macro level, with their category under singularity [18]. Buildings, with their forms, materials, and colors, scale and proportions, spatiotemporal organizations, and semantic meanings, create integrity and continuity in the urban space and thus affect the identity of the built environment and the representation of the image of the city. These paradigm-related designs, as well as Anthropocene-era-influenced environmental concerns and the socio-cultural and economic effects of globalization, have distinctive factors in the architectural formation of the present.

Physical Identity Assessment of Buildings in Architecture

By becoming progressively interconnected in cultural, economic, and political aspects, globalization has advantages and disadvantages in both physical [19] and social environments [20]. Accessibility to new fields and areas, increasing the spread of information, technology, and innovation worldwide, promoting economic growth, and improving mobility have changed how people, businesses, and nations interact. Deterritorialization, placelessness, belongingness, pastiche and imitation, layering of fragments, urban stratification, displacement, loss of identity, and many other crises are reflections of globalization on the urban fabric as well. In some instances, mega-projects with tremendous amounts of investment have been doomed to fail due to rapid urbanization, a lack of planning, and developmental strategies. In some cases, a building complex with its unique stylized form can affect the spatiotemporal transformation of the selected area and revive the livelihood of the place.

There are indicators and norms to evaluate the physicality-related built elements in the urban fabric for enhanced, acknowledged, recognized, livable, and meaningful spaces. The elements in the built environment should have similar and different facets from the other components around them and from themselves. Therefore, they will be identified as unique and worthy with site-specific features according to their phenotypic variations. Transformation and openness to change are essential steps to being a part of globalized development. The lack of design strategies brings about unplanned, unprogrammed, non-informative, and non-interactive physical elements. The lost connection with the continuity of the origin causes a glitch in the built environment, which shows itself in abandoned or collapsing built areas. The relationship with the past helps to preserve history, and the novelty creates and reflects the needs and wants of the contemporary world. Therefore, to appear authentic, both aspects should be harmoniously balanced. The relationships between various components present themselves in the integrity of the built environment. With diversified elements standing in unity, the pluralistic approach supports the rejection of monotony and vagueness.

Burj Al Babas in Bolu, a city that lies 250 kilometers east of Istanbul, is an abandoned residential complex that was supposed to be developed for wealthy foreigners, mainly from the Arabian Peninsula. It is well-known in the media for its copy-pasted and alleged Disney castle-like houses. It is an advisory sample not to develop an urban-scaled project due to its current status. In comparison to the failed ones, Museum Gazhane (Gasworks) is an urban renewal project in Kadıköy district of Istanbul. The area was renovated, redeveloped, and reconverted from an industrial heritage site to a culture and arts center. With the excessive bottom-up support of the locals who organized around Gazhane Environment Volunteers (Gazhane Çevre Gönüllüleri), the idle plot of the old factory area remains in the public realm. Therefore, a very profitable inner-city building complex is collectively embraced for the right-to-the-city concept. The building complex analysis of these current and popular architectural sites provides a comprehensive comparison to pin distinctive clues on physical facets. Both spatial and societal factors in design play a significant and central role in developing identities. Therefore, the process of particular interrelated possibilities benefits from the availability and potential of a place (Fig. 2).

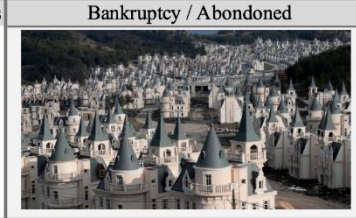
PHYSICAL IDENTITY ASSESSMENT	**BURJ AL BABAS**	**MUSEUM GAZHANE**
Current Status	Bankruptcy / Abondoned	Redeveloped and opened in 2021
		
Natural Environment		
Location	Rural (in Bolu)	City Center (in Istanbul)
Topography	Flat (<10%)	Moderate Slope (10-20%)
Built Environment		
Spatial Pattern	Horizontal	Horizontal, partially vertical
Texture	Linear (Streets)	Square
Mass Composition	Multiple identical masses	Multiple diverse masses
Material	Reinforced concrete with façade cladding	Masonry, steel, wood, reinforced concrete
Color	Pastel colors	Neutral colors
Technology	Conventional	Innovative and sustainable
Function	Residential	Multifunctional cultural facility
Visual Form *Balance, Contrast, Emphasis, Proportion and Scale, Repetition, Rhythm, Variety, and Unity*	732 small chateau-like houses, assembled with symbolic references from Turkey, arranged in strong monotony	The complex creates a stimulating and diversified atmosphere with its varying open and closed spaces
(Usage and Meaning) Created Form	non-informative, unresponsive	interactive, inviting

Fig. 2. Identity assessment upon physical components (building complex)

Case Study: Three Fragments from Istanbul

Clarifying the identity of an architectural object requires solid and intangible attributes, unique features, and activities that can be performed in and around it. Therefore, physicality has a strong connection with the object's identity, authenticity, and imageability, which is briefly examined in the literature review above. As explained in the above comparative analysis, several factors are decisive in forming image and identity. Spanning two continents, the city of Istanbul has unique characteristics with its geography, its role in the Turkish economy, its cultural and historical background, which mingles the traditional with the cosmopolitan, and its dense population, making it the most crowded city in the whole country.

The selected contemporary buildings, constructed after the announcement of Urban Renewal Act #6306 (2012) against the awaiting earthquake, are located in three different fragments of Istanbul (Fig. 3). All buildings have historical connotations and widespread acceptance with their visual manifestations and symbolic discourses in the modern-day globalized city of Istanbul (Fig. 4). Two buildings (Çamlıca Tower and Atatürk Cultural Center) were funded by the related ministries, and one building (Istanbul Modern) was funded by private equity.

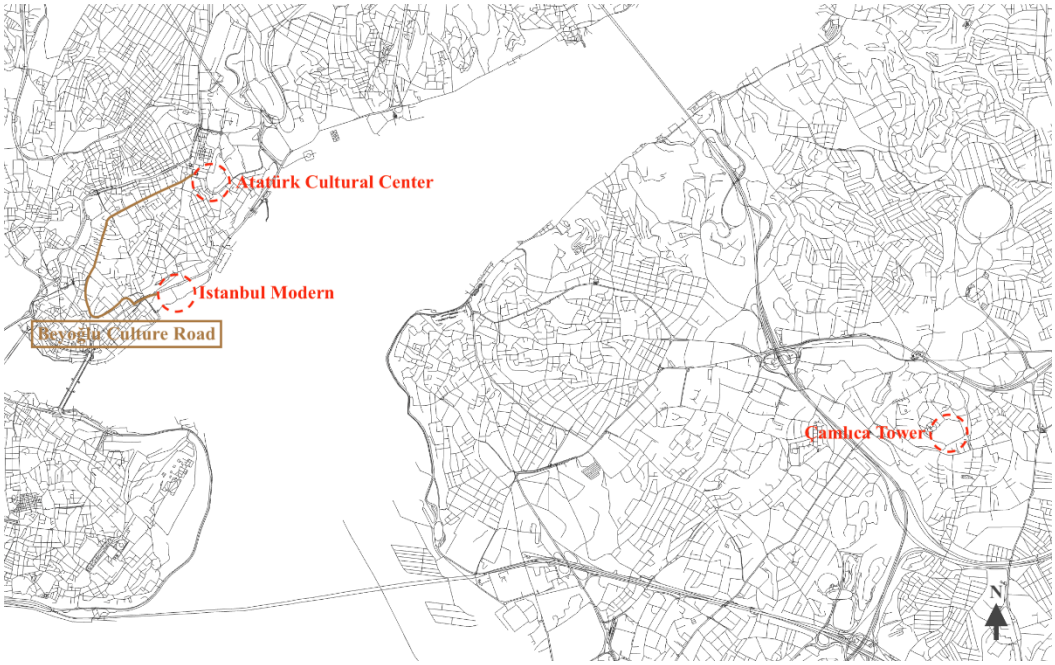


Fig. 3. Locations of the field of studies on Istanbul road map
(Retrieved from "*https://anvaka.github.io/city-roads/"* and edited by the 1st Author)

Çamlıca TV and Radio Tower (Çamlıca Tower) is a telecommunications structure erected atop a hill on the Anatolian side. There were 33 antennas scattered along the hill earlier. They were all dismantled and collected in one high-tech tower. Although the constructed tower won the 3rd prize in the competition (by jury selection), the former prime minister chose the 3rd over the 1st prize due to its symbolic reference to the Ottoman era-influenced tulip-like form [21]. With its monolithic structure, the tower was promoted in the media as the highest structure in Istanbul. The symbolic discourse of the tower is described by its designers as groundbreaking and futuristic [22]. Due to its distinctive monumental form and scale, the structure mainly manifests a top-down city image rather than characterizing a bottom-up collective societal engagement in its design and usage.

Ataturk Cultural Center (a.k.a. AKM), through its many phases and ideological clashes, has played a political role in the modernization of Turkey. The first AKM was designed by Hayati Tabanlıoğlu and his team and completed in 1969. Although the building was listed as a first-degree-registered cultural property, unfortunately it was abandoned for a decade since demolishing in 2018. The new building was renewed and enlarged structurally and spatially by Tabanlıoğlu Architects, who became a part of the project at the invitation of the Ministry of Culture and Tourism. The design of the prominent and significant front façade of the old building, looking towards the cultural and political demonstration hub Taksim Square, was preserved by remaining loyal to the collective memory while being globally modernized [23].

Istanbul Modern (Museum) was founded in 2004 as Turkey's first modern and contemporary art museum. The building was located in a former customs warehouse on the Karaköy pier, where the GalataPort project has been spanning. The new museum in the old location of the recent redevelopment area of GalataPort was designed by Renzo Piano (RPBW), who is presented as the architect behind iconic museums and cultural institutions in global cities [24]. Istanbul Modern supports a mission to make art accessible to everyone; therefore, specifically, the ground floor of the new building has been arranged with permeable clear fenestration to allow connection with the building and the Bosporus Strait. The building is a top-rated tourist attraction for arrivals of national and international cruise lines, where they dock at the still controversial location of the GalataPort project.

In 2022, the "Beyoğlu Culture Road," named after the district municipality, organized a 4,1 km-long festival route that extends between the Atatürk Cultural Center at Taksim Square and GalataPort at the seaside. Numerous historical and architectural assets, cultural heritage sites, art galleries, and exhibition areas are along the route. The paced renovation and restoration projects along Istiklal Avenue, comprising a vast part of the culture road, received significant criticism due to the negligence towards collective memory and historical appearance of cultural heritages by destroying the texture and promoting the demands of global brands on the façades of the buildings [25].

PHYSICAL IDENTITY ASSESSMENT	**ÇAMLICA TOWER**	**ATATÜRK CULTURAL CENTER**	**ISTANBUL MODERN MUSEUM**
Current Status	Demolished, reconstructed and opened in 2020	Demolished, reconstructed and opened in 2021	Demolished, reconstructed and opened on May 4th, 2023
Architect(s)	Melike Altınışık Architects	Tabanlıoğlu Architects	Renzo Piano Building Workshop
			
Natural Environment			
Location	On a hill (in Istanbul, Anatolian side)	City center (in Istanbul, European side)	Waterfront (in Istanbul, European side)
Topography	Steep Slope (>20%)	Moderate Slope (10-20%)	Flat (<10%)
Built Environment			
Spatial Pattern	Vertical	Horizontal	Horizontal
Texture	Square	Square	Mixed (streets and square)
Mass Composition	Single mass	Multiple derivative masses with curtain wall	Single mass with articulated façade
Material	Reinforced concrete with flat composite panel cladding	Reinforced concrete with travertine stone cladding	Reinforced concrete with slightly twisted composite panel cladding
Color	White cladding and blue glazed window panels	Earth tones, bronze tinted glazed window panels	White cladding and clear glazed window panels
Technology	Algoritmic design	Revival and recomposition	Contemporary design with analogical approach (reflecting bosporus features)
Function	Radio-TV tower, observation deck, and restaurant	Opera and theater stages, cinema, exhibition halls, library, commercial facilities	Museum and exhibition center, cinema, library, event spaces, commercial facilities
Visual Form *Balance, Contrast, Emphasis, Proportion and Scale, Repetition, Rhythm, Variety, and Unity*	The tower, with its domineering form, is recognizable in several locations. The streamlined wavy rhythm of the façade constitutes an incongruous relationship with the context.	The enlarged and rebuilt structure has historical references to the past. The front façade with its stimulating and evoking permeability creates a strong relationship with Taksim Square in front of it.	Built as a part of GalataPort, it is in formal unity with the adjacent buildings but varied in material choices and colors. The ground level has visual connection with the bosporus and is accessible via ramps.
(Usage and Meaning) Created Form	informative, unresponsive	focused, clustered	interactive on the GF, inviting

Fig. 4. Identity assessment upon physical components (contemporary buildings)

Findings

The natural environment, built environment, and building identity features are determinative according to the assessment table of the physical identity (Table 1). Therefore, the subcategories for each analysis are considered explanatory and significant. With the help of the assessment table, a feasible, measurable, and instructive guideline is basically structured concerning factors, their descriptions, and characterization by the inference of these particular instances as deductions. The differences and similarities give information on the identity of the architectural object. The use of innovative technology and the relationship with the past play an important role in the authenticity of the building(s). Besides, diversity and unity help the architectural object(s) be recognizable and memorable upon imageability via the visual and created form.

Table 1. Findings of the physical identity assessment of the building(s)

Physical Identity Assessment	Factor	Description	Deduction
Natural Environment	Location	In rural or urban areas (hill, city/town center, waterfront, etc.)	Giving information about accessibility, reachability, and nearby environment.
	Topography	Flat surface, moderate slope or steep slope	Divided into three gradients. (<10%, 10-20%, >20%)
Built Environment	Spatial Pattern	Horizontal or vertical	The form of the building is placed in one of the two dimensions in relation to the geographical and topographic conditions.
	Texture	Linear (streets), square or mixed	The spatial relation of the building with its adjacent structures is in linear order (street-like paths), square format (open spaces or courtyards) or systematically a mixture of both.
Building	Mass Composition	Single or multiple	Divided into two segments, the description of each one should be supported with striking visual emphasis.
	Material	Architectural materials (cladding, fenestration, etc.)	The preferred materials on visual parts of the building, especially on the façade.
	Color	Dominant colors and tones (on the cladding, fenestration, etc.)	The selected colors on visual parts of the building, especially on the façade.
	Technology	Conventional or innovative	The used methods in the construction.
	Function	Function of the building	Zoning and usage of the built environment.
	Visual Form	Basic design principles in architecture	Balance, contrast, emphasis, proportion and scale, repetition, rhythm, variety, and unity.
Meaning of Visual Dimension	Created Form	(non-)informative, (dis-)continuity, (non-)interactive, (in-)distinctness, (in-)congruous	The meaning of the building according to the current status and observed usage analysis: (un-)responsive, (un-)focused, (un-)inviting, clustered, scattered, (in-)congruent.

Conclusion

The visual dimension is essential in defining cities and urban environments. As expressed by Lynch [12], the visual dimension is in strong connection with the spatiotemporal factors. And these factors establish interactions, relations, and multi-faceted aspects with the built structure. The formation of the built environment is considered through paradigm shifts in two ways: *rhythmic repetition* and *progressive and irreversible change* [26]. As it is briefly discussed under the modernism and postmodernism paradigms, the identity-related homogenization and heterogenization of the urban fabric are not only considered with the physical dimensions but also with image-related signs and symbolic meanings. As we move into an era where sustainability and ecology-related concerns become significant, designing in an atmospherically sensitive manner could play a guiding role in the recognition of contemporary landmarks. Metamodernism, which was briefly mentioned above as an aftereffect in architecture, could unfold the synthesis process to create this atmospheric sensitivity upon differences and similarities, sustainable continuity by being loyal to the contextual history and open to novelty, and site-specific characterizations in unity while having diversified variability. The observed appearances shape the meaning through visual mechanisms, which influence behavioral choices. Therefore, how cities are promoted, environments are experienced, and buildings are formed directly affects the quality of the environment.

The quantitatively measurable data derived from the natural and built environment with its changing variables indicated that the design approach and decision-making processes influence the identity of the built structure.

Adapting noninformative, discontinuing, noninteractive, indistinctive, and incongruous models with top-down design decisions shaped by trends for global market competitiveness proves to affect the multi-layered identification of contemporary buildings. The phenotypical variations of the identity of buildings in the contemporary world are related to how cities and socio-spatial relations enhance and develop each other. This paper studies contemporary buildings in global cities as landmarks in their physical and visual dimensions quantitatively and the interpretation of the created forms qualitatively. It has presented a comparative analysis of identity assessment based on the physicality of contemporary buildings. The findings of this research highlight the diversified features, integrated implementations, and categorized applications on location, visual effect, usage, and meaning of the built environment. The further findings of this study could be improved by conducting a comprehensive questionnaire with the users of the selected contemporary buildings in the field of study. Therefore, the physical identity assessment table can be upgraded into a physical identity assessment matrix with the inquired data acquired from the users and their relationship with their immediate surroundings.

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THE USE OF CONTEXT AS KNOWLEDGE IN ARCHITECTURE: A HOLISTIC APPROACH

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Abstract
Context was initially utilized in the philosophy of language and semiotics to condition meaning, and then in epistemology to justify knowing. The concept of context has begun to be utilized in architecture to determine and make sense of all the conditions around the design object, such as social, political, geographical, cultural, economic, and physical. Although context has been implicitly integrated into architectural knowledge since Vitruvius, it has become a paradigm in architectural knowledge since the second half of the twentieth century with the phrases "contextualism" or "contextual design" [1]. As a result, context has begun to occupy a place in the literature as a philosophy used to justify information about the area in which a building is placed, its location, its natural surroundings, or all of this environment, using terminology such as architectural "contextualism" or "contextual design." The context's multidimensional, multi-meaning, and multi-layered structure needs explaining as a whole. The purpose of this research is to improve the representation of context in architectural knowledge, reduce ambiguities, and boost its functionality as architectural knowledge in both the theoretical and practical fields. To that end, the background to the historical process of postmodern architecture has been investigated using ontologies connected to the assets that are most frequently involved in architectural design, namely environmental, social, and speculative assets. Environmental ones, existing built environment (all existing structures, historic or not), physical data (climate, topography, orientation, etc.), urban morphology; social ones, culture, meaning, and identity associated with local human experience; and speculative ones are handled and discussed as discursive constructions shaped by personal views and approaches.

Key Words: *Context; contextualism; knowledge; architectural discourse; holistic approach.*

Introduction

Context was first used to condition meaning in the philosophy of language and semiotics and then to justify knowledge in epistemology. In architecture, context has begun to be used to determine and make sense of all the conditions surrounding the design object, such as social, political, geographical, cultural, economic, and physical. Although context has been implicitly included in architectural knowledge since Vitruvius, it has become a paradigm in architectural knowledge since the second half of the twentieth century, with the terms "contextualism" or "contextual design" [1]. It has been the source of design and knowledge. For this reason, this study aims to examine the multidimensional, multi-meaning, and multi-layered structure of the concept of context and contextualism within the postmodern architectural knowledge that emerged against modernism in the second half of the twentieth century. This context's multidimensional, multisemantic, and multilayered complexity needs its explication in its whole. Consequently, evaluating the evolution of the notions of context and contextualism in non-architectural language and philosophy of knowledge would enrich the understanding of their position and application in architectural knowledge.

Context in Language and Epistemology

Many philosophers, including Bertrand Russell, Ludwig Wittgenstein, and Rudolf Carnap, initially explored the context in the philosophy of language in order to examine language, based on the premise that philosophical difficulties emerge from the wrong use of language [2]. In semiotics, methods developed for conceptual analysis are classified into three major categories: syntax, semantics, and pragmatics. The first investigates the structure and laws of language without taking non-linguistic counterparts into account. In the second, the semantic element of language is analyzed in relation to its non-linguistic equivalents. Lastly, pragmatics is a subfield of semiotics that investigates idioms in terms of the factors that employ them [3].

After these three divisions, the context has been analyzed primarily in terms of its meaning, despite the fact that it has been handled differently by many thinkers. In this method, the comprehensiveness of the context is not based on the information that gives meaning to the proposition; rather, it is evaluated based on a meaning criterion derived from a particular linguistic unit in which it is embedded [4].

While the concept of context is mostly discussed over meaning in the philosophy of language, it is discussed with the concept of "contextualism" in epistemology. In terms of information theory, the approach developed on the view that propositions can be knowledge or justified and accepted as true is contextual and has been defined as "epistemic contextualism" [5]. Epistemic contextualism, which is presented as a different approach from traditional justification and knowledge theories, has been defined as the set of elements that make up the infrastructure of a thought system.

According to epistemic contextualism, only contextual conditions make it possible for a person to know a specific proposition or to justifiably hold that claim to be true. In other words, the criteria necessary and sufficient for knowing are not absolute. To justify information in a given circumstance, it is important to examine the subject, proposition, and current conditions, or context [6]. When approaching the subject through the subject-object relationship, the subject's comprehension and justification of the object rely on the evaluation of all conditions surrounding the object, i.e., the context.

In the twenty-first century, context has become an important term in the generation of knowledge. Gadamer called attention to the context-dependent, intersubjective, conventional, or common identity of knowledge. Therefore, knowledge also emerges historically and socially due to the fact that mind is context dependent. In this instance, the intersubjective aspect of knowledge does not render it subjectivist, nor does its dependence on context indicate that it is relativistic. Contextually dependent does not imply that there are no correct or incorrect criteria, but rather that the criteria are reinterpreted for each setting [7].

Consequently, the meaning of the context, as well as the justification of knowledge, varies based on the subject's perception in relation to historical and social situations. By assessing it within the historical process, it is able to analyze the multidimensional and multi-meaning structure of the context in architectural knowledge.

Context As Architectural Knowledge

Although context has been implicitly included in the study of architecture from the time of Vitruvius, the transformation of context into a paradigm using the word "contextualism" does not appear in the literature until the 1950s and 1960s [1]. In 1975, the "International Design Center" conference held in Berlin coined the phrase "contextual building" to describe the concept of context. The context, the building as an event, expression, or idea, and all the conditions surrounding it, including the social, political, cultural, economic, and physical environment [8]; Contextual design, on the other hand, is defined as the knowledge and instruction used to make sense of the terms related to the environment in which a building is placed, its location, its natural environment, or all of this environment [9].

With contextual thinking becoming a solid concept in the architectural discipline, the important features of context have become qualified concepts through the terms "contextualism" and "contextual design." Burden explains the application and place of the term "contextualism" in architecture through the urban planning approach that considers the city as a whole and that architectural design should be compatible with its environment, respond to its environment, and be a mediator [9]. In his definition of contextualism, Beaver associates the concept with the physical characteristics of the immediate environment as well as cultural and temporal characteristics [10].

In fact, the context was an open source to all the possibilities of the hermeneutic tradition, which is the legacy of understanding and interpretation, before it became a paradigm with the term "contextualism" in architectural knowledge. However, this possibility was not used to understand over time but was used in different forms from the perspective of the subject [11], and thus the context turned into speculative knowledge. To understand the possibilities of the context and to use it correctly today, one must first resist the narcissistic deviance, which will always be indifferent to the place and situation, and secondly, resist the ideological deviation that points to the same place and situation every time to be registered [12].

Context, according to Bilgin, is a description of a "situation" at a time [11]. This situation, which can be physical, cultural, environmental, geographical, social, etc., makes it necessary to read many layers in a multidimensional, holistic way. Therefore, the context is always dependent on the descriptive subject as much as the situation being described. The context's dependence on the subject is defined by many architects in different ways. It has brought with it various views and approaches that are sometimes produced individually and sometimes collectively. Context, according to Isenstadt, is one of the concentric parts of the situation, which consists of what we understand from the plot to the plot, from the neighborhood to the region, from the neighborhood to the landscape, the climate, that is, the place [1]. For İhsan Bilgin, context is a pattern of features that can be interpreted and understood with methods specific to each place [11]. Abdi Güzer, on the other hand, defines context as a concept that forces the architectural object to differentiate and liberate, while at the same time enabling quotations and references in design to gain different meanings in a way that will transform again [13]. According to Han Tümertekin, "context" is a concept that defines and strengthens the bond to be established with the "other" in design [14]. According to Paul-Alan Johnson, "context" is expressed as a concept that refers to the physical texture of the built environment in which an architectural product is placed, the ground in the perception of "figure ground," or a cultural and historical environment. Context is concerned with scale, volume, and the formality of color [15]. For Koolhaas, "context" is

an analytical process through which one defines one's own view and approach; for this reason, the concept determines the person's own view and approach, namely his stance, towards the data of that place [16].
The benefit of a holistic concept of context within architectural knowledge is that it has the possibility to consider various contexts and relate these aspects to other different aspects. The context, which is always considered by the designers, can be considered a starting point as it brings constraints and also provides possibilities in the design process. Therefore, to improve the representation of the context in architectural knowledge, to eliminate ambiguities, and to increase its functionality as architectural knowledge both in theory and practice, its multidimensional, multi-meaning, and multi-layered structure should be explained as a whole.

Method
In this study, on the upper scale, the context has been analyzed in the historical process of postmodern architecture through ontologies related to the assets that are most frequently involved in architectural design, namely environmental, social, and speculative assets. Environmental ones, existing built environment (all existing structures, whether historical or not), physical data (climate, topography, orientation, etc.), urban morphology; social ones, culture, meaning, and identity associated with local human experience; speculative ones are handled and discussed as discursive constructions shaped by personal views and approaches. For this purpose, firstly, the historical background of postmodern architecture, which coincides with the second half of the twentieth century, will be discussed. Later, on a subscale, the multi-layered structure of the context within postmodern architectural knowledge will be analyzed with its physical, cultural, historical, phenomenological, and critical regionalist dimensions. Thus, the complex structure of the context will be clarified as a result of ontological and epistemological evaluations of architectural knowledge.

Contextualism in Postmodern Architectural Knowledge

Historical Background
With the industrial revolution, significant developments in technology, industrial production, and transportation opportunities triggered migration from rural to urban areas. The phenomenon of rapid urbanization has brought with it problems such as infrastructure, sanitary construction, and the inadequacy of urban equipment in cities. Modern architecture felt the need to create “artificial places” [17] in order to find solutions to all these problems and for a healthier urbanization. The architect's “Contemporary City” was developed in different urban contexts with high towers, open spaces, and new-type streets, with the tools of its own era such as speed, efficiency, and mechanicalness, instead of noisy and dusty narrow streets that do not receive enough light that make up the historical texture [18]. Le Corbusier proposed the reorganization of the city with the skyscrapers district and the Plan Voisin and Radiant City schemes, based on the idea that the "Contemporary City," organized with the towers he created with the desire to create "artificial places," would get rid of all negativities and attain fresh air and greenery [19]. In the newly developing city, the buildings have been idealized by removing unnecessary complexity; they have become objects that are designed and built separately from each other. Thus, the new city is now a whole that is divided into pieces according to its functional differences in an abstract sense, instead of holistic forms such as streets and squares formed by buildings that are articulated to each other.

In order to overcome the “culture of congestion” that forms the context of modern cities, “Cartesian skyscraper” typologies have been developed to empty the city floor and create a new context [19–20]. Thus, the new city constructed its own internal context, independent from the outside. As a part of this inner context, the modern subject has provided its own operational (discursive and tectonic) continuity with the tools and methods of the new context. This understanding, which lasted until the second half of the 20th century, brought solutions to many problems brought by the industrial revolution. Modern architecture has created its own autonomous space in which it acquires innovation through reason, both physically, in terms of structure and program, and with its stance against history. However, by the 1960s, modern architecture was criticized for the disconnection of new urbanization from the rest of the city. Although modern architecture has been criticized for its context, with the thought that it is far from the meaning of postmodern architectural knowledge, namely "contextualism," it has taken a different stance against the context by returning to its inner context; it has revealed a reflexive and impermeable reality that obeys its own internal laws [21].

Physical Dimension of Context
In the second half of the twentieth century, the discovery of context as architectural knowledge first began to show itself in the field of architecture with structuralist approaches. Structuralism, with the support of positivism, aimed to find solutions to the problems of objectivity and method in architecture, with the thought that architectural knowledge should be rationalized and freed from subjectivity. Kevin Lynch's 1960 book "The Image of the City" is the first indication of the structuralist approach. Another notable piece of research is Christopher Alexander's book "Pattern Language: Towns, Buildings, and Construction," published in 1977. In this period, structuralism showed itself in architecture with the methods of disciplines such as linguistics, semiotics, anthropology,

psychology, and sociology. The syntactic method was used to analyze the grammar of the city, and the semantic method was used for analysis focused on meaning.

Kevin Lynch, in his structuralist approach to analyzing the grammar of the city, focused on the physical context as opposed to the historical context. It has brought a different perspective to contextual architecture by observing the cultural relations embedded in the physical fabric of the city and its streets. Thus, the spatial approach of the modernist view to the city and streets included the concept of "place" in architectural knowledge, with its meaning coming to the fore. Thanks to his mental mapping studies on five urban elements (paths, edges, districts, nodes, and landmarks), which he instrumentalized in his book titled “The Image of the City," Kevin Lynch made the casting. The city analysis he made with the five elements he used as a template revealed that various meanings can be attributed to different contexts with the idea of gaining belonging [22].

In the same period, the concept of context began to be used with the term "contextualism," which means a set of approaches that are described as a product of the urban design graduate program under Colin Rowe, which started in 1963 at Cornell. Thus, the foundations of an alternative approach to the understanding of modern architecture and urbanization were laid. Later, Rowe collected his theories on contextual urban design in his book Collage City, published in 1978 with Fred Koetter [23]. In these years, contextualism emerged as a critical thought, and this approach, which focused on the relationship between the whole of the city and architecture, later expanded its scope in various research studies in social, cultural, and economic terms, and became a doctrine within architectural knowledge. The first to come to mind of such studies are Steven Peterson's “Urban Design Tactics” and “Space and Anti-Space,” Colin Rowe's “The Present Urban Predicament,” Thomas Schumacher's “Contextualism: Urban Ideals and Deformations,” and Stuart Cohen's “Physical Context/Cultural Context: Including it All,” as well as William Ellis's “Type and Context in Urbanism” and Steven Hurtt's “Conjectures on Urban Form” [24-25-26].

Rowe emphasized that urban design is more of a collage than a drawing. He used the metaphor of collage to suggest that different elements of the city should be gathered into a harmonious whole that includes opposite poles (such as utopia and anti-utopia, past and future). With the collage method, they aimed to create defined open spaces in the city and prevent the restriction of public life. Thus, they defined the new kit as a collage of different architectural types and items from different histories. Like Lynch, Rowe attempted to read the city as a "text." With the preconception of the city as text and collage, the task of the designer has also changed, especially in the context of the contextual understanding in which the text is at the center. Approaching city plans as real paintings, Rowe saw associating these plans with art as a way to create a contextual and ethical architecture that is not fond of objects [23].

To revive the relationship between built space and open space, Rowe referred to Nolli's map of Rome as a prototype and applied the figure-ground map that he developed based on Gestalt principles. The map describes the open space positively (in white) and the building mass negatively (in black). Rowe uses this technique to show architects that buildings are a phenomenon that they must evaluate with their surroundings, not as individual objects [23]. Fred and Koetter put this method into practice in Le Corbusier's Voisin Planning, which was prepared in 1925 but was not realized.

Cultural Dimension of Context

In response to Rowe's studies, which are more concerned with the built physical texture, new approaches have been developed that suggest contextual knowledge should be evaluated with both physical and cultural dimensions. Stuart Cohen, who first went beyond Rowe's physical framework, brought up the cultural dimension of contextual knowledge in his article "Physical Context/Cultural Context: Including It All." In contrast to the analysis of modernism within the framework of the concept of exclusivism, Cohen proposes an analysis within the framework of the concept of inclusivism in the contextualism approach. In this sense, the formal and imaginative view created within the framework of the cultural context in the shaping of the building is inclusive [27].

Thomas Schumacher also criticized Rowe's approach to design, which remains on the random and arbitrary figure-ground plan, in his work "Contextualism: Urban Ideals and Deformations" due to its excessive dependence on geometry, which hinders the potential of buildings to tell history [28]. In this sense, by arguing that Rowe's figure-ground analysis should not be restrictive for the new design, he brought a different perspective to Rowe's contextualism and introduced the concept of "differentiated building," which includes the compelling conditions of the building in the current situation [29]. This new understanding is a synthesis between the modern city and the traditional city, including the necessities of the time and the evaluation of all the conditions of the place.

For Rowe's students, Stuart Cohen and Thomas Schumacher, context should no longer be treated as a mere reference to physical structure. Because, according to Cohen and Schumacher, context is now a phenomenon related to the time of the city rather than physical data in the city,

Venturi, Denise Scott Brown, and Steven Izenour used the streets, suburbs, and local forms of Las Vegas as a source of design in their 1972 book "Learning from Las Vegas," in which they dealt with the context of the modern city. They evaluated Las Vegas and Rome together to create the city's own context; they coincided the international elements with the local texture in the city. The churches of Rome, which is a religious center, and the casinos of

Las Vegas, which is an entertainment center, are compared, and Las Vegas is superimposed on Giambattista Nolli's map of Rome dated 1748 [30], and thus a new context-reading method has been developed. The most important thing about their adoption of this approach was that the spatial and superficial changes (such as signs and lights) experienced by the commercial buildings in Las Vegas were similar to the spatial and stylistic changes experienced by the religious buildings in Rome. Thanks to this reading, which takes place through the physical change of the city, the cultural values of the city were also analyzed. They interpreted the context of Las Vegas, the commercial information and communication hub, with signs, lights, and advertisements. Thus, the new images of the new city transformed the strip, that is, the street, into a "place" and the building into a "signboard" [31].

Historical Dimension of Context

Aldo Rossi, in his book Architecture of the City, introduced the concept of "locus" (place) as the object of research that includes the entire history of architecture. Locus, as a concept that explains the relationship between a specific place and event, city and architecture, context and monument, is an important condition for obtaining an original design. Rossi analyzed the typological and morphological characteristics of the city in a historical sense with the concept of "locus" [32]. While Rossi attaches importance to the concept of locus, which corresponds to the location of the artifact in the city, he sees the context as an obstacle to urban research. Expressing this as “the concept of context is the opposite of the concept of monument," according to Rossi, the monument that brings style to the agenda is the primary value that characterizes a particular place. Since the existence of only one architectural style allows the final choices and the development of the city with these choices, the monument, and therefore the style, has a reality that can be analyzed [33]. This reality can be analyzed concretely, reflecting the preferences of the society constituting it in urban history, and it can only be produced through social memory or collective memory by analogy. Therefore, the context is insufficient in revealing and understanding this reality, and the concept of place is a more adequate concept in revealing the concrete reality instead of analyzing and comprehending the built environment through abstraction, as it allows the historical context to be examined. Rossi's suggestion of establishing a stylistic relationship with the monumental structures that form the image of place in the historical framework enables the reuse of historical structures in analogical interpretations. Therefore, this approach is considered an opposition to the functional and idealized abstract form understanding of modernism [25].

Rossi typified the knowledge of architecture, which consists of features related to function, space, and tectonics. Aldo Rossi, who advocates the continuity of historical typologies and morphologies on a syntax-based urban scale, has been called a neo-rationalist because he created the knowledge of architecture, abstracting from meaning and ideology and under the dominance of logic and reason [34].

With the emergence of the existence of architectural knowledge as a cultural context and the efforts to deal with the relationship between form and space shaped by structuralist thought within the framework of logic, the typology approach filtered from abstract geometry has emerged within a closed system belonging to Western culture. This approach necessitated searching the semantic content in deep structure, intellectual and logical relations, and history. After Rossi's architectural syntactic of Western culture, Christopher Alexander developed a new design method in 1977 by introducing the concept of "pattern language" as an architectural language that includes different cultures and user groups. Unlike Rossi's approach, his approach, based on the analysis and synthesis of patterns derived from the user-sign pragmatic relationship, has been proposed as a design tool to create more humane environments [34].

Indeed, as Rossi suggests, history can be active in original and new production. However, making history a source of typology and morphology has often led to controversy. Peter Eisenman, who does not see history as such a resource, explains in the introduction to Architecture of the City that Rossi achieves “nowhere” by connecting different periods in the continuum of time [35]:

“This bifocal lens of time, history and memory of analogy breaks down into chronological time (time of events) and atmospheric time (time of place) ... The place of analogy is thus abstracted from the real city... The place of analogy is nowhere; but precisely because it springs from both history and memory, there is no place different from that of modernist utopia …”

According to Eisenman, Rossi's attitude, which gives a kind of autonomy to architecture by reaching "nowhere," implies anti-contextualism in terms of isolating architectural artifacts from their own contexts. In this respect, Eisenman evaluated Rossi's teachings and studies as an argument against the "empty formalism" of contextualism, which was later developed by Rowe's figure-ground analysis. For Rossi, the city is not just a representation, as for Rowe, but a reality that becomes the stage of events. Because the locus is a place that hosts a series of events [35].

Brolin's contextual understanding includes historicity, similar to Rossi's typological and morphological approach, which deals with the context as opposed to the concept of monument. According to Brolin, the priority is to “strengthen the character of the neighborhoods and cities rather than harm them," because “the existing body is not a historical waste; it is a value that should be used as a bridge to the future” [1].

Gregotti, on the other hand, suggested using two methods, namely mimesis and juxtaposition, in order to produce architectural knowledge from environmental conditions [36]. The architect must explore nature through

the "modification," "measurement," and "use" of the landscape in order to produce knowledge of the context in the design process [37]. Based on this discovery, Gregotti defined the responsibility of architecture as accepting the physical spirit of history, that is, the existence of the environmental context bearing the traces of its own history, based on the view that architectural form is obtained by transforming historical traces into form [37]. For Gregotti, who bases his theoretical discussion within architectural knowledge on Heidegger's philosophy, design knowledge in architecture emerges as a result of an action that starts with the idea of place. The beginning of the modifications that transform the place into architectural knowledge begins with putting a stone on the ground [37].

Ernesto Rogers criticizes the understanding of architectural knowledge as an abstract knowledge that is formed independently of the ground and argues that in the 1950s and 1960s, buildings should be designed by considering their surroundings (ambiente). Although Rogers's approach was influenced by historicism, he advocated constructing the formal features of the building according to the ambient conditions, unlike the picturesque context understanding that imitates plans, sections, and views [38].

Phenomenological Dimension of Context

After the 1980s, alternative approaches to the conventional positivist approaches established by method and model thinking have come to the fore. Names such as Norberg-Schulz, Cooper Marcus, Dovey, Seoman, Mugerauer, Lerup, Moore, and Lyndon have reproduced context knowledge in the traditions of phenomenology, hermeneutics, and post-structuralist thought. Norberg-Schulz's use of the concept of "genius loci" for "place" [39], Dovey's questioning of the concept of authenticity [40], Lerup's crooked view of the city and the metropolis [41], and Moore and Lydon's descriptions of their experiences [42] illustrate different perspectives in the production of contextual knowledge.

Norberg Schulz's concept of place elevated the concept of context to a new level in architectural understanding. The concept of place was proposed as an alternative to modern architectural knowledge's concept of quantified, measurable, and objectivable space. Instead of soft knowledge of space such as function, geometry, and program, it has emphasized concrete knowledge that develops as a result of the person's encounter with the qualities on which life depends. This information has been produced with a phenomenological approach within the knowledge of architecture. In the phenomenological approach, contrary to the classical enlightenment view, which accepts the existence of the object before the subject, the view based on the experience of the subject prioritizes the subject. According to this view, the object is not an entity independent of the subject; it comes into existence from the subject's point of view. Therefore, there is no need for the abstraction of objects that make sense as the subject senses them with general frameworks and subject-object distinction.

Schulz reconceptualized the "spirit of the place" (genius logi), which appeared in Ancient Greek thought, which he based on Heidegger's phenomenology, and used it in his architectural knowledge. The spirit of the place is a unity that takes place directly in the sense of the subject, such as material, color, texture, and shape, beyond the physical patterns of landscape and settlement. By defining this whole, that is, context, as the "environmental character" that includes human existence and action, Schulz argues that the task of the individual is to revive the spirit of the place and create meaningful places [39–43].

Critical Regionalist Dimension of Context

Critical contextualist approaches have developed different approaches to the subject of "place" in addition to questioning the concept of "place" in context, such as Rossi's scrutiny of the meaning through the concept of "locus" and Schulz's revealing the concept of "genius loci," which he expresses as the spirit of the place that covers everything. This approach, known as Critical Regionalism, was developed by Alexander Tzonis and Liane Lefaivre in their article titled "The Grid and the Pathway" published in 1981. It became an alternative in the production of context information by focusing on issues such as suitability to the local texture, place, and identity.

In addition to the criticism, it formed over global modernism, critical regionalism sought to build a stance against both the de-identification effect of modernism and postmodern approaches such as Venturi and Rossi, which instrumentalize the location pragmatically and semantically [44]. Critical regionalism has taken a stance against such trends as analogy, mimesis, mimicry, and stylistic repetition of local characteristics.

Unlike Tzonis and Lefebvre, the critical regionalism method of Frampton was not conducted within the framework of predefined rules against the context. A contextual solution based on the nature of the relationship was explored, and architectural knowledge was evaluated as a tectonic reality. Frampton claimed that architecture's tectonic reality might be understood by examining its relationship with the natural environment [45]. According to him, a structure is regionally contextualist insofar as it is shaped by terrain, local light, climate, and other site-specific factors. Thus, Frampton broadened the Cornel school's understanding of the physical context by include the natural environment. The necessary contextual conditions for the formation of 'Critical Regionalism,' which Frampton referred to as the 'Six Points for Architectural Resistance,' are: 1) Culture and Civilization, 2) The Rise and Fall of the Avant-garde, 3) Critical Regionalism and World Culture, 4) The Resistance of the Place-Form. 6) The Visual vs. the Tactile [46].

Conclusion

Analyzing the context, beginning with the philosophy of the language and epistemology in which it was originally employed, has contributed significantly to our understanding of the multidimensional, multilayered structure of the context inside architectural knowledge. In these fields, context determines the situation of the subject, whereas in architecture context is a notion that explains the situation of both the object and the subject.

Rowe and Koetter's research and the Cornell School use context to reveal the relationships between objects in a part-whole relationship and to explain how the architectural item's features become a part of the object. In the writings of Hurtt, Cohen, Ellis, and Peterson, the concept of context is assessed in a broader context, shifting from its physical dimension to its historical, social, and cultural dimensions. Focusing on the object rather than the subject, Rossi and Venturi also utilized a comprehensive framework to address the context's historical and cultural assets. In terms of the subject-object relationship, Schulz's approach is distinct from that of the others. Schulz's phenomenological method allowed for the generation of context-dependent knowledge that is continually changing and shifting [28].

It has been observed that a vast array of contextual information can be gathered when evaluating all ontological components of the setting in architecture. In architectural design, contextual information is associated with all the assets surrounding the architectural object, namely the physical [existing built environment (all existing structures, whether historical or not), environmental data (climate, topography, orientation, etc.), urban morphology] and social [existing built environment (all existing structures, whether historical or not), environmental data (climate, topography, orientation, etc.), urban morphology] (depending on that place). It has been determined that it can be classified as the culture, significance, and identity associated with a particular human life.

Before context became a paradigm in architectural knowledge with the word "contextualism," it had an open source to all the possibilities of the hermeneutic tradition, which is the legacy of understanding and interpretation. However, this possibility was not employed to grasp the context across time; rather, it was used in various forms from the subject's perspective [11], transforming the context into speculative knowledge. To comprehend the potential of the context and to use it correctly in the present day, there are two types of deviations: first, the narcissistic deviation, which is always indifferent to location and circumstance; and second, the ideological deviation, which always refers to the same place and scenario in order to be registered [12].

The context is comprised of the physical, cultural, environmental, geographical, and social conditions. Consequently, reading these numerous layers in a multidimensional and holistic manner will allow the construction of various conceptual expansions for new architectural designs and the ability to redescribe the qualities provided by the setting each time, depending on the time, location, and subject. Thus, the setting will become a source of design and information for the architectural object's construction.

Once again, all of the contextual conditions surrounding a structure should be dealt with holistically, thoroughly evaluated, and presented without accumulating discursive content. If our own beliefs overwhelm true contextual evidence, it is unavoidable that structures far from their contextual conditions will grow, with the belief that anything can happen anywhere.

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RE-UNDERSTANDING THE MULTI LAYERED PROCESS OF BUILDING DESIGN DEVELOPMENT THROUGH THE CONCEPT OF SUSTAINABILITY

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Abstract
Sustainability, in the realm of building design, has primarily focused on the building performance and technologically integrated simulations for the performance of the buildings, ignoring the broader lifecycle approach required for an extensive sustainability achievement. To truly address sustainability, it is necessary to acknowledge the complex, multifaceted yet tightly connected, and all-encompassing nature of the design development process throughout its entire lifecycle, from the initial decision-making phase to post-project phase, including waste management after demolition. The development process entails numerous stages, participants, and variables, necessitating a multi-dimensional understanding that integrates these diverse and conflicting requirements, thus sustainability must be of utmost importance. Concerns regarding the priorities of participants, the constraints/ potentials or limitations of the context, the management of the exchanges within the project development processes and the potential for re-use, recycling or demolition, have been disregarded or undervalued.
Current complex and multidisciplinary design requirements pose a significant risk of causing undesired consequences and producing excessive wastes- and not being sustainable at all-, if not approached and managed with optimization and efficiency. All the interdependent stages of any building design development (including early decision-making, construction, post construction, occupancy or facility management, re-use, demolition…etc.) will inevitably have similar impacts on the achievement of sustainability (and sustainable processes). Besides these direct impacts, environmental, contextual, social and/or cultural relationships as well as regional and economic factors and constraints, play an essential role in achieving sustainability. Therefore, the process itself must be reconsidered through the perspective of a multilayered and multidimensional total lifecycle approach that can foresee, optimize, integrate, and subsequently manage these distinct but interconnected aspects. The need for this new understanding and approach has been studied in the dissertation of Duran [1], where she has extensively researched, developed, and proposed alternative sustainability concepts in order to achieve this broader sustainability in building design development processes. In the development of this paper, newly developed or revised sustainability concepts (a total of eight: social, cultural, economic, environmental, physical, and contextual, occupancy-based, and process-based) served as a guide for the case studies analyzed and the subsequent discussion. This paper's methodology consists of two stages; identifying missing aspects in sustainability approaches and proposing new concepts, and then analyzing these concepts in significant building developments to reveal the results of insufficient approach and to propose a new understanding for the sustainable process and sustainable lifecycles in building design. Public buildings in Turkey with complex programs and criticized applications or impacts, were selected as case studies for the second part of the methodology. Each of these cases was subjected to in-depth analyses utilizing the newly proposed sustainability concepts in an effort to decipher neglected factors and highlight their impact on sustainability approaches. The outcomes were used to support the framework of the re-understanding and newly developed multilayered process, which includes the addition of new sustainability concepts having different but complementary priorities, implemented with a multi-layered superimposed design development approach, and serves as a base mind-map and a process path for various scenarios in different contexts.

Key Words: *sustainable building design process, comprehensive lifercycle, multi layered design approach, multidisicplinary integrated building design*

Introduction

Sustainability can be traced back to the 18th century, when it first appeared in "Our Common Future" in 1987 [2] and described as 'an approach meeting the basic needs of all people and extending to all the opportunity to satisfy their aspirations for a better life without compromising future generations' ability to meet their own needs". This definition has been appreciated over the years by various researchers from different approaches, however it wasn't until the last 20 years that the term gained attention and a level of prominence [3]. Rapid technological and economic advances over the last two centuries combined with an uncontrolled population increase, resulting in an increase of urban developments and an uncontrolled expansion of the settlements have fostered the sensitivity and raised awareness to the issues of preserving the world's scarce and limited natural resources. This new awareness, being effective particularly in building design developments and environmental studies, resulted in new and more comprehensive definitions of the concept of sustainability. Given that the primary source of the problem is related to resources and their (ir)responsible consumption- because of its both producing 40% of carbon emissions and 60% of waste worldwide while also consuming 14% of water [4] [5], it has occurred that the construction industry

and all of its widely dispersed applications would be one of the main responsible domains for achieving a broader sustainability in our environments.

However, construction industry is not limited to the design and construction of buildings and infrastructure, due to the manufacturing of new products or the constant consumption of resources over a long-term period of time; it also encompasses and effects various fields, such as the national economies, social and cultural developments of communities, administrative and legal regulations and relative future projections of the authorities, contextual shifts in existing environments or post-occupancy evaluations and user's psychological well-being or comfort levels. Therefore, it became evident that the most significant developments, improvements, and applications to enhance sustainability need to be applied in the building design and construction industry. These interventions and contributions also need and should bring a diverse set of priorities, concerns, integrations, and comprehensive propositions of multiple outcomes, which are effective through a considerable long-term duration with various consequences (starting from macro level to the micro level). This significant long-term duration of any building design development -occurring until the completion of construction, through occupancy, and even including the demolition processes- also demonstrates that building design development process itself also need to be executed within a broader integrated and a sustainable approach, as it involves numerous diverse, challenging and sometimes contradictory (conflicting) issues raised by different people, constraints, and involvements. Therefore, to attain a broader sustainability, the approach itself, to develop a building design, needs to be revised. "A sustainable building requires more than identifying solutions to specific problems, but changes to attitudes, paradigms, processes and systems to deliver the project", according to Blutstein and Rodger [6][7]. Therefore, fundamental improvements in the definition and perception of the sustainability, should begin with a comprehensive understanding of the building lifecycle as a whole, followed by a more sophisticated, multidisciplinary, integrated and multilayered approach to maintaining this entire building lifecycle.

Problem Definition

Sustainability is a broad concept, with many diverse requirements and aspects. Although it emerged with a focus on the provision of a better life for people through reduced and sensible consumption of natural resources for a better life for future generations [2], a major shift has occurred within the main perception of it, where the emphasis on environmental issues, like resource efficiency, has been replaced by a focus on the broader social and economic issues [8][9]. In general, however, the majority of research on sustainability has centered on the performances of those building design developments, revealing the prioritization of technical features constraints and specifications required to achieve this sustainability. While many different streams of sustainability research continue to emphasize technology, or health and social considerations as the primary solutions to environmental problems or comprehensive approaches [17][10], they proceed to underestimate and disregard the relevance of the significant impact of the design process itself in achieving overall sustainability. Furthermore, the sole definition of sustainability, which refers to the maintenance of a process over an extended and acceptable period of time, also highlights the importance of the process – the entire lifecycle more specifically- in achieving the desired outcome. Contrary to the studies interpreting the lifecycle as the performance of the building designs, or the realization of estimations in the building usage, the importance of the synchronous multilayered applications of multiple multidisciplinary collaborations has been overlooked or undervalued. It should also be remembered that the existing built environments are primarily the consequences and direct results of various interdependent impacts of actors, factors, exchanges, priorities or concerns, acting synchronously, sequentially or iteratively within the overall development process of each design built on them and thus, it is not only the duration of the process to be improved, but also its content. In their studies, Yalçın and Acar also revealed the problem of the fragmented structure of building industry, where different priorities, visions, ideas, and technical knowledge of stakeholders make it difficult to develop a shared sustainability agenda and achieve goals in an integrated manner [17]. To overcome this barrier of isolated and prioritized emphasis, new approaches and methodologies need to be elaborated with the integration of several other aspects and factors. These others (yet to be named as factors) effective on sustainability such as local, regulatory, contextual, administrative, and people-related factors, are most influential and must therefore be incorporated into the process beginning even before the design development process, since the absence of or improper types of policies, regulations, steering mechanisms, and the associated instruments can impede the dissemination of sustainable practices [11][12].

As a result, the main problem of unsustainable built environments has been identified as the lack of a comprehensive approach to the achievement of a broader sustainability. Such an approach would be multi-layered, include additional sub-concepts and be able to sustain any sustainable building design development process throughout its entire lifecycle, as well as prevent any insufficient implementations of (un)sustainable building design outputs in the built environments.

Aim

Built environments are results of current building design development practices. However, the methodologies and approaches that result in these built environments continue to have deficiencies and problems in perceiving the issue as a whole process and a lifecycle where a multilayered and integrative multidisciplinary superimposition

of various concerns and priorities has been implemented. This deficiency also causes a failure to integrate a comprehensive and an advanced strategy for achieving a broader sustainability. Therefore, the main goal of this research has been defined as; to reveal the importance of a multisided approach for integrating other complementary factors effective in any building design development process (such as contextual, economical, or cultural, regulatory…etc.) with proposing a much more comprehensive and integrative re-understanding.

This main aim has been built on the foundation of many additional divisions serving as sub-goals in the fulfillment of this re-understanding of sustainable building design processes. One of these supplementary aims has been defined as revealing the importance and the necessity of such a multilayered understanding and an integration in the building design project development processes, where the second to re-define the essential strategies, steps to be executed to enhance and sustain a broader lifecycle for any sustainable building design development process (beginning with the idea of the development ending with the construction and even including the waste management of the demolition). When re-defining these new strategies in the second step, classifying and proposing sub-concepts of sustainability has been included as the main grounding of origin. The third goal is to identify and reveal how this new understanding of sustainability within a process improvement approach can be reflected and implemented specifically in building design project developments. The last but not the least supplementary aim of this research has been defined as the strengthening the proposition of such and integrative and comprehensive approach by exemplifying from real world building design scenarios.

Method

This main aim has been accomplished by following a concise but effective methodology, which has been structured on two main stages; the first of which was to identify the lacking aspects in sustainability achievement approaches and identify what other concepts need to be added to develop and improve these processes as well as desired outputs in terms of sustainability achievement, and the second of which was to analyze these proposed sustainability concepts on certain significant building developments and reveal the undesired outcomes occurred due to the lack of such an ad hoc approach. In detail, when following this brief methodology in the first stage, the findings of the study of Duran [1] have been referred in order to identify and emphasize the descriptions as well as the essentials and priorities for each newly proposed sustainability concept. Afterwards, under the light of these justified sustainability concepts, a new understanding of a multi-dimensional approach to achieve sustainability has been discussed with the help of these selected case studies. Especially these sub-concepts of sustainability that are effective, collaborative and essential on a broader sustainability are also highlighted to display the need for a multi-layered perspective and a corresponding action plan in order to attain these sustainable processes as well as the outcomes.

To be relevant to the mentioned objectives, all examples have been selected among public buildings to represent the general context of Turkish design and building industry. They all share a certain level of complexity and common, accepted - but also criticized- general applications (particularly site plan organization, building articulation approaches, contextual or regulatory (in)appropriateness or (dis)harmony with existing environment…etc.). Based on these considerations and objectives, examples of a mixed-use development, a city-hospital project and a public office building project have been selected for comparison and analysis. Each of the developments has been subjected to a comprehensive set of analyses with their positive and negative reflections on the basis of newly proposed sustainability concepts during the analyses process. In addition to the diagrammatic and graphical representations of the cases (such as site, context, building design itself, spatial provisions, user perception and experience…etc.), each case's technical and objective has also been categorized and presented in brief tables to facilitate comparison.

In accordance with these approaches and main two divisions, a concise conclusion has been provided, which summarizes the revealed significant need for a broader and multilayered perception and a re-understanding in the sustainability achievement through multidimensional integration and multidisciplinary involvements. The methodology of first identifying the necessity for a re-understanding with the help of research and discussions and then simply supporting it with exiting case studies; intends to reveal the crucial requirement of a change in the perception of sustainability in the exiting building design development and relevant processes that the urban environment has been constructed. Moreover, not only has the need been discussed and proposed, but also a new perspective on how to reflect this new approach in the use of alternative action plans to design and building developments, by promoting a full lifecycle embraced by the early and full contribution of numerous stakeholders actively and synchronously taking part throughout the whole process.

Sustainability Concepts in Building Design Lifecycles

As stated in the definition of sustainability; its realization is predicated on its longevity. And, as the term refers, this duration is completely effective on the outcome and covers various stages, from evolution to demolition. Therefore, it is necessary to consider the stages of this process in order to produce fully efficient sustainable and long-lasting existing building design developments. In addition to this approach, the term 'building lifecycle' must cover all stages of any building design development, from the investment feasibility to planning, including project design and construction, through occupancy, and finally until and even after the demolishment, in terms of its

removal, waste management and disposal [13]. Since this broader perception of this new lifecycle understanding includes an increased involvement and various exchanges in terms of various people, constraints, concerns and priorities, it is unavoidable that the term should have multiple dimensions that must be fulfilled for its enhancement. Najjar, in his research, has also questioned and then identified the significance of additional dimensions that must be fulfilled in the nature and dynamics of sustainability [14]. His study where he demonstrated the correlations between several dimensions of sustainability, has also displayed the importance of contributions from other factors, such as people (human impact), cultural aspects, contextual references or regulations such as laws and politics…etc. (Fig.1)

Fig.1. Dynamics of Sustainability (Najjar, 2022) [14].

These discussions on the necessity for a broader perception of sustainability, require a shift in the current approaches and proposed methodologies where it has to be re-considered and re-defined from being solely dependent on and prioritized by the satisfaction of triple bottom line concepts of sustainability such as; social-economic and environmental [15]; to rather a much more comprehensive and integrative approach of identifying other additional sustainability concepts of contextual, physical, occupancy based, process based [1]. These newly proposed sub- concepts have been developed with the intention of re-understanding all these built environments as complex and integrated consequences of multiple factors perceived as individual identities, confined by being sustainable in their self-domains in a limited approach, but not at all in the broader sense. The quality of development processes, the quantity and contents of numerous project revisions, the long-term infrastructural or contextual consequences and their (questionable) reasons, or the waste management strategies at the end of their lifecycle have never been taken into account in the evaluation of a building design output to be judged as sustainable or not.

In order to further describe and justify the significance of these newly proposed sub-concepts of sustainability, Table 1 provides a brief description, essential aspects and basic priorities for each of them. Although each and every one of these sub-concepts are the subjects of individual studies, they have been taken as references of analysis in this study to reveal the necessity and significance of this broader approach of sustainability.

Table 1. Sub-concepts of Sustainability (Duran, 2022) [1]

Sub-concept	Brief Description	Essentials, Priorities
Contextual Sustainability	It may be defined on the bases of; being coherent and in harmony with the existing context in terms of function, scale, supplementary amenities, public services and infrastructural necessities, re-utilizing already contaminated lots, and introducing adaptive re-use potentials of existing design stocks	i.) selection of the appropriate site: utilizing already contaminated or used urban lands within the urban fabric ii.) determine the specific (coherent) function, typology, and program of the building design project, acceptable or available land plots and site options
Environmental Sustainability	Briefly, it refers to the provision of an equilibrium between the building design and its surrounding in terms of its damages / impacts on it and its adaptability, flexibility to future changes, demands and local context related prerequisites.	i.) careful selection of the development site provided with facilities, public transportation, easy use of pedestrian / cyclist, with own ecological value, ii.) utilization of land efficiently considering needs of community, design of appropriate densities and building on already contaminated lands iii.) minimization of the impact of the development by protection of natural habitats, enhancing additional landscaping for microclimate, inclusion of production of food and if possible.

Social and Cultural Sustainability	It refers to a sensitivity towards the urban environment to be perceived as a collection of sustainable spaces including social and cultural necessities, since the built environments are already a collection of spaces that built upon the continuation of the memories, habits, accustomed usage of communities, interactions and exchanges and thus re-built community lives…etc.	i.) a social dependence and a social context ii.) consideration of a multitude of ever-changing criteria and negotiation of trade-offs between stakeholders. iii.) adhere to ethical standards by ethical trading throughout the supply chain and by providing safe and healthy work environments v) provide place that meets needs with a mix of tenure types and ensure flexibility wherever possible [10] iv) conserve local heritage and culture [10]
Economical Sustainability:	It may be considered as improving the lifetime efficiency of any design by preventing (minimizing) wastes like direct and indirect costs, idle resources, overproduction or overprocessing, and instead providing (maximizing) values like producing energy, promoting recycle or optimizing the resource allocations	i.) sustainability in the building design development processes, ii.) sustainability in the operational or functional processes when the building is in use and experienced by the occupants iii.) sustainability in the end of the lifecycle (possibilities of adaptive re-use of the spaces or recycling and/ reuse of the wastes / materials)
Physical Sustainability	It needs to be perceived in a much more comprehensive and an integrative approach of design development, where all interdisciplinary collaborations and design efficiencies are promoted and accomplished	i.) integrated collaboration of a multidisciplinary design team. ii.) and development of various design components, multiple alternatives, combinations, and priorities of all disciplines
Occupancy-related Sustainability	It focuses on the early involvement of users and the operational concerns in the design development process with their requirements, concerns, expectations and sensitivities, as well as post- process related aspects like the possibilities of re-use, revise, refit or demolish.	i.) feedback on the existing/ current building design to be searched for alternative efficient re-uses; revitalizations, and thus still maintaining a sense of sustainability, ii.) feedback on next/ future building designs, where lessons are learned and applied not to end up with undesired or future-wise risky solutions proposals of designs and thus ending up with a longer term of sustainability approach
Process-based Sustainability	It refers to a fully- sustainable building design development process, since the processes themselves are accused as one of the most consuming & waste-producing components in the entire building lifecycle,	i.) prevention of due to numerous iterations in the design, idle waiting hours, lack of communication or poor design communication, unstructured data exchanges or overprocessing ii.) provision and promoting an advanced integrated design management approach

Despite having distinct priorities in their self-approaches, these sustainability concepts are highly interdependent and interconnected due to their mutually beneficial impacts and priorities. The fulfillment of one will inevitably foster and enhance the satisfaction of another and as a result, a more efficient, self-sufficient and a long-lasting sustainability achievement could have been realized.

Re-understanding Sustainability In Building Design Development Processes (under the light of sustainability concepts)

Sustainable or green design implies not only better environmental performance and improved standards with new investment values, but also a reevaluation of design "intelligence" and the ways of integrating them into the building design lifecycles, as Alwaer & Clements-Croome underlined [16]. Therefore, this level of a design intelligence could have only been achieved through a comprehensive way of approach, in which different constraints and priorities of each sustainability concept were considered, superimposed with each other, and optimized to be constituted as stages or paths to follow and proceed with a sustainable building design development process and lifecycle. In order to search for the probability of realizing such an integrated design intelligence or approach, a case study method has been conducted to detect the presence or absence of various sustainability concepts in built environments as well as their consequences.

As a general strategy, the public building typology has been determined as the common domain of building example selection criterion. Afterwards, three sub-typologies have been chosen to illustrate this disconnection of sustainability approaches in building design and construction industry, particularly in the Turkish context. The primary criterion for selecting the examples was their ability to represent the common understanding and implication approaches of the Turkish building design industry, in terms of general agreements and decisions regarding planning, implementation, regulatory approvals or usage. Since public building designs with such complexities of urban context, scale, typology, in area usage and occupant perception, have been expected to be entirely sustainable for a permanent global respectability, the selected examples are all representatives of complex public building typologies serving communities of various user groups, in different time zones and for various purposes. The expected sustainability here, however, should include and satisfy all of the aforementioned sustainability concepts to be acceptable. By being located in the capital of Turkey and all having certain amount of complex area allocations with diverse community serving facilities in their public program developments, they are expected to have a broader and a comprehensive understanding for sustainability; including their initial investment decisions, project development process planning approaches, appropriateness within the context (consistent with existing (for future) planning approaches), provision of social and cultural continuity, integrity, potential and flexibility for possible future adaptations, full involvement and participation of users (with maximum fulfillment of user expectations), future projection alternatives for possible revisions, re-use, or revitalizations and planning for the waste management after disposal (demolition) at the end. Using all of these criteria as a grounding

for an accurate and complementary analysis; three recognizable building design examples in Ankara have been selected, and subjected to a detailed analysis of proposed sustainability concepts.

Table 2 displays briefly the selected cases of three example building designs in comparison. The table includes a general view of each with the depiction of their locations , general relations with the context, mass articulations, layout and orientation as well as with their general scale and program.

Table 2. Case Studies for Analysis Of Sustainability Sub-Concepts (Duran, 2022) [1]

Case-1 **Ankara Bilkent City Hospital**	**Case-2** **Incek Prestij MXD**	**Case-3** **Ministry Of Environment Urbanization and Climate Change Headquarters**
		
		
Location: Bilkent , Eskisehir Road Ankara Typology: Healthcare complex (3.704 beds) Total campus area: app .180.000 sqm GBA: 1.312.000 sqm	Location: İncek, Ankara Typology: MXD: Housing / Retail Land area: 60.000sqm land - 375 total residential unit (12 types)	Location: Eskişehir Road, Ankara Typology: Office Complex, Governmental Office Headquarters GBA: 142.166 sqm

When examining the case studies, three primary focus sets have been applied as the sustainability concept tests: i. the site layout decisions and contextual references, with decisions on volumetric mass articulations and spatial relations, public outdoor space integrations, compatibility and suitability with the existing environment as well as infrastructural necessities. ii. spatial qualities, microclimatic and controlled indoor space provisioning, and section-wise elaborations enhancing efficiency of indoor program allocations. iii. the analysis on floor plans, sections, or details of the system / building materials specifications. Appendix A provides a comprehensive depiction of the case study analyses of these three focus sets conducted on chosen building design development examples.

One of the main significant lacking aspects of the building examples have been identified as the problematic relationship that they have constituted in their contextual references. Neither of these public buildings have taken into consideration the existing building codes (in terms of regulations in physical limitations) or programmatic / functional decisions in general masterplan land-use plannings; which are proofs of a lacking awareness of contextual sustainability. They have catalyzed and changed the overall planning configuration of the existing building construction and environment silhouette, with their serious impacts not only in terms of physical outcomes, but also in terms of infrastructural necessities and thus consequential heavy loads. These consequences furthermore display the significance of the interdependency and inevitability of incorporating additional concepts of sustainability, specifically physical sustainability and environmental sustainability. In more detail, it is evident in the analyses that they have, not only blocked the sun exposures and natural ventilation possibilities of the surrounding (due to the excessive shading that they have casted), but also in terms of the undesired changes that they have caused in terms of excessive user (pedestrian and vehicular) loads, which have changed entire daily patterns and usage routines of the neighborhood. Another important aspect that these public building designs lack is the missed opportunity for a better public integration and urban use of public within the planning and social and cultural provisions of these complexes. None of these buildings provide any urban public space for possible user groups to act for several gathering possibilities, fostering necessary social and cultural sustainability to remain efficient and valid in the long term. Table 3 displays a brief but comparable display of how these selected building design examples, may be – and should be- evaluated through such a comprehensive approach, with displaying their performances or reflexes under the proposed sustainability concepts individually.

Table 3. Brief Summary of The Analysis of Case Examples on The Reference of Sustainability Concepts

Sub-concepts	Case -1	Case -2	Case-3
Contextual Sustainability	has been constructed in a context where educational (university) complexes) and public administrative buildings have been existing- thus brought an additional excessive traffic and infrastructural load to the existing already loaded region due to its scale and functional requirements	has been constructed in a fully low-rise and low-dense residential district with its program and service requirements it has brought an additional traffic load and infrastructural requirement to the existing region and also effected a land-use change within the surrounding to be transferred into a more hybrid (commercial) accommodating region	close to the main axis on which many administrative / office building complexes have been exiting. However, that periphery is on the critic edge of being transformed into either residential or MXD, which is strongly effected with this development.
Environmental Sustainability	Excessive solar radiation for the surrounding, a numerous land usage without any in between space creation, no possibility for a pedestrian access in the complex no efficient and sufficient vehicular traffic network and public transportation provision	The mass articulation and site plan layout is totally disrespectful and self-oriented in marketing purposes to the surrounding existing building stock, and casting excessive shadow and prevents the existing thermal comfort levels of natural ventilation, sun exposure and microclimate.	No concern for a required set -back for social gathering space or a provision of a public interface within the existing surrounding No roof utilization or podium utilization for energy efficiency or passive system utilizations
Social and Cultural Sustainability	Due to excessive footprint no possibility for a people interaction, no walkability between buildings, no social gathering outdoor / indoor spaces in human-scale	Due to the introverted site layout and planning approach, the complex has no social and/or cultural integration or gathering, promoting facility possibilities and provisions	Due to the introverted site layout for excessive governmental privacy, no social and/or cultural integration or gathering, possibilities and provisions. No additional facilities provided for public use
Economical Sustainability:	excessive travel hours due to its location and due to its enormous land use, excessive initial investment requirement and resulting in excessive operational cost, Government investment so no economical land value concern or RoI priority, No operational cost concern so excessive heating cooling loads and wastes in the usage and long.-term building performance	As an initial investment cost, it had required a significant amount of budget. Then by being the pioneer of its function in the region it might have fostered initial profit, however in terms of economical sustainability the necessary requirements to sustain the program in full efficiency requires additional investment and causes wastes	Government investment so no economical land value concern or RoI priority No operational cost concern so excessive heating cooling loads and wastes in the usage and long.-term building performance
Physical Sustainability	No passive system (roof or podium) utilizations, excessive solar (heat) island effect has been created, No specific orientation concerns with respect to functional space distributions No daylight or natural ventilation provision due to large footprint	excessive solar (heat) island effect has been created with a contrast of excessive shadow casting to the surrounding and insufficient shadow for the required outdoor spaces within the complex	No appropriate facade treatment (passive system utilizations) according to orientation and thus creating excessive heating cooling loads and wastes in the usage and long.-term building performance
Occupancy-related Sustainability	No occupancy involvement in the project program development process., No feedback or post-occupancy evaluations conducted for possible improvements	The occupants are constrained with their closed-gate community having no possible interaction with the neighborhood	No occupancy involvement in the project program development process, no feedback or post-occupancy evaluations conducted for possible improvements
Process-based Sustainability	It took many years for the project to be completed due to its excessive scale of investment, planning and construction. The amount of wastes created is unsustainable	In the development process, the revisions for the building codes had delayed the process, due to the excessive investment scale the project has had to be suspended many times and then re-activated which caused waste in the process	No public involvements (discussions or contributions) for major decisions, Excessive space allocations and multiple revisions due to changing authorities) decision making parties) caused waste in the process

The case study findings revealed that very similar outcomes can be noticed in many building design examples, which exist independently of their typologies or contexts and result in insufficient sustainability achievements. The majority of these problems were discovered to be caused by similar circumstances, some of which are listed below. These lacking aspects highlight and display the actions that must be taken to achieve a broader sustainability.

- limited focuses on a specific area of the sustainability and simply integrating building performance-related aspects, thus neglecting and lacking the broader accomplishment as a whole,
- misapplication or inaccurate modifications on the legal and legislative domains, resulting in interdependent impacts in the surrounding (i.e., the changes in the plan notes, set back and / or height limitations effecting the nearby developments)
- ignorance of the potential or drawbacks of the contextual and local settings, leading in demands for additional facilities to achieve optimal use, or underutilization and idleness of current facilities.
- no concern or enthusiasm to boost overall sustainability levels in a multifaceted manner to satisfy as many sustainability concepts as possible.

- no multidimensional approach to consider and satisfy additional sustainability concepts in the whole building design development processes throughout the entire lifecycle, but rather focused on specific stages of the projects.

As discussed earlier, the comprehensive new approach for sustainability achievement is multidimensional and should include numerous multileveled features to be implemented. The priorities and governing determinant criteria effective on the design will inevitably vary depending on the specific typology of any building design, but this collaborative multisided and multi-layered approach, which considers other additional sustainability concepts in integration, should always be followed.

Conclusion

Sustainability is a multileveled, optimized and long-lasting process whose realization is highly reliant on long-term maintenance and efficient adaptability. Consequently, it requires a comprehensive approach, which integrates various concerns and people with diverse priorities and establishments for the mutual benefit of distinct but interdependent concepts. Sustainability is more than a single output achievement; it is the process itself that must be sustained, in order to produce a variety of sustainable outputs. As building design developments have been identified as the primary responsible parties for today's un/sustainable built environment, it is necessary and even unavoidable to incorporate multi-levelled and multi-sided interventions into the process. Priority should be given to significant consequences of these insufficient processes. In order to be sufficient and effective in a comprehensive sustainability, the necessary actions (and stakeholders associated with their realization), as well as the regulatory and local indirect impacts must all be-reconsidered and re-understood within a multi-layered building design development process.

The isolated perception of sustainability approaches based solely on the performance of individual building design developments is insufficient to prevent undesirable and inadequate results. More specifically, when satisfying environmental sustainability by incorporating renewable energy production into its design criteria, the building design may lack the sensitivity of contextual accuracy and coherence (in terms of typology), resulting in excessive traffic load and pollution- that is, infrastructural waste. Such circumstances highlight the critical interdependence of the additional sustainability concepts that must be integrated into a multi-disciplinary and multifaceted approach. However, the narrow definition of sustainability, which emphasizes environmental and economic problems, ignores this multidimensional understanding which includes contextual, social, and cultural concerns, as well as process and occupancy-based sustainability goals. Furthermore, this multidimensional approach to sustainability also necessitates a broader understanding of the lifecycle, with pre-design and post-design stages evaluated, planned, and integrated from the very beginning of the building design development processes.

Significant concerns and responsibilities, particularly those relating to the contribution and integration of various factors, association of different tasks, and action plans to be followed, should have been incorporated into the process, including all decision-making stages, execution periods, construction, post construction and even demolition and waste management, in order to achieve a broader understanding of sustainability. To cover and be effective at each of these distinct but interconnected stages of the process, the impacts and interdependencies of the key factors must be re-defined and re-structured. People as actors, processes as all exchanges, tasks as responsibilities and sustainability concepts as accomplishments, particular or broader achievements and fulfillments, must all be considered as crucial and intricately interconnected determinants of the sustainable understanding in any building design. These determinants should have been incorporated into a multidimensional approach, where the whole process is executed synchronously. The concurrent and multi-layered integration requires a breakdown of interdependent responsibilities for specific involvements of various actors, which guides the necessary follow-ups of assigned tasks as they progress through the determined building design stages due to significant sustainability concepts. This multi-layered design approach's concurrent mindset will facilitate the incorporation of all determinants. The continued contribution and improvement of this new re-understanding of the multidisciplinary building design processes towards the concept of sustainability, will simultaneously prevent the excessive or undesirable wastes, generated by the process, such as revisions due to miscommunication, reworks due to a lack of design data exchange, idle waiting hours due to insufficient concurrent planning of interrelated actions or overproduction due to the dissociation of interdependent actors.

The necessity for a multilayered approach in building design development has yielded two significant outcomes. It has first emphasized the significance of defining clear tasks and action plans, to achieve a broader sustainability agenda. This involves the identification of all building design objectives and targets. By breaking down sustainability into actionable tasks, stakeholders can better comprehend their roles and responsibilities in achieving overall sustainability goals. Second, the multilayered approach has illuminated the implementation of these tasks and action plans within building design development practices. It has highlighted the need for collaboration and integration across all involved disciplines and stakeholders. Architects, engineers, contractors, developers, and

policymakers must work together and collaborate to ensure that sustainability considerations are seamlessly integrated from the initial design stages through construction, operation, and even demolition. Implementing sustainability in building design development requires a holistic perspective and a commitment to continuous improvement. Embracing sustainable practices involves utilizing technological advances, fostering greater community engagements and involvements, complying with relevant regulations and codes as well as sustaining the entire lifecycle to enhance a comprehensive sustainability. The outcomes of the multilayered approach provide a framework for influencing change in the building industry and addressing the urgent need for more sustainable built environments. Stakeholders can contribute to reducing the carbon footprint of buildings, mitigating the effects of climate change, and improving the overall quality of life for occupants and surrounding communities by adhering to the defined tasks and action plans. Therefore, by embracing these outcomes, a more sustainable and resilient built environment in the future can be accomplished.

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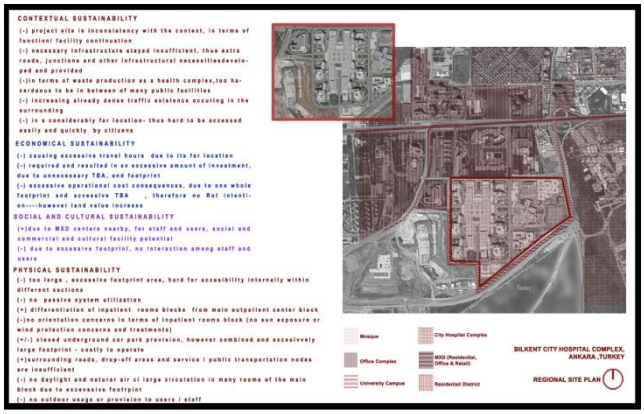
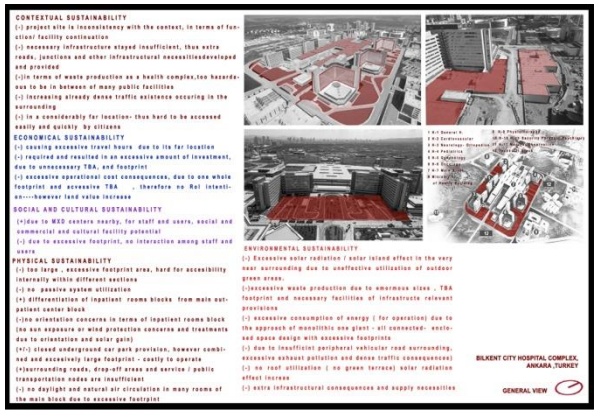
Appendix A.

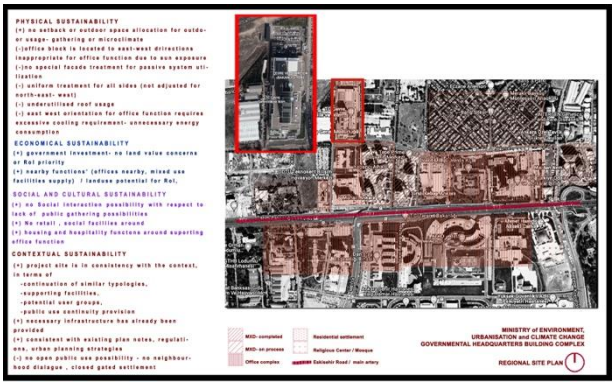
A.1. Ankara Bilkent City Hospital _Analysis Sets

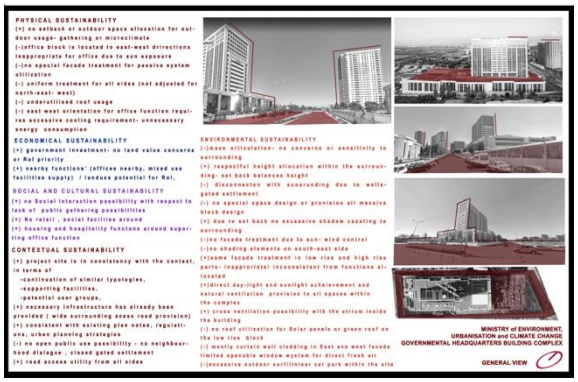




A.2.Incek Prestij MXD Complex_ Analysis Sets

A.3. Ministry Of Environment Urbanization and Climate Change Headquarters





ANALYZING ARCHITECTURE & UTOPIA, SPACE & BOND CONCEPTS THROUGH MIYAZAKI MOVIE; SPIRITED AWAY

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Abstract

Architecture and space have a direct connection with the city and its dwellers. It could directly affect human/social life. Because of this, topics related to it are essential, as well as being highly disputed. By creating utopias, architects attempted to systematize the management of this social layer. The idea behind utopias has the power to create a new way of thinking. Utopias were produced and discussed not only by architects but also through different disciplines. One of the most significant areas of these is the cinema. It is critical to evaluate the predictions of the universes that shed light on today's problems. The article discusses utopia & architecture and space & bond concepts through an interdisciplinary perspective. For this research, the discussion goes through a Miyazaki movie. The movie is a tool for examining these concepts. The movies have a unique atmosphere and a correct fit for the notion of this paper. The selected movie is Spirited Away. The link between reality and the created universes was discussed. The connection between space and people has been analyzed in the axis of Japanese design and the movie. Considering the derived data from the article, the main element always seems to be in connection with reality. Whether it is the production or design- architecture fields themselves, similar problems and questions arise through different disciplines. The relationship between nature, space, and the built environment needs to be reconsidered. It is beneficial to examine predictions and possible scenarios of these movies well for new productions and discussions to come. It is essential to create new approaches by constantly questioning the existing strategies. This situation could lead designers to achieve a better understanding.

Key Words: Architectural Utopias, Space, Miyazaki Movies, Spirited away, Japanese Design

Introduction

Design fields have a connection with other professions due to their interdisciplinary nature. Architecture is one of those disciplines, which has links with different notions. It has a direct relation with the city and its dwellers. It has the power to affect human/social life. Because of that, architecture stands in a significant and contradictory position. Architects tried to foresee the principles of this social life by producing utopias. The idea behind the utopias has the power to create a new way of thinking, and discussion. While discussing architecture, the space concept emerges. As architecture, space also has this distinctive connection with humans and their experiences. The bond between humans and space has a significant role in this case. The paper tries to enlighten these concepts. Yet utopias were produced and discussed not only by architects but also through different disciplines. One of the most significant areas of these disciplines is cinema. It is critical to evaluate the predictions of the universes created in movies that shed light on today's problems. To examine these concepts, a movie was selected as a tool. The paper discussed the movie comparatively on the axis of architecture-utopia-real World concepts and space-connection/bond concepts. The reason behind the selection of Miyazaki Movie has an essential role in this paper. The movies have a unique atmosphere and a correct fit for the concept of this paper. The selected movie is Spirited Away. The paper starts with the general atmosphere of Miyazaki movies and continues with architecture & utopia, space & bond concepts to create a background. These concepts are discussed within the scope of the article, through an interdisciplinary perspective.

For the architecture-utopia concept, the general atmosphere of the movies is suitable for this paper. Moreover, the critical approach in the nature-human-architecture relationship is notable for this dual concept. The article discusses architecture & utopia via structures and the relationship with nature in the movie. Miyazaki movies create their utopias/dystopias in a unique atmosphere. In the following chapters, the discussion continues with architectural utopias and the ones that are framed in the movies. The article examines the other concept, space & bond over interior spaces. The bond/connection between characters and spaces also has a vital role. The connection between space and people were analyzed in the axis of Japanese design and the movie. The relationship between nature, space, and the built environment needs to be reconsidered. Considering the data derived from the article, the results are discussed in the conclusion part.

Miyazaki Movies-General Atmosphere

It will be accurate to say Miyazaki movies are animation movies and stay in a notable place. Those movies have a unique general atmosphere. The way that it discusses the stories separates the movies from others. When animation movies were mentioned, it was assumed that those movies were generally made for children. But when it comes to Miyazaki movies, those are not made only for children. Even the movies are children's book

adaptations; they have a dark atmosphere and interlaced structure of stories. Because of that, they have a huge adult audience as well. But for these reasons, it should not be understood, as it is not appropriate for children. What the audience can derive from these movies is various. Those movies represent different levels of understanding. It is suitable for both adults and children. Due to this interlaced structure, both parts perceive it differently.

At this point, it is right to mention Hayao Miyazaki and Studio Ghibli. From 1970 to nowadays, Miyazaki has been writing, directing, and animating [1]. Studio Ghibli is Miyazaki and his partners' studio. With this studio, Miyazaki and his crew created several movies. Even though the technology developed considerably through the years, Miyazaki and his team never gave up hand drawing, paper, and pen [2]. This occasion can be seen as sincere in movies. Working together through these years creates an atmosphere and unique style in movies. The audience can effortlessly understand if a movie comes from Studio Ghibli or not. It could be said that movies are timeless.

The general atmosphere of movies has a multi-layered structure. The characters and the actions of those characters (due to their features) have a significant role in movies. The movies have fantastic elements, yet this situation is not enough to classify the complete filmography as fantastic movies [1]. Whether it's a fantasy universe, or a production without fantastic components, Miyazaki's movies captivate audiences in their world. It is a significant fact that; Miyazaki wants the audience to believe in the universe that he created. Miyazaki offers a gate to his world to his audience. The atmosphere of the movies relies on this critical fact. This situation empowers the audience to create a connection between characters and the spaces in movies. In the plots examined, there is not only good or evil among the characters. Even badly portrayed characters can act at some point in unexpected behavior. This situation brings the atmosphere of the movie closer to reality. As in our universe, Miyazaki movies' characters are good or evil. This unique feature creates a distinction between Miyazaki movies and other child animations.

One of the most essential elements in Miyazaki's movies is the nature-human relationship. The relationship between humans and nature emerges as a critical issue [2]. The main idea, that humankind should respect nature, reaches the audience either with the relationship between characters & nature or with the events that occur in movies. The importance of nature and human relationships is shown dramatically in utopic universes. Human ignorance that results in a poor relationship between humankind and nature is framed as a dystopian part of these utopic universes. The atmospheres are dystopian, yet the movie's universes can be tagged as utopias. Utopias do not have to be the visualization of the perfect city. As in utopias, there is a problem in the movie and there is a solution to this problem. That’s the reason why utopias shouldn’t understand as happy worlds [3]. Considered this way, even though the atmosphere is dystopian, the universe could be a utopia. In movies, it is shown that every problem can be solved concerning every spicy and staying in harmony with nature. As a result of that, the universe can be a better place. In movies, every spicy is significant and valuable.

Another critical point that audiences frequently see in Miyazaki movies is that the characters are flying at some point in the movie and gazing at the city or nature from a bird's-eye view. This opportunity gives a lot of information about these utopic universes. This flying situation gives another perspective to the main character [2]. Trains have a substantial part in journeys as it is in movies. Resolving the characters or reckoning with themselves is supported by train journeys. The journeys are significant elements in movies.

The concept of home is also a critical element in Miyazaki's movies. Houses/Homes usually have a veranda or a balcony. They are in connection with nature. Therefore, the veranda functions as a transitional space, seen as part of the building when it is seen from the outside and as part of the outside world when seen from the inside [4]. The idea behind the veranda usage is significant for Japanese culture. The interior spaces have a connection with nature. This understanding can be clearly seen in Japanese architecture. The relationship with light is also different from Western architecture. The transition of light into spaces and its relationship with materials is significant. Boundaries are redefined by these relations of light, emptiness, and fullness. The inside and outside borders are blurry. The audience can read traces of Japanese culture and architecture altogether. After the representation of the general density of the cities, the audience can see the homes where the main events proceed. The homes are directly connected to nature, open to green areas or the sea. In these houses, the characters are depicted while eating. Sitting at the same table represents the connection between the characters. The ceremony of eating and the place where it happens has a significant part of these homes. The ceremonies themselves are noteworthy. Greater awareness of the temporariness of existence and the significance of the present moment is embodied in Japanese design [5].

Some of the architectural elements are used as it is in the real world. But in ‘Spirited Away’ movies the rules of the real world are rejected in terms of architecture. The movies write their own rules in those universes [6]. Even though it has its own rules, the balance between reality and fantasy is delicately balanced that the audience can believe these worlds are real (Fig 1). Even though the spaces are imaginary in dystopias, the traces of real spaces can be derived [7]. The connection between those concepts is vital to create a bond with the audience.

Fig. 1. General atmosphere of spaces, (Miyazaki,2001) (Url-1)

Architecture & Utopia, Space & Bond

Architecture and utopia were in a connection since architecture existed as a concept. Although it may take some time to be called a utopia, architects have produced utopias considering social conditions and developing and changing technological elements. Since ancient times, societies have thought of flawless civilization and produced utopias [8]. These utopias had different aims. Various of them tried to determine the progress of social life. The others tried to change the existing architectural approach and bring a new one. Various groups produced utopias and presented new urban life. Some of these groups offered new strategies to existing cities, while others have erased the current condition of cities and created a new city in their utopian ideas. Whether with a new system or integrated into the old, utopias are in a connection with the present situation. Those utopias benefited from the existing things while they suggest new alternatives [8]. Whether the utopias propose a new society or an architectural approach, every perpetual is nourished and evolves with it. Utopians determine a problem and create these ideas to resolve these problems. This state exists not only in the utopias produced for architecture but also in the utopias in the Miyazaki universe. Even the utopians created utopias from nothingness, those universes have a connection with the real world.

It is correct to state that the architectural utopias changed through the process. The spread of people to rural areas after the Second World War and the occupation of these areas by cities is a significant element in this change of utopias [9]. These sharp shifts in the relationship with nature made architects question the relationship between architecture and nature. These questions caused utopias to develop in this context. At this point, the understanding of the Miyazaki movies and the utopian view of the architectural environment is parallel. Nature, which is critical for Miyazaki, is now emerging as a significant element in utopias. The question "Can a new relationship be established with nature" is presently on the agenda in utopias [9]. This changing process causes the utopias to break off from the ground with moving and walking elements. The relationship between humans and nature is a significant element in Miyazaki movies as in utopias. In films, Miyazaki tried to reproduce this relationship again. Yet another common point in all the utopias is that these utopian cities create their own rules. They are in linkages to the real world and create their own rules, bearing traces of it. This concept also exists in architectural utopias; Yona Friedmans’ utopian city, which breaks off from the ground, and Archigram’s Walking Cities. Architects like Yona Friedman, Buckminster Fuller, and the Archigram architecture community welcomed fantasy and the

greatest amount of freedom, experimenting with the mobility and combinability of lightweight structures [10]. The desire of architects to produce a utopia, and the thinking on cities' future is significant in terms of the architectural production environment. It is significant to mention utopians didn't behave, as they will be able to determine the future of cities with a see from the above attitude. For sure, there are attitudes in the utopias that they see from above. Yet this does not diminish the quality or importance of production. Utopia producers do not dictate these utopias; they make an addition to social knowledge accumulation. Some of the utopians tried to accomplish their utopias. The others contributed to this accumulation of knowledge as an idea. Even being able to create controversy is a critical element in terms of architecture. And yet the projects can face significant problems in the scenario of building them in real life. It is even true for the famous Archigrams walking cities. Many different questions can be addressed to the project yet what it creates is, simply to excite the public about the future [11].

At this point, it is essential to look closely at interior spaces. Interior space is also in a relationship with humans and human life. The bond that humans create with space has a particular and significant role. Each production of architecture connects with people, the city, and therefore with space. Space is a concept which has a direct contact with people, which links all these elements together. The place is neither a mere abstraction nor an object or a physical thing. With all its dimensions and shapes, it is both concept and reality, it is social [12]. This bond with the places is shaped and developed concurrently with the city, memory, and personal experiences of people. The places where this bond is felt most intensely are the homes. Homes are places, which allow the concept of personalization and belonging. Personalization is directly related to cultural diversity at this point. In some cultures, goods, and furniture were used to strengthen the bond. Yet Japanese culture, which has a massive part in Miyazaki Movies, stays in a distinctive position. In Japanese culture, the ceremony has a more significant role than the goods. Due to that, the bond between people and space is not built by the furnishing but by the occasions and ceremonies themselves. Furniture is used in the simplest way, which matches nature [13]. Due to that, space, atmosphere, and experience form the personalization and the bond. Each element has a role in this unique connection. The general atmosphere created in the movie is similar to the Japanese interior design concept. This atmosphere is provided by materials, light and interior design. The Japanese architectural style is a striking example of this understanding. It is important to consider how light enters places and how it interacts with different materials. These relationships between light, emptiness, and fullness change boundaries. These elements change the atmosphere and therefore the bond that people establish with the space.

A Review Through Miyazaki Movie: Spirited Away

One of Miyazaki's most known movie, Spirited Away, begins with the story of a girl named Chihiro who moves to another city with her family. In Miyazaki's movies, the concepts of relocation, a new settlement, and belonging are confronted. Usually, the main characters are avid and enthusiastic in this process of getting used to the new place. Unlike the others, in this movie, Chihiro's unbreakable bond with the past is conveyed by his unhappy car journey. It clearly shows that she does not want to leave. The movie continues with the disappearance of the family in the forest. They leave their car in the forest and start to go on foot. They reach an abandoned city. Chihiro and her family arrive at the abandoned city in the daytime. During their visit, they find a feast in the abandoned city, and Chihiro's family starts to eat with a big appetite. Although Chihiro warned them that it is wrong and that those do not belong to them, she cannot convince them. She leaves them there and walks through the city.

When the evening begins, the utopian universe created by Miyazaki encounters. The city sets its limits by raising its waters and becomes an island. Lights start to sparkle, and the city awakens (Fig. 2). In Miyazaki's utopian city, the day-night relationship is reversed. It is no longer the same as dwellers witness in everyday life. The city, which is dead in the daytime, is alive with the arrival of the night (Fig. 3). The city is quite dynamic for ghosts and Gods at night. To this city, which sets its limits, only the Gods can come by sea or by a train that travels over the sea and serves in one direction. The dynamics of the city are contrary to the real-life universe. Yet the traces of the current buildings and their relationship with the streets can be seen in the movie. The buildings have either a direct connection with the street or a veranda, which connects them with the city. Chihiro is surprised by this sudden change and goes to find her family. But when she returns, she sees her family, which turned into a pig. These animal-human transformations, which the audience can frequently encounter in Miyazaki movies, are antagonized in this movie in an integrated manner with the concept of greed. The family, trying to have something which is not their own, is pictured as a pig.

Fig. 2. day time in city (Miyazaki,2001) (Url-2)

It is beneficial to mention the general architectural approach in the movie. When the city is in the process of change, it unties its bonds with the present world with water. This city brings itself to an island position and breaks communication with the real world. The fact that the city begins to set its own rules is directly related to its ability to break its bonds with this world. This kind of 'breaking ties' idea also exists in architectural utopias. The new shapes itself by creating its own rules. Yet it has a connection with the real world and architectural elements. The city has stairs, which are going up and tie to the areas which were occupied by the festival. And it is a critical fact that the day and nightlife reverse in this utopian world. The universe that humans currently live in has different sets of rules and behaviors for day and night. In the daytime, the city looks like an abandoned place. But when it is night time the city is awake and in use (Fig. 3). The architectural structures and the street life has similarities with the real world. Japanese architecture and Japanese belief in Shinto's' traces can be seen in the movie. Even if it is a utopian universe, the cultural traces remain. This bond between the real and utopian universe makes the audience communicate with the movie more accessible. The connection to reality, which is also valid in architectural utopias, can also be seen in the utopian universes of Miyazaki. There are fragments from Japanese culture and Japanese belief while it creates its unique World. The elements of Japanese architecture can be seen in everyday spaces and religious areas. At this point, the utopian universes of Miyazaki and the universes produced in the framework of architecture are similar. Despite the proposal of a new order, it does not break its bond with the present.

Fig. 3. night time in City (Miyazaki,2001) (Url-3) & (Url-4)

The interior spaces have a huge role in the movie. The main events either take place in Bathhouse or the rooms. The characters do everyday actions in these spaces. The rooms have a veranda. The veranda functions as a transitional venue. The idea behind the veranda usage is significant for Japanese culture. So, it is in the movie. The interior spaces have a connection with nature. The inside and outside borders are blurry. The audience can read traces of Japanese culture and architecture. One of the most significant philosophies found in the Japanese interior is; simplicity and the use of just as much furniture as needed. Fluidity can be seen between the inside and outside of Japanese architecture. The distinction between wall and door is flexible, while fixed walls are often used, and entire facades in both temples and residences can be opened to the elements by folding the panels, opening or swinging up between the posts, or sliding the wooden screens open or even removing them entirely [4]. This can be spotted in the movie as well. There are not numerous materials in the rooms (Fig. 4). The characters are sleeping on the floor. The bond is established not with furnishings, as in Japanese culture, but with the experiences of the characters in the space. The characters always eat together in these spaces. The eating table, which is crucial in Japanese culture, emerges as an element of connection with space.

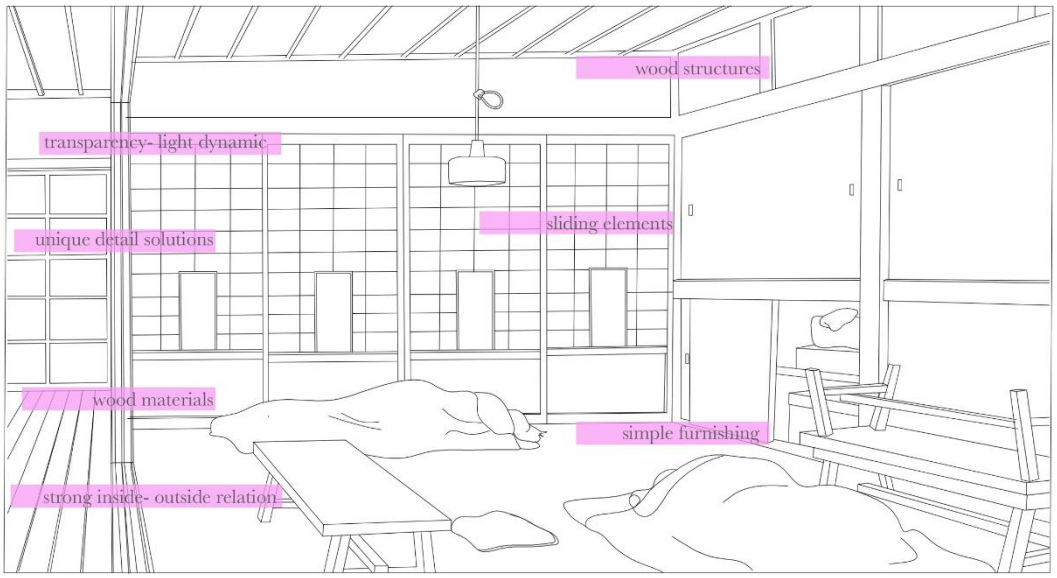

Fig. 4. rooms (Miyazaki,2001)

Another significant element in the movie is The Bathhouse. In this utopian universe, the bathhouse is at the top of the city. The visitors can only reach it by a bridge. The bathhouse is the main venue of the movie. The significance is underlined by the separation from the rest of the city by the water element. The movie portrays The Bathhouse as a place where Gods go to be served and cleaned in this utopian stage. There is a sort of a break in the utopian environment in bath scenes. Although the characters are Gods, they use baths like humans. When the interiors of the baths are analyzed, traces of Japanese domestic architecture can be spotted. The concept of washing has a link with purification. Furthermore, a connection is established between the space and this element. The bath, which is particularly significant in Japanese culture, is portrayed as significant in the same ritual of bathing rituals.

Conclusions

Throughout history, architects tried to create utopias. Understanding the ideas behind the utopias is a significant matter. Architecture is an interdisciplinary field, and it is nurtured and connected with other disciplines. To support this interdisciplinary structure of architecture, the paper used Miyazaki's movie as a tool for discussions. The paper discusses architecture-utopia and space-bound concepts.

After examining the movie, it will be accurate to state that there are similarities with the post-second world war utopias. The utopic-dystopic universes created by Miyazaki have a connection with the existing world. These circumstances apply to architectural utopias as well. The current world provides data for these utopias even though it is a production of new. During the production of this new, the connection with the existing environment still endures. It aims to draw attention to current problems and make people think about them. The common denominator of both fields was the damage to human nature and how to get rid of it. The question that both ask is 'Is a new understanding possible on the axis of nature and living things?'. The architects and the designers have a significant role to create a new relationship with nature and the built environment. The designers should consider the idea behind those movies and utopian worlds. In each utopian universe, creating a balance between nature and human life solves the problems. For sustainable cities and spaces, this should be the first step. In the current era, sustainability should become an obligation, not a choice. And this relationship should start from the beginning, restoring the human-nature relationship.

After the analysis of the space-bond concept, the connection that characters established in the movies with the spaces is a significant element for Miyazaki. Miyazaki accepts the space as a whole. He does not establish this connection with the objects. He builds this bond through the life-ceremony of the space, just as in Japanese culture. Although there are quite a lot of objects used in the scenes, the main places used by the characters generally adhered to the understanding of space in Japanese culture. It can be seen in goods and material choices. Everything flows and it reminds us that design is just a moment within a continual state of material flow [5]. This condition brings personalization and bonding with places to a different dimension. Even though it is a utopian universe, the fact that cultural marks can be read. It improves the connection that the viewer establishes with these places. The idea of simplicity and the material choice in those spaces should be considered while designing. The idea behind

this material choice and simplicity can help to create interior spaces be sustainable as well. Raw and sustainable materials could help to create a new relationship with nature. The connection with nature in interior spaces should be considered significant data for designers. The idea behind the whole space and fluidity can help designers to create more flexible and livable places. This concept could help the overall idea of sustainable cities. It could develop a new understanding of space and connection. The bond between humans and spaces can be reconstructed with these unique atmospheres.

Considering this data, the main element is always in connection with reality. Whether it is the movie or the architecture field itself, similar problems and questions arise through different disciplines. It is necessary to produce new approaches by constantly questioning the current strategy about space, nature, and architecture. In this way, examining the world, nature, and living things in a different frame can make architectural productions more beneficial. Considering each data from these interdisciplinary fields can help the design process. By evaluating and interpreting these data correctly, the built environment can be more respectful and livable for every species. It can help to achieve sustainability goals. For further studies, more fields can be integrated into the research to seek different perspectives on current situations.

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CREATIVE CULTURAL TRANSFORMATION OF INDUSTRIAL PORT AREAS: EXAMPLE OF OBERHAFEN, HAMBURG

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Abstract

Port cities have different typologies of buildings used as storage complexes. They are usually built near rivers or water sources to store, protect, and process goods. With the development of trade, these storage buildings became an important part of the industry. However, with the containerized loading and unloading from the 1970s onwards, storage buildings became redundant. The containers also began to serve as transportation and storage areas. Therefore, these large areas of land and warehouses for cargo loading and unloading became idle. In some port cities, this resulted in the need to create new use scenarios for these idle buildings close to the city center. In recent years, the industrial heritage value of these buildings, which can be repurposed as public spaces, has come to the fore. They form a creative cultural fabric framed by museums and depict authentic architecture with a harbor ambiance for locals and tourists and becoming reference points for maritime culture [1]. At this point, the design and new functions of these idle industrial buildings should be carefully taken into consideration in terms of cultural development without gentrifying the areas.

When idle industrial zones are re-functionalized for cultural and touristic activities that are different from the purpose for which they were built, there is a risk that the existing industrial heritage identity of the region to be lost. This issue raises questions such as what should be considered when producing reuse projects, what can be done to preserve the regional identity, and whether cultural development can be achieved without gentrification while new functions are added to the area. The research aims to answer these questions.

The study aims to examine the adaptation process of port buildings to their new functions while preserving their existing industrial identity and the limits of intervention. The subject is discussed through Oberhafen in Hamburg, where cultural buildings have become the focal point in Europe's largest urban regeneration project [2].

Oberhafen is a creative urban development project area in Hamburg. It continues to develop as an artistic and creative district in line with the decisions of the Hamburg Parliament, involving many stakeholders [3].

The research method is a case study as one of the qualitative research methods. The study investigates the cultural development and transformation process of the Oberhafen area through a comprehensive literature review, followed by on-site field research. The results show that adaptive reusing the idle industrial areas needs a participatory design and decision process involving the locals and collaboration between the public and private sectors. The organic realization of culture-oriented transformations with the use of waste materials help preserve the identity of the region.

Key Words: *Adaptive reuse, cultural transformation, waterfront redevelopment, Oberhafen, Hamburg.*

Introduction

Modernization and industrialization of urban areas have transformed traditional port areas into bustling hubs of commerce and trade. However, with the decline of traditional industries, many of these port areas are now becoming obsolete, leaving behind vast spaces of abandoned factories and warehouses.

In recent years, there has been a growing trend to transform these areas into creative and cultural hubs as a means of revitalizing the urban landscape. The stratified cities of the 21st century transform existing structures and functions, producing new spaces, often with uncertain functions for rapidly changing social and cultural expectations [4].

As the connection between the city and the sea, ports are vital parts of the city organism in terms of economic, commercial, logistic, industrial, and touristic activities [5]. This paper aims to investigate the creative cultural transformation of industrial port areas, focusing on the example of Oberhafen, a creative urban development project area in Hamburg. The port of Hamburg is currently the second biggest port in Europe in terms of good traffic. Its privileged location on the banks of the Elbe River and the proclamation of the idle port area at the end of the 19th century rapidly expanded the city. After the appearance of containers for goods transport in the 1960s, port activities shifted to the west of Hamburg and left some of the former port areas abandoned. Hamburg's port areas had not been addressed by urban planning for decades and were perceived as dangerous, unsafe, “no entry” areas with ugly facades [6]. The earliest mid-nineteenth-century facilities and infrastructures near the city center of Hamburg became empty or underused in the 1980s, and the port was relocated to the southwest-sea direction,

where new container terminals were built [6]. The idle state of the buildings and the uncanny nature of the region alongside the Elbe River has been the driving force for the area to gain new functions.

Oberhafen is a waterside district in a vast inner-city development project area called HafenCity in Hamburg. As a former bargeman's center for centuries, after the development project of Hafencity, Oberhafen continues to transform and develop as an artistic and creative district. Currently, the area still preserves its former industrial identity yet is transformed with new functions. When idle industrial zones are re-functionalized for cultural and touristic activities that are different from the purpose for which they were built, there is a risk that the existing industrial heritage identity of the region to be lost. This issue raises questions such as what should be considered when producing reuse projects, what can be done to preserve the identity of the region, and whether cultural development can be achieved without gentrification while new functions are added to the region. The main focus of the research is to identify the transformation process and determine the design principles of Oberhafen to answer the questions above using the case study method.

Background: Waterfront Redevelopment and Creative Transformation Concepts

The background will provide an overview of the existing research on the waterfront redevelopment phenomenon and the transformation of industrial port areas into creative hubs. The phenomenon of urban waterfront renewal and development began to spread around the world in North America in the 1960s. Early transformations of industrial buildings in cities like Baltimore, San Francisco, and Boston provided examples of what can be done in abandoned, underutilized waterfront areas close to the city center [7]. In the next decades, other waterfront cities have developed their approaches to transforming the idle port areas and integrating them into the city centers.

Waterfront redevelopment projects on abandoned industrial ports consist of connections with multiple identities between land and water, past and contemporary, and history and culture. These places constantly evolve to create new resources and opportunities while producing new urban forms within the current needs of the urban dwellers as well as respecting the existing conditions and local identity of the industrial heritage [4]. The waterside areas have recreational value for both urban dwellers as well as tourists. Idle industrial ports go beyond their former use and expand the city center for the use of the urbanites [8]. These are highly visible areas, and their redevelopment not only affects the transformed area but can also affect the image of the reproduced city as a whole [9]. Therefore, the transformation of the waterfront industrial areas has many parameters to consider.

Abandoned waterfront and port areas offer opportunities for new sustainable uses that no longer require waterside use [6]. According to Girard [5], abandoned port areas can be the entrance point for the sustainable development of the cities when creativity and resilience are promoted in the transformation process. Redevelopments that lead to creative transformation can be considered a common situation today. Urban regeneration of waterfronts such as Rotterdam, Barcelona, Liverpool, Valencia, Vancouver, Tokyo, Hamburg, Malmo, Amsterdam, Genoa, Glasgow, Antwerp, Copenhagen, etc. are some of the examples that put forward creative transformation [10] as cited in [5].

At the Global Conference on the Urban Future (URBAN 21) held in Berlin in July 2000 “10 Principles for a Sustainable Development of Urban Waterfront Areas” were defined and approved [11]. Previously developed by Wasserstadt GmbH, Berlin in collaboration with the Centre Cities on Water in Venice, these principles are:

- “Secure the quality of water and the environment.
- Waterfronts are part of the existing urban fabric.
- The historic identity gives character.
- Mixed use is a priority.
- Public access is prerequisite.
- Planning in public-private partnerships speeds the process.
- Public participation is an element of sustainability.
- Waterfronts are long-term projects.
- Re-vitalization is an ongoing process.
- Waterfronts profit from international networking.” [11].

With a focus on the participatory design process, easy public access, preservation of the former identity, and mixed-use that offers a diversity of cultural, commercial, and housing uses, these principles support a creative transformation for waterfront areas. Creativity has become the primary driving force for cities' growth and development since millions of people work in industries driven by innovation and talent of the information age [12]. According to Florida, cities that succeed are those that can attract and retain members of the creative class. Renewed waterfronts are places where "creatives" choose to "live, work and play" by meeting their social needs and stimulating their cultural desires [13]. This study argues that Hamburg is becoming one of those cities that attract the creative class.

As an important and busy port city in Europe, today's Hamburg can be considered a sustainable, pedestrian-friendly, green, culture-oriented city. In 2011 Hamburg was named the European Green Capital by European Commission [URL-2]. On top of this, The European Centre for Architecture Art Design and Urban Studies and The Chicago Athenaeum: Museum of Architecture and Design has named Hamburg as the Green City of the Year for 2021 [14]. Usually, these are not the characteristics of a port city and for Hamburg, the situation was not always like this as well. In the early 1980s, Hamburg's oldest seaport facilities from the 19th century became idle when the port moved to the new container terminals in the southwest of the city. Accordingly, the idea of improving this idle coastal area and the convergence of the old warehouses aroused high expectations from the public. Re-functionalization of the area was expected to have a positive impact on the city as well as on the citizens, economy, and tourism. The project was named the "String of Pearls". As the name itself reveals the intentions, the idea was to present the best locations to the companies and investors. There was not a congruous strategy. The project was not implemented strictly according to planning requirements. The transformation started with small projects such as the conversion of warehouses in the oldest parts of cities. Then it gradually moved to the surrounding areas. Initially, a step-by-step approach was adopted that started in the most attractive areas but was not integrated into a sustainable urban or regional development strategy. This approach mostly gentrified the riverside areas [6].
HafenCity on the other hand, is a much more successful approach than Hamburg's initial approach for the riverside transformation. The next subsection will explore the urban development process of HafenCity.

Development Process of HafenCity

On an area of 157 hectares, including the former port and industrial land, HafenCity is Europe's largest ongoing, inner-city, waterfront urban development project [URL-3]. Waterfronts are sites that need intensive planning together with creative hubs and cultural quarters [15-16]. In 1997, the HafenCity project was announced, and the international competition prepared by the then Urban Development Ministry and the GHS (today called HafenCity Hamburg GmbH) for masterplan won by Kees Christiaanse and ASTOC in 1999. The Senate agreed on the masterplan the next year on February 29 and in 2001, the above-ground construction began. The masterplan for eastern HafenCity was revised in 2010 and continues to be implemented.
HafenCity consists of ten quartiers: Am Sandtorkai/Dalmannkai, Am Sandtorpark/Grasbrook, Brooktorkai/Ericus, Strandkai, Überseequartier, Elbtorquartier, Am Lohsepark, Baakenhafen, Elbbrücken and Oberhafen (Fig.1). Each neighborhood has its own individual character yet blends with the overall area.

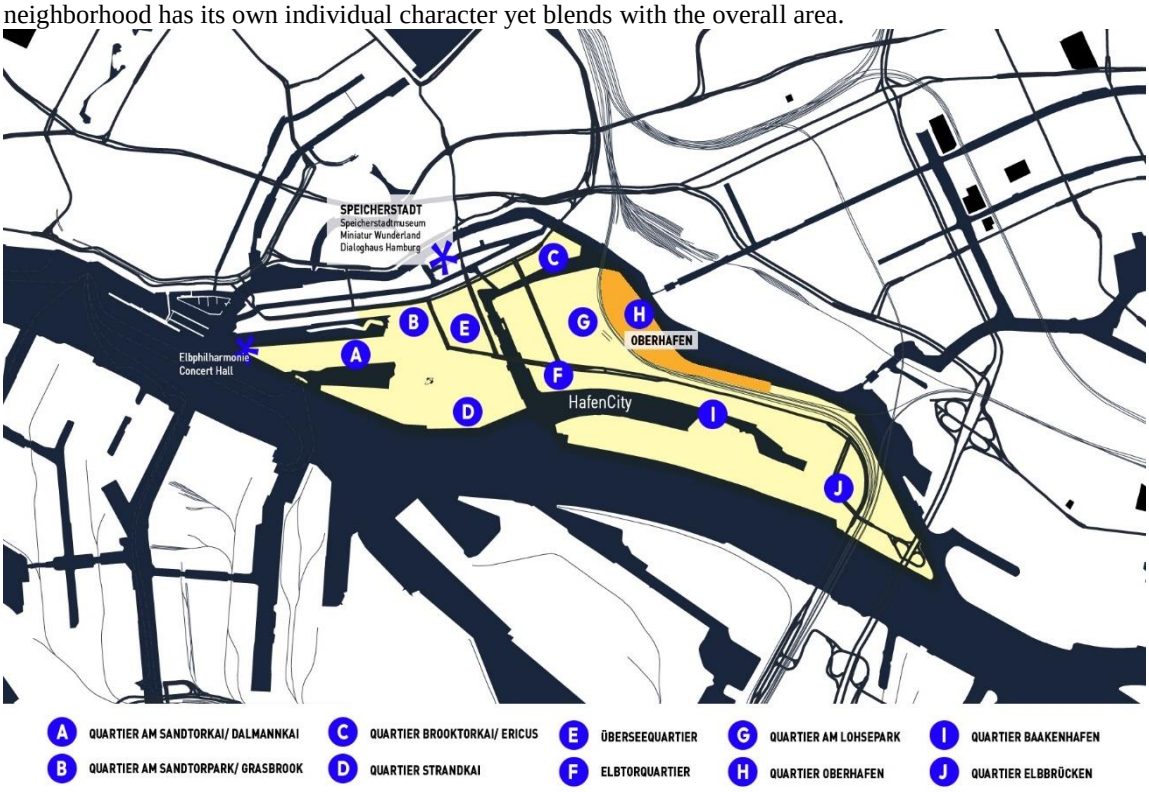

Fig. 1. Map of HafenCity (Illustrated by the author, 2023).

By having a mix of land uses, HafenCity became a new attraction point for the urbanities as well as the tourists. Land areas are distributed with 32% building area, 24% public squares (Fig. 2), parks and promenades, 23% traffic

usage, 14% private (publicly accessible) open spaces, and 7% private (not publicly accessible) open spaces. The building spaces consist of 39% offices, 35% residential, 16% education (including the HafenCity University opened in 2014), culture, leisure, and hotels, and 10% retail, restaurants, and ground floor services [17].

Fig. 2. A public square (Magellan Terraces) in HafenCity (Gamze Ergin, 2023).

Methodology

The research is based on a combination of observations and document analysis. Observations were conducted on-site to determine the existing situation and understand the design principles. Document analysis has been carried out to examine the relevant policy and planning documents and decision-making process. The urban waterfront development phenomenon is defined with a comprehensive literature review. The study employs a qualitative case study approach to investigate the creative cultural transformation of Oberhafen using the deductive method.

From an Idle Industrial Port to a Creative Cultural Area

Oberhafen is an area located south of Hamburg, on an old island called Grasbrook (today called HafenCity). It is near the Elbe River surrounded by railways leaving the area separated from the city centre. Well preserved industrial quarter is accessible from the north-west with bridges and roads. The identity of this area visibly changes into an industrial feel from its neighbouring areas. This isolated state of the former industrial area makes it a unique case for its transformation into a creative hub. At first glance, murals on the walls, reused materials, and wood pallets draw attention (Fig. 3).

Fig. 3. General atmosphere of Oberhafen (Gamze Ergin, 2023).

Oberhafen used to be a bargeman's centre for centuries. From the 17th century on, Elbe barges were unloaded in Oberhafen, carrying the produce of the vegetable farmers upriver "Vier- und Marschlanden" to the market in Deichtor. After Hanover Train Station was built in 1872, the neighbourhood became a heavily used rail transport area [URL-1].

During the 20th century, the port declined in importance, and by the 1990s, it had become an abandoned and neglected area. In 2010 with the revision of the HafenCity masterplan, it was decided to create a new space for the cultural and creative industries. The plan aimed to create a space for artists and cultural entrepreneurs to work,

exhibit, and network. The beginning of the conversion process for Oberhafen was marked by a symposium held in 2011 at Kampnagel Arts Center, where options for its development and use were explored. Various issues such as railroad, port, and building codes were resolved for rezoning and reuse. As a result, DB and logistics companies vacated the area and new anchor tenants moved in. The urban working group and local association, Oberhafen e.V., established a foundation for long-term structures and collaborations between the two co-developers, HafenCity Hamburg GmbH and Hamburg Kreativ Gesellschaft mbH, as well as local stakeholders [URL-1]. This led to the establishment of creative spaces by adaptive reusing of the existing buildings in the area.

Today, the area is preserved with several sheds that still display their industrial identity. The buildings are functionalized as creative offices, bars, cafes, and retail areas. Rather than demolishing the old warehouses and shipping facilities, the buildings were renovated and repurposed for new uses. This approach not only preserved the area's historical character but also provided affordable spaces for creative businesses.

There are seven main building blocks in the region. The first one is the Alte Bahnmeisterei which is the former railway inspection building and the oldest structure in the area. Today the building block contains an art gallery, co-working offices, and a workshop area for kids. The second one is a long warehouse that is once used to store trains, right in front of the track field, re-functionalized as creative offices, and ateliers for crafts. The third building is a former warehouse located in the middle of the area. Today, it contains a restaurant and supermarket, large creative offices, and event halls (Fig. 4).

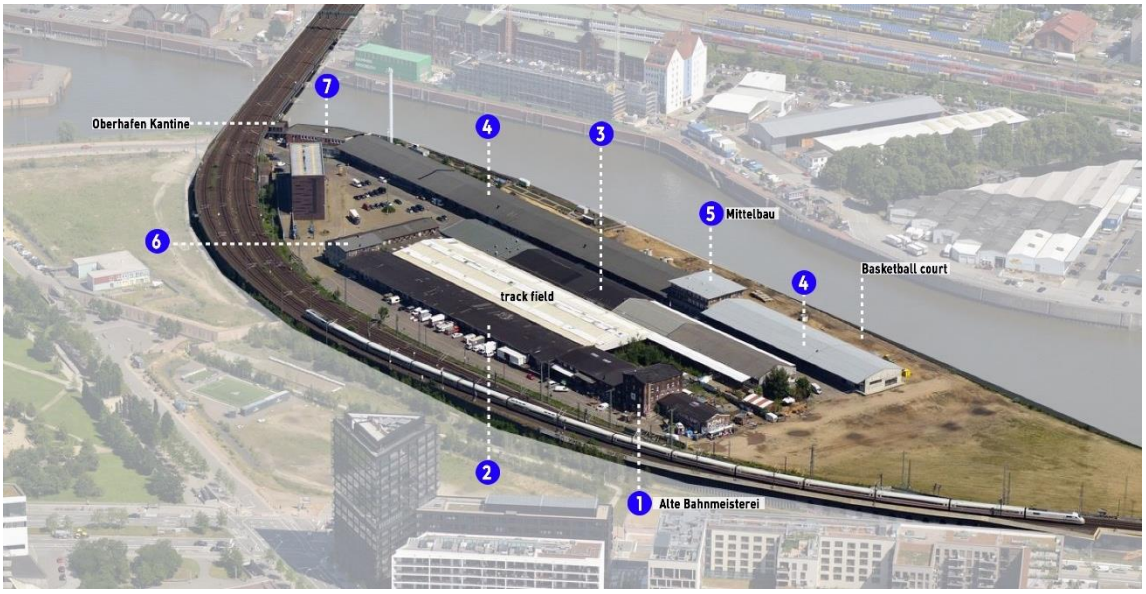

Fig. 4. Oberhafen. Illustrated by the author using the reference in [3].

The fourth building is a long and spacious warehouse facing the river. It is designed for multiple uses as well such as retail stores, co-working offices, exhibit areas, carpenter ateliers, a film studio, a hall for parkour and free-running, and even a jazz club. The fifth one is a 1700m2 building (Mittelbau) in the middle of the fourth building

Fig. 5. Interior spaces (Gamze Ergin, 2023).

block. It contains workshops and offices like the rest of the raw. The sixth building is designed as a film studio, a parkour creation center, and offices (Fig. 5).

At the entrance next to the railways, Oberhafenkantine, a shed that was built in 1925 as a canteen for dockworkers and is now a listed building, welcomes visitors. Similar to its former use, today it is functionalized as a restaurant. Right next to the Oberhafenkantine, there is the customs office (Zollamt) built in the early 70s. Today contains a restaurant and offices (Fig. 6).

Fig. 6. (a) Entrance to the area and the Oberhafenkantine, (b) Former customs office building next to the Oberhafenkantine (Gamze Ergin, 2023).

The open spaces next the river have been made traffic-safe, resulting in additional leisure and neighbourhood gathering spots in an appealing waterfront setting opposite the wholesale market. The riverbank areas were landscaped with gardens and seating. The industrial feel and the original features of the building facades are protected. The garden area is public and contains furniture designed with reused materials by the creative offices. There is also a basketball court at the end of the garden area right next to the railways (Fig. 7).

Fig. 7. (a) Oberhafengarten, (b) The basketball court (Gamze Ergin, 2023).

The innovative aspect of Oberhafen lies not only in its diverse range of uses but also in the transformation process itself. In contrast to other creative districts that rely on investor-driven marketing and the potential risk of gentrification, Oberhafen is run with low rents that are made possible by two unique characteristics of the HafenCity development: adaptive reuse of the existing buildings at their historic level rather than constructing new buildings with flood-protected elevation, and the ownership of the buildings by the City and Port Special Fund, rather than selling the land. While low rents do not gentrify the area, they finance building renovations with minimal interference in the long term [URL-1].

Conclusion

In the era of communication and knowledge, the cities aim to position themselves as “creative cities” in order to be internationally competitive. The future cities are expected to be sustainable, energy-efficient, pedestrianized, human-oriented and green. Hamburg’s transformation process addresses sustainability, multiplicity, and diversity to attract creative actors and provide a space for more development. As one of Europe’s

largest port cities, Hamburg's waterfront renewal and development is an ongoing project that aims to create such a city.

As an isolated, idle industrial zone in HafenCity which is Europe's largest ongoing, inner-city, waterfront urban development project, Oberhafen comes to the forefront with the following characteristics in its development process:

- The project aims for a creative cultural transformation.
- Designed with a mixed range of uses.
- Former industrial buildings transform with an adaptive reuse approach.
- Adapts a participatory design process.
- Protects the industrial and maritime identity.
- Renters operate the development process. Therefore, the process is slow but does not gentrify the area.

The transformation of Oberhafen from an idle industrial port to a creative cultural quarter is a testament to the power of collaboration and adaptive reuse. The key factor that has contributed to the success of Oberhafen Quartier is the collaboration between the public and private sectors. The city provided the infrastructure, while private investors and cultural entrepreneurs contributed to the development of creative spaces and events. This collaboration has created a unique and diverse cultural area, with a wide range of offerings, from galleries and studios to concert venues and food markets. The Oberhafen Quartier can become a model for other urban regeneration projects through the preservation of the historical and maritime character and the repurposing of existing buildings.

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PANDEMIC REFLECTIONS ON INTERIOR DESIGN EDUCATION

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Abstract
There has always been a strong relationship between the design of interior spaces and their users' health and wellbeing. Consequently, every pandemic in history affected the design of the interior spaces as well as the way the spaces are perceived and used [1]. According to Yuko [2], a number of contemporary popular design features were adapted due to the previous pandemics such as 1918 flu, tuberculosis, and dysentery. The latest pandemic COVID-19 had an impact on interior design as well, and altered the design of buildings and spaces in terms of the ways the spaces are used, and quantity, quality and types of spaces required [1]. Lessons learned from pandemics makes it evident that interior designers should find innovative solutions for providing users with healthy, safe and sustainable spaces. The interiors must become antivirus-environments that reduce to a minimum the spread of viruses and diseases [3], [4]. Green Building Certifications/Rating systems (such as Leadership in Energy Efficient Design – Interior Design + Construction - LEED ID+C, Fitwell, WELL) can help achieve this goal as they all relate to indoor environmental quality, users' wellbeing, design flexibility as well as to sustainability.
Given the increased expectations and demands of users for interior spaces, it is crucial for education to adapt to enable the future generation of interior designers to meet these enhanced user needs. Hence, the objectives of this research are to investigate the reflection of last pandemic on interior design and education, the contribution LEED ID+C can make towards creating healthier interior spaces, and teaching methods for improving interior design studio projects outcomes that relates to users' wellbeing. The article discusses a studio teaching method that require students to reference LEED ID+C for designing healthier interiors. The study describes the experimental teaching method, examines students' accomplishments in terms of projects' wellbeing features and investigates the advantages and limitations of the applied teaching method.

Key Words: *Interior design studio, Studio teaching methods, Pandemic and education, LEED ID+C, Healthy interiors.*

Introduction

The emergence of the COVID-19 pandemic has emphasized the importance of prioritizing healthy and sustainable interiors, while creating spaces that are flexible, versatile, and safe for their users. Aiming to equip future designers with the knowledge and skills necessary to meet the augmented due to COVID-19 users' demands, this study discusses the pandemic reflections on interior design education, and discusses how the education adapts new methods to meet the required. The introduction chapter of the research includes a literature review in the field, an overview of the Leadership in Energy Efficient Design (LEED) framework, with a specific focus on LEED Interior Design and Construction (LEED ID+C). Furthermore, it outlines the research framework and presents the study findings.

Literature Review

The connection between healthy spaces and building design has always been evident, but the most recent pandemic highlighted the true extent of this relationship. Throughout history, each previous pandemic has influenced the design of human settlements, buildings, and spaces, as well as their utilization [1]. Notably, several contemporary design features have been adjusted in response to past pandemics such as the 1918 flu, tuberculosis, and dysentery. Similarly, the recent COVID-19 pandemic has also impacted the design, altering users' perceptions regarding the types, sizes, qualities, and quantities of spaces required [1]. A literature review examining space design and pandemics, including the most recent one, delves into the evolving field of interior design, aiming to anticipate the future demands of users, particularly their need for antivirus environments that minimize the spread of viruses and diseases, should another pandemic occur [3], [4].

Furthermore, following the recent pandemic, interior design faces even more challenges in meeting increased demands of users for healthy and safe spaces, as well as in anticipating future design trends [5], [6]. For instance, Squier [7] suggests that modern interiors will increasingly focus on well-defined and adaptable spaces, with an emphasis on home offices, remote learning areas, larger foyers, biophilic design, hotel-inspired amenities, creative partitions, multi-use rooms, and outdoor entertainment spaces [7]. According to Ranim [8], the design of building spaces will prioritize activity-based orientation, simplified layouts, flexible circulation, and the inclusion of barriers/buffer zones to limit direct user contact, along with improved accessibility and organizational efficiency [9]. Elbert proposes a design approach that prioritizes cleanliness, self-sufficiency, and well-being, with an emphasis on multi-functional spaces and outdoor areas. Interiors may feature warmer colors, and operations will adapt to technological advancements [10]. The shift in interior design will move away from maximalism and open spaces, focusing instead on the quality of spaces, dedicated work-from-home areas, expanded outdoor spaces,

natural light, larger entries, ample storage, healthy homes, and specialized functions [11]. In summary, the aforementioned authors, along with others [12], [13], [14], [15], suggest that lessons learned from COVID-19 should guide interior designers in creating multi-functional, easily reconfigurable, and healthy spaces that enhance user well-being. Zarrabi [16], Sullens [17], and Worden [18] propose that Green Building Certifications/Rating systems (such as Leadership in Energy Efficient Design - Interior Design + Construction - LEED ID+C, Fitwell, WELL) can assist designers in achieving these goals. All green building rating systems address indoor environmental quality, design flexibility, and sustainability. By utilizing them as design guidelines, designers can create healthier, more comfortable, and sustainable living environments. Consequently, this research describes an experimental teaching method, in which LEED ID+C was utilized as guidance for students throughout the design process in interior design studios. The primary reason of choosing LEED ID+C among other green building certification systems is that students are more familiar with it than with other systems. Furthermore, this rating system among its goals lists enhancing individual human health [17], and can be used for promoting users' heath [18].

LEED and LEED ID+C Overview

The Leadership in Energy Efficient Design (LEED) is a green building rating system that promotes the prioritization of building efficiency, benefiting people, the environment, and the economy by improving building performance throughout the design, construction, and operation phases. It facilitates the reduction of resource consumption and operating costs for buildings, while simultaneously increasing their value and creating safer and healthier spaces for occupants [19].

In the LEED v4.1 rating system, human beings are recognized as the most crucial aspect of the built environment. Therefore, it places a strong emphasis on human comfort and the air quality of buildings and spaces. The system also highlights the importance of social equity and inclusiveness for all, ensuring that buildings are not isolated from their surrounding communities [20].

LEED ID+C specifically focuses on interior design and construction, with credit categories such as Integrative Design (IP), Indoor Environmental Quality (EQ), Materials and Resources (MR), and others addressing issues related to human comfort and indoor air quality. Consequently, this research will concentrate on these aforementioned credit categories and elucidate how design studio educational projects can be enhanced with the assistance of LEED ID+C [21].

Framework and research objectives

In light of users' heightened expectations and demands for interior spaces, it is imperative that education adapts to ensure that the next generation of interior designers can create spaces that effectively meet these evolving needs. Consequently, this article presents an experimental method employed in design studio teaching, where students are required to utilize LEED ID+C as a guiding framework.

The objectives of the research are to:

Reflect post-pandemic users' demands on interior design education;

Facilitate healthier spaces design thought LEED ID+C;

Improve interior design studio projects outcomes as it refers to healthy spaces.

By examining the students' accomplishments in creating healthy interiors, the authors explore both the benefits and limitations of this experiment. The research comprises several stages, commencing with a literature review that encompasses an overview of the LEED ID+C rating system. It then proceeds to describe the experimental teaching approach employed in the interior design studio, along with analyses of the students' projects. Finally, the research concludes by presenting the findings, and discussing the advantages and limitations observed.

This experimentation involved three different studios within the Department of Architecture at the American University of Ras Al Khaimah. These studios included Interior Design Studio 2, which focused on a coworking space design project; Interior Design Studio 4 with a thematic hospitality design project; and the Graduation Design Project, which encompassed a variety of topics chosen by the students themselves. In total, there were 25 participants in this experiment, consisting of 12 second-level students, 5 third-level students, and 8 fourth-level graduating students.

Research outcomes

The outcomes of these experiments demonstrate that through the incorporation of LEED ID+C, students were able to make improved design choices and find solutions more easily for their design challenges. As a result, the interiors they designed, provided healthier and more sustainable spaces for the users.

Interior Design Studio and LEED ID+C

According to Zarrabi [16], it is suggested that healthy spaces should support mental, physical, and social well-being of users. Any external intervention to the interior spaces can have an impact on users' health, leading to a reduction in their mental and social functioning. Zarrabi [16] notes that prevalent mental health issues reported by users are often related to factors such as the layout of spaces, availability of daylight, views, noise levels, privacy, indoor air quality, and temperature control, as well as maintenance. Furthermore, Zarrabi [16] establishes five

criteria for evaluating healthy spaces: air quality, acoustics, comfort, safety, and social quality. Building on Zarrabi's [16] insights, four criteria have been formulated (outlined below) to assess the contribution that LEED ID+C can make in the design process, with a focus on user well-being:

Criteria 1: Air quality - The air quality within an interior is influenced by various factors, including temperature, relative humidity, air velocity, availability of fresh air, emissions from materials and cleaning/maintenance activities, as well as the density of the space;

Criteria 2: Comfort - Occupants' comfort is ensured when the design addresses aspects of thermal comfort, visual comfort, auditory comfort, olfactory comfort, and hygienic comfort. Thermal comfort pertains to surface temperatures, temperature levels, relative humidity, and air movement. Visual comfort is related to the quality of daylight, color, light intensity, and privacy. Auditory comfort considers acoustics and privacy. Olfactory comfort addresses potential hazards, behaviors, and emotions. Hygienic comfort focuses on air quality and indoor pollutants [22];

Criteria 3: Safety - The safety of users within the interior space depends on the layout of the area, including the arrangement of spaces, circulation paths, means of egress, as well as the density of occupancy. Ventilation, the presence of contaminants, and the choice of furnishings and materials also contribute to user safety. Additionally, quality views and good acoustics contribute to the overall sense of safety;

And, Criteria 4: Social quality - An interior space is deemed to have high social quality when it facilitates easy communication and interaction among users, as well as provides physical or visual connections to the outdoors.

These four criteria – air quality, comfort, safety, and social equity, were mapped to the LEED ID+C credit categories that students will target (along with other categories) in their studio projects (see table 1).

Table 1 shows how different LEED ID+C credit categories can contribute to designing healthier interiors and accents that credit categories such as Integrative Design (IP), Indoor Environmental Quality (EQ), and Materials and Resources (MR) play significant roles in creating healthy interiors that meet all four defined criteria. However, the key to a successful design is IP that is emphasized and described below.

IP requires that at the very beginning of the design project, at the predesign phase, project health goals that ensure the wellbeing of the building occupants, surrounding community and supply chain, must be established, strategies for achieving those goals developed, and outcomes anticipated. As a result, a statement of health goals is written and design strategies prioritized to be considered throughout all design phases of the project. With an integrative design process, LEED ID+C target credit categories are chosen that address sustainability as well as indoor air quality, occupants' comfort, safety and social quality of the space (EQ and MR) (see table 1).

Table 1. Healthy interiors criteria and related LEED ID+C credit categories [21].

Credit category	Intent	Healthy interiors criteria			
		Air quality	Comfort	Safety	Social quality
Integrative Design (IP)	Emphasize human health as a fundamental evaluative criterion for building design, construction and operational strategies	✓	✓	✓	✓
EQ Minimum Indoor Air Quality Performance	Contribute to the comfort and well-being of all building occupants by establishing minimum standards for indoor air quality	✓			
EQ Environmental Tobacco Smoke Control	Prevent/minimize exposure of building occupants to environmental tobacco smoke	✓			
EQ Enhanced Indoor Air Quality Strategies	Promote occupants' comfort, well-being, and productivity	✓			
EQ Low-Emitting Materials	Protect the health, productivity, and comfort of installers and building occupants	✓		✓	
EQ Construction Indoor Air Quality Management Plan	Promote the well-being of construction workers and building occupants	✓		✓	
EQ Indoor Air Quality Assessment	Establish better quality indoor air, protect human health, productivity, and wellbeing.	✓		✓	
EQ Minimum Acoustic Performance	Facilitate communication through effective acoustic design.		✓	✓	✓
EQ Acoustic Performance	Promote occupants' well-being, productivity, and communications through effective acoustic design		✓	✓	✓
EQ Thermal Comfort	Promote occupants' productivity, comfort, and well-being		✓		
EQ Interior Lighting	Promote occupants' productivity, comfort, and well-being		✓	✓	✓
EQ Daylight	Connect building occupants with the outdoors, reinforce circadian rhythms		✓	✓	✓
EQ Quality Views	Give building occupants a connection to the natural outdoor environment		✓	✓	✓
MR Furniture and Medical Furnishings	Enhance human health performance attributes associated with freestanding furniture and medical furnishings		✓	✓	
MR Design for Flexibility	Design for flexibility and ease of future adaptation		✓	✓	✓

Integration Process – Design Studio with LEED ID+C

During the predesign phase of the studios' projects at the beginning of the semester, students were tasked with establishing their sustainability goals, which also encompassed health-related objectives, and devising strategies to achieve these goals. To facilitate this process, students created a list of targeted LEED ID+C credit categories and developed a mind map that outlined priority goals and implementation strategies. This mind map served as a guiding tool throughout all stages of the design process, informing students' design choices and assisting them in finding solutions to design challenges. The studio projects were supported by complementary courses such as Material and Finishes, Sustainable Approaches in Interior Design, Furniture Design, and Design with Light and Sound by giving assignments that were associated to studios' projects. At each design stage, students were required to demonstrate how their designs aligned with the targeted goals and chosen credit categories.

Students' Achievements

As previously mentioned, all students in their respective projects aimed to achieve both sustainability goals and health goals. However, this research focuses solely on the students' accomplishments related to health goals. It is important to note that students' achievements varied across the studios, depending on the complexity of their projects. For instance, level 2 students working on the coworking space design project demonstrated notable improvements in terms of layout (criteria 3&4), types and locations of openings (criteria 1, 2&4) selection of finishes and furnishings (criteria 1&3), all aimed at providing users with healthy, safe, and productive workspaces that promote effective communication.

Due to the advanced level of the other two studios – level 3 and 4, and the students' increased knowledge and skills, their list of targeted credits expanded, resulting in the accomplishment of a greater number of sustainability and health goals. Table 2 provides an overview of the LEED ID+C credit categories that students focused on, as well as the strategies they employed to achieve these targets.

Table 2. Interior design studio and targeted LEED ID+C credit categories.

Healthy interiors criteria	LEED ID+C credit categories contribution			
	Studio 2	Studio 4	Graduation Design Project	Contributing LEED ID+C credit categories
Criteria 1: Air quality	Starting with predesign and throughout all stages ensure all systems facilitate air quality			IP Integrative Design
	Integrative Better indoor air quality: most of the selected materials were non- or low-emitting			EQ Low-Emitting Materials
	Spaces layout, window location and size for better natural ventilation			EQ Thermal Comfort
Criteria 2: Comfort	Starting with predesign and throughout all stages ensure all systems facilitate users' comfort			IP Integrative Design
	Daylight for all permanently occupied spaces, windows sizing, and shading			EQ Daylight
	Visual and acoustic privacy: Spaces designed and allocated for the given function in a way that provide visual comfort; easy to reconfigure; proper selection of acoustic treatment that offer acoustic privacy for users			MR Design for Flexibility
				EQ Acoustic Performance
	Ergonomic furniture: Furniture selection based on principles of ergonomics			MR Furniture and Medical Furnishings
	N/A	Ergonomic furniture: Furniture designed by students	Ergonomic furniture: Furniture designed by students	MR Furniture and Medical Furnishings
	N/A	Lighting: Lighting design considering the light intensity required and min CRI	Lighting: Lighting design considering the light intensity required and min CRI	EQ Interior Lighting
	N/A	Views: quality views for each permanently occupied space	N/A	EQ Quality Views
Criteria 3: Safety	Starting with predesign and throughout all stages ensure all systems facilitate users' safety			IP Integrative Design
				EQ Daylight
	Daylight and artificial light: daylight during the day and artificial light provide visibility allowing users to safely use the spaces			EQ Interior Lighting
	Ergonomic furniture: selected for particular users and tasks to avoid users' injuries			MR Furniture and Medical Furnishings
	Materials selection (non- or low-emitting)			EQ Low-Emitting Materials
Criteria 4: Social quality	Starting with predesign and throughout all stages ensure all systems facilitate social quality life of users			IP Integrative Design
	Layout: Depending on the function (office, hotel, other) and allowing users to socialize if they wish to do so and when they wish			MR Design for Flexibility
	Acoustic design: Allows users to easily communicate with each other for work tasks required and also socializing.			EQ Acoustic Performance
	N/A	Views: Allows users to be connected with outdoor	N/A	EQ Quality Views

The finalized students' design projects indicated improved air quality through the careful selection of non- or low-emitting materials and the incorporation of natural ventilation systems. Comfort and safety were achieved by ensuring access to daylight in all regularly occupied areas, incorporating ergonomic furniture, implementing effective acoustic design, promoting natural ventilation, and providing both acoustic and visual privacy. Furthermore, the projects emphasized the importance of well-thought-out layouts that encourage interaction among users and the incorporation of views that establish connections between the indoor spaces and the surrounding outdoors, thereby enhancing the social quality of the spaces. Students' projects demonstrate that the design achieved significant improvements for satisfying all four criteria: Air quality, Comfort, Safety, and Social interaction (see table 2).

An exemplar of a mind map, showcased in Figure 1, was prepared by a student during the predesign phase for the hospitality project conducted in Interior Design Studio 4. This mind map illustrates the sustainability and health goals established by the student, as well as the specific LEED ID+C credits targeted and the strategies employed to achieve these goals. The project specifically focused on the following credit categories: Water Efficiency (WE), Energy and Atmosphere (EA), Materials and Resources (MR), and Indoor Environmental Quality (EQ). While WE and EA were mandatory credit categories to attain sustainability objectives, the student had the freedom to select the credits under MR and EQ that aligned with their health and well-being goals.

Fig. 1. A mind map for a hospitality project demonstrating sustainability and health goals (interior design studio 4), ©Yousuf Alkadri.

Figure 2 showcases a specific instance of user well-being features accomplished by the students in their design project for a hotel within Interior Design Studio 4. The well-being features of the project are categorized according to the four criteria: air quality, comfort, safety, and social quality and aligned to LEED ID+C credit categories targeted by the student – Integrative design (IP), Materials and Resources (MR), and Environmental Quality (EQ). Through the interior design of the hotel, the students achieved better air quality (criteria 1) due to building systems selection at the predesign phase (IP), specification of non- and low-emitting finishing and furnishing (EQ), and spaces layout and properly sized and positioned operable windows that facilitate natural ventilation (EQ). The comfort of the users (criteria 2) was improved due to the IP (building systems selection), EQ (daylight to all permanently occupied spaces, visual and acoustic privacy, interior lighting and quality views), and MR (design for flexibility, ergonomic furniture). Due to IP (users' safety was prioritized), EQ (daylight and artificial light, non- or low-emitting materials), and MR (ergonomically designed furniture) the design satisfies criteria 3 in providing safer interior spaces. Criteria 4 – social quality, was achieved through IP, MR and EQ that offer social interaction via layout, acoustic design and quality views that facilitate connection with the outdoors.

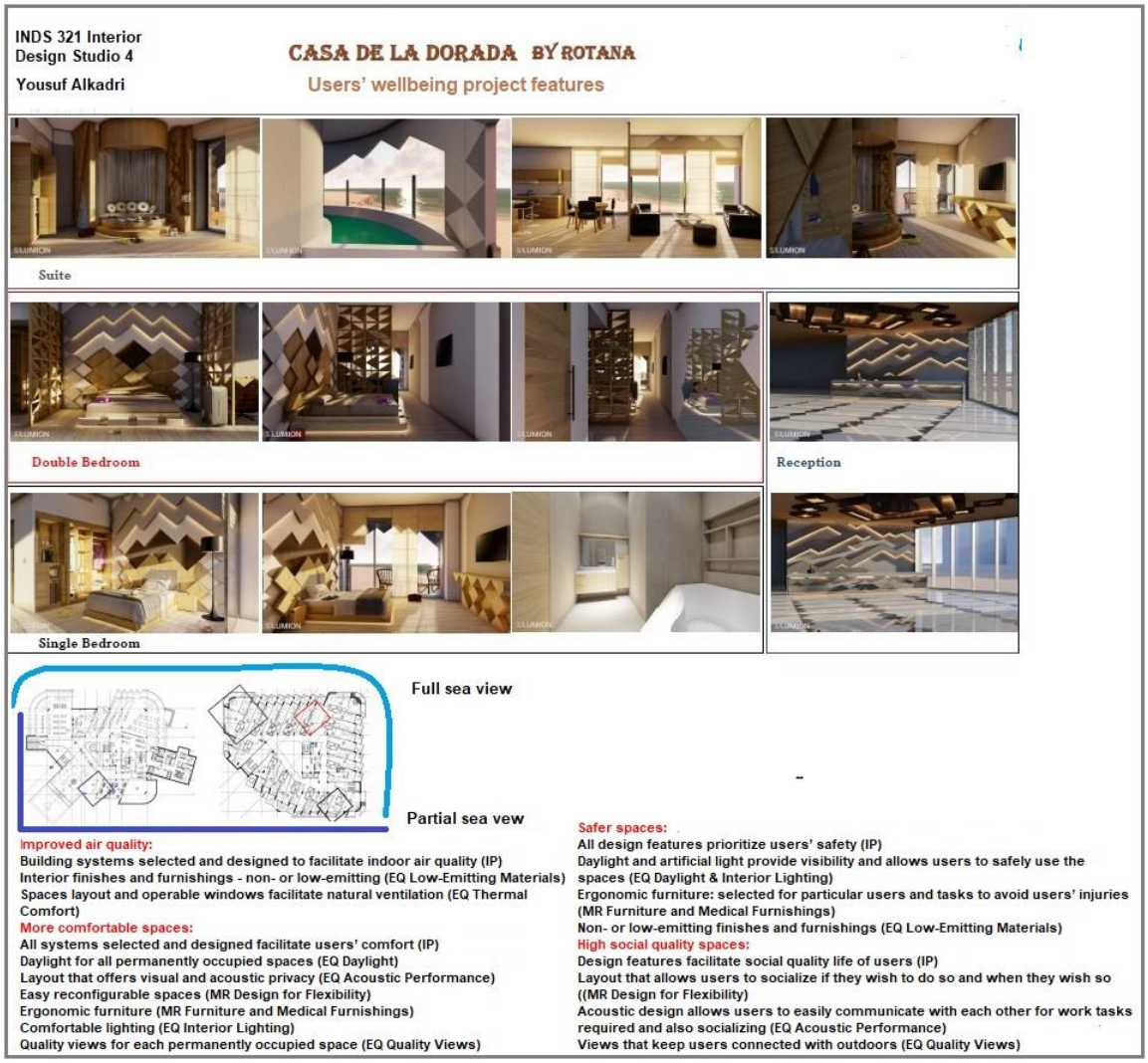

Fig. 2. Project users' wellbeing features, (interior design studio 4), ©Yousuf Alkadri.

Figure 3 illustrates the LEED ID+C credit categories that were specifically targeted by a student in her coworking space project within Interior Design Studio 2. Notably, the student focused on EQ (Indoor Environmental Quality) credit categories, which played a significant role in designing healthier environments for the occupants of the spaces. As the studio is level 2, the list of wellness related credit categories selected by the student is limited to acoustic performance (EQ), environmental tabaco and smoke control (EQ) and low-emitting materials (EQ). Due to the careful selection of finishes and furnishings the acoustic performance of the spaces was improved (criteria 2,3,4). The design suggests better air quality as all specified materials are non- or low-emitting and the co-working spaces follows a non-smoking policy (criteria 1,2,3).

Figure 4 displays an illustrative instance of sustainable project features created by a student upon the conclusion of their graduation design project. In addition to presenting the list of targeted LEED ID+C credit categories, the student also developed a scorecard to facilitate the assessment of the project's accomplishments in terms of sustainability and user well-being. As the project is level 4, the list of wellbeing features is more extensive as well as the list of targeted credit categories – Integrative Design (IP), Location and transportation (LT), Indoor environmental quality (EQ), and Materials and resources (MR). The project presented by the student demonstrated compliance with all four criteria – air quality, comfort, safety and social quality.

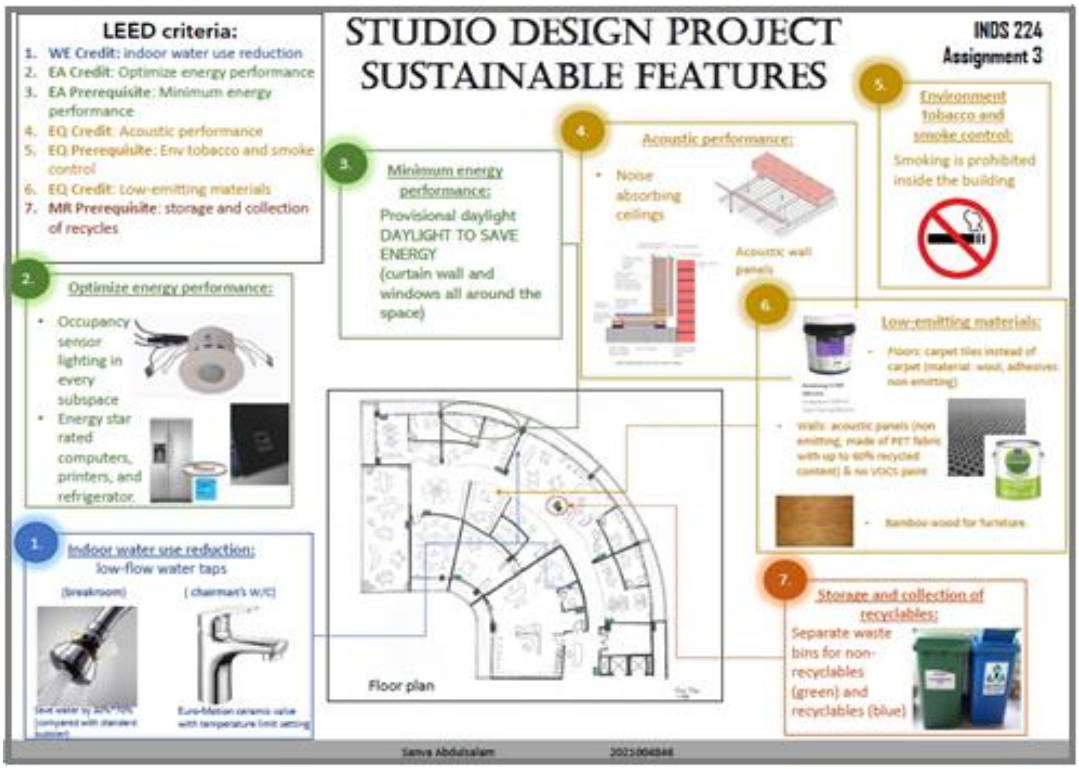

Fig. 3. Project sustainable features (interior design studio 2), ©Sanva Abdul Salam.

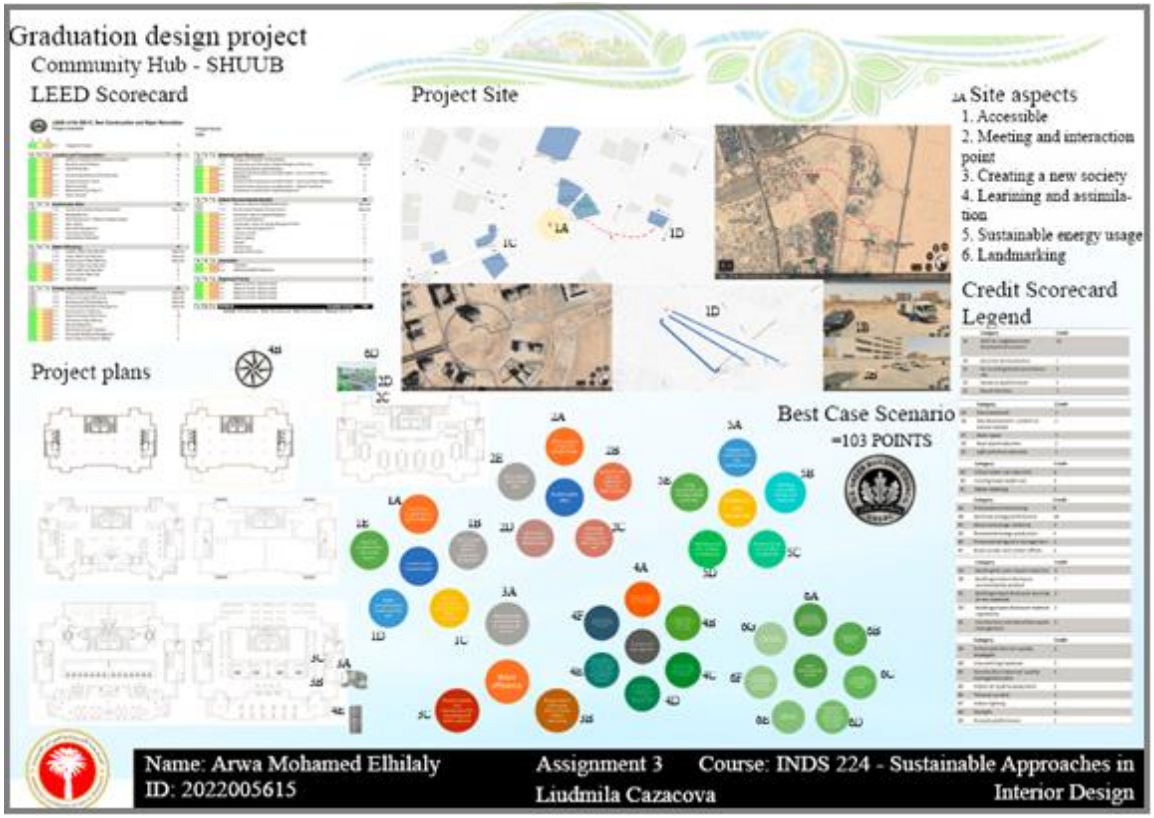

Fig. 4. Project sustainable features (graduation project design), ©Arwa Elhilaly.

Limitations/challenges – what was not achieved

The experimentation faced certain limitations. One of these limitations was the short duration of the projects, which was confined to the semester timeframe of 16 weeks. Consequently, students were unable to fully accomplish all the targeted sustainability and health goals within this restricted timeframe. Another challenge arose from the students' limited knowledge of LEED ID+C, which was primarily acquired during the Sustainable Approaches in Interior Design course. Additionally, the students' lack of proficiency in digital skills posed

difficulties in visualizing the incorporation of healthy features in their interior designs. The experimental teaching method also encountered challenges in sourcing sustainable and responsible manufacturers and suppliers for product specifications. Furthermore, due to time constraints, the role of technology in fostering healthy interiors was not thoroughly explored and addressed.

Experimentation limitations:

Time limited to the duration of the semester/project;
Students limited knowledge and skills as it relates to LEED ID+C;
Digital media representation skills;
Role of technology in providing users with healthy interiors not fully explored.

Findings and conclusions – Pandemic reflections on interior design education

Interior design has always been played a crucial role in providing users with healthy spaces to live in. As a consequence of the recent pandemic, the demands of the users for healthy environments have evolved, therefore, the interior design field is currently changing and aiming in meeting the new needs of the users and improving their experiences within a space. Consequently, the education in interior design must adapt to reflect and accommodate these changes. Future designers need to be equipped with the skills enabling them to create spaces that can readily accommodate users' demands, modern trends and incorporate the latest technological advancements. These new trends in interior design are also reflected in education through the exploration of new teaching methods that aim to equip students with all necessary knowledge and skills for designing healthy spaces. Hence, the teaching method described in this research, outlines how LEED ID+C rating system can contribute to designing healthy interiors. The outcomes of this experimental interior design studio teaching method demonstrate the effectiveness of LEED ID+C in assisting students in achieving greater design projects. The results of this experiment shows that through the integration of LEED ID+C, students were able to deliver interior spaces that satisfy all four criteria related to healthy spaces, and offer improved air quality, enhanced comfort, and increased safety, all while fostering a higher quality of social interactions for building occupants.

The students' experience with the experimental teaching approach revealed that establishing sustainability and health goals, as well as selecting target LEED ID+C credit categories, during the predesign phase of the projects greatly facilitated their ability to find solutions to design problems. By implementing sustainable and health strategies step-by-step throughout the various phases of the project, the students were able to produce higher-quality outcomes.

In conclusion, it can be said that the impact of the recent pandemic has led to a shift in users' expectations towards the quality of interior spaces, emphasizing the importance of creating healthy and safe environments that also promote social interactions. This shift in user demands has necessitated changes in interior design education. As a result, new experimental teaching methods have emerged, contributing to the development of a new generation of interior designers who prioritize health and well-being of the spaces/buildings occupants. Although the students in this experiment faced limitations and were unable to achieve all sustainability and health goals, the overall outcome was positive, prompting the authors to consider continuing the experiment in the next academic year with the aim of improving the outcomes of studio projects. Additionally, the authors recognize the need to address the role of technology in designing healthy spaces, including aspects such as contactless user experiences. Modern technology has proven essential in overcoming the challenges posed by the pandemic and is expected to play a significant role in both interior design [6] and design education. For the continuation of the experiment, authors will also focus on extending the time of the projects beyond the teaching time limited by the semester and also focus on digital media for projects visualization.

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Lessons of Architecture Without Architects in Pécs, Hungary

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Abstract

This study examines how individuals living on the periphery of society have designed their own homes in a Hungarian locality without the help of architects, shedding light on the phenomenon of "architecture without architects" by investigating the design, construction, and social aspects of these self-built homes. Survey sketches and architectural drawings serve to bring these instinctive buildings and the discipline of architecture closer together. Although hidden from a significant part of society, these case studies exemplify a potential means for addressing social challenges in a regulated construction environment and a highly polarized society. Using qualitative methods such as interviews, observation, and documentation, the study reveals how participants utilized local materials, traditional techniques, and their own creativity to construct affordable and functional homes. The research also highlights the social dynamics of the self-built environment, including the role of community support and the negotiation of land ownership. Overall, the study provides insight into the potential of self-built housing as a means of addressing the housing needs of low-income communities.

Key Words: *homelessness; sustainability; rural architecture, circular economy*

1.Introduction

Homelessness often looms for people with very low incomes, who struggle to attain and remain in housing. In Hungary these conditions are felt by 80% of the population with an income of less than HUF 141.154 (€ 400) per month, and 20% earn less than HUF 67.700 (€ 200) per month.[1] Meanwhile, apartment rents in Hungary have risen by 60% compared to 2015.[2] This means that broad strata have no chance to get their own or rented home in the traditional housing market.

Among people most affected by the affordable housing crisis are those who do not accept the forms of assistance provided by the state to address homelessness. In Pécs, examples of this assistance include daytime shelters, night shelters, transition homes and crisis shelters. Many unhoused people find these forms of assistance unsatisfactory and limiting to their sense of autonomy or from fulfilling their personal desires. For example, domestic partners cannot reside together at night shelters, and other forms of housing restrict pets. Additionally, the use of transition homes is usually limited to one and a half years, so these are not permanent solutions. Even still, the time afforded for shelter is often not sufficient for those being housed to find a permanent abode.

These circumstances have given rise to the survival strategies that the authors of this paper witnessed during the preparation of the study in the weekend garden area of Pécs, one of the 5 largest cities in Hungary. During socialism, the city was an important industrial center with coal and uranium mines. The present case study examines the possibility for fundamental, but untrained home-making instincts to be tapped and focused, as exemplified by self-built houses in the region. Also considered will be a range of social situations and degrees of finish to understand the extent to which this mode and model of *architecture without architects* presents an alternative. Not only can experts seeking to define safe and sustainable living environments learn from these creative experiments but also those who do not have the financial means to afford traditional housing solutions.

1.1. House construction in nature

Construction and creation are not the exclusive ability of the human race. Insects, mammals, and birds build impressive habitats, too. Essentially, housing is a form of shelter that many lifeforms construct to define a protective living space isolated from the vast universe. For example, the male specimens of the Baya Weaver construct fantastic nests for their future mates. (See Fig.1.) They build a house to protect themselves from their enemies, and to provide a safe place for the eggs to hatch. Creating their own home is part of their lives, the most important task in their lifetime, with the ability to create a physical nest encoded in their genes. After selecting the location for the nest, they collect the building materials for it. This is also part of the cycle of nature.[3]

Fig. 1. Baya Weaver weaves a nest from blades of grass: from pixabay.com

Human modes of house construction and home-making activities do share some common elements with these expressions of architecture by other lifeforms. The New York Museum of Modern Art drew attention to this continued heritage and traces its long history in the 1964 exhibition of non-pedigree architecture. Through thousands of years of examples, Bernard Rudofsky showed this visceral, instinctive form of human activity, where matter, structure and form melt into perfect harmony to serve the function.[4]

In the Hungarian context, these traditions persist into recent history. People born in the early 20th century continued to live in Hungarian vernacular architecture from the 19th century, including mud-plastered and mud-brick houses. Their houses in rural areas were built of clay from a pit on the edge of the village, the roof fashioned from wood harvested in the nearby forests and covered with reeds collected from swamps. Their dwellings belonged to the families for generations, and grandparents' techniques were passed by traditions of how to restore the roof, rather than through formal training, or to repair the damage caused by winter frosts, to mud and whitewash. In developed societies, vernacular architecture almost completely lost its role in shaping the built environment by the 20th century. [5]

1.2. Specialization and socio-economic barriers to realizing vernacular housing

In 20th-century Europe, architecture became more and more detached from the creative activities of ordinary people. An ever-increasing number of aspects of building culture were professionalized and regulated by the municipalities, with architects obliged to have ever more specialized training and knowledge to meet these conditions. An important stage in this process was the decision in the United Kingdom in 1958, of the Royal Institute of British Architects (RIBA) that a university degree was required to practice architecture. [6] The situation is similar in Hungary and in many other countries of Europe. [7]

However, there are layers of polarized societies whose members cannot afford access to this kind of knowledge. They have such a low income that it does not allow them to pay an architect or to use building materials that meet European Union standards to build homes. Also, the class of individuals who comprise most architects and urban policymakers often provide shelter at a remove from the needs and desires of those being sheltered. The voices and creative imagination of people who find themselves unhoused barely register in state-provided housing solutions. Unfortunately, there is no answer to how decent housing should be provided in low-income conditions. The Hungarian constitution, for example, codifies the right to live in a home [8], and this cannot be replaced by night shelters for the homeless.

2.Self-built shelters in weekend gardens of Pécs

The housing units that this study examines are all located within small garden areas on the outskirts of the city of Pécs. These gardens were essential to the livability of the city in the 1950s to the 70s, when many new apartments were built, mainly with industrialized technology. One, two, and three-bedroom apartments were built, measuring 30-60 square meters. At the time, the gardens were essential, and popular among the residents of apartments with extremely limited floor space.

Only gardening was allowed on the 400-square-meter plots, no construction was allowed, except shelters for gardening tools. After the change of regime in the early nineties the housing estates and the gardens closely linked to them lost a lot of their popularity. As the gardens became less frequented, an opportunity for constructing shelters became available to unhoused people (while being unregulated and legally unsanctioned). Many people use the small plots for their original purpose, but a number of unhoused people have also discovered the potential of the area. Local residents can rent the garden lots from the local municipality for HUF 5.000 per year (€13). This amount is within reach even for an unhoused citizen.

The case studies focus on the different degrees of construction of shelter by homeless in this area. It is striking how these individuals deploy methods common in rural architecture, such as the vernacular of Hungarian villages in ways that recall Rudofsky's study. The research explores the different degrees to which these shelters by untutored designers use local materials, deploy individuals' strength and knowledge, and create homes.

3.Research methodology

3.1.The survey

This multidisciplinary study presents examples of creating a home without significant financial outlay, based on seven visits in the weekend garden area. We asked one the Pécs homeless care foundations (Támasz) for help in finding the homeless people living in the former weekend gardens. The foundation has a so-called winter tea-tour. Hot tea and pastries are brought to those who do not spend the night in the foundation's night shelters. This is how we met the first homeless people whose homes we assessed. While walking around the area, we came across new residents and members of the community who recommended others who, although unknown to the care system, would be worth contacting.

The current paper presents architectural drawings that illustrate the construction technology, the building materials used, the spatial organization and the furnishing of the exterior and interior spaces, as well as the basic dimensions. The sketches capture and document the main features and atmosphere of the dwellings and were made in such a way to introduce as little disruption to the goings on of the residents as possible. However, the analysis is not limited to these sketches. The research utilised qualitative methods such as interviews, observations, and documentation. The interviews were conducted with people who live in self-designed and built homes in a weekend garden area. The situation of the interviewees is very complex, both financially and socially, so during the interviews we gave our narrators a lot of space, we talked with them and did not question them. During the surveys, interviews were made with the residents of the homes, and freehand drawings were produced of the houses. Where team members were allowed into the interior spaces, those were also surveyed, while elsewhere the survey was limited to the description and analysis of facades. During the survey we inquired about the heating method, access to water and electricity, cooking and cleaning options. In case it was not apparent, inquiries were also made about the construction materials and methods used.

So far, fifteen homes have been visited, where a total of 22 people live, six of whom will be presented in this article. According to our assumption, there may be 20-30 plots used as permanent housing. We intend to visit all residents in the area in the near future.

3.2.Notes on context and typology for site narratives

CONTEXT

Each structure is located in the weekend garden area around the Pécs housing estates. In some cases, there is a dug or drilled well on the spot, not suitable for human consumption, although some people use it for cooking. There is no running water, no electricity, and there are only dirt roads. Although these gardens are on the outskirts of the city, all services are within reach. Since the resources that can be used to create a home are extremely limited, the so-called urban mining plays a major role. While the works of vernacular architecture and Hungarian homes of the early 20th century were built from materials offered by nearby natural resources, the dwellings documented in this paper were primarily built from the waste of industrial society. [8]

TYPOLOGIES

Even with 15 homes surveyed so far, the typology of homes created without money or with an exceptionally low budget can be observed:

- ***Spatial occupation:*** József (50) moved into an empty toolshed on an abandoned lot.
- ***Found object construction:*** Sándor (37) and his partner live in an environment created from tents.
- ***Construction from locally harvested building materials:*** Antal (72) built from locally harvested wood.
- ***Deploying modularity:*** Lajos (57) assembled his house from doors.

- ***Frame architecture:*** József's (66) house is a filigree structure, the frame consisting of columns and beams, covered/lined with found materials.
- ***Using industrial leftovers:*** János (64) used special industrial materials found at his workplace, his house was made of heat-insulating sandwich panels.

4.Site narratives

For each of the research sites, the authors have summarized some key material/spatial conditions that result from formerly unhoused people constructing shelter, crafting home spaces and otherwise manipulating former garden sites with different degrees of effort as untrained architects/builders. The physical descriptions of architectonic interventions appearing in this paper are followed by observations and descriptions of the social, cultural, economic and other circumstances that further contextualize the physical manifestations were observed on site. In this section of the paper, we intend to provide descriptive, narrative details about how these contexts and typologies materialize in the lives and circumstances of the occupants of these dwellings.

4.1.*Spatial occupation*

Material/spatial conditions: The most limited typology is a spatial occupation that adds little to a found shelter. The case of József (50) was an example of this, with the simplest solution: moving into a found shelter, a small existing structure with a single room (originally a tool shed) and an adjoining garden. Apart from a rickety bed and chair, there was no other furniture in the room. There was nothing on the floor, no carpets on the walls.

Observations/circumstances: József had no personal belongings at all. He did not shape or decorate his surroundings, he did not collect personal items, he did not require any additional comforts.

4.2.*Found object constructions*

Material/spatial conditions: Sándor and his partner lived in a complex made up of a central fireplace and a few tents surrounding it. A tent, or a collection of them, requires more invested labor. It can be done on a zero budget, using only found objects. It can be freely expanded and set up very quickly, usually in a secluded place, in a park, a forest. When the owners move on, they take few personal items and leave many things behind. Due to the climate conditions in Hungary, it is limited in its suitability for permanent residence. Sheets layered on top of each other are common. This is protection against getting wet and the cold.

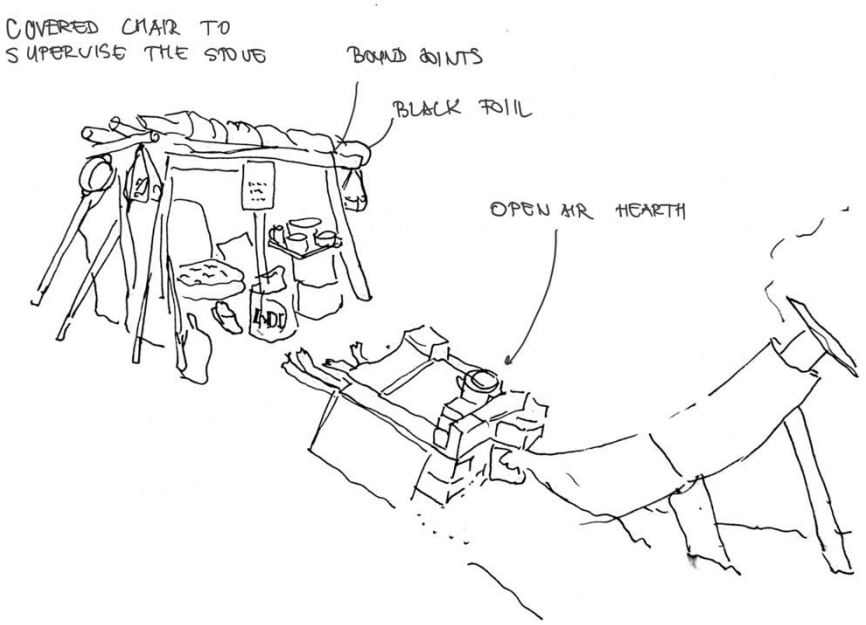
Observations/circumstances: Sándor and his partner were proud of their home, enthusiastically showing off how beautiful their bedroom was and what a great stove they had. They lit their abode using battery-powered lamps and garlands and cooked on a camping gas stove if there was no fire. By the time of our team's second visit, they had already moved. According to a neighbor, they had found a small house for themselves in the nearby gardens.

4.3.*Construction from locally harvested building materials*

Material/spatial conditions: Antal's house was built in a densely overgrown forest next to the railway. He used only his own labor: the source of raw materials was natural and the garbage bins of the nearby housing estate. He used recycled black garbage bags and discarded rubber mattresses as protection against precipitation. The floor was created on the ground, layers laid directly on it. He had no specialist knowledge, and only limited financial resources. He did not buy any tools or equipment, only working with a found bone saw. The construction did not use screws or nails; all joints were made with ropes and electrical cables. The area of the sleeping cabin was minimal, with a small air space, no stove, and the bed covered with thick blankets. His kitchen was outdoors, but he could build a fire and cook from a covered chair (see Fig. 2). From spring to autumn, the use of space was enriched with a garden of daffodils, a small pond under construction, a table and chairs.

Observations/circumstances: One might think that building one's own structure would cost a lot of money. However, the story of Antal's house refuted this. His regular income is a little less than HUF 35,000 (€100) per month. Those who plan for the long term and are less mobile build in this way. Although he had sought a hidden way of life, very isolated from civilization 20 meters from the train tracks in the forest, Antal and his house were

quite exposed and unprotected.



Among the services for the homeless, medical care and food distribution are the only ones Antal sometimes uses. He had to leave his previous home, in the same place two hundred meter far, because it was set on fire. That time he left all his things behind and probably never returned; a daffodil meadow was born among the remains. The fact that the Támasz Foundation staff regularly visits these places during the winter months means some security. He meticulously decorated his surroundings, ensuring everything was tidy, arranging umbrella tables and chairs as if he was eagerly anticipating the arrival of guests. Unfortunately, no one was coming anymore, including those who occasionally used to visit him, mainly because there was no more alcohol available. However, he aspired for a fishpond, which was under construction during the survey of our team. With a kind of romantic perspective on the present, he deliberately avoided discussing his life before he became homeless.

4.4.*Deploying modularity*

Material/spatial conditions: Lajos's house was built on a rented plot, using only found materials. The main building materials are doors collected from the renovation of apartments in the nearby housing estate, which he neatly organized, covered, and stored away. The consequence of deploying this type of construction technology is a module, which measures around 200 cm in Hungary. As a defense against soil moisture, he set the house on concrete blocks. Thermal insulation was made with mats, whereas rainwater insulation was provided by PVC flooring and corrugated slate. Lajos was surrounded by neighbors. The house was built in several stages, and the door wings stored in the yard allow for further expansion. (See Fig. 3.) Lajos also had a well-cultivated garden. It had fruit trees, vegetable and flower rows.

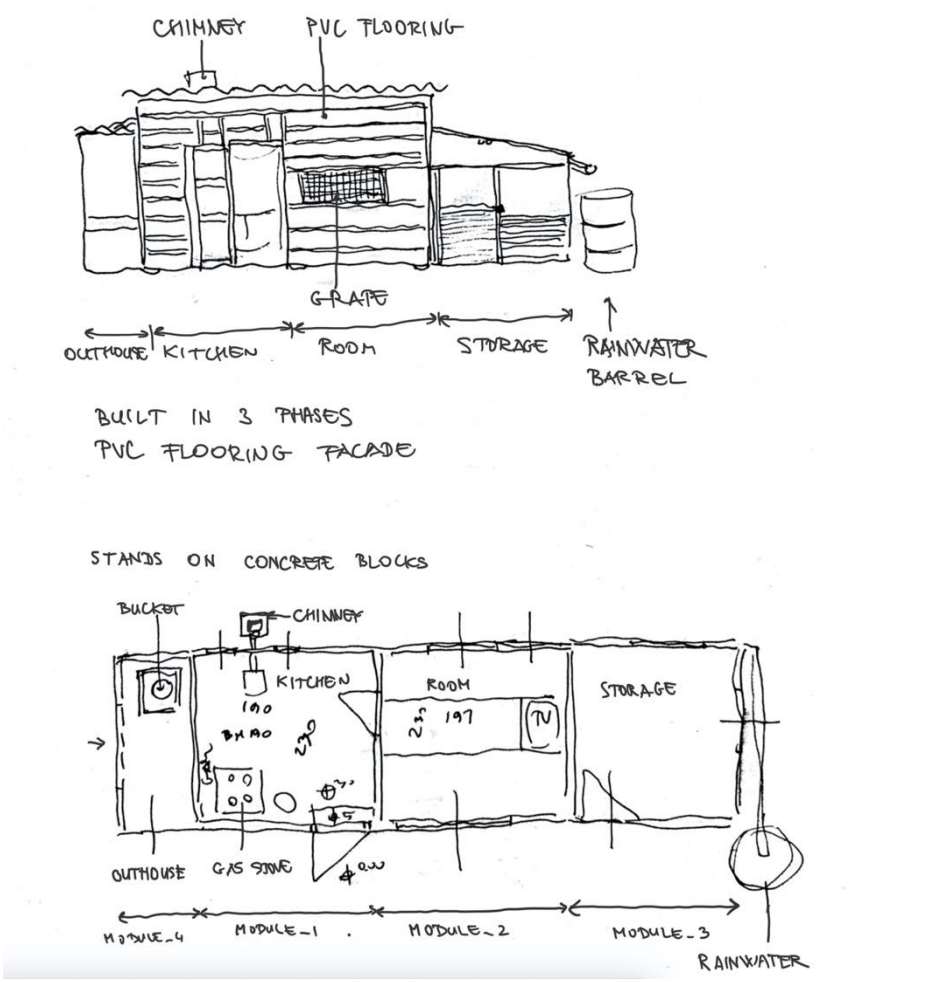


Fig. 3. Modular house made of door wings: author's own illustration

Observations/circumstances: Lajos exuded an aura of activity and optimism, giving the impression that he was constantly engaged in various endeavors. Despite becoming homeless by challenging circumstances in his intimate relationship, he refrained from blaming anyone. In a genuine display of his commitment, he even made an attempt to reconcile with his ex-wife, although their reunion faltered due to her ongoing struggles with alcohol. Nevertheless, he graciously accompanied her to the bus stop and provided her with some financial assistance.

4.5.*Frame architecture*

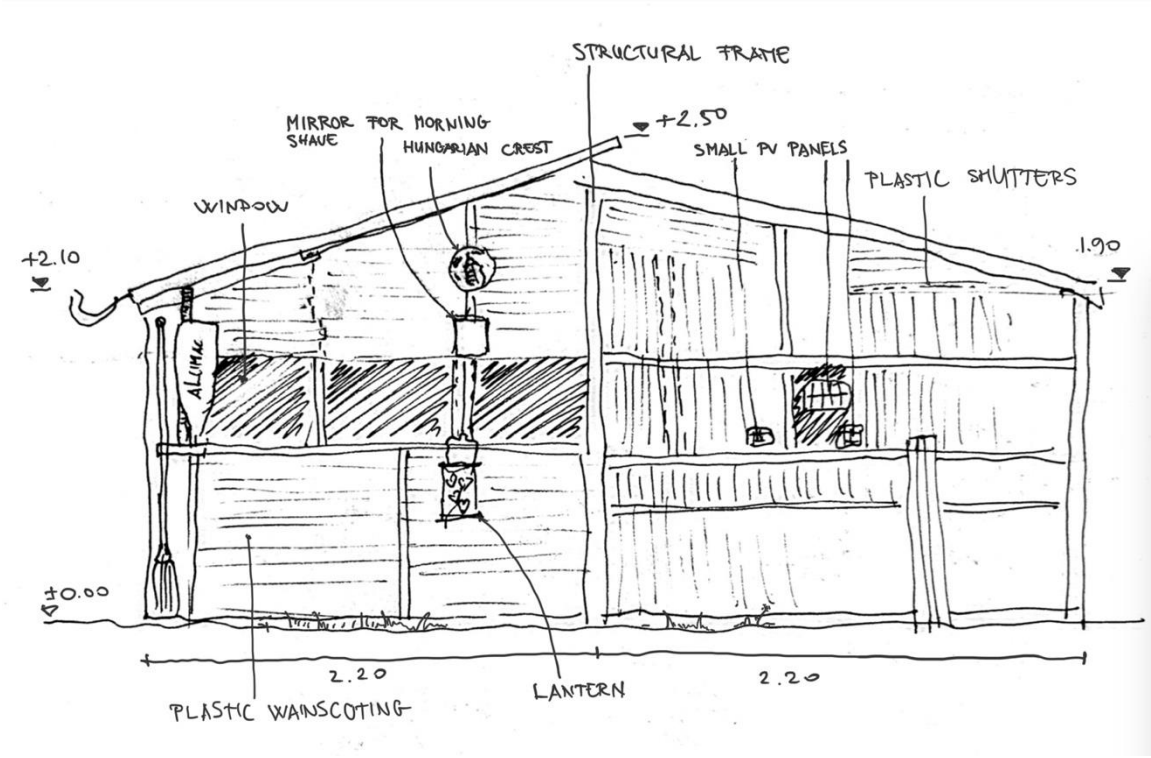


Fig. 4. Filigree structure covered with plastic wainscoting and shutters: author's own illustration

Material/spatial conditions: József's house belonged to the group of filigree structures. Pillars and beams formed the framework of the building, filled with a range of materials. Insulation on the inside was created with carpets, whereas on the outside plastic wainscoting and plastic shutters were common materials (Fig.4). He had expanded the original hut several times, currently in the process of collecting money to renovate the roof. This was also a fenced plot, and József had amicable relations with his neighbors. He did not cultivate vegetables, he only had a few fruit trees and grapevines, which he worked on beautifully and shared the harvest with his neighbors. He had a well, a lawnmower, and a well-kept lawn. From spring to autumn, the building of only 15 square meters (Fig.5). was wonderfully complemented by the kitchen island in the yard and the comfortable living room created under the cherry tree.

Observations/circumstances: József narrated the tragic loss of his daughter, which resulted in a divergence in mourning between him and his wife, ultimately leading to their separation. This is how he came to reside here over ten years ago. Nevertheless, he remains devoted to maintaining and repairing things in his wife's house whenever something breaks. Each day, he diligently scoured through garbage bins, tirelessly seeking discarded treasures. He possessed a meticulous demeanour, rising promptly at 3 o'clock every morning to shave before embarking on his well-established routine. The afternoons often find him beneath the shade of a cherry tree, where he indulges in listening to the radio and immersing himself in books. Interestingly, he explained how the majority of his possessions are discovered amidst the refuse. He lightened the atmosphere by humorously recounting the abundant amount of perfectly usable items people thoughtlessly discard. He playfully described tapping his stick upon stumbling upon two kilograms of frozen meat in the garbage. Additionally, he shared the story of his grandfather, a soldier during the Second World War, and the pivotal role he played in raising him. In contrast, his parents, who lived under the socialist regime, did not provide with any care.

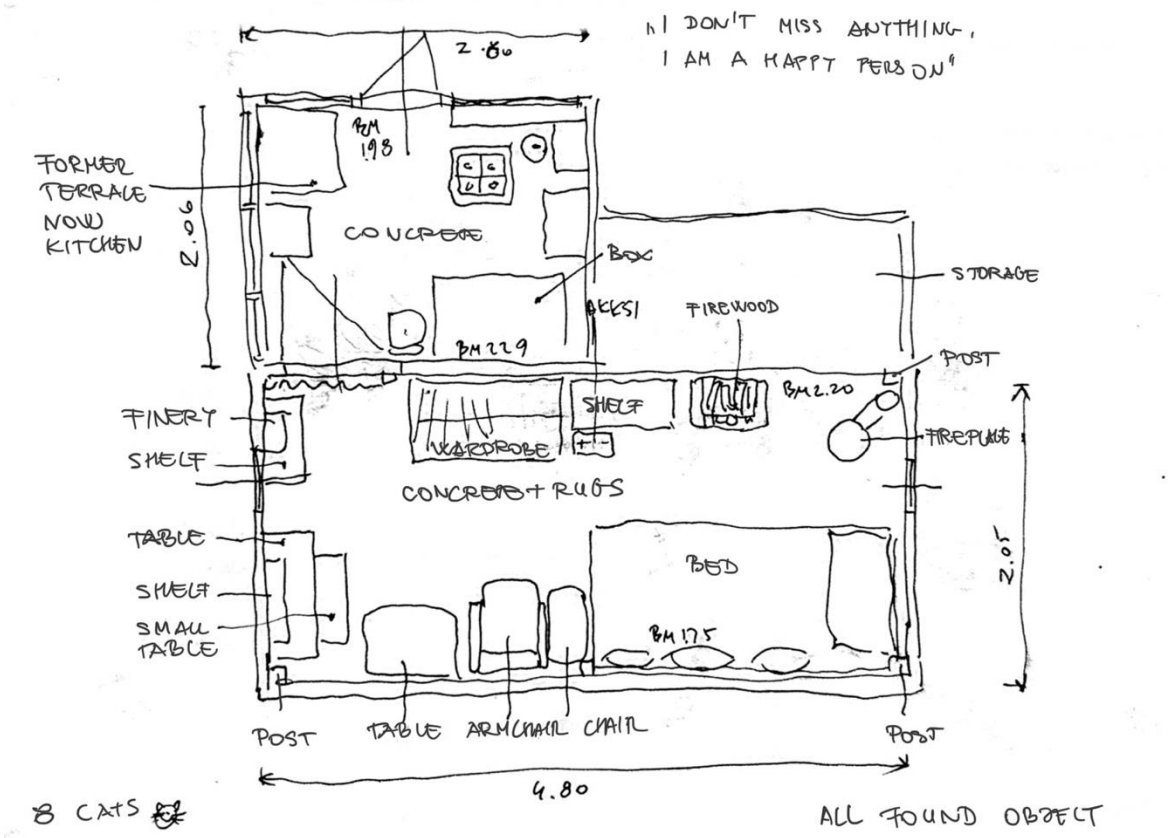


Fig. 5. Filigree structure with a heated room: author's own illustration

4.6.*Using industrial leftovers*

Material/spatial conditions: János's house represented a special case, a prime example of how the quality and quantity of available materials influence the construction of a house. At his previous workplace, a former cold storage building made of heat insulated sandwich panels was demolished. The floor, walls and roof of his new house were also made of this material. The panels were cut to size at his workplace based on his own designs. His friends helped him put the building together. The house is lined with plasterboard inside and heated with an iron stove. A small house had already stood on the site, and the experience gained there helped in the design of the new building. János decided to raise the new house from the ground because soil moisture destroys building structures.

See Fig. 6.

Observations/circumstances: János used to work as a contractor, specializing in building houses. Unfortunately, a lawsuit resulted in the loss of everything he held dear: business, house, family. His children ceased searching for him. For a period, he resided in a tent and battled with drinking. Tragically, his tent was intentionally set on fire, endangering his girlfriend's life. This incident served as a turning point, compelling him to quit drinking and sever ties with his former companions. Currently, János resides with his partner spending his free time repairing motorcycles. Recently, an exciting job opportunity arose for him to become the fish keeper at the nearby lake. This offer filled him with joy, as it could provide him not only with a job, but also access to social security, ensuring health care as he aged. Remarkably, throughout his struggles, he never relied on others for assistance or handouts.

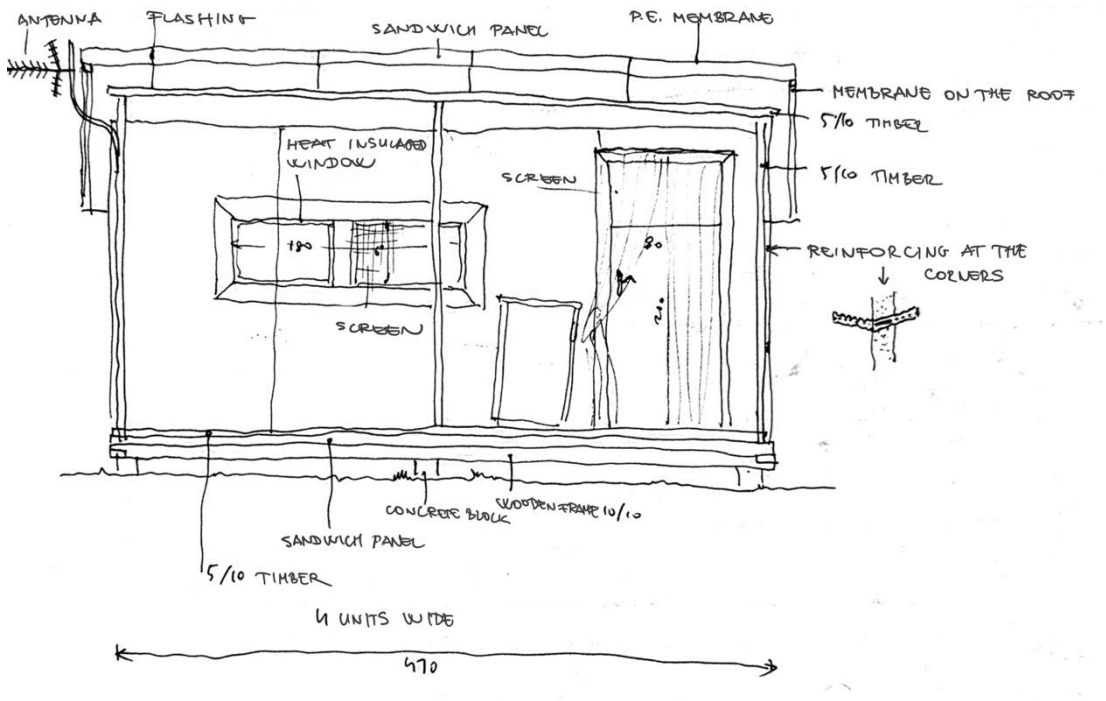


Fig. 6. A house built from sandwich panels raised off the ground: author's own illustration

5. Habitability for architecture without architects: Evaluation of minimum living conditions

In addition to sheltering from the elements, these unhoused individuals have taken additional steps to create the minimum conditions for comfort for themselves. Some examples are as follows:

- Drinking water is stored in bottles and cans, most people securing it from municipal wells. The water from the wells dug on their sites is mainly used for irrigation, but some people also use it for cooking.
- Many people cook for themselves, with gas stoves, gas bottles in common use, camping gas used in tents, and many people also use the outdoor stove when the weather is good.
- Some do not dare to heat in the houses because they are afraid of a fire hazard. They prefer to sleep in the cold. Typically, they use a smaller room in winter, which is easier to keep warm and stays warm for longer. Branches collected in the nearby forest or waste are used for the fire, but there are also people who buy firewood for the winter.
- In some places only candles are used for lighting in the evenings. At some dwellings, we discovered small solar panels that operate LED lighting, radios, or mobile phones. In one place, a rechargeable car battery was used for lighting. There are no more powerful solar panels anywhere, according to the residents, because they are not able to finance their purchase. An aggregator appeared in one place only, the owner using it for watching TV, rather than for lighting.
- No one uses camping or compost toilets, outdoor toilets being everywhere. However, many residents in the area use human waste for fertilizing their gardens. Some people use wet wipes to provide hygiene.
- Experiences related to waste management: typically, garbage is collected bit by bit and transported to city bins, whereas some people hoard it, burning it in the stove or in the yard. Many illegal dumpsites were observed in the area.
- Several residents of the area use mobile phones to keep in touch, but others are completely off the grid.
- The main source of entertainment is listening to the radio, watching TV, playing cards, and reading.

6. Conclusion

From the case studies presented in this paper, two model-like examples are instructive to compare and contrast of how formerly unhoused residents support comfort and provide basic utilities:

- Lajos (***Deploying modularity***) uses city services, e.g., taking waste to collection points, renting gas cylinders for his PB gas stove. There is a built-in chimney and an iron stove for burning waste. Due to lack of water and electricity, he has created the minimum level of comfort with an aggregator that he turns on for a few hours in the evening, burning 1-2 liters of diesel and watching a movie on his TV.
- József (***Frame architecture***) depends on friends to charge a car battery, powering LED lights. He utilises some small solar cells for charging phones and listening to the radio. A PB gas stove is installed in the kitchen and a wood-burning iron stove in the room, fuelled with real twigs and branches that he collects, rather scavenged from garbage bins.

Besides the two models above, all the cases presented in this article possess a high level of importance because they illustrate in an instructive way how people with extremely low incomes are able to create the environment, they can call home. These residents take care of themselves, asking for nothing more than a few square meters of land, and even that not for free. Although the living conditions of these people do not reach what the majority society considers acceptable today, many residents identify as being happy. They are proud of their self-created built environment, a sentiment that can be seen as more important than complying with European Union construction standards as their approaches prove that they are able to create the conditions necessary for a happy life.

During the conversations with the residents, it became clear that almost everyone had a sudden break in their lives, which led to the abandonment of their previous lifestyles. Although the people have continuously experienced the role of living on the periphery of society since they moved to the garden area, the fear of losing their current residence often appears. They still report that they can live a fuller life in their current home than in the day and night shelters made available by the various care system providers. Therefore, it is essential that in addition to the architectural survey, the sociological and psychological aspects of the research are further explored in a future article. An important lesson learned from the current research is that, without exception, the examined dwellings were built at least partially from recycled and reused materials. Taking into account the principles of the circular economy, it is possible to create homes that include low-income residents as participants in this ecologically friendly economy behind the means of construction. Considering issues of minimum habitable conditions for self-built communities, architects could also contribute to making these structures more comfortable. It is possible to find solutions that provide greater comfort to building users without the use of conventional utility services, “off-the-grid” in furtherance of sustainability goals.

There being no accurate record of the neighborhood under investigation in this study, one further objective of

the team is to assess the entire area to document the number of vacant and cultivated plots and, most importantly from the point of view of the current research, how many people live there on a permanent basis. According to the plans, upon completion of the research, additional papers and monographs will be published that contain the documentation of all surveyed homes and the condition assessment of the municipally owned garden area.

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ARTISTIC VALUE OF INTERIOR FORMS: SANLIURFA HARRAN HOUSES

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Abstract

People need a place to live, settle and be protected from natural conditions. They build this space with their own cultural, functional, technical and different tastes. Architecture is seen as the art of constructing spaces that meet the needs of people such as accommodation, rest, work and entertainment, with economic and technical opportunities, with aesthetic creativity. Architecture and sculpture are separate branches of art, and a place in the formation of architecture is in the position of a sculpture. The art of architecture designs all kinds of indoor and outdoor spaces, including the simple housing types that make up the texture of the city. The culture of life in Haran brought together the arts of architecture and sculpture. Designing with space is a common point for both sculpture art and interior architecture. Harran houses feature a sculpture that covers the necessary functions. Each dome has a spatial function and a sculptural form. With the geometric shapes used, conical, circle, almost-square forms were created. Harran and its surroundings, which is one of the oldest settlements in Şanlıurfa, is an important center in terms of cultural heritage. Harran houses are one of the important examples as one of the first settlements. They built Harran dome houses, which is one of the first sheltering methods, in order to meet the shelter needs of people with their own architectural and engineering abilities and hand skills before they moved into the modern age. They have brought a different breath to the place they live by completing their needs in their vital activities with their own efforts. Harran houses are densely textured and domed houses built with the adjacent overlapping method within the city walls. The rooms of the house are connected to each other from the inside by arched passages. The aim of the study is to examine the interior spaces of the Harran Houses with their forms resembling the art of sculpture. People built Harran dome houses, which are one of the accommodation units, with basic forms (conical, cube, etc.) in the interior spaces in order to meet their shelter needs with their own hands. In this study, the meeting of these forms with the art of sculpture and their importance in the interior will be conveyed.
The method used to convey the artistic value of the interior forms of Harran houses; Literature studies on the interior effect of sculpture art; making architectural determinations with indoor and outdoor photographs in the area where the Haran houses are located, and interpreting the space forms by examining them [1, 2].
As a result, architecture began to emerge with a structure similar to the sculpture art of functional interiors. Harran houses have the feature of being in the art of sculpture with their architecture. The people who created the spaces with their own handicrafts, as in the art of sculpture, ensured the emergence of iconic structures that reflect from the interior to the outside and are perceived as sculptures.

Key Words: Interior, Form, Art, Sculpture, Harran Houses

Introduction

Architecture is called the art of constructing spaces that meet the needs of people such as accommodation, rest, work and entertainment, with economic and technical opportunities, with aesthetic creativity. The art of architecture designs all kinds of indoor and outdoor spaces, including the simple housing types that make up the texture of the city. Architecture and sculpture are separate branches of art and have progressed as two disciplines that interact with each other in the historical process. (During the Roman Period, they began to sculpt their doric, ion and corinean columns/columns with human figures.) This interaction emphasized the importance of the sculpture for the architecture both in the decoration of the structural columns and beams of the architectural structure and in the exterior coating of the building. Although the interaction of sculpture and architecture has changed in the process, it has continued to be together. Also, by completely disrupting the mainwork-building perspective, make the observer to contemplate the dilemma of if it is a sculpture or an archicetural structure. The culture of life in Haran brings together the arts of architecture and sculpture. Designing with space is the common point for both sculpture art and interior architecture (Devrilmez B, 2022). Harran houses feature a sculpture that covers the necessary functions. Each dome has a spatial function and a sculptural form. The geometric shapes

used in this form are conical, circle, and almost-square forms. The art of sculpture, which uses architectural space effectively, was also used while creating space in Harran houses. When viewed from the outside, Harran houses create a sculptural effect with their form feature. Before the modern age, in order to meet their shelter need, people built Harran dorm houses with their own architectural, engineering and manual skills without losing their form as long as the topographic structure allows. The interior, which is a sculpture, is designed as a livable space. [3]

1.1. Purpose of the study

The aim of the study is to examine the interior spaces created by the Harran Houses with their forms resembling the art of sculpture. People built Harran dome houses, which are one of the accommodation units, with basic forms (cone, cube, etc.) in the interior spaces in order to meet their shelter needs with their own handicrafts. In this study, the meeting of these forms with the art of sculpture and their importance in the interior will be conveyed.

1.2. Method of the study

The method used to convey the artistic value of the interior forms of Harran houses are determined as; Literature studies on the effect of sculpture art on interior space; making architectural determinations with indoor and outdoor photographs in the area where the Haran houses are located, and interpreting the space forms of the Harran houses by examining them [1, 2]. In the study, meeting of these forms with the art of sculpture and their importance in the interior are conveyed.

Sculpture Art and Interior Concepts

The interaction of sculpture and architecture dates back to the first ages. In its traditional sense, sculpture is a three-dimensional form designed with artistic concern. Sculpture has an artistic point of view. There is the need for a place to protect people from nature conditions. The relationship that the sculpture establishes with the interior is based on artistic concerns and practices such as understanding, experiencing and re-expressing the space. Sculpture increases its effectiveness on the interior. Sculpture and interior architecture search form as well as traditional definitions with material possibilities.

2.1. Interior

Interior space is the concept that takes place within the architectural building and corresponds to the interior form. The inner form is an enclosed volume. The bottom, top and sides (floor, ceiling and walls) are closed. These interior spaces created in the buildings; walls, floors, ceilings, stairs and reinforcements defines and compartmentalizes the limitations of the three-dimensional empty spaces. The purpose of the limitations of the interior spaces is to provide human comfort. The elements that limit the space are seperated as architectural space and natural space according to their differences. Interior design is a complementary element of architecture. [Figure 1] Usability, durability and beauty form the basis of interior design. Usability refers to the functionality of a product. It defines its suitability for its purpose and its usefulness. Solidity while defining the structural integrity of an object, answers the questions about what material it is made of, its durability, and the ability to carry the items it is designed to carry. Beauty, on the other hand, asks questions about whether the design element has aesthetic value.

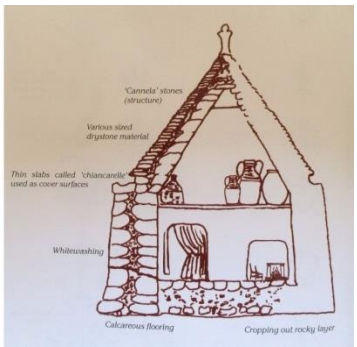


Figure 1. Interior [4]

2.2. Form

Form is a term that is the result of the relations of line, color and other surface elements with each other, allows us to examine objects in three dimensional by defining volume and mass, and deals with shapes with their placement relative to each other. The form of the space is determined by the shape of the plane, its size and its height above the ground. The form is determined by the function and the necessary structure in the interior. The method, in which form is at the forefront and functionality is transformed into form, is designed as a plastic art in interior architecture [Figure 2]. In architecture, the internal structure was first designed as a form and the required functionality was included in the designed form. In the interior structure, which is expected to present a functional use, the priority is the form itself while functionality has been pushed to the secondary plan and the structure has been given a sculptural appearance as much as the form allows, without disturbing the form. Designing the form as a method is the way architects think like sculptors and reflect them on the form artistically. The buildings, on the other hand, appear as functional sculptures at the urban scale. [5]

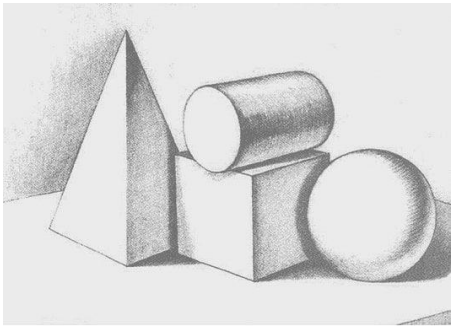


Figure 2. Form [6]

2.3. Art

Art is all of the methods used in the explaination of a feeling, design, beauty, expression, etc. The primary meaning of art is understood as the expression of creativity and imagination. Throughout history, ideas on what to name as art have changed constantly. It is seen that the most common types of art by definition are literature, painting, architecture and sculpture. Architecture in Art is defined as the art of preparing a place and structure in accordance with certain measures and rules so that people can continue their actions such as living, settling, and being protected [Figure 3].

Figure 3. Art and Sculpture [7]

2.4. Sculpture

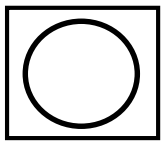
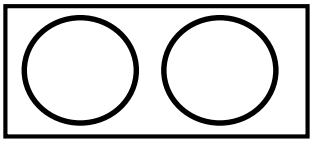
Sculpture is a three-dimensional form created with an artistic point of view, it gives shape to the space and gives functionality for the individual. While the art of sculpture is defined as an element that is added to the interior and increases its value, it can also transform into livable interior spaces. The art of sculpture, which conveys its purpose

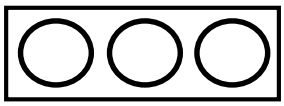
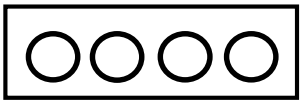
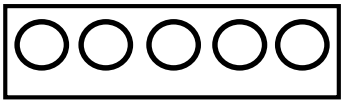
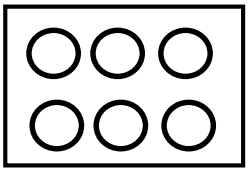
with the plastic expression it creates, reveals the form of the sculpture and the relationship that the form establishes with the interior space. The unity of interior space and sculpture art is important in designs. For architecture, which examines the distinction between sculpture and architecture on a spatial basis: "Today, the most accurate definition of architecture is the one that takes into account the 'interior' (Zevi, 1990)". Designing with space is a common point for both sculpture art and architecture. The interior design seen in sculpture art has increased the boundaries between sculpture and architecture. The sculpture enables it to be designed as a space that meets the interior architectural functionalities and even as a livable house in some examples. The fact that the art of sculpture accomplish the human needs and include interiror spaces that forms a house, such as kitchen, bedroom, bathroom, can be considered as an artistic and plastic solution given by architecture to the task of being a shelter.

Harran Houses

Harran, a district of Şanlıurfa, is one of the settlements of northern Mesopotamia. Almost all of the people of the district are Turkish citizens of Arab origin. These houses, concentrated in the southern part of Harran district, were built on the ruins of the old city approximately 150-200 years ago. The region was declared as an Archaeological and Urban Site Area in 1979, and almost thousand houses taken under protection. Harran houses are domed houses within the surrounding walls, built with adjacent overlapping method and with dense bricks. The houses are next to each other because the neighbors are relatives. The rooms of the houses are interconnected from the inside. The domes are 4m to 5m high. There are ventilation holes on the very top of the domes to remove the hot air. Harran houses are brick structures built on a square or near-square infrastructure, built in with an overlapping technique, narrowing as they go up and resulting in a conical cone. This makes the effects of sculpture art felt in Harran houses. The transition to this top cover, which is domed from the inside, was provided with simple squinches and pendants. These domes, whose height do not exceed 5m, were built with the 30-40 adobe block series. The walling pattern of the adobe bricks of the Harran houses is walled up as the mother-lamb pattern. Its size is known as 30-35. Harran houses were connected to each other with arches from the inside and large spaces were obtained with this method. Domed houses contain groups of two, three, four, five and six domes. (Table 1). Another feature of these domes is that they are left open from the top. This opening not only allows the smoke inside to come out, but also illuminates the interior space. The walls and upper covers of the Harran houses were plastered with slime mortar. The same system was applied in the interior as well. Harran houses are cool in summer and warm in winter. Today, none of the Harran houses are used for housing. It is mostly used as places such as barns and cellars. The interior features of Harran houses can bring adjectives such as majestic, magnificent, solid, simple, orderly in the image perception, as well as attributes such as rhythm, continuity, finalization, fusion, central orientation or upward tendency in sculpture. [8]

Table 1. Examples of Dome formation of Harran Dome Houses

	Plan	**Photograph**
1		
2		

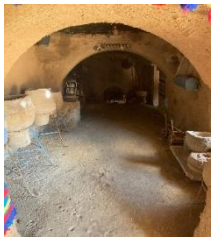
3		
4		
5		
6		

The Sculpture Artistic Value of the Interior of Harran Houses

Harran houses have striking features in terms of sculpture and interior architecture. When we evaluate it with the art of sculpture, these buildings which have the same formal features, were built in a cone shape. The bearing structure forms the plan of the building, with a square-based form. In terms of these features, Harran houses are seen as a kind of sculpture (conical). The dome brings the form to a functional position and forms the roof of the interior place. Sculptural value emerges with the form, material, color and geometric properties of the structure which are loaded with the construction of the building or acquired during the use of the building. Both the art of sculpture and interior applications are a means of conveying material, visual and textural qualities. The dome is shaped material. It has features that keep alive the sculpture perception. The shape of the sculptural geometry in the dome shows the semantic equivalent of the shape/form. It is seen that the transfer of vertical loads such as walls is at the forefront in the construction system of Harran houses. Curvilinear componants such as arches, domes, vaults together with vertical planar componants completes the form to pass through span lenghts and to close spacial gaps. [8] This gives a sculptural appearance in Harran houses. In other words, the construction of the dome takes place with the fragmented order of the elements in Harran architecture. Each conical dome forms an interior space. The number of rooms increases according to the needs and possibilities of the household. The space need due to the increase in family population and family ties is supplied by adding a dome. While conical domes create interior spaces, the aspects of the assemblage that are being tools to understand the family and kinship ties and traditions shows it in the building's shell. The form is described as the sculptural form that shows the contents of the dome. When the dome is perceived, it is accepted that it represents an assamblage and its content has a form. The dome shape of Harran houses is perceived by all senses. The building's volume through the conical dome describes the place it occupies in the Harran archaeological site. The shape of the conical dome houses, while creating the sculpture, expresses the sculpture in balance and abstraction. Interior spaces have occupancy/space ratios and features such as rhythm, harmony and symmetry. The repetition of the vacancy gives rhythm to the mass and indirectly to the form. The rhythm is reflected in the plastic effect from the interior. The repetition of dimensional assemblage at human scale and the modular form provided by the domes give a sculptural appearance. In square-shaped formations where the dome mounted, there are load-bearing walls of different sizes from each dome. The occupancy rate of the surfaces is as significant as the voids in the resulting mass. The voids are used as

door and window on the structural wall and as ventilation hole function at the top of the dome. In dome houses, the material creates a plain and simple appearance.

Table 2. The Form and Sculptural Artistic Value of the Interior in Harran Houses

SCULPTURAL ARTISTIC VALUE OF INTERIOR SPACES in HARRAN HOUSES		
SHAPE/FORM	INTERIOR UNITS	SCULPTURAL ARTISTIC VALUE
	 Entrance	The continuous wall defines the inner and outer boundaries of the building.
	 Passage between units	The reflection of the modules in the interior space to the exterior with the art of sculpture..
	 Main room	The material integrates with the building in Harran houses. Form is seen as the basic element.
	 Kitchen	Sculptural art view created by the rhythm and continuity with the repetition of domes
		The repetition of dimensional assamblage at a human scale and the sculptural appearance provided by the domes.

	 Dressing room	
	 Passage between units	The sculptural approach of the shape and height of the dome in the transition between the interior units.
	 Bedroom	The continuity of the form in the interior. Sculptural view.
	 Living area	The sculptural approach of the conical dome in the depth that the volume creates in the living area.
	 Inner dome	The dome is the sculptural form that represents solidity by the downward expansion of its massive body.

Table 2. The Form and Sculptural Artistic Value of the Interior in Harran Houses [8]

Conclusion

As a result, functional interior spaces in Harran houses started to form with a structure similar to sculpture art. Harran houses show the feature of being in the art of sculpture with their architecture and sculpture feature. The spaces that people create with their own hand skills, the forms reflected from the interior to the outside, as in the art of sculpture, are perceived as sculptures. The co-occurrence of sculpture and interior space has led to the emergence of iconic structures. Sculpture and interior design have different priorities. Despite their different

priorities, the art of sculpture and interior architecture constitute two disciplines that use three-dimensional space and occupy space and have many common denominators. The integration/merging of interdisciplinary borders, the structures emphasizing the art of sculpture that incorporates the interior space into the artistic work, and the distinction between sculpture tend to disappear. Artistic dome houses provided the meeting of sculpture and interior architecture. It is seen that Harran dome houses create a sculptural artistic value together with the building and interior spaces.

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